Economic Issues: Global and Local Perspectives

Editors
Selcuk Koc
Sema Yilmaz Genc
Vahit Ferhan Benli

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The decade since the global financial crisis of 2008–09 has indeed brought dramatic economic and political developments. Advanced economies’ growth has generally trended downward since the mid-2000s while emerging market and developing economies have continued to grow more quickly than during the 1980s and 1990s. Increasing economic interaction, allied to the changes in the world, has created a need for more sophisticated perception of the economics, social, and political environments. Economic Issues: Global and Local Perspectives, therefore, combined with interdisciplinary contributions on developments in social sciences areas, makes a valuable input into growth of new ideas. The book also provides a qualitative analysis of the new changes that are underway and helps illustrate some of the big changes that are already happening by including valuable chapters.

The authors of the chapters in this book have contributed to the success of the work by the inclusion of their respective studies. Each chapter presents a different perspective, which investigates the process of shifting global economy in the context of new developments. They also analyze development pathways beyond economic terms, exploring well-being across the developing world. The chapters focus on prices, economic growth, optimal currency area, shipping market, unemployment, telecommunication, mobile games, environment, education, trade risks, tourism, credit rating agencies, quantum and neoclassical economics, money and capital markets.

The development experience is different today, as countries are confronted with challenges like never before. We are entering a new era, in which a series of innovations that leverage the internet could have a major impact on economic growth. Blockchain, the Internet of things, 3D printing, artificial intelligence, and have the potential to profoundly transform to our world. The new development context has new rules, new environmental constraints, new technologies and more competition. Therefore, development strategies and policies need to adapt to these changes, and reflect a country’s context, endowments and institutions.

Editors
Selçuk KOÇ
Sema Yılmaz GENÇ
Vahit Ferhat Benli
AN EMPIRICAL ANALYSIS OF THE LONG-RUN RELATIONSHIP AMONG REGIONAL HOUSE PRICES IN TURKEY*

Abdurrahman Nazif ÇATIK**
Utku AKSEKI***
Barış ALPASLAN****

Introduction
Understanding the reasons behind the regional house price fluctuations has of vital importance in the formulation of efficient housing market policies. House price changes may have redistributive impact on the wealth and income since housing expenditures constitute a considerable portion of households’ budget. This may eventually lead to remarkable differences in the growth rate of the regions to be considered in the implementation of regional policies. House price fluctuations may also cause labor mobility across the regions by affecting affordability of housing and relocation costs (Alexander and Barrow, 1994).

As argued by Meen (1999) regional house price shocks may ripple out to the economy, i.e. changing of house prices in a region triggers changing of house prices in the other regions. Although ripple effect is also affected by the specifics of the regions, migration, industrialization levels of the regions etc., the presence of the long-run relationship between the prices has been acknowledged as a necessary condition for the ripple effect. The long-run relationship of the house prices is mainly investigated by using convergence analysis, based on unit root and cointegration tests.

Similar to the studies investigating the long-run relationship between prices in the other markets, the evidence on the convergence of regional house prices has produced mixed results. First studies are mainly focused on the UK housing market. MacDonald and Taylor (1993) analyze regional house price movements both in the short-run and long-run for the eleven regions of the UK. The results from Engle and Granger (1987) and Johansen (1991) cointegration tests implies numerous long-run relationships and also indicate that the South of England is the most important region affecting price movements. Using bivariate cointegration

*Authors would like to thank Real Estate Information Services Company (REIDIN) for making available the data for the study.
**Assoc. Prof., Ege University, FEAS, Dept. of Economics, a.nazif.catik@ege.edu.tr, Author’s ORCID: https://orcid.org/0000-0001-9247-5668
***Assist. Prof., Ege University, FEAS, Dept. of Economics, utku.akseki@ege.edu.tr, Author’s ORCID: https://orcid.org/0000-0002-8426-1296
****PhD, Res. Assist., Ege University, FEAS, Dept. of Economics, baris.alpaslan@ege.edu.tr, Author’s ORCID: https://orcid.org/0000-0002-0756-7021
tests, Alexander and Barrow (1994) find six cointegrating relationships among the nine regions of the UK. Multivariate cointegration tests show the existence of two cointegrated vectors in the South of England and four cointegrated vectors in the North and the Midlands.

After the MacDonald and Taylor (1993) and Alexander and Barrow (1994) numerous studies covering different countries and time span have been conducted to analyze the long-run relationship among regional house prices. While some authors (Holmes and Grimes, 2008; Payne, 2012) find results proofing the presence of house price convergence, the others (Drake, 1995; Meen, 1999) don’t reach results supporting convergence of house prices. However, there are limited studies (Chen et. al., 2011; Hooi and Smyth, 2013; Zhang and Morley, 2014) on developing countries in the literature. These studies suggest mixed results like studies regarding developed countries.¹

Some authors argue that the linear estimation methodologies are not sufficient in the analysis of convergence since they do not consider the effects of possible structural breaks on the estimated parameters. (Recently some studies employ nonlinear unit root tests to overcome this shortcoming. Chien (2010) utilizes both conventional unit root tests and two break minimum LM unit root test developed by Lee and Strazicich (2003) to analyze ripple effects in Taiwan.) The findings of conventional tests suggest that there is no convergent behavior among cities’ house prices. On the other hand, the findings of LM test show the presence of the convergence for the cities except Taipei City. Unlike linear unit root tests, Kapetanios (2005) unit root test support the presence of unit root for some of the regions. Balcilar et al. (2013) test the ripple effect in terms of house size for the five metropolitan regions in South Africa for the period of 1966-2010 based on the application of nonlinear unit root tests. For South Africa, the results strongly suggest that there is convergent behavior among house prices in the study.

The paper has been considered to make contribution to the housing literature in two respects. To the best of our knowledge, firstly, seven big cities of Turkey has not been analyzed based on house price convergence. Secondly, structural breaks have not been taken into account while calculating house price convergence in Turkey. In this regard, unit root tests with structural breaks have been used to measure the effects of the mortgage system.

The paper is organized as follows. Second section describes the recent developments in the Turkish housing market. The data used in the analysis is discussed in section three. Section four describes the methodology of the paper. The last section includes conclusions on the basis of empirical findings.

**Turkish Housing Market**

The growth of the Turkish housing sector has accelerated after the 2001 financial crisis in Turkey. Macroeconomic instabilities experienced over the 1990s can be

¹See Zohrabyan et al. (2007) for a detailed literature survey on the house price convergence.
considered as an important obstacle against the development of healthy housing market (Sarioglu, 2014). During that period the growth rate of GDP followed a volatile pattern and average growth rate was realized as 3.97 percent. Higher and chronic inflationary environment were another important characteristic of 1990s. The inflation rates fluctuated widely over the period and reached its highest level 106.26 percent in 1994 with the impact of financial crisis (see Table 1). The monetization of the huge government budget deficits by the CBRT (Central Bank of The Republic of Turkey) through the short-term advances to the Treasury were seen as one of the main reason behind the inflationary process (Kandil et al., 2007). Higher inflation rates experienced in this period also contributed to higher nominal interest rates leading to rise in the cost of borrowing. The rise in the cost of borrowing was resulted in a decline in the amount of overall investments including the housing market.

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP growth (annual %)</th>
<th>Inflation consumer prices (annual %)</th>
<th>Deposit interest rate (annual %)</th>
<th>Depreciation of TL against USD (%)</th>
<th>Current Account Balance (% of GDP)</th>
<th>Budget Account Balance (% of GDP)</th>
<th>Domestic credit provided by financial sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>9.27</td>
<td>60.31</td>
<td>47.48</td>
<td>22.89</td>
<td>-1.31</td>
<td>-2.51</td>
<td>19.47</td>
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<tr>
<td>1991</td>
<td>0.72</td>
<td>65.97</td>
<td>62.68</td>
<td>60.20</td>
<td>0.14</td>
<td>-3.96</td>
<td>22.48</td>
</tr>
<tr>
<td>1992</td>
<td>5.04</td>
<td>70.07</td>
<td>68.74</td>
<td>64.65</td>
<td>-0.46</td>
<td>-3.23</td>
<td>24.87</td>
</tr>
<tr>
<td>1993</td>
<td>7.65</td>
<td>66.10</td>
<td>64.57</td>
<td>60.53</td>
<td>-2.63</td>
<td>-5.02</td>
<td>26.38</td>
</tr>
<tr>
<td>1994</td>
<td>-4.67</td>
<td>106.26</td>
<td>87.79</td>
<td>169.93</td>
<td>1.75</td>
<td>-2.93</td>
<td>25.56</td>
</tr>
<tr>
<td>1995</td>
<td>7.88</td>
<td>88.11</td>
<td>75.97</td>
<td>53.95</td>
<td>-0.98</td>
<td>-3.03</td>
<td>27.78</td>
</tr>
<tr>
<td>1996</td>
<td>7.38</td>
<td>80.35</td>
<td>80.75</td>
<td>78.00</td>
<td>-1.00</td>
<td>-6.24</td>
<td>34.12</td>
</tr>
<tr>
<td>1997</td>
<td>7.58</td>
<td>85.73</td>
<td>79.49</td>
<td>86.81</td>
<td>-1.04</td>
<td>-5.78</td>
<td>34.57</td>
</tr>
<tr>
<td>1998</td>
<td>2.31</td>
<td>84.64</td>
<td>80.11</td>
<td>71.61</td>
<td>0.73</td>
<td>-5.27</td>
<td>27.46</td>
</tr>
<tr>
<td>1999</td>
<td>-3.37</td>
<td>64.87</td>
<td>78.43</td>
<td>60.98</td>
<td>-0.40</td>
<td>-8.65</td>
<td>36.76</td>
</tr>
<tr>
<td>2000</td>
<td>6.77</td>
<td>54.92</td>
<td>47.16</td>
<td>48.46</td>
<td>-3.72</td>
<td>-7.71</td>
<td>37.91</td>
</tr>
<tr>
<td>2001</td>
<td>-5.70</td>
<td>54.40</td>
<td>74.70</td>
<td>96.47</td>
<td>1.97</td>
<td>-11.89</td>
<td>52.92</td>
</tr>
<tr>
<td>2002</td>
<td>6.16</td>
<td>44.96</td>
<td>50.49</td>
<td>22.88</td>
<td>-0.27</td>
<td>-11.15</td>
<td>47.47</td>
</tr>
<tr>
<td>2003</td>
<td>5.27</td>
<td>25.30</td>
<td>37.68</td>
<td>-0.85</td>
<td>-2.47</td>
<td>-8.75</td>
<td>42.77</td>
</tr>
<tr>
<td>2005</td>
<td>8.40</td>
<td>10.14</td>
<td>20.40</td>
<td>-5.73</td>
<td>-4.42</td>
<td>-1.50</td>
<td>45.63</td>
</tr>
<tr>
<td>2006</td>
<td>6.89</td>
<td>9.60</td>
<td>21.65</td>
<td>6.74</td>
<td>-6.01</td>
<td>-0.61</td>
<td>45.77</td>
</tr>
<tr>
<td>2007</td>
<td>4.67</td>
<td>8.76</td>
<td>22.56</td>
<td>-9.06</td>
<td>-5.76</td>
<td>-1.63</td>
<td>49.26</td>
</tr>
<tr>
<td>2008</td>
<td>0.66</td>
<td>10.44</td>
<td>22.91</td>
<td>-0.66</td>
<td>-5.38</td>
<td>-1.83</td>
<td>54.63</td>
</tr>
<tr>
<td>2009</td>
<td>-4.83</td>
<td>6.25</td>
<td>17.65</td>
<td>19.66</td>
<td>-1.89</td>
<td>-5.54</td>
<td>64.70</td>
</tr>
<tr>
<td>2010</td>
<td>9.16</td>
<td>8.57</td>
<td>15.27</td>
<td>-3.02</td>
<td>-6.09</td>
<td>-3.65</td>
<td>71.84</td>
</tr>
<tr>
<td>2011</td>
<td>8.77</td>
<td>6.47</td>
<td>14.22</td>
<td>11.31</td>
<td>-9.64</td>
<td>-1.37</td>
<td>71.62</td>
</tr>
<tr>
<td>2012</td>
<td>2.13</td>
<td>8.89</td>
<td>16.35</td>
<td>7.34</td>
<td>-6.15</td>
<td>-2.03</td>
<td>74.39</td>
</tr>
<tr>
<td>2013</td>
<td>4.19</td>
<td>7.49</td>
<td>15.76</td>
<td>5.79</td>
<td>-7.92</td>
<td>-1.18</td>
<td>84.18</td>
</tr>
<tr>
<td>2014</td>
<td>2.91</td>
<td>8.86</td>
<td>16.77</td>
<td>15.03</td>
<td>-5.83</td>
<td>-1.30</td>
<td>88.13</td>
</tr>
</tbody>
</table>
Source: Central Bank of Republic of Turkey, World Development Indicators

In 2001, Turkish economy has experienced one of the worst financial crises of its history in consequence of the failure of exchange rate based on stabilization program supported by IMF. Even though the government has been successful in the achievement of fiscal discipline, the failure in the implementation of structural reforms and increase in the trade deficits as a result of the appreciation of the domestic currency cast doubt on the sustainability of the program. In November 2000, the financial system has been collapsed due to sudden capital outflow. The CBRT has lost more than half of its foreign currency reserves to prevent further depreciation of the Turkish Lira. As a result, the disinflation program was abandoned in February 2001. As it seen from Table 1, depreciation of the Turkish Lira against the US dollar has reached to 96.47 by the year of 2001, interest rate is increased from 47.158 to 74.699 compared to the previous year and the overall economic activity is contracted by 5.697 percent.

Macroeconomic stability achieved after the 2001 crisis has provided a suitable macroeconomic environment in improving credit market domestically in Turkey. The IMF-led stabilization program named as “Transition to the Strong Economy” including the implementation of financial sector reforms, the tight fiscal and monetary policies have been successful to keep inflation under control and achieve stable and higher growth rates compared to previous periods. GDP, in real terms, between the years 2002 and 2014 rose on average 4.904 annually. Inflation rate which hits one of its highest values with 54.90 percent in the 2001 crisis has declined significantly to 8.86 percent by the end of 2014. Disinflation contributes the further decline in interest rates from 50.49 in 2002 to 16.77 in 2014. This leads to an expansion in the amount of available funds in the financial system. The ratio of domestic credit provided to private sector increased more than four times from 19.47 percent in 1990 to 88.13 percent in 2014 (see Table 1).

Decline in interest rates has affected the composition of the loans. Table 2 presents the distribution of the loans according to their types. In 2002 corporate loans constituted nearly all of the domestic loans in the banking system. The share of individual loans was 0.44 percent, i.e. even below the one percent, but reached to 29.21 percent by the year of 2005. The increase in the share of housing loans from 0.10 in 2002 to 9.42 percent in 2015 is very noteworthy. Figure 1 illustrates the composition of individual loans between 2002 and 2015. Share of housing loans in total consumer credits is 23.79 percent in 2002. However, it remarkably rose to 34.42 in 2015.
Table 2: The Distribution of Loans in Turkey

<table>
<thead>
<tr>
<th></th>
<th>Corporate</th>
<th>Individual</th>
<th>Credit Cards</th>
<th>Housing</th>
<th>Automobile</th>
<th>Other Consumer Credits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>Million TL</td>
<td>60843</td>
<td>269</td>
<td>0</td>
<td>64</td>
<td>46</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>Share (%)</td>
<td>99.56</td>
<td>0.44</td>
<td>0</td>
<td>0.1</td>
<td>0.08</td>
<td>0.26</td>
</tr>
<tr>
<td>2005</td>
<td>Million TL</td>
<td>114016</td>
<td>47057</td>
<td>18384</td>
<td>12423</td>
<td>6230</td>
<td>10021</td>
</tr>
<tr>
<td></td>
<td>Share (%)</td>
<td>70.79</td>
<td>29.21</td>
<td>11.41</td>
<td>7.71</td>
<td>3.87</td>
<td>6.22</td>
</tr>
<tr>
<td>2010</td>
<td>Million TL</td>
<td>381803</td>
<td>181780</td>
<td>49098</td>
<td>61660</td>
<td>6027</td>
<td>64995</td>
</tr>
<tr>
<td></td>
<td>Share (%)</td>
<td>67.75</td>
<td>32.25</td>
<td>8.71</td>
<td>10.94</td>
<td>1.07</td>
<td>11.53</td>
</tr>
<tr>
<td>2015</td>
<td>Million TL</td>
<td>1112621</td>
<td>419030</td>
<td>10258</td>
<td>144221</td>
<td>6679</td>
<td>165541</td>
</tr>
<tr>
<td></td>
<td>Share (%)</td>
<td>72.64</td>
<td>27.36</td>
<td>6.7</td>
<td>9.42</td>
<td>0.44</td>
<td>10.81</td>
</tr>
</tbody>
</table>


Figure 1: The distribution of consumer loans
The improvements in the macroeconomic environment also have led to the expansion in the maturity of the loans. Table 3 classifies the individual loans with respect to their maturity. In 1997 more than half of the consumer loans, around 57 percent, had a maturity between 3-12 months and no credit is granted with maturity of more than three years. In 2005, around 14 percent of the total consumer loans (5,550 million TL) had a maturity of more than six years. This figure increased to 42,066 million TL in 2013 due to the successful implementation of the mortgage system introduced in 2007. All of the developments summarized above give rise to surge in the demand for housing in Turkey. The number of housing permits is increased from 161,491 in 2002 to 724,331 in 2015. This increase triggers to rise the regional house prices. Based on the data taken by REIDIN (Real Estate Market Information Service in Turkey), house prices of seven cities (Kocaeli, İzmir, İstanbul, Bursa, Antalya, Ankara, Adana) have increased more than two times during the period from 2003 to 2015 averagely. Especially during the period from 2007 to 2015, it is observed that house prices increased by about 164 percent. In this context, mortgage law enacted in 2007 gave rise to significant rise in house prices of metropolitan cities. Highest price increases among these cities have been observed in İstanbul by about 194 percent, while Bursa is the city with the lowest house price increase with 117 percent (see Figure 2).

### Table 3. The Classification of Consumer Loans According to Maturity

<table>
<thead>
<tr>
<th>Loans Granted, Million TL</th>
<th>3-12</th>
<th>13-18</th>
<th>19-24</th>
<th>25-36</th>
<th>37-48</th>
<th>49-72</th>
<th>73+</th>
<th>Not</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>344</td>
<td>161</td>
<td>50</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>37</td>
<td>600</td>
</tr>
<tr>
<td>1998</td>
<td>627</td>
<td>227</td>
<td>61</td>
<td>16</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>244</td>
<td>1,180</td>
</tr>
<tr>
<td>1999</td>
<td>697</td>
<td>173</td>
<td>71</td>
<td>15</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>289</td>
<td>1,249</td>
</tr>
<tr>
<td>2000</td>
<td>1,641</td>
<td>903</td>
<td>1,138</td>
<td>927</td>
<td>425</td>
<td>0</td>
<td>0</td>
<td>653</td>
<td>5,687</td>
</tr>
<tr>
<td>2001</td>
<td>573</td>
<td>182</td>
<td>81</td>
<td>46</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>246</td>
<td>1,147</td>
</tr>
<tr>
<td>2002</td>
<td>1,348</td>
<td>556</td>
<td>577</td>
<td>158</td>
<td>66</td>
<td>0</td>
<td>0</td>
<td>611</td>
<td>3,317</td>
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<tr>
<td>2003</td>
<td>2,784</td>
<td>1,838</td>
<td>2,519</td>
<td>1,693</td>
<td>536</td>
<td>0</td>
<td>0</td>
<td>1,112</td>
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<tr>
<td>2004</td>
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<td>2,327</td>
<td>5,308</td>
<td>4,424</td>
<td>1,961</td>
<td>0</td>
<td>0</td>
<td>3,497</td>
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<tr>
<td>2005</td>
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<td>1,583</td>
<td>5,300</td>
<td>4,226</td>
<td>3,663</td>
<td>3,532</td>
<td>5,550</td>
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<td>39,384</td>
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<td>2006</td>
<td>3,002</td>
<td>1,506</td>
<td>5,432</td>
<td>5,570</td>
<td>3,452</td>
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<td>8,115</td>
<td>9,155</td>
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<td>49,853</td>
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<tr>
<td>2008</td>
<td>5,941</td>
<td>2,752</td>
<td>8,430</td>
<td>11,315</td>
<td>3,878</td>
<td>7,676</td>
<td>9,529</td>
<td>5,725</td>
<td>55,246</td>
</tr>
<tr>
<td>2009</td>
<td>7,122</td>
<td>3,203</td>
<td>10,975</td>
<td>15,448</td>
<td>7,360</td>
<td>10,395</td>
<td>11,353</td>
<td>273</td>
<td>66,129</td>
</tr>
<tr>
<td>2010</td>
<td>6,717</td>
<td>3,423</td>
<td>12,602</td>
<td>22,484</td>
<td>15,643</td>
<td>19,885</td>
<td>22,249</td>
<td>16</td>
<td>103,019</td>
</tr>
<tr>
<td>2011</td>
<td>6,631</td>
<td>3,558</td>
<td>12,858</td>
<td>22,077</td>
<td>13,883</td>
<td>30,910</td>
<td>22,879</td>
<td>32</td>
<td>112,827</td>
</tr>
<tr>
<td>2012</td>
<td>7,584</td>
<td>3,722</td>
<td>14,454</td>
<td>22,495</td>
<td>15,190</td>
<td>28,344</td>
<td>19,833</td>
<td>56</td>
<td>111,678</td>
</tr>
<tr>
<td>2013</td>
<td>8,519</td>
<td>4,276</td>
<td>18,025</td>
<td>30,939</td>
<td>21,642</td>
<td>56,234</td>
<td>42,066</td>
<td>59</td>
<td>181,759</td>
</tr>
<tr>
<td>2014</td>
<td>9,804</td>
<td>4,424</td>
<td>15,497</td>
<td>67,734</td>
<td>7,190</td>
<td>17,462</td>
<td>29,043</td>
<td>53</td>
<td>151,206</td>
</tr>
</tbody>
</table>

**Source:** The Banks Association of Turkey, BAT, www.tbb.org.tr.
Data
In this paper, we used the data taken by REIDIN. The data includes house price indexes of the seven big cities of Turkey between the period 2003:1 and 2015:6. These cities are Kocaeli, Izmir, İstanbul, Bursa, Antalya, Ankara, and, Adana which have available data for this period and also which represents almost 42 percent of total population in Turkey. Also, share of those cities in total housesale is 51.3 percent.
Following Balcılar et al. (2013), Holmes and Grimes (2007), Meen (1999), Bilgin et al. (2010) and we calculated relative regional house prices. Equation 1 represents relative regional house prices.

\[ r_{pri}^t = \ln\left(\frac{p^t_i}{\bar{p}_t}\right). \]  

\( r_{pri}^t \) is an individual relative house price, \( p^t_i \) is house price index of the cities, \( \bar{p}_t \) is aggregate house price index.

As can be seen above, \( r_{pri}^t \) is an individual relative house price, \( p^t_i \) is house price index of the cities, \( \bar{p}_t \) is aggregate house price index. \( \bar{p}_t \) is derived from house prices of the big metropolitans based on share of total population.

Figure 2 shows relative house prices for the period 2003-2015 in Turkey. It can be seen that there are conspicuous house price movements in the Figure 2. There is no clear difference among house price movements of the cities until the year of 2007. However, after the year of 2007, divergent behavior of house prices of the cities could be observed. The occurrence of diversification may be caused by the enactment of the mortgage law on that time.
Methodology
This section briefly summarizes the methodology for the analysis of the house price convergence. As outlined in the literature review, the studies are mainly focused on the integration levels of the prices series based on the application of unit root tests, whereas some studies also take into account the existence of long-run relationship with cointegration tests.

To investigate the presence of price convergence, firstly, ADF and PP unit root tests (Phillips and Perron, 1988; Dickey and Fuller, 1981) are utilized. The investigation period covers the important reforms in the housing market. Because of this, it is important to investigate sub-periods, employing unit root tests developed by Lee and Strazicich (2003, 2004). Also, the tests are also applied to quantify the effects of those changes on the stationary levels of the prices. Unlike conventional unit root tests, those tests assume that there are breaks in the hypotheses. If the null hypothesis is rejected, it obviously implies trend stationary.

After making the unit root tests, we also employ Johansen multivariate cointegration test (Johansen, 1991; Johansen and Juselius, 1990) to analyze the presence of long-run relationship among dwelling prices of aforesaid metropolitans. For this purpose, the following unrestricted VAR model is considered.

\[ X_t = A_0 + \sum_{i=1}^{p} A_i X_{t-i} + \varepsilon_t, \]  

(2)

In Equation 2, \( X_t \) is the k-dimension vector of endogenous variables containing the relative house price series \( rpr_i^t \). \( A_0 \) and \( A_i \) are the parameters of constant and endogenous variables lagged by \( p \) period. With the variance covariance matrix of
The vector of innovations. If there are co-integrated variables found after the analysis, according to Granger (1983) representation theorem, it is possible to rewritten the VAR model above in the VEC form as follows:

\[ \Delta X_t = \gamma + \Pi X_{t-1} + \sum_{i=1}^{p} \Gamma_i \Delta X_{t-i} + \varepsilon_t, \]

where,

\[ \Pi = -I + \sum_{i=1}^{p} A_i \quad \text{and} \quad \Gamma_i = -\sum_{i=1}^{p} A_i. \]

The analysis of cointegration is determined by the matrix \( \Pi = \alpha \beta' \). \( \alpha \) represents the impact matrix with the vector of adjustment coefficients, \( \beta \) represents the vector of cointegration relations. The dimension of \( \alpha \) and \( \beta \) is \( r \times r \). If \( \Pi = \alpha \beta' \) matrix has a rank of \( r \), there are \( r \) cointegrating relationship with stationary I(0) series. If \( \Pi = \alpha \beta' \) matrix has a rank of zero, then there is no relationship between the variables in the long-run. Johansen developed two tests, maximum eigenvalue and trace tests, within the scope of the VECM, maximum likelihood estimation. Maximum eigenvalue test analyzes the existence of \( r \) cointegrating vectors against the alternative of \( (r + 1) \) based on the following equation:

\[ \lambda_{max} = -T \ln(1 - \hat{\lambda}_{r+1}) \]

In (4), \( \hat{\lambda}_{r+1} \) represents eigenvalue equivalent to \( r \) cointegrating vectors, \( T \) represents number of observations in total. If the value of \( \lambda_{max} \) is greater than the critical value, the null hypothesis of \( r \) cointegrating vectors will be rejected.

The trace statistics examines \( r \) cointegrating vectors’ null hypothesis against \( k \) cointegrating vectors’ alternative hypothesis. The trace statistics is computed as:

\[ \lambda_{trace} = -T \sum_{i=r+1}^{k} \ln(1 - \hat{\lambda}_i) \]

If the computed \( \lambda_{trace} \) statistic is found to be greater than the critical value, the null hypothesis will be rejected. After the application of Johansen test, following Hansen and Johansen (1998) we also check for the stability of the cointegration relationship based on the recursive estimation of the model. To this aim, starting from the initial sample \( X_{-k+1}, ..., X_{T_0} \), the eigenvalues are computed recursively \( X_{-k+1}, ..., X_T \) for \( t = T_0 + 1, ..., T \) and then the diagnostic tests are computed based on two different methods: In the first method, known as X-form, the parameters of the model are re-estimated in each step. The second method, named as R1-form, is based on the recursive estimation of only the long-run parameters \( \alpha \) and \( \beta \) using the full sample estimates of the parameters (Dennis et al., 2005).

---

2 The Cointegration test are obtained using CATS in RATS, version 2.
Empirical Results
Following the previous studies, firstly, we employed ADF (Augmented Dickey Fuller) and PP (Phillips and Perron) unit root tests to analyze the presence of the convergence between house prices. Firstly, for the levels of the prices, the null hypothesis is not rejected; on the other hand, they become stationary after taking the first difference. Hence, the findings of the linear unit root tests do not support the house price convergence among the regions of Turkey.\textsuperscript{3}

Table 4. Unit Root Test with One Structural Break (Lee and Strazicich)

<table>
<thead>
<tr>
<th>Model A (Crash Model)</th>
<th>Model C (Trend Shift Model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-Stat</td>
<td>LM-Stat</td>
</tr>
<tr>
<td>Lag</td>
<td>Lag</td>
</tr>
<tr>
<td>Breaking Time</td>
<td>Breaking Time</td>
</tr>
<tr>
<td>(D_{1t})</td>
<td>(D_{1t})</td>
</tr>
<tr>
<td>(DT_{1t})</td>
<td>(DT_{1t})</td>
</tr>
</tbody>
</table>

| \(Inad\)  | -2.032 | 12       | 2008:10  | -2.558 | 12       | 2008:10  | 2008:10 (ns) |
|\(A\text{lnad}\) | -4.735*** | 8       | 2010:07  | -5.664*** | 8       | 2007:07  | 2007:07 |
|\(Inank\) | -2.123 | 11      | 2008:08 (ns) | -3.817 | 9       | 2012:07  | 2012:07 |
|\(A\text{lnank}\) | -3.647** | 10   | 2007:10 (ns) | -7.057*** | 1       | 2007:11  | 2007:11 |
|\(Inant\) | -2.397 | 8       | 2009:09 (ns) | -4.016 | 8       | 2010:08  | 2010:08 |
|\(A\text{lnant}\) | -3.503* | 7    | 2008:06 (ns) | -4.984** | 6       | 2008:11  | 2008:11 |
|\(Inbur\) | -1.606 | 12      | 2012:05  | -3.439 | 0       | 2010:11  | 2010:11 |
|\(A\text{lnbur}\) | -7.863*** | 0   | 2014:07 (ns) | -8.814*** | 0       | 2010:10  | 2010:10 |
|\(Inist\) | -1.863 | 8       | 2009:09 (ns) | -3.258 | 1       | 2008:12  | 2008:12 |
|\(A\text{lnist}\) | -3.283* | 3    | 2010:03  | -5.188*** | 5       | 2008:12  | 2008:12 |
|\(Inizm\) | -2.107 | 11      | 2008:01 (ns) | -1.705 | 0       | 2008:11  | 2008:11 (ns) |
|\(A\text{lnizm}\) | -3.599** | 10   | 2008:11  | -4.346* | 10      | 2009:08  | 2009:08 |
|\(Inkoc\) | -1.789 | 7       | 2011:04 (ns) | -2.820 | 7       | 2010:07  | 2010:07 |
|\(A\text{nkoc}\) | -4.051** | 8     | 2010:05  | -5.555*** | 8       | 2007:11  | 2007:11 |

Note: *, ** and *** shows significant at 10, 5 and 1\% respectively. Maximum number of lag of augmented part is set to 12. General to specific strategy is followed to find optimum lag size of the augmented part. Critical values of Lee and Strazicich (2003) are used in the study. (ns) represents insignificant breakpoints and the other breakpoints are found to be significant at 10\% level.

\textsuperscript{3}The results of those tests are represented but available upon request from the corresponding author.
Conventional unit root tests are not adequate techniques to detect structural breaks. However, unit root tests developed by Lee Strazicich (2003, 2004) has power to determine the presence of structural breaks. While Table 4 reports the findings of unit root test with one break, Table 5 shows the results of unit root test with two breaks. The evidences corroborate the results from the linear unit root test, i.e. no evidence for convergence is obtained since all house price series are I(1). Findings of unit root tests with structural break suggest that there are structural breaks for the cities in the analysis. Findings of the test indicate that there is one structural break in the intercept for 2008:09 for Adana. Also, we find evidences in favor of the presence of structural breaks in Ankara too (in the intercept 2007:05, in the trend 2007:11). While the findings for Antalya, Istanbul, Izmir and Kocaeli support the existence of two structural breaks in the both trend and intercept, there is only one structural break found for Bursa. 2009:03 and 2013:07 for Antalya, 2008:05 and 2008:12 for Istanbul, 2008:03 and 2009:11 for Izmir, 2008:05 and 2011:11 for Kocaeli represent timing of structural breaks.

Because the same order of integration has been found after making unit root tests, we employ Johansen multivariate cointegration analysis to investigate relationship among the house prices in the long run. The results of the multivariate cointegration test covering the whole investigation period is reported on Table 6. Findings of cointegration tests suggest that there is only one cointegrating relationship among the seven regions at the %5 level. After the whole period estimation, based on Beta constancy and eigen value fluctuation tests based on the recursive estimation of the cointegration model, we also check for the stability in the long run. The results illustrated in Figure 3 imply that there are some observable parameter instabilities starting from the midst of the year 2007. This indicates that the introduction of the mortgage system on that time may also lead to a structural break.

### Table 5. Unit Root Test with Two Structural Breaks (Lee and Strazicich)

<table>
<thead>
<tr>
<th></th>
<th>Model A (Crash Model)</th>
<th>Model C (Trend Shift Model)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LM-Stat</td>
<td>Breaking Time</td>
</tr>
<tr>
<td>lnbur</td>
<td>-1.756</td>
<td>12</td>
</tr>
<tr>
<td>lnizm</td>
<td>-3.075</td>
<td>8</td>
</tr>
<tr>
<td>lnkoc</td>
<td>-1.940</td>
<td>7</td>
</tr>
</tbody>
</table>

Notes: See Table 4.
in the cointegrating vector. Therefore, we also repeat the same analysis based on the two subsamples covering the period before and after the introduction of the mortgage system.

Similar to results obtained for the whole period, the tests suggest the existence of only one cointegrating vector for the post-mortgage period. However more than one cointegrating vectors are obtained, i.e. six and four according to trace statistics and max-eigenvalue statistics respectively, for the pre-mortgage period. Co-integration level decreases during the post-mortgage period compared to the pre-mortgage period. The observed decline can be interpreted as an evidence for the weakening of the long-run relationship among the house prices after the introduction of the mortgage law. In order to investigate this fact in detail, following Smyth and Nandha (2002) we also employ pairwise cointegration tests. Maximum eigenvalue and trace test obtained from the each pair of the cities are reported on Table 7. The results of the tests differ slightly; Johansen and Juselius (1990) propose the use of maximum eigenvalue test when the tests give different results. Both pairwise tests corroborate the weakening of the long-run relationship among the prices. Max-eigenvalue tests suggest that the presence of two long-run relationships for the whole period (Antalya-Bursa and Bursa-Izmir). The pairwise estimates covering pre-mortgage period imply only one long-run relationship (Ankara-Antalya), whereas the results for the post-mortgage period do not suggest any long-run relationship among the house prices.

<table>
<thead>
<tr>
<th>Table 6. Multivariate Johansen Cointegration Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Sample</td>
</tr>
<tr>
<td>Trace</td>
</tr>
<tr>
<td>Statistic</td>
</tr>
<tr>
<td>None *</td>
</tr>
<tr>
<td>At most 1</td>
</tr>
<tr>
<td>At most 2</td>
</tr>
<tr>
<td>At most 3</td>
</tr>
<tr>
<td>At most 4</td>
</tr>
<tr>
<td>At most 5</td>
</tr>
<tr>
<td>At most 6</td>
</tr>
<tr>
<td>Pre-Mortgage</td>
</tr>
<tr>
<td>Trace</td>
</tr>
<tr>
<td>Statistic</td>
</tr>
<tr>
<td>None *</td>
</tr>
<tr>
<td>At most 1</td>
</tr>
<tr>
<td>At most 2</td>
</tr>
<tr>
<td>At most 3</td>
</tr>
<tr>
<td>At most 4</td>
</tr>
<tr>
<td>At most 5</td>
</tr>
<tr>
<td>At most 6</td>
</tr>
</tbody>
</table>
Having investigation of the long-run relationship, to analyze causality relationship among the house prices in the short run, we also employ Granger test based on the estimated VECM in (5). The findings of Granger causality test are shown on Table 8. The findings mainly corroborate the existence of only one directional relationship between the prices, however bilateral causality between some cities has been also observed: Adana-Kocaeli, Ankara-Izmir, Antalya-Istanbul, Antalya-Izmir, Istanbul-Kocaeli. It is also remarkable that change in the house prices of the highest populated city, Istanbul has a significant impact on the all cities excluding Ankara. This evidence can be interpreted as the leading role of Istanbul in determining house prices.

a. Eigenvalue Fluctuation Test
b. Test of Beta Constancy

**Figure 3.** Cointegration stability tests
Table 7. Bivariate Johansen Cointegration Tests

<table>
<thead>
<tr>
<th></th>
<th>Ankara</th>
<th>Antalya</th>
<th>Bursa</th>
<th>Istanbul</th>
<th>İzmir</th>
<th>Kocaeli</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whl</td>
<td>Pre</td>
<td>Post</td>
<td>Whl</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Adana</td>
<td>7.57</td>
<td>10.33</td>
<td></td>
<td>10.8</td>
<td>12.74</td>
<td>10.31</td>
</tr>
<tr>
<td>Bursa</td>
<td></td>
<td></td>
<td></td>
<td>17.22</td>
<td></td>
<td>11.75</td>
</tr>
<tr>
<td>Istanbul</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>İzmir</td>
<td>7.99</td>
<td>10.84</td>
<td></td>
<td>5.40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * Indicates significant at least at 5 percent level. An unrestricted intercept term is assumed in the cointegrating equation. The number of lags in the VAR model determined by Schwarz information criterion. Critical values are obtained from McKinnon et al. (1999). Whl is whole, Pre is pre-mortgage and post is post-mortgage.
### Table 7. Bivariate Johansen Cointegration Tests (continued)

(b) Maximum Eigenvalue Test

<table>
<thead>
<tr>
<th></th>
<th>Ankara</th>
<th>Antalya</th>
<th>Bursa</th>
<th>İstanbul</th>
<th>İzmir</th>
<th>Kocaeli</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole</td>
<td>Pre</td>
<td>Post</td>
<td>Whole</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Adana</td>
<td>5.64</td>
<td>8.69</td>
<td>10.6</td>
<td>9.88</td>
<td>8.9</td>
<td>8.78</td>
</tr>
<tr>
<td>Ankara</td>
<td>7.95</td>
<td>18.06*</td>
<td>4.08</td>
<td>14.23</td>
<td>7.07</td>
<td>10.33</td>
</tr>
<tr>
<td>Bursa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>İstanbul</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>İzmir</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 8. VEC Granger Causality Tests

<table>
<thead>
<tr>
<th>Direction</th>
<th>Wald Test</th>
<th>Prob.</th>
<th>Direction</th>
<th>Wald Test</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adana → Ankara</td>
<td>4.220</td>
<td>0.121</td>
<td>Ankara → Adana</td>
<td>1.822</td>
<td>0.402</td>
</tr>
<tr>
<td>Adana → Antalya</td>
<td>3.368</td>
<td>0.186</td>
<td>Antalya → Adana</td>
<td>34.704</td>
<td>0.000</td>
</tr>
<tr>
<td>Adana → Bursa</td>
<td>12.267</td>
<td>0.002</td>
<td>Bursa → Adana</td>
<td>0.764</td>
<td>0.682</td>
</tr>
<tr>
<td>Adana → Istanbul</td>
<td>3.667</td>
<td>0.160</td>
<td>Istanbul → Adana</td>
<td>6.564</td>
<td>0.038</td>
</tr>
<tr>
<td>Adana → Izmir</td>
<td>4.486</td>
<td>0.106</td>
<td>Izmir → Adana</td>
<td>1.829</td>
<td>0.401</td>
</tr>
<tr>
<td>Adana → Kocaeli</td>
<td>23.367</td>
<td>0.000</td>
<td>Kocaeli → Adana</td>
<td>9.053</td>
<td>0.011</td>
</tr>
<tr>
<td>Ankara → Antalya</td>
<td>6.078</td>
<td>0.048</td>
<td>Antalya → Ankara</td>
<td>0.685</td>
<td>0.710</td>
</tr>
<tr>
<td>Ankara → Bursa</td>
<td>6.862</td>
<td>0.032</td>
<td>Bursa → Ankara</td>
<td>1.194</td>
<td>0.550</td>
</tr>
<tr>
<td>Ankara → Istanbul</td>
<td>3.497</td>
<td>0.174</td>
<td>Istanbul → Ankara</td>
<td>1.936</td>
<td>0.380</td>
</tr>
<tr>
<td>Ankara → Izmir</td>
<td>30.139</td>
<td>0.000</td>
<td>Izmir → Ankara</td>
<td>6.559</td>
<td>0.038</td>
</tr>
<tr>
<td>Ankara → Kocaeli</td>
<td>0.783</td>
<td>0.676</td>
<td>Kocaeli → Ankara</td>
<td>2.372</td>
<td>0.306</td>
</tr>
<tr>
<td>Antalya → Bursa</td>
<td>8.670</td>
<td>0.013</td>
<td>Bursa → Antalya</td>
<td>0.798</td>
<td>0.671</td>
</tr>
<tr>
<td>Antalya → Istanbul</td>
<td>4.920</td>
<td>0.085</td>
<td>Istanbul → Antalya</td>
<td>8.029</td>
<td>0.018</td>
</tr>
<tr>
<td>Antalya → Izmir</td>
<td>12.158</td>
<td>0.002</td>
<td>Izmir → Antalya</td>
<td>14.101</td>
<td>0.001</td>
</tr>
<tr>
<td>Antalya → Kocaeli</td>
<td>20.908</td>
<td>0.000</td>
<td>Kocaeli → Antalya</td>
<td>1.839</td>
<td>0.399</td>
</tr>
<tr>
<td>Bursa → Istanbul</td>
<td>0.302</td>
<td>0.860</td>
<td>Istanbul → Bursa</td>
<td>8.831</td>
<td>0.012</td>
</tr>
<tr>
<td>Bursa → Izmir</td>
<td>2.454</td>
<td>0.293</td>
<td>Izmir → Bursa</td>
<td>3.500</td>
<td>0.174</td>
</tr>
<tr>
<td>Bursa → Kocaeli</td>
<td>2.396</td>
<td>0.302</td>
<td>Kocaeli → Bursa</td>
<td>5.944</td>
<td>0.051</td>
</tr>
<tr>
<td>Istanbul → Izmir</td>
<td>11.422</td>
<td>0.003</td>
<td>Izmir → Istanbul</td>
<td>1.278</td>
<td>0.528</td>
</tr>
<tr>
<td>Istanbul → Kocaeli</td>
<td>41.830</td>
<td>0.000</td>
<td>Kocaeli → Istanbul</td>
<td>14.662</td>
<td>0.001</td>
</tr>
<tr>
<td>Izmir → Kocaeli</td>
<td>5.649</td>
<td>0.059</td>
<td>Kocaeli → Izmir</td>
<td>13.244</td>
<td>0.001</td>
</tr>
</tbody>
</table>
Conclusion
This study investigates house price convergence among the selected big metropolitans in Turkey covering the period from January 2003 and December 2015. To this aim, we first analyze the integration levels of the variables with unit root tests. Those tests do not provide evidence in favor of convergence since all house prices are found to be nonstationary at the level. Structural break tests developed by Lee and Strazicich identify statistically significant breakpoints in the house prices after the implementation of mortgage law. We also conduct multivariate and pairwise Johansen cointegration tests to explore the relationship among the house prices in the long run. The evidence on the presence of one cointegrating relationship among the seven regions supports the convergence to some extent. However, the long-run parameter instabilities identified from the recursive estimation of the cointegration model reveal the existence of two distinct periods before and after the mortgage law within the scope of the dynamics among house prices. The multivariate and pairwise cointegration tests covering the period after the inaction of the mortgage law indicate the decline in the number of cointegrating vectors that might be taken as an evidence for the weakening the relationship among house prices.

The analysis developed in this study has several limitations. First, our analysis considers only the relationship among the seven provinces due to unavailability of data for the other regions. Second, our results imply that the presence of convergence may also affected by some location specific factors, i.e. migration flows, regional price, income and wage rate differences. Therefore, a more detailed investigation in determining the house prices at the regional level is required to explore the role of those factors as more data become available.

References


SHOULD TURKISH REPUBLIC OF NORTHERN CYPRUS USE EURO WITHIN THE SCOPE OF THE THEORY OF OPTIMAL CURRENCY AREA?

Sukru Umarbeyli¹
Ugur Avcilar²
Dervis Kirikkaleli³

INTRODUCTION

Countries establish relations with other countries to reach a higher level of economic development by using the resources more effectively. In the most general sense, this relationship actualizes by buying and selling the goods and services. Moreover, capital movements take an important place in relationships. Free circulation of goods and services, capital and production factors in economic liberalization have gained importance day by day and been discussed as well. International economic, political and cultural relations have increased by increasing globalization, several monetary and political unions; these increasing relations and unions cause economic integration movements such as preferential trade arrangements, foreign trade zone, customs unions, common market, and economic union. These economic integrations aim to liberalize the goods and services movements between the countries; liberalize the production factors and apply common monetary and fiscal policies in addition to all these goals. The integration movements have different degrees. The most known among those integrations is the European Union (EU) that has a deep-rooted history started by being signed European Coal and Steel Community Agreement by six European countries (Germany, France, Italy, Belgium, Netherlands, and Luxembourg) on April 18, 1951. Afterward, it came to the phase of economic and monetary union stage that is the most advanced level of economic integration by Maastricht Treaty. The community name has been changed to the European Union. Other associations which have similar purposes with EU are as follows; MERCOSUR (Mercado Comun del Sur) in South America; ECOWAS (The Economic Community of West African States) in West Africa; ASEAN (Association of Southeast Asian Nations) in Asia.

The gains that are made by the monetary union are the direct and indirect gains arising from setting off the conversion costs; welfare gains arising from eliminating the currency risk; transparency in prices; providing the liquidity increase; avoiding a speculative capital increase, etc. Besides, there may occur several costs such as changes in demand; countries’ different preferences on inflation and unemployment; labor market differences; growth rate differences; different financial systems and seniorage problem; loss of policy instruments.

LITERATURE

It is good to define the monetary union before passing to the theory of optimal currency area. Monetary union means irrevocably linking the money of member countries of the association by fixed rates. Moreover, the monetary union also means free floating of currencies of member countries against the countries out of the association; having a single monetary unit; eliminating the barriers in front of the current accounts and capital movements (Utkulu, 2005). Currency means linking the money of countries with strong economic relations by fixed exchange rates (Tonus, 2000). Two essential conditions need to be considered when the currency area is established. One of these conditions is the coordination of monetary policies; the second condition is establishing an elastic and regional financial system. Namely, there is a need for policy

¹European University of Lefke, Northern Cyprus
²European University of Lefke, Northern Cyprus
³European University of Lefke, Northern Cyprus
parallelism and central authority that audit budget policies of countries and coordinately work with a single monetary authority (Ertürk, 1993). Monetary union theory supports fixed exchange rates instead of flexible rates. However, the unignorable point in the discussion of fixed exchange or flexible rate is that whether the exchange rate policy is in conformity with the member countries and country groups of the association. The success possibility of a foreign exchange regime that does not consider the differences between countries is lower. Therefore, the following issues have importance for the monetary union; development level of the countries, the degree of intensity of the economic relation of counties with each other; whether the production factors are mobile; whether there are regional differences; whether there is product diversification (Ertürk, 1993).

OPTIMAL CURRENCY AREA

Optimal currency area (OCA) is the area where high labor mobility, inflation ratio contiguity, a high level of product diversity, wage and price elasticity, a high level of financial, monetary and trade integration occur. In addition to this, optimal currency area is the scope where a flexible exchange rate needs to be out of the region; fixed exchange rates need to be within the region for a high balance of payments compatibility and the success of the domestic macroeconomic policies (Samsar, 2003). The literature relating to OCA theory can be analyzed in two aspects. The first of these aspects is to determine the borders of currency area and the features within the currency area. The second of them is the conditions for countries to fulfill to be a member of the related association (Yanar, 2008:55). Namely, it is emphasized on the cost-benefit analysis. Theory of optimal currency area is divided into two groups. The first group is the traditional optimal currency area in which started in the 1960s and finished in 1970s. The second one is the new optimal currency area that has continued as from the 1970s and followed a more reintegrative way (Özer, 2007). The first studies about the theory of traditional optimal currency area started by Mundell’s study called “A Theory of Optimum Currency Areas” in 1961. The studies on the related subject were developed by economists like McKinnon (1963) and Kenen (1969); they conducted a study that analyzes the advantage and disadvantage of the monetary union. In other words, it is a study that scrutinizes the benefit and losses of the application; fixed exchange rate system of member countries; flexible exchange rate system of member countries against the countries out of the association. The theory was not very important when it was first introduced. The related theory came into prominence by being provided economic integration by the European Union in the 1990s. The economists like Tavlas (1993), Bayoumi (1994), Melitz (1995), Ricci (1997) and Fukuda (2002) focused on the theory. The theory substantially means irrevocably fixing the national currency of a group of countries through the specified currencies or floating against the currencies of countries out of the monetary union. The scope of the theory of OCA is being preferred fixed rate system instead of flexible exchange rate besides the discussion of whether the scope of the theory is the flexible rate or the fixed rate (Ertürk, 1993). The fixed exchange rate system is preferred by the countries which have an intense business connection and also the whose balance of payments is not rooted in the microeconomic factors. These countries accept the flexible rate as costly and unnecessary differently from the countries which prefer the flexible rate. Under this circumstance, there should be an economic integration between the countries accept fixed exchange rate. Namely, the economic conditions of countries should be similar and also the countries should apply the same monetary and fiscal policies. In this case, the success possibility of the fixed exchange rate increases at the same time (Savaş, 2010). Although OCA establishes a general theoretical line for testing the advantages and disadvantages of the monetary union, it is difficult to specify the benefits area and more effective one among the advantages and disadvantages. Therefore, it is true to mention that political reasons are important as much as the economic factors (Ata & Silahşöyr, 1999). Theory of OCA is an application that is operational by economically and politically integrated countries. OCA is an area has its own currency and common monetary policy as well as it covers an area that is bigger than a country and smaller than the world with Frankel’s word. In another saying, OCA is neither small so as to link its own currency to outside monetary units nor large that can be divided into sub-zones have different currencies in themselves (Altay, 2007). The condition for a monetary area to be optimum has been interpreted by several authors in different manners. The opinions of these authors are as follows.
According to Mundell (1961), the area is an area in an economic sense, not in geographical sense. The region in an economic sense is the area where homogeneous products are produced; knowledge and information are at the same level; the changes coequally affect the places within the regions (Yüceol, 2004). Mundell (1961) pointed out that there should be adequately factor mobility between the regions of monetary union for a monetary area to be optimal; factor mobility can replace with the corrective effect of flexible exchange rate imbalances. Mundell (1961) defines the optimal currency area as the region where the benefits of common currency exceed the losses of the common currency. With reference to this theory, if the number of countries which use the common currency, the benefits of common currency decreases; its negative sides increase at the same time (Yüceol, 2004). The region in which the positive effect of the monetary area is maximum and the negative effect of the monetary area is negative is called as the optimal currency area (Savaş, 1999). According to McKinnon (1963), the exchange rate that is used with financial and fiscal policies needs to provide the balance in the balance of payments and the price stability for a monetary area to be optimal. McKinnon emphasized that as the openness and size of the economies increase, the fixed exchange rate advantage increases (Tavlas, 2009). With regard to Kenen (1969), there is a need for a product range for the monetary area to be evaluated as optimal. There are various arguments on the effects of the shocks on the export for the monetary area. Kenen (1969) offered a financial integration in this case. Financial transfer flow becomes high with financial integration; thus, the effects of asymmetric shocks are minimized. Unemployment shifts from the region with a high ratio to the region with a low ratio (Tavlas, 2009). Optimal currency area analysis is about the resistance of economies against asymmetric shocks. Therefore, the equalizer feature of exchange rate mechanisms should be revealed. Despite the fact that the economic imbalances between the countries are called the shift of the demand, this circumstance is called an asymmetric shock in the theory of optimal currency area. Asymmetric shock is the shock that disproportionately affects a country in comparison with another country without noticing being positive or negative in terms of the effect (Şimşek, 2005). It should be considered that the shock may not only be a supply shock but also a demand shock. The biggest asymmetry is becoming narrow of a region while another region enlarges.

TIME INCONSISTENCY PROBLEM

Recent studies have continued to determine the criteria of optimal currency area; the approach toward the benefit and costs arising from the monetary integration has also been continued. However, developments in macroeconomics caused being in need of a new perspective. Theory of OCA was reevaluated based on creating an expectation, time inconsistency, reliability problem, mobility of labor power in an atmosphere of uncertainty and the developments during the period of fixing the exchange rate (Tavlas, 1993).

ENDOGENEITY AND DIVISION OF LABOR

The reason that lies behind the endogeneity hypothesis is that monetary integration eases the foreign direct investments, strengthens the long-term relations and provides political integration by eliminating the possibility of competitive devaluation and reducing the commercial costs. This circumstance will help to be ensured the business cycle synchronization of countries which attend to the monetary area (Mongelli, 2002). Frankel & Rose (1998) conducted studies to test whether the countries which are candidates for EPB is ready. The general run of those studies analyzed the size of transnational trade; the degree of shocks, financial transfers; business cycle synchronization and labor mobility. It was expressed with reference to the research results that since OCA criteria are interconnected and internal, the results obtained may be wrong. Frankel & Rose (1998) performed a study including thirty-years bilateral trade and business cycle of industrialized countries. According to their empirical analysis results, increasing commercial connection increases the international business cycles correlation.
LABOR MOBILITY IN ATMOSPHERE OF UNCERTAINTY

Bertola (1989) highlighted that the degree of uncertainty about future and compliance costs are the significant determinants of resource allocation in the period after facing with shocks. Continuing the atmosphere of uncertainty causes economic units to want to attend to harmonization process less because of being afraid of encountering with a situation that makes them feel sorry. There is a similar situation in labor mobility. Based on this circumstance, the income difference of a worker expects from moving to a place from another place needs to be more than fixed movement cost as much as the amount relating to the possibility of returning the worker. In other words, as the uncertainty about the gains from other sector and places increases, the willingness of labor to replace or migrate will decrease (Tavlas, 1993).

SETTING THE EXCHANGE RATE

Several authors mention that costs of direct control loss on the exchange rate will not at a high ratio in case of setting nominal exchange rates is not an effective policy instrument to provide external equilibrium (Kılınç, 2008). There is a need for enough time for modern OCA theory to show a corrective effect for the external equilibrium of exchange rate fluctuations. This is because modern OCA is different from the traditional approaches (Tavlas, 1993).

NEW OPTIMAL CURRENCY AREA THEORY

After the contributions for the theory in the first half of the 1960s and 1970s, there was seen a slowdown in studies relating to the optimal currency areas. The reason for the slowdown is the absence of monetary unions in developed countries in practice. However, developments in theory accelerated by actualizing the monetary union in Europe; in this way, the theory excited the attention of the investigators again. EU was seen as an application area on this subject. Previous studies focused on the issue that whether EU is an optimal currency area; there emerged a necessity for new approaches (Broz, 2005).

Recent studies have continued to determine the approach towards the benefit and losses of the monetary integration and also the criteria of the optimal currency area. However, the developments in macroeconomics caused needs for new perspectives. Theory of OCA was reevaluated based on creating an expectation, time inconsistency, reliability problem, the mobility of labor power in an atmosphere of uncertainty and the developments during the period of fixing the exchange rate (Tavlas, 1993).

SHOCKS and CHARACTERISTICS

Discussions on the similarity of shocks in countries which want to attend to the monetary union increased in the late 1980s and early 1990s. Besides, it was so important that whether the candidate countries would bear the costs of the shocks (Mongeli, 2002). With reference to Buitre (1995), the general run of the shocks that affect the monetary area is asymmetric, regional and country oriented. This situation is to monetary area’s disadvantage. However, the valid conditions of this situation point out that the exchange rate regime will lose its importance in the case of the absence of nominal rigidities. Moreover, while the real and external shocks are significant in the orientation period of the elasticity of the exchange rate, the nominal exchange rate is not demanded in financial shocks.

FINDINGS AND DISCUSSIONS

Since TRNC is unrecognized, it could not adequately develop in the banking sector. TRNC remained at low capital and has no enough power to compete for the world; because there is a problem in the opening to foreign countries. Either the shortage in population or the lack of transactions affected the banking instruments. Operating through Turkey and high costs affected the profit margins as well.
Since TRNC does not have its own currency and uses TL, the Central Bank of TRNC could not beyond being a symbol. Therefore, TRNC is not ready for optimal monetary unit. However, it is a theory that can be ready in light of political and cultural developments.

If we assume that TRNC is world-wide recognized and has its own currency, what is the value of this new currency compared to Euro? This issue needs to be discussed.

TRNC should impose restrictions to keep the floating rate so as not to exceed the specific margins and also review the macroeconomic conditions and fiscal policies based on the theory of OCA. Actualizing these circumstances will take so long time.

It is not possible to keep the currency fluctuation constant by the theory of OCA because of existing budget deficits, high unemployment, fiscal policies, large trade deficits, lack of enough production, continuous current deficit, fewer investments

The transformation of existing currency to Euro will be specified based on the rules after joining the European Union. Euro reserves will absolutely be provided by also the help of the European Union. There will be no big problems in these matters. Turkey should support TRNC in the conversion of existing currency to Euro. Moreover, the goods will increase in value under the conditions of the European Union. Banking system and the economy will reach development level and the central bank will manage itself.

REFERENCE

ARE RELATIONSHIPS STABLE BETWEEN FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN TURKEY?

MUSTAFA KIRCA¹
ȘERİF CANBAY²

Introduction
Developing countries' economies need foreign capital investments to sustain their development going. Because the savings volume required for investment in developing countries may not be sufficient. As is known, there are two different foreign capital investments for the countries. The first one is foreign direct investments and the second one is indirect foreign capital investments. While foreign direct investments are investments to increase production activities for countries, indirect foreign movements are called portfolio investments. As stated by Eğilmez (2006), the first of the three basic differences between these two foreign capital investments is long-term foreign direct investments, while indirect foreign capital investments are short-term; secondly, foreign direct investment gives the investor administration authority while indirect foreign investment does not give the investor authority to interfere in the administration; the third and the most important difference is that foreign direct investment can increase the efficiency to increase profitability, thus making changes to bring new technology or to change production. However, due to the lack of administrative authority of indirect foreign investments, such changes do not have the right to go. Because of these differences, developing countries want more foreign investments. Zhang (2006:3-4) explains the effects of foreign direct investment on the economies of the countries;

i. effects on national income, capital formation and employment,

ii. positive effect on exports,

iii. contribution to management know-how, skilled labor access to international production network and established brand names,

iv. contribution to Technology transfer, spillover effect and positive externalities.

Moreover, opportunities for companies in developed countries gain maximum profit slow downed in the 1970s because of restrictions in chances to reach new markets. This problem has appeared like solved a tiny bit by removing the existing obstacles for capital movements in developing countries which want to attract foreign capital that is seen as the finance for economic progress from the midst of the 1970s. The implementation of open economic policies in developing countries has led to an increase in revenues of developed countries by investing in these countries. Especially after the 1980s, international capital has started to intensely enter from developed countries into developing countries. This circumstance allowed for developing countries to catch an economic growth trend by causing capital accumulation.

Foreign direct investment brought new production techniques, technology transfer, capital accumulation, contribution to human capital and employment opportunities by an inflow of foreign currency. All these added-value is one of the factors that constitute accelerator effect for economic progress of countries where capital enters into. This study analyzed the relationship between economic growth and foreign direct investment in Turkey as well as alternative policy

¹Düzye University, Akçakoca Bey Faculty of Political Sciences, Department of Economics, mustafakirca52@gmail.com

²Düzye University, Akçakoca Bey Faculty of Political Sciences, Department of Economics, serifcanbay@duzce.edu.tr
suggestions were made through the estimated results. In this context; First, studies investigating the relationship between foreign direct investment and economic growth were examined. Secondly, the data and model used in the analysis were introduced. Thirdly, time series analysis revealed the relationships between variables. In the conclusion section, the findings were discussed.

**Literature**

The relationship between foreign direct investment and economic growth has been analyzed by different empirical methods in several studies. Table 1 shows some of the studies conducted for Turkey and country groups including Turkey.

**Table 1: Literature Review**

<table>
<thead>
<tr>
<th>RESEARCHERS</th>
<th>TIME PERIOD</th>
<th>METHOD</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alagöz, Erdoğan &amp; Topalli (2008)</td>
<td>1992-2007</td>
<td>Granger Causality and Ordinary Least Square (OLS)</td>
<td>There is not granger causality relationship between foreign direct investment and economic growth. According to the results, foreign direct investment effects on economic growth is found medium intensity.</td>
</tr>
<tr>
<td>Örnek (2008)</td>
<td>1996-2006</td>
<td>Granger Causality</td>
<td>It has been found that short term capital inflows and foreign direct investment have positive effect on economic growth.</td>
</tr>
<tr>
<td>Falki (2009)</td>
<td>1980-2006</td>
<td>Ordinary Least Square (OLS)</td>
<td>The results of the study show a negative and statistically insignificant relation between the GDP and FDI Inflows in Pakistan.</td>
</tr>
<tr>
<td>Vergil &amp; Karaca (2010)</td>
<td>1980-2005</td>
<td>Panel Data Analysis</td>
<td>While foreign direct investment and portfolio investment have positive effects, short term capital investments have negative effects on economic growth of countries in the sample.</td>
</tr>
<tr>
<td>Acaravcı &amp; Bostan (2010)</td>
<td>1992-2007</td>
<td>ARDL Cointegration and Granger Causality</td>
<td>There was a positive long-term relationship between foreign direct investment, GDP and domestic investments in Turkey. The increase in foreign direct investments causes economic growth in the short term.</td>
</tr>
</tbody>
</table>
There is a positive strong relationship between foreign direct investment and economic growth in Turkey.

There is a long-term relationship between foreign direct investment and economic growth. In addition, there is a two-way causation relationship between foreign direct investment and economic growth.

Pakistan’s economic performance is negatively affected by foreign investment while its domestic investment has benefitted its economy. Moreover, the nation’s debt, trade and inflation have found to have negative impact on its GDP.

There is a significant relationship between foreign direct investment and economic growth in the long-term.

There is not Granger causality relationship between foreign direct investment and economic growth.

Consequently, was found long-term relationship from foreign direct investments to economic growth.

Growth in Turkish economy has a positive impact on foreign direct investments inflows.

While the general run of empirical studies has found significant relationships between foreign direct investment and economic growth until today, there were not found significant relations in another part of studies. Current situation reveals how important foreign direct investment is for developing countries. However, observing insignificant relationships for some periods may be a signal for the inconsistency of these relationships. On the other hand, the studies which were conducted for Turkey concluded that related relationships are stable. Researching whether these relationships are stable make this study different from previous studies.

Data And Model

This study researched the effects of foreign direct investment (FDI) on the economic growth (GDP) by using the variables of foreign direct investment and gross domestic product (2010=100) that cover the period of 1974-2017 for Turkey. Data belonging to the variables were obtained from the World Bank Data Base. Analyses used logarithmic transmission of variables. Moreover, Figure 1 shows the graphics belong to both original and logarithmic transmission of variables.
The basic equation of the model of our research is as follows:

\[ \text{LGDP}_t = \beta_0 + \beta_1 \text{LFDI}_t + u_t \]  

(1)

\( \beta_0 \) in the numbered model represents constant term coefficient; \( \beta_1 \) shows the slope coefficient; namely, it represents the change in LGDP arising from 1% change. Error term of the model is shown by \( u_t \). Index \( t \) expresses that variables are a time series. As is mentioned above, \( t = 1974, 1975, \ldots, 2017 \).

**Method And Findings**

Relationships between the variables were researched by time series analysis methods in this study in which we reviewed the effect of the foreign direct investment on economic growth. A four-phase method was specified in accordance with this purpose. In the first phase, we investigate stationary levels of variables. In the second phase, long-term relations between variables were analyzed by the help of the cointegration test developed by Gregory and Hansen (1996). In the third phase, the time-varying causality test that was developed by Balcilar, Ozdemir, and Arslanturk (2010) and Arslanturk, Balcilar and Ozdemir (2011) determined whether the effects on variables are stable. Finally, there was made a coefficient estimation belongs to time-varying causalities to determined the sign of causality relationships by a method that is similar to the methods of Balcilar et al., (2010) and Arslanturk et al., (2011).

First of all, stationarity of variables, namely, it should be analyzed in time series analyses that whether variables have a unit root. In this paper, stationarity of variables was researched by Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests that are expressed as traditional unit root tests. Table 2 shows the classical unit root test results. As is seen in Figure 1, a unit root research was performed by the ADF unit root test that considers a single break because of structures of the variables. As is mentioned in Perron (1989), the reason for this situation is that classical unit root tests may give incorrect results in case of disregarding structural changes and being structural breaks in variables. For this reason, ADF unit root test that considers a single break was applied in variables; Table 3 shows the results.

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2 By using both classical unit root tests and single break ADF unit root tests
Table 2: Traditional Unit Root Test Results

<table>
<thead>
<tr>
<th>Variables/Model</th>
<th>Intercept Model</th>
<th>Trend and Intercept Model</th>
<th>Intercept Model</th>
<th>Trend and Intercept Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGDP</td>
<td>1.42 (0.998)</td>
<td>-2.22 (0.464)</td>
<td>0.51 (0.985)</td>
<td>-2.22 (0.461)</td>
</tr>
<tr>
<td>△LGDP</td>
<td>-4.55* (0.001)</td>
<td>-4.90* (0.001)</td>
<td>-6.27* (0.001)</td>
<td>-6.39* (0.001)</td>
</tr>
<tr>
<td>LFDI</td>
<td>-0.57 (0.865)</td>
<td>-3.43** (0.062)</td>
<td>-0.74 (0.822)</td>
<td>-3.96* (0.017)</td>
</tr>
<tr>
<td>△LFDI</td>
<td>-9.30* (0.001)</td>
<td>-</td>
<td>-9.76* (0.001)</td>
<td>-</td>
</tr>
</tbody>
</table>

() refers to the probability value of the test statistics.

*, ** respectively, 5% and 10% significant stand for stability.

The lag length was determined by “t critical value” method.

As is seen in Table 2, variables are stationary at their first difference based on both ADF and PP unit root test results for models with constant, namely, I(1). However, while LGDP is I(1) for the model with constant and trend, LFDI is I(0). With reference to single break ADF unit root test results in Table 3, it is I(1) for both two models. Being variables I(1) for all the models in ADF unit root test with breaks. Because a cointegration relation is expected to be in existence between variables that are stationary at the same level. Therefore, it was determined whether there are long-termed relations between the variables by the help of a single break cointegration test developed by Gregory and Hansen (1996).

Table 3: ADF Test Results with Single Break

<table>
<thead>
<tr>
<th>Variables/Model</th>
<th>Intercept Model</th>
<th>Break Date</th>
<th>Trend and Intercept Model</th>
<th>Break Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGDP</td>
<td>-0.32 (0.998)</td>
<td>2009</td>
<td>-4.51 (0.120)</td>
<td>2010</td>
</tr>
<tr>
<td>△LGDP</td>
<td>-6.27* (0.001)</td>
<td>1978</td>
<td>-4.91* (0.041)</td>
<td>1993</td>
</tr>
<tr>
<td>LFDI</td>
<td>-2.51 (0.897)</td>
<td>2000</td>
<td>-4.50 (0.128)</td>
<td>2002</td>
</tr>
<tr>
<td>△LFDI</td>
<td>-10.49* (0.001)</td>
<td>1978</td>
<td>-10.47* (0.001)</td>
<td>1978</td>
</tr>
</tbody>
</table>

*Stationarity levels of 5% significant.

The single break cointegration test that was developed by Gregory and Hansen (1996) and also the cointegration test that was developed by Engle and Granger (1987) were used as the base. The difference between the tests is being added structural breaks to models belong to the test by Gregory and Hansen (1996). Date of structural breakage is internally determined in this test. Hypotheses of tests are as follows;

\[ H_0: \text{There is no cointegration between variables,} \]

\[ H_1: \text{There is cointegration with a single break.} \]
Gregory and Hansen (1996) used three test statistics to test the hypothesis. The first of the test statistics is ADF test statistics; the second of them is $Z_{\alpha}$ and $Z_t$ statistics. $H_0$ is denied if computed statistics are bigger than table critical value; namely, there is cointegration with a single break between variables. Table 4 shows Gregory and Hansen (1996) cointegration test results for the equation in which LFDI is the independent variable. It is seen based on these results that ADF and $Z_t$ test statistics are significant for 10% for break model in constant (level shift); only the ADF test statistics is significant for break model in constant with the trend (level shift with trend); only $Z_{\alpha}$ test statistics is significant for a model with break in the regime (regime shift). These results mean that there is cointegration with a single break.

**Table 4:** Gregory and Hansen Single Break Cointegration Test Results

<table>
<thead>
<tr>
<th>Level Shift Model</th>
<th>Test</th>
<th>Test Statistics</th>
<th>Break Date</th>
<th>Critical Value**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF</td>
<td>-4.43*</td>
<td>2008</td>
<td>-4.34</td>
</tr>
<tr>
<td></td>
<td>$Z_t$</td>
<td>-5.18*</td>
<td>2010</td>
<td>-4.34</td>
</tr>
<tr>
<td></td>
<td>$Z_{\alpha}$</td>
<td>-30.42</td>
<td>2010</td>
<td>-36.19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level Shift with Trend Model</th>
<th>Test</th>
<th>Test Statistics</th>
<th>Break Date</th>
<th>Critical Value**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF</td>
<td>-5.079*</td>
<td>2010</td>
<td>-4.72</td>
</tr>
<tr>
<td></td>
<td>$Z_t$</td>
<td>-3.545</td>
<td>2010</td>
<td>-4.72</td>
</tr>
<tr>
<td></td>
<td>$Z_{\alpha}$</td>
<td>-21.04</td>
<td>2010</td>
<td>-43.22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regime Shift Model</th>
<th>Test</th>
<th>Test Statistics</th>
<th>Break Date</th>
<th>Critical Value**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF</td>
<td>-4.51</td>
<td>2010</td>
<td>-4.68</td>
</tr>
<tr>
<td></td>
<td>$Z_t$</td>
<td>-5.39*</td>
<td>2010</td>
<td>-4.68</td>
</tr>
<tr>
<td></td>
<td>$Z_{\alpha}$</td>
<td>-30.52</td>
<td>2010</td>
<td>-41.85</td>
</tr>
</tbody>
</table>

* For 10% significance level, there are cointegration relationships.

** Critical values of Gregory and Hansen (1996, p.109) were obtained.

Significant cointegration test results with structural break give clue about inconsistent relationships between LFDI and LGDP. Time-varying causality test that was fourthly developed by Balcilar et al., (2010) and Arslanturk et al., (2011) was applied to show whether the relationships between variables are stable. However, the VAR model, bootstrap and ‘rolling windows’ methods lie behind these tests developed. The most important feature of this test is conducting causality analysis for sub-periods of the inspected period, not only a single period. Thus, it is gained insight about the soundness of relationships. LR test statistic is obtained for sub-periods of the inspected period by means of this test. The null hypothesis is denied for the years when the probability value of this test statistic is lower than the 10% significance level. Test’s hypotheses are as follows;
Moreover, after being specified the causality periods, causality coefficients were computed to determine the direction of these causality relations. Figure 2 shows the time-varying causality results and coefficients. With reference to analysis results, the hypothesis called ‘LFDI does not Granger cause LGDP’ was denied at 10% significance level for the periods of 1994-1995, 1999-2001, 2008, 2010-2015. As is seen above, relationships between LFDI and LGDP are unstable. In addition, LFDI positively affects LGDP in periods of causality according to the calculated coefficient estimates.

![Figure 2: Time-Varying Causality Results](image.png)

**Conclusion**

It is determined in this research in which we reviewed the effect of foreign investments on the economic growth that there are structural breaks in variables; these breaks are also influencing on stationarity structure of variables. According to the single break cointegration test, the foreign direct investment with a single break affects economic growth. Changes in the years of 2008 and 2010 have been effective in long-termed relationships. As is known, 2008 is the year when the global crisis happened. 2010 is a year when Turkey’s higher economic growth after 2008 global crisis. There are structural breaks in variables and in cointegration relationship between this variable, this result gave clues about the relationships between the variables would unstable. We analyzed time varying causality relationships between this variable with taking into account the unstable condition According to time-varying causality test results, there are foreign direct investment effect on economic growth varying sub-periods. Those periods are the sub-periods of 1994-1995, 1999-2001, 2008, 2010-2015. If we look closely, the common trait of those periods is that Turkey started to open foreign countries in related periods. Moreover, it is a remarkable and worth-stressing finding that corresponding the periods of 1994-1995, 1999-2001, 2008 to crisis periods. The 2010-2015 period was the date when foreign direct investment affects economic growth at maximum long term.

In addition to other studies, results obtained show that relationships between foreign direct investment and economic growth are unstable. Another important finding is that foreign direct investment in crisis periods in Turkey has a positive impact on economic growth. Being positively affected economic growth by foreign direct investments in the periods between the years of 2010 and 2015 necessitates being examined cyclical features of that period. The study will be broadened by discussing the features of this period in the continuation of our study. In conclusion, it can be said that foreign direct investment has an effect on economic growth for Turkey; this effect is not stable at the same time.
References


INCOME AND ASSET VALUE RELATIONSHIP: A NONLINEAR APPROACH TO CAPE SIZE SHIPPING MARKET

Abdullah AÇIK¹
Muhammet Rıdvan İNCE²

Introduction
Dry bulk shipping is the main component of international maritime trade. It is also defined as a market with high risk and volatility, because there is a constant uncertainty about the shape and volume of world trade, global economy and government policies (Jing et al., 2008). Dry bulk shipping also performs a very important function for the global economy. It enables the randomly distributed resources on the world to be delivered in large volumes and in a cost effective manner to the regions in need of them (Dai et al., 2015, Lun and Quaddus, 2008). Especially five major bulks, which are iron ore, coal, grain, alumina/bauxite and phosphate, constitute the biggest raw material groups for the industries in the world such as construction, agriculture, automotive, food, energy etc.

Dry bulk carriers usually carry cargo from port to port and have no fixed schedules (Lun and Quaddus, 2008). The dry bulk shipping market in the world is divided into three sub-markets which are Capesize shipping, Panamax shipping and Handysize shipping (Jing et al., 2008). Also as all maritime markets, dry bulk shipping market is divided into 4 sub-markets; freight market where transport operations are carried out; the second-hand market where second-hand vessels are traded; the new building market where new ships are ordered; ship demolition market where the ships which have completed their economic life are scrapped (Stopford, 2009). These markets are different from each other but are constantly affecting each other.

The market structure of the dry bulk market is very close to the perfect competition market characteristics. Because there are many buyers and sellers, there are no entry-exit barriers (except large capital requirements), the price is known and followed by everyone in the market (Lun and Quaddus, 2008). The prices (freight rates) in the market consist of the interaction between supply and demand. If the supply is high, the freight rates decrease, but if the demand is high, the freight rates increase. While the increase in freight rates increases new orders and increases the supply in the long term, the decrease in freight rates increases shipping and reduces the supply in the long term. Due to this structure, the freight market is defined as mean-reverting by many researchers (Tvedt, 2003).

Players interested in transport activities in the market may consider increasing their transport capacity by taking a ship from the existing market or ordering a new ship when the demand is so high and hence the freight rates are also so high. Because they hope to carry out more transportation operations and generate more revenue. Some other investors in the market are asset players and they are only in a position to generate revenue by trading. These players also follow the dynamics of the ship value and aim to make the right decision at the right time (Kavussanos and Alizadeh, 2002,). No matter what type of player, one of the factors that most affect the ship values is the freight rates (Beenstock, 1985).

The factors affecting the second hand and the new building values are also evaluated by many researchers. Because the right investment decision at the right time poses a difference of millions of dollars as positive or negative. The spotted studies about second hand price mechanism have focused on trading volume and price volatility (Alizadeh and Nomikos, 2003), second hand and

¹ResearchAssistant, Dokuz Eylül University, MaritimeFakülty
²ResearchAssistant, Kocaeli University, Department of Economics
new building price relationship (Strandenes, 1984), price dynamics (Kavussanos, 1997), and general factors to model second hand price (Pruyn et al., 2011). These studies have concluded as; the increased second-hand trading volume reduces the price volatility; the second hand value is the weighted average of the freight rates gained in the long run and in the short run; the prices of large vessels are more volatile; and based on 20 years of literature, the models examining second hand prices should include variables such as new build price, order book size, freight rates, fuel prices, age and ship size. On the other hand, the spotted studies about new building price mechanism have focused on comparison of new building price volatility with second hand price volatility (Adland and Jia, 2015), and the factors affecting the volatility of the new build prices in the dry bulk market (Dai et al., 2015). These studies have concluded as; new build prices are less volatile than second-hand prices; and the volatility in freight rates is the most important determinant of the volatility in dry bulk new building ship prices.

These studies have identified significant relationships between freight rates and asset values as expected, however, since the financial series are heavily exposed to crises, structural breaks, changes in production levels, reforms and political relations, their structures become non-linear (Bildirici and Turkmen, 2015; Ajmi et al., 2013). In this context, it is inevitable to be non-linear for maritime markets since it has a derived demand structure (Branch, 2012:1), its market is similar to the perfect competition market (Lun and Quaddus, 2008) and it is very open to shocks (Karakitsos and Varnavides, 2014). In this respect, it is thought that examining the relationship between variables with a non-linear method will strengthen the conclusions in the current literature by providing different insight to the related subject.

In this context, in this study, the non-linear relationship between the freight rate and the asset values is investigated on the basis of the Capesize market by a nonlinear causality test developed by Dicks and Ponchenko (2006). This test also identifies the lagged causal relationships and determines the possible delayed relationship between the variables. Baltic Capesize Index (BCI), 5-year-old Capesize vessel value, 10-year-old Capesize vessel value and new building Capesize vessel value variables are selected as the Capesize market variables, and the causal relationships between the freight index and all three asset values is examined. As a result of the analysis made by the dataset on a monthly basis covering the dates between July 1999 and July 2018, while there are causalities from the freight index variable to all other asset value variables for 4 lags, the reverse causalities are found only to 5 years old and 10 years old vessel values. Nonlinear causalities from new building value to freight index cannot be found. These results show that there is a dynamic relationship between the freight market and second hand market and there are mutual interactions. This shows that the second hand market and the freight market are both influencing and affected variables, while the new building market is only the affected variable. In other words, new building prices are affected by the variables in the market, but they do not have the power to influence them. It is hoped that these results give a different perspective to the existing maritime literature and present ideas about leading indicators that sector stakeholders should follow.

The remainder of the study is organized as follows; the method and data set used in the study are introduced in the second section; the results obtained from the analyzes are presented in the third section; and finally, conclusions are made in the last section.

Methodology

In this section, the method and data set used in the study are introduced. In addition, the historical course is analyzed using a graphical representation.

The Nonlinear Granger Causality Test

A variety of methods are used to measure econometric relationships between variables. One of the most common of these is causality analysis. The linear causality analysis developed by Granger (1969) is the basis of causality analysis. However, such linear models require linearity in
the regression structure and the nonlinear structure in the financial series has been found to be worthy of investigation and significant results have been obtained by many researchers in the recent years (Ajmi et al., 2013). Financial and economic series are subject to constant shocks and unexpected events which makes their structure nonlinear. The main sources of the nonlinearities may be economic crises, high volatilities (Bildirici and Turkmen, 2015), sudden changes in economic structures, changes in industrial productions and differentiation in investor heterogeneities (Ajmi et al., 2013). Therefore, nonlinear type analyses are more suitable for practical life.

The logic in the standard granger causality test is quite simple. In examining the causality between the two variables, it tests whether the second variable's historical information can explain the current and future values the first one. If a significant relationship is found, the second variable is expressed as the Granger cause of the first one (Yu et al., 2015). In other words, Granger test determines the correlation between the current value of first variable and the past values of the second variable (Chiu-Wei et al., 2008). However, by their nature, the standard linear Granger tests are insufficient to detect non-linear causal relationships (Beak and Brock, 1992; Hiemstra and Jones, 1994; Bal and Rath, 2015; Kumar, 2017; Adıguzel et al., 2013). Therefore, rejecting non-linear relationships based on linear results causes misleading conclusions (Lim and Ho, 2013). So, researchers have focused on nonlinear patterns and developed new methods.

One of these developed nonlinear causality tests is the test developed by Hiemstra and Jones (1994) and makes it possible to examine the causal relationship between lags of the variables. Thus, it has become possible to detect lagged non-linear causal relationships since the possibility of a lagged relationship between some variables is quite reasonable in practical life. However, in later studies, Dicks and Panchenko (2006) have found that the Hiemstra and Jones’s test was experiencing an over-rejection of null hypothesis problem as the sample size increased. So, they have developed a new nonparametric test for Granger causality to overcome over-rejection problem (Adıguzel et al., 2013). Also t values have been reassessed and standardized by Diks and Panchenko (2006).

When applying the test, the series must not contain unit roots and must be stationary. Therefore, unit root analyzes are applied to the series before starting the analysis. In the next section, the data set used in the study is examined and then the analyzes are applied.

**Data**

The data set used in the study consists of 229 observations covering the dates between July 1999 and July 2018. The data obtained from the data source on a daily basis is converted to monthly data by taking averages due to relatively slow motion in the second hand prices of the ships. The data set presented in Table 1 contains the descriptive statistics of the Capsize ship variables which consists of the 5-year-old value, the 10-year-old value, the new construction value and the freight index value. In addition, descriptive statistics of logarithmic variables are presented since the analyzes are carried out with logarithmic data. The fact that the logarithmic variables do not have normal distribution properties (J-B) also provides clues about non-linear structures.

<table>
<thead>
<tr>
<th></th>
<th>Cap 5 Y</th>
<th>Cap 10 Y</th>
<th>Cap Nb</th>
<th>Cap In</th>
<th>Ln Y</th>
<th>Cap 5 Ln</th>
<th>Cap 10 Ln</th>
<th>Ln Cap Nb</th>
<th>Ln Cap In</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>48.03014</td>
<td>35.59250</td>
<td>55.40734</td>
<td>3381.074</td>
<td>3.734503</td>
<td>3.393950</td>
<td>3.974528</td>
<td>7.809802</td>
<td></td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>36.17273</td>
<td>26.45238</td>
<td>51.00000</td>
<td>2245.000</td>
<td>3.588305</td>
<td>3.275346</td>
<td>3.931826</td>
<td>7.716461</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>153.5000</td>
<td>127.0000</td>
<td>105.0000</td>
<td>18749.00</td>
<td>5.033701</td>
<td>4.844187</td>
<td>4.653960</td>
<td>9.838896</td>
<td></td>
</tr>
<tr>
<td><strong>Std. Dev.</strong></td>
<td>29.84201</td>
<td>25.50433</td>
<td>16.85787</td>
<td>3076.099</td>
<td>0.491797</td>
<td>0.560180</td>
<td>0.276307</td>
<td>0.793079</td>
<td></td>
</tr>
<tr>
<td><strong>Skewness</strong></td>
<td>2.051473</td>
<td>2.151047</td>
<td>1.295738</td>
<td>2.203671</td>
<td>0.867992</td>
<td>0.778578</td>
<td>0.637339</td>
<td>0.015197</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1 presents a graphical representation of the variables used in the analysis. It can be said that the variables mostly have a parallel course and have a positive correlation. However, there is a very interesting point about ship values. The values of 5-year-olds and 10-year-olds exceed the new construction value when the maritime industry is undergoing a golden age in 2004 and especially in 2007. This is due to the time-to-build effect, because a ship can enter the market on average two years after it has been ordered (Kalouptsidi, 2014). The owners are interested in the current situation as it cannot be known how the market is going to be after two years later.

Figure 1. Graphical Display of the Variables

In the next section, econometric tests are applied and the results are presented in the direction of the purpose of the study.

3. Findings and Results

Since the relationship between the variables is assumed as nonlinear and it is tried to reach the result with nonlinear causality test, it is necessary to determine the nonlinear structures in the series. In this respect, the BDS Independence test developed by Brock, Dechert and Scheinkman (1987) is applied to the series used in the analysis. First, the series are converted into return series by $ln(\text{Value}_t)-ln(\text{Value}_{t-1})$. Then the deterministic elements in the series are separated and residues are tested by BDS test. In order to determine the deterministic elements, the most suitable ARIMA models are determined with automatic ARIMA forecasting function of econometric software. The suitable one is the model that provides the lowest Akaike information criteria value. After determining the model, the significance and roots of the model are checked. If the model is significant and all roots are smaller than 1, the residues of the model are separated. Finally, the nonlinearities according to the BDS test are examined.

Most suitable ARIMA models are; ARMA (4, 8) with an AIC value of -0.67 for Capesize Index; ARMA (5, 4) with an AIC value of -2.61 for a 5 year old vessel value; ARMA (3, 2) with an AIC value of -2.32 for 10 year old value; ARMA (3, 7) with an AIC value of -4.66 for new building value. All these models are estimated and all are significant according to the F statistics. Also, all the roots in the models are smaller than 1. Therefore, the residuals from the models are separated for the BDS test and the results of the test are presented in Table 2. The test shows whether the residuals are distributed identically and they are independent. The null hypothesis for this test is established as data in a time series is independently and identically distributed (Brock et al, 1996). According to the results, the null hypothesis is rejected for all other variables except the 5 year old ship value. This shows that the series are nonlinear and nonlinear causality analyzes can be used.
Although the 5-year-old ship has linear structure, it is appropriate to be subjected to nonlinear analysis since it is included in the analysis with a nonlinear variable.

Table 2. BDS Independence Test Results

<table>
<thead>
<tr>
<th>Dim.</th>
<th>Capsize Index</th>
<th>5 Years Old Value</th>
<th>10 Years Old Value</th>
<th>New building Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.029328</td>
<td>0.0000</td>
<td>-3.86E-05</td>
<td>0.9459</td>
</tr>
<tr>
<td>3</td>
<td>0.050233</td>
<td>0.0000</td>
<td>-0.000116</td>
<td>0.9268</td>
</tr>
<tr>
<td>4</td>
<td>0.059002</td>
<td>0.0000</td>
<td>-0.000233</td>
<td>0.9118</td>
</tr>
<tr>
<td>5</td>
<td>0.062019</td>
<td>0.0000</td>
<td>-0.000390</td>
<td>0.8988</td>
</tr>
<tr>
<td>6</td>
<td>0.068307</td>
<td>0.0000</td>
<td>-0.000586</td>
<td>0.8869</td>
</tr>
</tbody>
</table>

One of the most basic pre-tests that need to be done in time series analysis is unit root tests. According to the structure of the model, some models require to stationary of included variables while some models require knowing maximum order of integration of the included variables. In the Diks and Panchenko (DP) model used here, the series must be stationary. In this context, one break ADF test developed by Zivot & Andrews (1992), one break LM test developed by Lee & Strazicich (2013), two breaks ADF test developed by Narayan & Popp (2010), two breaks LM test developed Lee & Strazicich (2003) and two breaks KPSS test developed Cis & Sanso (2007) are applied to the all variables considering break in level and break in level and trend options. According to the results obtained from the two-breaks Narayan & Popp (2010) and two breaks Cis & Sanso (2007) KPSS test, all series are stationary. According to some of the other tests, the series become stationary when breaks in trend and level are taken into account. For this reason, all of the series are determined as I (0) and the analyzes are continued without any difference taking operations. Then, DP test is applied by using stationary variables.

Table 3. Unit Root Test Results with Structural Breaks

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Break in level</th>
<th>Break in level and trend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cap 5y</td>
<td>Cap Nb</td>
</tr>
<tr>
<td>ADF Stat</td>
<td>-3.69</td>
<td>-3.36</td>
</tr>
<tr>
<td>Break Date</td>
<td>50</td>
<td>49</td>
</tr>
<tr>
<td>Fraction</td>
<td>0.21</td>
<td>0.21</td>
</tr>
<tr>
<td>Lag</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>LM Stat</td>
<td>-2.43</td>
<td>-2.11</td>
</tr>
<tr>
<td>Break Date</td>
<td>113</td>
<td>113</td>
</tr>
<tr>
<td>Fraction</td>
<td>0.49</td>
<td>0.49</td>
</tr>
<tr>
<td>Lag</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>ADF Stat</td>
<td>-5.04**</td>
<td>-4.64**</td>
</tr>
<tr>
<td>Break Date</td>
<td>110, 178</td>
<td>110, 111, 183</td>
</tr>
<tr>
<td>Fraction</td>
<td>0.48, 0.77</td>
<td>0.48, 0.48</td>
</tr>
<tr>
<td>Lag</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>LM Stat</td>
<td>-2.70</td>
<td>-3.37</td>
</tr>
<tr>
<td>Break Date</td>
<td>53, 113</td>
<td>55, 113, 114, 116</td>
</tr>
<tr>
<td>Fraction</td>
<td>0.24, 0.49</td>
<td>0.24, 0.49</td>
</tr>
<tr>
<td>Lag</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>KPSS test</td>
<td>0.02*</td>
<td>0.04*</td>
</tr>
<tr>
<td>Break Date</td>
<td>53, 140</td>
<td>52, 87, 84</td>
</tr>
<tr>
<td>Fraction</td>
<td>0.22, 0.61</td>
<td>0.22, 0.23</td>
</tr>
</tbody>
</table>

Symbols correspond to *10%, **5%, ***1% confidence intervals.
DP causality test is applied for three different situations. The Capesize freight index is positioned as the main variable, and the causalities between the index and the 5-year-old ship value, the 10-year-old ship value and the new build ship value are examined respectively.

Firstly, the causal relationship between the Capesize freight index and the 5-year-old Capesize ship value is tested and the results are presented in Table 4. According to the results, while there are causalities to the ship value from the index during the 4 period lags, there are causalities from the ship value to the freight index for 3 periods. However, since the probability value is very close to the 10% significance level, it would not be too wrong to think about the significant relationship in the fourth delay.

Table 4. Causal Relationship between Freight Index and 5 Years Old Ship

| IX=IY=1 | p_HJ=0.000022 | T_HJ=4.086836 | p_T2=0.000118*** | T_T2=3.677216 |
| IX=IY=2 | p_HJ=0.000037 | T_HJ=3.962859 | p_T2=0.000155*** | T_T2=3.607394 |
| IX=IY=3 | p_HJ=0.000117 | T_HJ=3.678124 | p_T2=0.000365*** | T_T2=3.378018 |
| IX=IY=4 | p_HJ=0.000327 | T_HJ=3.408331 | p_T2=0.000706*** | T_T2=3.192105 |

Symbols correspond to *10%, **5%, ***1% confidence intervals.

Secondly, the causal relationship between the Capesize freight index and the 10-year-old ship value is tested, and the results are presented in Table 5. According to the results, the significant causalities are determined both from the freight index to the value of the ship and from the ship value to the freight index for all 4 lags.

Table 5. Causal Relationship between Freight Index and 10 Years Old Ship

| IX=IY=1 | p_HJ=0.006662 | T_HJ=2.475000 | p_T2=0.007442*** | T_T2=2.435197 |
| IX=IY=2 | p_HJ=0.031096 | T_HJ=1.864923 | p_T2=0.033551*** | T_T2=1.830993 |
| IX=IY=3 | p_HJ=0.049310 | T_HJ=1.651583 | p_T2=0.069513* | T_T2=1.479425 |
| IX=IY=4 | p_HJ=0.079253 | T_HJ=1.410112 | p_T2=0.103684* | T_T2=1.260837 |

Symbols correspond to *10%, **5%, ***1% confidence intervals.

Thirdly and lastly, the causal relationship between the Capesize freight index and the value of the new build Capesize vessel is tested and the results are presented in Table 6. According to the
results, while the causalities are determined in 4 lags from the freight index to the value of the 
ship, a significant causality cannot be determined from the ship value to the freight index.

Table 6. Causal Relationship between Freight Index and New Building Ship

| Ln Capesize Index does not granger cause Ln Capesize New Building Price |
|-----------------------------|-----------------------------|-----------------------------|
| IX=IY=1                     | p_HJ=0.003676               | T_HJ=2.680475               |
|                             | p_T2=0.004404***            | T_T2=2.619410               |
| IX=IY=2                     | p_HJ=0.002577               | T_HJ=2.797299               |
|                             | p_T2=0.007678***            | T_T2=2.423863               |
| IX=IY=3                     | p_HJ=0.005329               | T_HJ=2.553701               |
|                             | p_T2=0.011276**             | T_T2=2.280950               |
| IX=IY=4                     | p_HJ=0.006023               | T_HJ=2.510814               |
|                             | p_T2=0.009704***            | T_T2=2.337595               |

| Ln Capesize New Building Price does not granger cause Ln Capesize Index |
|-----------------------------|-----------------------------|-----------------------------|
| IX=IY=1                     | p_HJ=0.153038               | T_HJ=1.023489               |
|                             | p_T2=0.146601               | T_T2=1.051125               |
| IX=IY=2                     | p_HJ=0.168819               | T_HJ=0.958844               |
|                             | p_T2=0.156036               | T_T2=1.010886               |
| IX=IY=3                     | p_HJ=0.276416               | T_HJ=0.593522               |
|                             | p_T2=0.261797               | T_T2=0.637815               |
| IX=IY=4                     | p_HJ=0.225131               | T_HJ=0.754979               |
|                             | p_T2=0.237809               | T_T2=0.713370               |

Symbols correspond to *10%, **5%, ***1% confidence intervals.

Conclusion

In this study, it is aimed to contribute to the literature by approaching from a different perspective 
to the clear relationship already known in the literature. The maritime market is directly affected 
positively or negatively by the shocks in the global economy by its nature. In addition, dry bulk 
shipping is close to the perfect competitive market and its supply side is uncontrollable. Entrance 
to the market is relatively easy and the barriers are low. All these factors lead to the formation 
of market variables in a volatile and non-linear structure. Therefore, it is hoped that examining the 
possible relationship between variables with nonlinear methods contributes to obtaining more 
accurate results.

In this context, the freight market is one of the four sub-maritime markets and is their pioneer 
market. Because the changes here affect other markets, then it is affected by the developments in 
other markets. The necessity of examining the relationship between the ship asset values and the 
freight market as nonlinear due to the nature of the maritime market directed us to conduct this 
study. For this purpose, the relationship between the freight market and ship asset values is tested 
by the Dicks and Panchenko (2006) method which allows the detection of the causalities with 
lagged values. The relationship is examined based on the Capesize market by using Baltic 
Capesize Index (BCI), Capesize 5 year old ship value, Capesize 10 year old ship value and 
Capesize new building ship value variables. As a result of the study, it is determined that the 
freight index is the cause of the second-hand ship values, while the second-hand ship values are 
also the cause of the freight index. Although the freight index is the cause of the new building 
value, the new building value is not the cause of the freight index. This indicates that both the 
freight index and the second-hand ship values are both influencing and affected, but the value of 
the new building vessel is only affected. This can be attributed to many factors. Firstly, as seen in 
the chart in Figure 1, the new building values are below the second-hand ship values at several 
points. In other words, it is affected by the developments in the freight market and the price 
increases in the second hand values are parallel with it. However, due to the time-to-built effect, it 
cannot lead to second-hand prices after a certain point. The second hand market is more liquid as 
it makes it possible to obtain earnings under current market conditions. Secondly, shipbuilding 
prices are affected by some factors other than market conditions. For example, the utilization rate 
of shipyards is effective. Even if there is not much increase in demand, new building prices rise if 
capacity utilization rate increases. Or, if the capacity utilization rate is low, the prices increase.
more slowly even if the demand is high. In another aspect, ship prices are also affected by shipbuilding costs. An increase in costs can lead to an increase in shipbuilding values even if there is no demand for new vessels.

Further studies may investigate this relationship in other vessel types or other shipping markets. Also it is thought that using different econometric methods helps to increase the consistency of the results by different approaches.

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INDUSTRY 4.0 REVOLUTION AND THE FUTURE OF ACCOUNTING APPLICATIONS

A. Cemkut BADEM¹
Yavuz KILINC²

INTRODUCTION

Among the most important revolutions in terms of human history, first the agricultural revolution and then industrial revolutions are shown. Until today, three important industries revolution have been experienced and nowadays we are transitioning to a new industrial revolution that is mostly discussed. In this revolution, which is called the fourth industrial revolution (Industry 4.0), all memorization has begun to deteriorate and the human factor in the industrial field is almost destroyed.

In fact, when we look at the general aspects of all industrial revolutions, we see that the revolutions are fundamentally affecting the whole human life. That is to say, it significantly influences all industrial areas rather than just a single industry branch or a single field of activity. For this reason, Industry 4.0 will affect human life as a whole, as in other revolutions.

This study discusses how the accounting profession and accounting practices will be affected by Industry 4.0, how much and in what way. Therefore in study, first the concept of Industry 4.0 and then the content of Industry 4.0 are introduced. In the continuation of the research, the current situation of the accounting profession and its applications and what the profession waits together with Industry 4.0 are discussed.

1. CONCEPT OF INDUSTRIAL REVOLUTION AND HISTORICAL DEVELOPMENT OF INDUSTRIAL REVOLUTION

The concept of revolution as a word means a rapid, effective and radical change in a particular area (TLS). Industrial revolution, on the other hand, is the name of the transition from the mode of production based on human and animal power to the mode of production using machines. Industrial revolution is considered as the second most important turning point in terms of human history. As a result of industrial revolutions, human life has experienced substantial changes and consequently, significant changes have occurred in people's living standards (Küçükkalay, 1997:52).

Industry is an important part of the economy in which products are produced through high level mechanized and automation. Technological advances since the beginning of industrialization have led to paradigm shifts called "industrial revolution" (Lasiet all, 2014:239).

Until the 21st century, human history has experienced three important industrial revolutions. In this revolution, which was first seen in England at the end of the 18th century and was considered to be the first industrial revolution, James Watt's steam power-driven machines began to be used in production. This change in the textile industry began to spread rapidly to the chemical industry and other production areas over time (Yıldız, 2018:547, Eğilmez, 2018:265).

With the transition from the use of steam-powered machinery to the operation of machines with electrical power, the Industrial 1.0 revolution has been replaced by the Industry 2.0. Especially in the late 1800s, the presence of machines powered by electric power, which was first used in slaughterhouses in Cincinnati, in the US, led to this revolution, however it was mainly driven by Ford Motor Company in the United States. This period is also called Fordism or Taylorism. The

¹ Kocaeli University, Faculty of Economics and Administrative Sciences, cemkutbadem@hotmail.com
² Kocaeli University, Faculty of Economics and Administrative Sciences, yavuzkilinc25@gmail.com
second industrial revolution emerged from the use of electricity in production systems and the adaptation of electrical power to assembly lines. Together with Industry 2.0, significant breakthroughs have been made in transition to mass production. With the increase in mass production, significant increases in the capacities of enterprises and decreases in costs and prices have been experienced (Drath and Horch, 2014:56; Sayer and Ülker, 2014:66; Eğilmez, 2018:266).

The Industry 3.0 revolution, which still continues its existence, has emerged in the 1970s, after Industry 2.0, with the transition of production systems from analog to digital and the use of digital systems in industries. In this process, by adapting the programmable logic circuits developed by Modicon Automation Systems in 1969 were adapted to the system, automation systems in the industry are made available (Drath and Horch, 2014:56; Yıldız, 2018:547). With the third industrial revolution, the use of computers, Smartphone and the spread of the Internet have affected and shaped the production in all its aspects. The developments in transportation and communication have led to the globalization of trade and industry. In this respect, industry 3.0 is called as a period in which human labor in production decreases and production automation increases (Eğilmez, 2018:266).

With the disappearance of the borders between countries in terms of trade, globalization has increased trade level between countries significantly. In addition, production systems that are forced to adopt a more flexible structure with changes in customer preferences have led to the need for higher technologies to be used in enterprises. Interdisciplinary studies have gained momentum in the provision of high technologies needed. This situation constituted the 4th Industrial Revolution in which all objects communicate and interact with each other (Sayer and Ülker, 2014:66). The change and development of the industrial revolutions, which are called the most important revolution after the agricultural revolution in terms of human history, are shown in Figure 1 below.

![Figure 1: Historical Development of Industrial Revolutions](image)
2. CONCEPT OF INDUSTRY 4.0

In recent discussions on the development of new information and communication technologies, a paradigm shift is observed, indicating a transition from a real physical world to a virtual world. In this respect, it can easily be said that the products and production processes produced in the enterprises are connected with the internet based applications and the situation is gradually increasing. This rise in information and communication technologies constitutes the basis of future development and change. These developments in technology since the beginning of industrialization have led to paradigm changes and the formation of industrial revolutions accompanied by these paradigm changes. The concept of Industry 4.0 can be defined as the vision of the fourth industrial revolution Wilkesmann and Wilkesmann, 2018:239).

Industry 4.0; It is a complex and flexible system covering many areas such as digital production technology, network communication technology, computer and automation technology. The basis of the system consists of digital design and simulation, production systems with high level automation, data management network and product process management. Industry 4.0 is also based on Cyber-Physical System (CPS), which incorporates computing, communication and control technologies that enable real-time data sensing, intelligent production systems, dynamic control and information services (Zhou et al, 2015:2149).

The concept of Industry 4.0 is basically a system connected to Cyber Physical Systems for the integration of information and communication technologies and industrial technologies, and for the establishment of digital and intelligent factories for digital, information-oriented, personalized and environment-friendly production. The goal of Industry 4.0 is to ensure the delivery of digital products and services by creating a personalized and highly flexible production model with real-time communication and interaction between people, products and machines throughout the production process. With Industry 4.0, there will be significant improvements in production efficiency and competition in enterprises and industrial efficiency is expected to increase by 30% on average (Zhou et al, 2015:2147). In addition, according to some sources, it is expected to decrease 10-30% in production and logistics costs and 10-20% in if quality management costs (Rojko, 2017:80).

Industry 4.0's to enterprises; has advantages such as new products to the market faster, to produce special products suitable for the demand of customers without increasing the overall production costs, to create a more flexible working environment, to provide more efficient use of natural resources and energy (Rojko, 2017:80-81).

Hermann et al (2016) and Roblek et al (2016) state that there are four basic components of Industry 4.0 as: Cyber-Physical Systems, Smart Factories, Internet of Things and Internet of Services. These components will be briefly described as follows.

2.1. Cyber-Physical Systems (CPS)

The most important component of Industry 4.0 is the existence of Cyber Physical Systems which bring the physical world and the virtual world together. CPS is a system in which physical and virtual world is integrated by combining the machines, storage systems and production facilities used in production by creating global networks in enterprises. By means of CPS, high level cooperation in planning, analysis, modeling, design, implementation and maintenance will be ensured in the production process. CPS; it will enable enterprises to increase the productivity and labor force performance, to promote the growth of enterprises and to produce higher quality products at lower cost (Lu, 2017:4). CPS has two main functions based. These; are advanced connection that provides real-time data acquisition from the physical world and information feedback from the cyber area and it is the analytical and computational ability with intelligent data management that creates cyber space. The implementation of CPS in existing factories, ie using the components of Industry 4.0 to integrate activities such as production, logistics and services, existing factories will be transformed into Industry 4.0 factories with significant economic potential (Lee, et all, 2015:18). For the development and innovation of CPS, various disciplines such as control engineering, mechanical engineering, civil engineering, biology and
computer engineering need to be put together. The global competitiveness of the countries that become technology leaders in CPS will increase significantly (Rajkumar, et al., 2010).

Figure 2 below shows the steps to be followed for the development and implementation of Cyber Physical Systems in the production applications of enterprises.

Figure 2: Requirements for Use of Cyber-Physical Systems in Enterprises

Source: (Lee et al., 2015:19)

2.2. Smart Factories:

Figure 3 shows the structure of intelligent factories from the major components of Industry 4.0. Smart factories, also referred to as Cyber Physical Production Systems, are the transformed form of Cyber Physical Systems into practice in production systems (Alçın, 2016:26). The Smart Factories, the other important component of Industry 4.0, includes intelligent machines and systems where the business need is detected by sensors, communication is established via the internet with other remote production tools, and where the required production information is obtained from big data (Yıldız, 2018:551).

Thanks to smart factories, enterprises will be more intelligent, flexible and dynamic. Production; It will be equipped with sensors, actuators and autonomous systems. Machinery and equipment have the ability to improve the production process through autonomous decision making and self-healing (Robleket et al., 2016:4). As can be seen in Figure 3, the basis of intelligent factories is reconstructable production systems. These production systems provide enterprises with the opportunity to act in accordance with the constantly changing market structure at the points such as the design and quantity of the products, and provide opportunities to increase the competitiveness of the enterprises (Rojko, 2017:81).

With the concept of smart factory, it is possible to reduce the possible losses in production and to answer the customer needs immediately. In addition to the product range, smart factories are able to make production in a just in time production manner possible for enterprises (Alçın, 2016: 26-27).
2.3. Internet of Things

Structures that make it possible for objects to communicate with each other are called Internet of Things. This concept was first mentioned by Kevin Ashton in 1999. From a technical point of view, the Internet of Things is a collection of physical artifacts that include embedded systems of electrical, mechanical, computer and communication mechanisms that enable internet-based communication and data exchange (Yıldız, 2018: 550). The basis of this concept is the various objects or objects that are located around us; Communication with Radio Frequency Identification Labels (RFID), sensors and actuators is the idea of cooperating with one another to achieve common goals (Atzori et al., 2010: 2787). The main features of the internet of objects can be listed as follows (Vermesan and Friess, 2014: 12-13):

- **Interconnectivity**: Thanks to the use of IOT, all kinds of objects can be connected together with the global information and communication infrastructure.
- **Things-related services**: IOT has the ability to provide services such as privacy protection for objects and the relationship between physical objects and virtual objects in accordance with the constraints of objects. In order to provide these services, both the technologies in the physical world and the information technologies need to be adapted to Industry 4.0.
- **Heterogeneity**: The devices in IOT are heterogeneous depending on the different hardware platforms and networks. In this way, they can interact with other devices and service platforms through different networks.
- **Dynamic changes**: Devices such as sleeping, waking up, connecting, disconnecting, operating speed and location of devices can be monitored and changed. Also the number of devices can be changed dynamically.
- **Enormous scale**: The number of devices that need to be managed and communicating with each other will be greater than those connected to the existing Internet. Communication provided by the devices will be of greater importance than
communication provided by people, and there will be a preference for the communication provided by devices rather than people. The most important point here is the interpretation of the obtained data and its intended use.

2.4. Internet of Services

The Internet of Services means that service providers provide their services from the Internet. Thanks to the internet of the services, it is ensured that the requested services can be offered worldwide and that these services can be requested worldwide. Services are brought together by suppliers to create added value and are offered to those who demand it (Buxmann et al., 2009: 341).

3. FUTURE OF ACCOUNTING APPLICATIONS

Nowadays, the important technologies that will enter our lives with Industry 4.0 will significantly affect both accounting practices and accounting education. Especially the fact that the Internet of Objects, which is one of the main components of Industry 4.0, will be in communication with other objects or people over the internet will cause significant changes in the business flow processes of enterprises (Yürekli and Şahiner, 2017: 157).

Accounting information system covers a significant part of the information systems of enterprises. The data obtained from the accounting information system are used for planning, control, audit, economic analysis and reporting. Accounting, aimed at the targets set forth in the reporting period of the enterprises; it plays an important role in measuring the performance of the enterprise, making future planning and providing the necessary estimations. In addition, it provides important information to managers in determining the causes of deviations in planning, increasing the efficiency of the enterprise and conducting accounting procedures in accordance with the legal regulations of countries (Slyozko and Zahorodnya, 2016). As it is known that the impact of future technologies on accounting information system will be significant, considering that accounting information system has such importance in enterprises, Industry 4.0 applications will provide further development of both accounting profession and accounting applications.

It is thought that the technologies used in enterprises with Industry 4.0 will significantly improve the accounting practices in terms of integration and real-time accounting data. When the existing accounting practices are considered, integration with Enterprise Resource Planning (ERP) systems is realized, and thanks to XBRL, real-time accounting data is available (Can and Kiymaz, 2016: 111). However, there are two basic questions have to asked. These:

1. What is the compatibility of existing ERP and XBRL systems with emerging technologies under Industry 4.0?
2. Is it possible to achieve the objectives desired by Industry 4.0 through the use of existing systems?

In order to answer these questions, it is necessary to examine the existing systems and determine whether they are ready for Industry 4.0.

3.1. Structure of Existing ERP and XBRL Systems

ERP systems; such as accounting, finance, human resources, material management, production, sales and marketing all the functions of the enterprise, to integrate each other aims to integrate. In this period, the use of Information Technologies in the institutional field has been viewed as one of the most important developments of the 1990s (Gyampah and Salam, 2004: 732).

Today, ERP systems are considered as the most basic information systems that enterprises should have in order to maintain their activities. Moreover, it is considered that institutional enterprises will incapable of work when there isn't an ERP and Customer Relationship Management (CRM) system. However, the existing ERP and CRM systems on the way to the future industry have important obstacles (Stojkic, et al., 2016: 918). Existing ERP systems do not quickly provide adaptation to production planning. At the same time, it is seen that traditional automation structures are insufficient to meet the requirements of Industry 4.0. In addition, it is known that
they do not have enough flexible structure to integrate quickly with dynamic variables for workflows in factories and to offer the best solutions. These points can be given as an example of the obstacles of existing ERP systems (Rojko, 2017: 83-84). Since ERP and CRM systems will continue to be the backbone of enterprises, existing ERP and CRM systems need to be delivered in accordance with Industry 4.0. From this point of view, ERP and CRM systems that must be adapted to Industry 4.0 must contain the following features (Stojkic, et al, 2016: 918).

- ERP and CRM systems should functionality to enable information users to access the information they require by mobile phones and tablets. These improvements in the systems will increase productivity in enterprises and enable employees to benefit from the benefits of these systems at maximum level.
- ERP systems must be adapted for the automatic analysis of large amounts of unstructured data collected in real time from the operating processes over embedded big data and data mining.
- Virtual applications should be implemented to enable businesses to realize their activities in real time through the smart value chain. Thus, ERP systems will be functionalized.
- It is necessary to integrate ERP systems with social networks that will enable faster transmission of information to end users.

ERP systems that are equipped with Industry 4.0 and use the Internet of Things; it is directly connected with the establishment of smart factories that require the installation of production equipment that can read and store acquired data from variables such as production, energy, time and other production processes. The aim to be achieved with the establishment of smart factories is to establish a direct relationship between all systems in the enterprise, including ERP systems (Robleket all, 2016: 5).

With the use of smart devices and machines in factories, existing ERP systems will need to be significantly improved. In order to develop a broad communication network through the internet of objects, ERP systems must provide the necessary interface to smart objects. Thanks to the use of advanced technologies in enterprises, enterprises can further develop their production processes and achieve maximum benefit in production processes. Businesses with smart factories will be able to obtain the necessary data for the production of the finished products or the raw materials to be put into production and automatically identify what needs to be done in the next step (MajeedandRupasinghe, 2017:38). In this way, it will be seen that the network communication problem between the machines and systems, which are one of the most important points of Industry 4.0 and the existing ERP systems, can be solved and the need for human existence will be eliminated in eliminating the problems that are likely to arise in ERP systems.

It is thought that, with the Industry 4.0, real-time accounting data will be presented to the users of information more quickly and efficiently. In the current system, it is seen that real-time accounting data is presented to the users of the information via XBRL (Extensible Business Reporting Language).

XBRL; is a financial reporting language that spreads rapidly in the world. XBRL is the name of the structures that enable the real-time presentation of financial information on the internet and enables electronic communication (Toraman and Abdioglu, 2008:79). The primary objective of XBRL is to ensure the integration between the data that interact with each other in the preparation of the financial statements and to obtain financial reports quickly. However, in the internal reporting; XBRL is also used in the acquisition of information, integration and control processes. In addition to providing significant benefits in all enterprises, the benefits obtained by using XBRL in high automation enterprises are increasing. Some of these benefits are as follows (Faboyedeet all, 2017: 21):

- It allows competitors to be analyzed and compare the enterprise with other businesses in the same industry.
• It enables the development of audit processes and the analysis of enterprises' objectives such as mergers and acquisitions.
• It enables the enterprises which are newly joined to the enterprises to integrate faster.
• It enables communication between the autonomous units of the enterprise even when different accounting and ERP systems are used.
• It provides data from various software and databases automatically.

Considering both investors and analysts and other users of information, significant advantages can be achieved through existing XBRL applications. Some of these advantages are as follows (IIiaset all, 2014: 7):

• The time spent on the analysis of the financial reports of the enterprises is significantly reduced.
• Provides ease of access to financial information that needs to be obtained worldwide.
• Allows real-time financial analysis.
• It enables the financial status of businesses to be seen quickly and easily.
• It allows the comparison of financial reports of businesses operating in different countries.

The CFA Institute's survey conducted in 2016 to measure the XBRL awareness level of its members reveals significant results. In this survey, 362 CFA members participated in the USA, Europe, Middle East, Africa, and Asia Pacific region and the level of awareness of the members about the XBRL was tried to be measured. According to the results of the survey as of 2016, 55% of the members are not aware of XBRL, 35% of them are aware of XBRL but they do not use them in financial reporting, while 10% of the participants use XBRL. This finding is almost identical to the results of the surveys conducted in 2007, 2009 and 2011 (CFA Institute).

Considering all the benefits of XBRL in terms of financial reporting, it is clear that it is of great importance for all users of information. However, it is seen that the use of XBRL applications is not high when CFA's surveys are conducted. In other words, it is seen that the participants did not benefit from this reporting language and the important advantages of this reporting language or the beneficiaries were few. It is thought that the awareness and usage level of XBRL, which is expected to provide greater benefits to users through applications developed with Industry 4.0, will increase in this way. Thanks to the widespread use of XBRL, the real-time presentation of financial reports, which are the most important outputs of the accounting information system, will be more reliable and the cost of acquiring information will be lower. In addition, it can be said that the accounting information system will have a more flexible structure and thus the information that needs to be acquired will be obtained much faster.

3.2. The Effect of Technology on Accounting Profession

Together with Industry 3.0, significant developments have been made in accounting. Accounting activities of enterprises have been started to be realized through computers and the internet significantly. Businesses with the use of internet and computer technology; have implemented applications such as electronic signature, electronic invoice, and electronic declaration. In addition, invoices and notebooks started to be kept in the electronic environment (Toraman and Abdioglu, 2008: 93). Therefore, businesses will be able to develop these applications that they use with Industry 3.0. As the phrase goes, businesses will be able to carry out their accounting activities without the need for human resources. In order to achieve this situation, enterprises will need to adapt their technological infrastructure to Industry 4.0 and make significant investments and transform their factories into smart.

With Industry 4.0, the volume of the informal economy can be reduced by the technologies expected to be developed in accounting and economics. The fact that the accounting information system will be under the control of the relevant regulatory authorities will ensure that the data entry to the accounting information system is more transparent. This will allow the unregistered economy to be reduced on the one hand, while on the other hand it will allow for automatic
prevention of unwanted deviations or the correction of deviations by real-time reporting (Slyozko and Zahorodnya, 2016).

In the light of these important developments, which will be experienced by CPS as well as by the internet of objects and services, the question of whether the accounting profession and accountants will be needed in the future will be raised. With all these technological developments, it is clear that the accounting profession will move away from the bookkeeping concept. Accountants will need to be individuals with the required technological knowledge. The data to be transferred to the accounting information system via intelligent objects will be analyzed by data analysis techniques such as data mining and will be presented as direct and real-time available information by the accounting information system. All these technological developments will require accountants to be individuals who are able to prepare the technological infrastructure for obtaining accounting reports and read all the data processing process and apply them to the required management processes.

Even with the industry 4.0, accountants will no longer need to establish any office, they will not need to have computers, furniture, telephones and similar equipment in these offices. The presence of computers with good hardware and a strong technology for accountants will be sufficient to perform their profession. In short, the presence of Internet connection and computers may be sufficient for accountants to perform their professional activities (Slyozko and Zahorodnya, 2016).

Accountants of the future; individuals who are able to work with robots, keep up with digital developments and make the necessary data analysis with the use of new technologies, read advanced engineering data, and provide consultancy services to companies and other users (Akdogan and Akdogan, 2018: 12).

In the light of all these explanations, the possible effects of Industry 4.0 on accounting practices can be summarized as follows.

New developments in the production processes of Industry 4.0 are expected to result in significant reductions in production costs. In this system, where the human factor will be reduced to a minimum level, labor costs in enterprises will decrease significantly. In addition, the fact that the errors in the human factor in production will be eliminated will also reduce the costs.

Intelligent systems to be used in Industry 4.0 will enable enterprises to use their capacity at maximum level. Since it will be possible to determine the problems that may be encountered in production vehicles beforehand by means of the internet of the objects, the problems that may occur during the production will be determined in advance and the costs will be reduced by minimizing the time loss. This will also enable enterprises to make continuous production.

By reducing the social, economic and environmental factors that are thought to have important effects on the production capacities of the enterprises, and the enterprises will be able to produce at maximum capacity. This will lead to a significant reduction in the idle capacity costs resulting from the unavailable capacity of the enterprises.

The factor of smart machines that businesses need to acquire in spite of the cost reductions due to the reduction of the human factor's place in the production system will result in significant cost input to the enterprises, ie, the enterprises encountering fixed costs. However, this situation will decrease with the effective use of the system over time and fixed costs will be offset by depreciation.

The methods such as FIFO and LIFO, which are used by companies in stock valuation, can be completely replaced by real party cost method. Because smart forklifts, smart barcodes or labeling systems to be used will provide enterprises with the convenience of identifying the actual costs of the products.

First of all, intelligent systems will be able to automatically record the accounting transactions of financial events of the enterprises to the accounting information system and accounting procedures can be performed automatically. Processes such as electronic invoices which become
widespread nowadays will become simpler and the accounting reports related to the conveniences that will be provided from the communication of the objects with one another can be arranged instantly on the systems and presented to the users of accounting information. In addition, thanks to cloud systems, the desired accounting process can be reached at any time.

Non-collectability of receivables, impairment of inventories and value decreases in equity shares and taxes to be calculated can be made automatically by accounting information systems. In addition, the calculated taxes, the fees to be paid to the suppliers and the collections to be made can be made automatically on the system.

It is expected that the new regulations, laws and standards that arise about the accounting activities of the enterprises can be updated automatically by the systems and it is expected to avoid the calculation of multiple profit figures such as commercial profit-tax profit or similar situations.

Another aspect of the impact of Industry 4.0 on the accounting profession is accounting education. The training curricula of the future accountants or managers need to be adapted to the requirements of the Industry 4.0 at both high school, undergraduate and postgraduate. In this way, the adaptation problem of the accountants is eliminated and the enterprises are provided with the human resources to meet the requirements of Industry 4.0.

Conclusion

It is expected that the factories and of all devices in the factories will become smarter in the process reached with Industry 4.0. It is not only the automatic exchange of information with the production resources expected from future factories, but also the fact that the machines are as intelligent as possible to control the current state of the machines with the systems installed in the factories. In addition, functions such as product design, production engineering, production planning and control will be linked to each other. Businesses of the future will develop a complete network of communication with all stakeholders involved in the product value chain (such as suppliers, customers, businesses that provide logistical support). The established communication network enables the needs of departments to be seen in real time and the departments are designed to enable the enterprise to operate in the most appropriate conditions. Thanks to the technologies used, it is possible to increase the profitability of all the stakeholders in the value chain through the reduction of product costs and the availability of the first materials and materials in time. Thus, the existence of enterprises with high level of competition can be ensured. Since Industry 4.0 sensors are built-in with identifiable components and processors, they can provide data for analyzing and monitoring the status of products. In addition, the most appropriate design for the development of products can provide the necessary data for the provision of forecasting and maintenance activities. With Industry 4.0, customers can order any number of products from any product of their choice. Customers can change their products even while they are in production, or they will be able to obtain the production information of the product they have ordered (Tsai and Lai, 2018: 3).

All transactions in smart factories; It shall ensure that the enterprises are in communication with all the elements within the organizational structure and value chain. In addition, the human factor will not be effective in carrying out all these operations.

When the future of the accounting profession is questioned from Industry 4.0, the question of whether there will be a need for accountants is encountered. In this period, it is stated that the human factor will decrease significantly in enterprises and the human factor will be activated only at important decision-making points. Although it is known that all accounting procedures can be done by intelligent systems, it is thought that human factor will be needed to ensure effective control of the information to be created by the systems. For this reason, accountants should have sufficient knowledge level in many fields such as robotics system knowledge, software development and informatics knowledge and project management skills. Therefore, it is expected that new developments will be introduced within the scope of Industry 4.0 for the audit activities.
of enterprises. In addition to the self-monitoring of the systems, it is of great importance to supervise all systems by a human.

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EVALUATING THE RELATIONSHIP BETWEEN SOCIAL BENEFITS AND UNEMPLOYMENT: AN EMPIRICAL ANALYSIS FOR TURKEY

Ayhan ORHAN1
Sedanur DEMİR2

INTRODUCTION

Much as the history of social assistance and social welfare institutions go back a long way, the concept of social state, namely, welfare state understanding began to spread in Western states since the 1940s along with the Keynesian view of economics. The concept of social state gives various tasks to the state to avoid poverty and ensure the fair distribution of income; also gives various rights such as good and social security to the citizens. Social benefits which become a burden to the state with the spread of social state understanding are the unpaid aid in the form of cash, in kind and/or services provided temporarily to enable individuals with low levels of welfare to reach standard living conditions.

While the reforms implemented by the welfare states reinforce the relationship between work and social protection, precarious forms of work lead to the simultaneous fragility of the relationship between work and social protection. This situation makes the increasing number of individuals addicted to social assistance in time. Studies on the beneficiaries of social assistance have shown that the individuals who receive help before and after the benefits are more concentrated in irregular, precarious and informal jobs. Moreover, as a form of a cycle, it was concluded that the members of the family and their children work in irregular jobs; thus, the poverty problem of the households entered a vicious circle (Gokbayrak, 2017: 72-84). Although it is foreseen that the social benefits that are given for the solution of the poverty problem is provided temporarily, this period is prolonged for such reasons and causes needy to maintain his life by related aids. This situation causes problems in the economy in terms of both the budget allocated for social assistance and the decrease in the registered labor force.

This study is based on the criticism that individuals who receive social assistance make it a habit of getting help and also make them dependent to the help.

In this empirical study, the relation between social assistance and unemployment was observed with the data between January 2005 and December 2017 in Turkey. VAR analysis and impulse-response analysis were applied in the data.

SOCIAL ASSISTANCE AND THE ROLE OF SOCIAL ASSISTANCE IN ECONOMY

Poverty is an economic problem that damages the right to life, limits the effective distribution of resources and also leads to be under of the country's potential (Ozturk N, Ozturk Y, 2010: 1). Social assistance is an important policy tool in the solution of poverty problem. In other words, social security is the in-kind and/or cash benefits provided by the state to individuals who do not have certain income security or cannot live in a minimum level of subsistence level even though they have an income (Yay, 2015: 19). Social aids are generally the policies of the state to solve market failures (Arslan, 2014: 17).

1Associate Professor, Kocaeli University, Faculty of Economics and Administrative Sciences, aorhan@kocaeli.edu.tr
2Research Assistance, Kocaeli University, Faculty of Economics and Administrative Sciences, sedanur.demir@kocaeli.edu.tr
Social assistance policies are built on three main objectives in developed welfare states. The first and the most important goal is the reduction of poverty, the second one is to ensure that the disadvantaged individuals are socialized and the third purpose is to ensure to provide individuals who are disadvantaged become socialized (Cited: Gokbayrak, 2017: 72). Within the scope of these objectives, various social assistance activities are carried out by the institutions under the keeper of the state and non-governmental organizations in order to insure the existence of the poor individuals and to provide a humanely life.

The basic characteristics of social assistance are as follows; (Cited: Yay, 2015: 20);

- Social assistance is primarily towards the implementation of social security services.
- Social assistance can be offered in cash, in kind, and in services (as rehabilitation, rearing, care, treatment).
- Social assistance is provided without any response (unpaid) from the needy recipients.
- Social assistance is offered based on the research and control of the needs of individuals receiving help.
- Social assistance is temporarily granted until individuals are self-sufficient.

**The Role of Social Assistance in the Economy**

The state, as a responsibility of being a social state follow policies transfer expenditure policies to prevent or minimize income injustices and poverty and to provide a variety of assistance to citizens who live under the standards of the minimum level of subsistence (Ozturk N, Ozturk Y, 2010: 168). The concept of transfer expenditures that is mentioned by Pigou for the first time in the literature is an expenditure item that is included general budget expenditures of the state and also defines the expenditures of state for free.

When examining transfer spending in Turkey, it is thought in two different periods. The first period was between 1963 and 1980, and the second period from 1980 to the present. The first five-year development plan covering the years 1963-1967 was adopted on 21 November 1962 and thus the first planned period started in 1963. Also in 1980, 24 January decisions were taken and liberal policies started to be implemented. For these reasons, transfer expenditures are examined as 1963-1979 and aftermath of 1980 (Cited: Ozen, 2003: 207). Examining in terms of the budget system, in the coding system of transfer spending has created some changes because Turkey's economy applied the Analytical Budget System since 2004 (Kanca, 2012: 52).

Current transfers that are a classification of public expenditures define unrequited payments made for the financing of current goods and services. Current transfers are divided into seven sub-headings, duty losses, treasury assistance, transfers to non-profit organizations, transfers to households, benefit payments from household social security institutions to households, transfers to abroad and dividends (Republic of Turkey Ministry of Treasury and Finance General Directorate of Budget and Fiscal Control). "Transfers to households" imply to transfers (in kind, cash, and services) to the citizens in need of help and to the people who need help from our country for any reason. Scholarships and allowances, transfers for educational purposes, transfers for health, transfers for food, transfers for housing, transfers for agricultural purposes, transfers for social purposes, transfers for economic/financial purposes and all other transfers to households constitute transfer expenditures for households.

**SOCIAL ASSISTANCE, SOCIAL SOLIDARITY AND SOLIDARITY FOUNDATION IN TURKEY**

Since Turkey is a country where the tradition of the foundation is common and so there is a lot of assistance activities in here. Besides, Turkey is engaged in social assistance for individuals who are in need of help as a legal obligation.
Turkey has adopted the principle of a social state along with the Constitution of 1961 and also adopted the law "Every individual is entitled to social security. The State is charged with the duty of establishing or assisting in the establishment of social insurance and social welfare organizations" as 48th article of the 1961 Constitution. The concept of social state that is also known as the welfare state required the implementation of social security policies and social assistance for the citizens in need because of wars, crises or various reasons. Later, the expression called "The State is charged with the duty of establishing or assisting in the establishment of social insurance and social welfare organizations." was abolished in the 1982 Constitution but in the 2nd article of the same constitution defines Turkey as a social state. In addition the 5th article of the 1982 Constitution called "The fundamental aims and duties of the State are to safeguard the independence and integrity of the Turkish Nation, the indivisibility of the country, the Republic and democracy, to ensure the welfare, peace, and happiness of the individual and society; to strive for the removal of political, economic, and social obstacles which restrict the fundamental rights and freedoms of the individual in a manner incompatible with the principles of justice and of the social state governed by rule of law; and to provide the conditions required for the development of the individual’s material and spiritual existence."

As a constitutional requirement, the state should take the necessary precautions for persons with low welfare and/or no regular income security. For this reason, our country also implements various social policies in order to fulfill this duty and provides social assistance which is a means of these policies to the people in need. When looking at Turkey's last twenty years, the need for social assistance and services has increased because of increasing the urbanization and migration; high inflation, changes in the family structure, the deterioration of income distribution and also increasing the poverty. However, the studies on social assistance included significant deficiencies in consequence of aid organizations are scattered from financial and institutional sense, lack of coordination between them and their inability to form a common benchmark and standard of service (State Planning Organization, 2000: 110-111). During the last two decades, several improvements have been applied for these problems, but they have not been fully rectified as of yet. It is aimed to create a common database in order to objectively identify the people who will benefit from the social assistance system based on the principles of equality, social justice, efficiency and effectiveness (State Planning Organization, 2006: 90). In addition, it is also among the targets to increase the control of social work expenditures and to make various improvements to support the people in need in order to include the person in the production process. Studies in the field of social assistance can be listed as follows (Ministry of Development, 2013: 24-43):

- Giving importance to lower income groups in the field of education in order to prevent intergenerational transfer that transforms poverty into a vicious circle.
- Making studies based on increasing the link between social assistance and employment.
- Giving employment incentives.
- Aggregating the social assistance institutions for keeping them under the Ministry of Family and Social Policies in order to provide a more integrated structure of social assistance services.
- Starting the application of love houses and children's houses for children in need of protection.
- Providing home care services for disabled people.

Social Assistance and Solidarity Foundation (SASF)

There are many institutions and organizations for fulfilling social assistance applications in Turkey. The Social Assistance and Solidarity Foundation is one of the institutions of the state and prominent of them.

With the responsibility of being a state of social law, the 3294 numbered Law on Encouragement of Social Assistance and Solidarity No. 3294 was adopted on 29 May 1986. There is a total of 1002 Social Assistance and Solidarity Foundation where in the provinces and districts across Turkey service for the goal of this law. SASF finances its activities by the funds transferred from
the Social Assistance and Solidarity Promotion Fund (SASF) and also by revenues and other revenues from the enterprises and subsidiaries. SASF sponsors the financing of its activities from the funds transferred from the Social Assistance and Solidarity Promotion Fund (SASF) and also from the revenues of enterprises and of subsidiaries and from the other revenues (General Directorate of Social Assistance, 2018).

People who can get help from SASPF are as follows: poor citizens without social security; martyr relatives; veterans; people who may be productive and beneficial to the society through financial assistance and / or education-teaching support; victims and according to the criteria determined by the Fund Board, the needy people that despite who are connected to a social security institution or are received monthly income from a social security institution their per capita income is less than 1/3 of the net monthly minimum wage.

SASF, within the measure of objectivity, provides a variety of assistance to the needy and disabled individuals such as food, clothing, goods, fuel, treatment tools and supplies, financial assistance, education services, and shelter assistance. Within the scope of the family allowances; food aids; soup kitchen activities; fuel aids are provided. Within the scope of educational aids, training materials; conditional cash transfer training assistance; free book assistance; lunch assistance in the transport system; higher education scholarships and free transport of disabled students are provided. Within the scope of health aids, conditional cash transfer health benefits; health care support aids and disabled aids are provided. In the framework of social risk reduction projects (SRRP), rapid assistance; corporate development; SRRP conditional cash transfers and local attempt program assistance are provided. Within the scope of the income generating and employment enhancing project aids, income-generating projects; training projects for employment; social work projects; temporary work programs for public benefit and social support projects in rural areas are provided (Ozturk N, Ozturk Y, 2010: 187-220).

DATA ANALYSIS

The literature review on social assistance and unemployment or employment shows that most of the studies on these issues have been conducted by field survey and survey technique (Table 1). In this study, we wanted to look at the subject differently and from a macroeconomic point of view; so, instead of survey techniques, we preferred to work with macroeconomic data and perform VAR analysis. We analyzed three different variables. We preferred the transfer expenditures to households because of the expenditure item that reflects social assistance within the general budget. And we also preferred the population not included in the labor force and the unemployment rate as the control variable to see the changes in the labor force.

The data have selected from January 2005 to December 2017 and included monthly data from 156 observations. During this period, the effects of the 2001 crisis that are experienced in Turkey has decreased and there has been implemented the policy of a stable one-party government. Therefore, the data from 2005 to 2017 were analyzed. Data on transfer expenditures to households was taken from the official website of the Ministry of Finance General Directorate of Accounting. Population data which do not include unemployment rate and the population were taken from the Turkey Statistical Institute (TSI).

Literature Review

A review of the literature on social assistance and unemployment or labor relations is shown in Table 1.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Publication Name</th>
<th>Year</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ersin Bicer</td>
<td>Project Supports in the Fight against Poverty and Time Series Modeling of Project Supports</td>
<td>2009</td>
<td>Time Series Method</td>
<td>When the beneficiaries of the project support were divided into sub-headings; it was observed that the income generating projects with a rate of 84.9% is at first and social service projects with a ratio of 10.12% is at the second place. The fact that the density of income generating projects is higher, their contribution to employment, taxes paid and production, and the contribution of these projects to the economy, indicate that the supports will be returned as funds.</td>
</tr>
<tr>
<td>Yigit Aydin</td>
<td>Social Assistance Effects on Labor Supply in Turkey</td>
<td>2012</td>
<td>Survey Technique / Household Budget Survey</td>
<td>It has been observed that social assistance has a negative effect on the labor supply of women living in urban areas and has a positive effect on the labor supply of women living in rural areas. In addition, it was observed that social assistance did not have a statistically significant effect on men living in urban and rural areas.</td>
</tr>
<tr>
<td>Neslihan Arslan</td>
<td>Investigation of the Relationship between Social Assistance and Employment - A Field Study in Sivas Province</td>
<td>2014</td>
<td>Face to Face Interview Technique</td>
<td>In the field study of Sivas province; 37.1% of those receiving social assistance do not work in any job; 48.6% of those receiving social assistance work irregularly and also 14.3% of those receiving social assistance work regularly.</td>
</tr>
<tr>
<td>Yasar Aksanyar</td>
<td>Conditional Social Assistance as a New Approach to Social Assistance: The Program of Enabling the Social Assistance-Employment Connection 2014 A Study on Implementation of Turkey</td>
<td>2015</td>
<td>Survey Technique</td>
<td>95% of the participants stated that Turkish Employment Agency’s work on increasing employment and reducing unemployment should apply for the poor by affirmative action. It was accepted by all the participants that “those who are in fact needy people will be permanent in their jobs when they are directed to appropriate jobs for themselves”. And it is concluded that in 74% of the participants who have tendency to choose jobs and to prefer to get social assistance.</td>
</tr>
</tbody>
</table>
The Effect of Means-Tested Social Transfers on Labour Supply: Heads Versus Spouses - An Empirical Analysis of Work Disincentives in the Kyrgyz Republic

Analysis of Data

When we look at the Fig. of transfer expenditures to households (Fig. 1), it is observed that the data have a seasonality effect and have an increasing trend.

**Fig. 1. Transfer Spending on Households (Level)**

![Graph showing transfer spending on households with a seasonal effect and increasing trend.]

*Source: General Directorate of Accounting, April 2018.*

When we look at the Fig. of the population not included in the labor force (Fig. 2), it is seen that seasonality effects are explicit, average 26 thousand up to 2014, and after 2014 with a lower average, about 23 thousand.

**Fig. 2. PopulationExceptforLabor Force (Level)**

![Graph showing population except for labor force with seasonality effects.]

*Source: TURKSTAT, April 2018.*

The unemployment rate has a series in which the seasonal effects are clear. In 2008-2009, the unemployment rate increased to 16% due to the 2008 Global Crisis. The lowest level can be seen in 2012 with 8%.
The variables used in the analysis (transfers to households [ht], the population except for the labor force [igd] and the unemployment rate [iso]) were adjusted for trends, seasonality and the 2008 Global Crisis period, respectively. Logarithms of the population except for labor force and the transfers to households were taken. We used these variables as lht_ar (transfers to households), ligd_ar (population except for labor force) and iso_ar (unemployment rate).

Stability Analysis of Variables

In a time series analysis, one of the most important considerations is whether the series analyzed has a stationary structure. The fact that there is a meaningful and real relationship between variables and the absence of false regression is related to the stability of the variables (Tari, 2014: 374). The concept of stationary refers to the fluctuation of the average, variance, and covariance of a series within a certain confidence interval over time (Yildiz Bozkurt, 2013: 29). In other words, if the statistical features of the series do not change over time, it means that the series has a stationary structure.

When the series shows the same characteristic (average, variance, and covariance) over time, it indicates that the results will not significantly differ regardless of the period taken for that series. In this case, a series that is not affected by the time dimension is an important condition for the analysis. In other words, the series is expected to have a stationary structure. However, each of the series cannot be stationary with their original form. Therefore, various unit root tests have been developed to determine whether the series has a stationary structure.

**H₀**: I(1)  (*The series has a unit root, DSP*)

**H₁**: I(0)  (*The series has not a unit root, TSP*)

According to the H₀ and H₁ hypotheses, the results obtained when we apply the unit root tests for the data we analyzed in the EViews 9 package program are shown in Table 2.
Table 2. The Results and Stationary Levels of ADF, PP, and Breakpoint Unit Root Tests

<table>
<thead>
<tr>
<th>Unit Root Tests \ Variable</th>
<th>Transfers to Households</th>
<th>Population Except for the Labor Force</th>
<th>Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller (ADF) Test</td>
<td>The Model with Constant and Trend</td>
<td>-11.57335</td>
<td>-5.773700</td>
</tr>
<tr>
<td>1% Critical Value</td>
<td>-4.018748</td>
<td>-4.019975</td>
<td>-2.880591*</td>
</tr>
<tr>
<td>Stationary Level</td>
<td>I(0)</td>
<td>I(1)</td>
<td>I(1)</td>
</tr>
<tr>
<td>Phillips-Perron (PP) Test</td>
<td>The Model with Constant and Trend</td>
<td>-16.56828</td>
<td>-7.826583</td>
</tr>
<tr>
<td>1% Critical Value</td>
<td>-4.018349</td>
<td>-4.018748</td>
<td>-4.018748</td>
</tr>
<tr>
<td>Stationary Level</td>
<td>I(0)</td>
<td>I(1)</td>
<td>I(1)</td>
</tr>
<tr>
<td>Breakpoint Unit Root Test</td>
<td>The Model with Constant and Trend</td>
<td>-17.04045</td>
<td>-11.96286</td>
</tr>
<tr>
<td>1% Critical Value</td>
<td>-5.347598</td>
<td>-5.347598</td>
<td>-5.347598</td>
</tr>
<tr>
<td>Stationary Level</td>
<td>I(0)</td>
<td>I(1)</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

*is the value with a 5% critical value for the model with constant.

When Table 2 examined; according to the results that are obtained from the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Breakpoint Unit Root tests, the transfers to households is stationary at level [I (0)]; the population not included in the labor force and the unemployment rate are at different levels of stationary [I (1)]. Therefore, they are used by taking the difference of the population not included in the labor force and of the unemployment rate. In the analyses to be made; there is used lht_ar (for the transfers to households), dligd_ar (for the population except for labor force) and diso_ar (for the unemployment rate).

**VAR (Vector Autoregressive) Model Analysis**

In consequence of criticizing simultaneous modeling system, the vector autoregressive (VAR) model developed as an alternative time series model by Sims in 1980, who incorporated the dynamic interaction of macroeconomic variables in the model (Yildiz Bozkurt, 2013: 77). The use of two or more variables in the model (the vector concept) and the lagged values of the dependent variable to the right of the equation as an independent variable (the autoregressive concept) have formed the vector autoregressive model. From this definition, VAR is, in short, a multidimensional time series model in which all the variables in the model are included in the lagged values of itself and other variables (Tari, 2014: 451-452).

**Determining the optimal lag length;**

The optimal lag length is determined by various selection criteria. These criteria are for two purposes, one of which is the average error square minimization and the other is the choice of consistent lag level. The final prediction error criterion (FPE) and the Akaike information criterion (AIC) aim to find the minimum mean error square; The Hannan-Quinn criterion (HQ) and the Schwarz criterion (SC) also aim to find a consistent lag level (Yildiz Bozkurt, 2013: 110-112).
Table 3. Determination of Optimal Lag Lengths

<table>
<thead>
<tr>
<th>Lag Length</th>
<th>LR</th>
<th>FPE</th>
<th>AIC</th>
<th>SC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NA</td>
<td>0.000396</td>
<td>0.678613</td>
<td>0.739642</td>
<td>0.703410</td>
</tr>
<tr>
<td>1</td>
<td>61.81480</td>
<td>0.000290</td>
<td>0.368791</td>
<td>0.612908*</td>
<td>0.467978*</td>
</tr>
<tr>
<td>2</td>
<td>20.70254</td>
<td>0.000283</td>
<td>0.343364</td>
<td>0.770569</td>
<td>0.516942</td>
</tr>
<tr>
<td>3</td>
<td>14.70876</td>
<td>0.000287</td>
<td>0.358450</td>
<td>0.968743</td>
<td>0.606419</td>
</tr>
<tr>
<td>4</td>
<td>24.58793*</td>
<td>0.000271*</td>
<td>0.297407*</td>
<td>1.090787</td>
<td>0.619766</td>
</tr>
<tr>
<td>5</td>
<td>6.683721</td>
<td>0.000291</td>
<td>0.368835</td>
<td>1.345303</td>
<td>0.765585</td>
</tr>
<tr>
<td>6</td>
<td>8.534185</td>
<td>0.000308</td>
<td>0.424611</td>
<td>1.584166</td>
<td>0.895751</td>
</tr>
<tr>
<td>7</td>
<td>11.66676</td>
<td>0.000318</td>
<td>0.453726</td>
<td>1.796369</td>
<td>0.999256</td>
</tr>
<tr>
<td>8</td>
<td>6.027850</td>
<td>0.000343</td>
<td>0.526766</td>
<td>2.052497</td>
<td>1.146687</td>
</tr>
</tbody>
</table>

Table 3 shows that the optimal lag length for the VAR model is 4 according to the FPE and AIC criteria; and 1 according to the SC and HQ criteria. We used the value of 4 which is the lag length determined by the FPE and AIC criteria as the optimal lag in our model.

**Stability of characteristic roots;**

When doing VAR analysis, it is required that the variables to be used in the model are stationary. Whether or not the stationary condition is achieved can be understood by the fact that the characteristic roots are within the unit circle or not.

![Fig. 4. Stability of Characteristic Roots](image)

As is seen in Fig. 4, when the stability of the characteristic roots is examined with the optimal lag length, no roots of the series are out of the unit circle. Thus, it is understood that the series have stationary structure.

**The Impulse Response Analysis**

Impulse response functions are a method that shows the responses of both own and other variables against the shocks (error margin) to be given to the variables respectively in the model. The variables in the model must provide the stationary condition and the effect of the shocks given as a result of this condition is damped over time (Yildiz Bozkurt, 2013: 110-112). Impulse response analysis measures the response of internal variables in vector autoregressive (VAR)
model to random shocks in the error term (Cinar ve Sevuktekin, 2017: 510). The results obtained when we apply impulse response analysis to our own data are shown in Fig. 5.

Fig. 5. The Impulse Response Analysis

In the first column of Chart 5, there are impulse responses Figures that are showing the reactions to one-unit random shock to the error term of the population not included in the labor force. Although up to the third period (three months) the reaction of the population not included in the labor force is positive and decreasing, it is observed that it reacts negatively since the fourth period. Because of a random shock to the population except for the labor force, the reactions of household’s transfers are firstly negative up to the fourth period; it is positive in the fourth period and then continues from negative to zero. The reaction of the unemployment rate to the population not included in the labor force is negative and remained close to zero from the eighth month.

In the second column of Chart 5, there are impulse responses Figures that are showing the reactions to one-unit random shock to the error term of the household transfers. These figures are respectively show the response of the population not included in the labor force, of the households transfers and of the unemployment rate. When we look at the first Fig., it is seen that the population except for the labor force initially reacted negatively to the transfers to the households and started to fluctuate around zero in the fifth month. The response of the household transfers to own has started and decreased in a positive way and it is seen that from the second month it continues to be in a negative way and has an increasing trend. The reaction of the unemployment rate to household transfers is seen negligible.
These reactions are the responses to one-unit random shock to the error term of the unemployment rate. It is seen that the population not included in the labor force has a low response to the unemployment rate and is fluctuating around the positive direction and zero. The response of transfers to households to the unemployment rate starts in a positive direction but in the fifth month is negative and then goes to zero. The response of the unemployment rate to the shock of own is positive and decreasing and starting from the fourth month in a positive and fluctuating.

4.6. Variance Decomposition Analysis

The variance decomposition analysis is the ratio of the movements of a variable in the model resulting from the shocks of its own and to the movements resulting from the shocks of other variables in the model (Cinar ve Sevuktekin, 2017: 515). In other words; if a shock can explain the variance of forward-looking prediction for a variable in the model, that variable is internal (Cited: Yildiz Bozkurt, 2013: 105-107).

Table 4. Variance Decomposition of Variables (Cholesky)

<table>
<thead>
<tr>
<th>Variance Decomposition of the Population Except for the Labor Force:</th>
<th>Period</th>
<th>S.E.</th>
<th>DLIGD_AR</th>
<th>LHT_AR</th>
<th>DISO_AR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.225185</td>
<td>100.0000</td>
<td>0.000000</td>
<td>0.000000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.245650</td>
<td>99.22911</td>
<td>0.554141</td>
<td>0.216753</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.250502</td>
<td>98.29491</td>
<td>1.417414</td>
<td>0.287671</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.258364</td>
<td>98.19861</td>
<td>1.446668</td>
<td>0.354721</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.259221</td>
<td>98.01256</td>
<td>1.635040</td>
<td>0.352395</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.259488</td>
<td>97.85499</td>
<td>1.745994</td>
<td>0.399020</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.261137</td>
<td>97.83973</td>
<td>1.729365</td>
<td>0.430903</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.261400</td>
<td>97.71049</td>
<td>1.769623</td>
<td>0.519883</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.261439</td>
<td>97.68112</td>
<td>1.794623</td>
<td>0.524257</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.261776</td>
<td>97.68088</td>
<td>1.790657</td>
<td>0.528461</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variance Decomposition of the Transfers to Households:</th>
<th>Period</th>
<th>S.E.</th>
<th>DLIGD_AR</th>
<th>LHT_AR</th>
<th>DISO_AR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.300177</td>
<td>0.777598</td>
<td>99.22240</td>
<td>0.000000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.314976</td>
<td>1.044955</td>
<td>98.08171</td>
<td>0.873334</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.318891</td>
<td>1.903039</td>
<td>97.22413</td>
<td>0.872829</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.321881</td>
<td>2.726027</td>
<td>95.87543</td>
<td>1.398547</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.326418</td>
<td>4.020361</td>
<td>93.59085</td>
<td>2.388788</td>
<td></td>
</tr>
</tbody>
</table>
In Table 4, firstly variance decomposition of the population except for the labor force then variance decomposition of the transfers to the households and finally variance decomposition of the unemployment rate have been given. According to the results acquired from Table 4; it is seen that the change in the standard deviation of the population not included in the labor force is affected by 100% in the first period (first month) because of its own shocks. However, in the tenth period (tenth month); it is affected by own shocks with 97.6%, by the transfers to households with 1.7% and by unemployment rates shocks with 5%. In the estimation of the variance of transfers to households, its own values are 99% determinant in the first period. In the tenth period, this rate has fallen to 93% and in the prediction about the variance of transfers to households in the tenth period, the effect of the population not included in the labor force is 4.1% and the effect of the unemployment rate is 2.5%. The change in the standard deviation of the unemployment rate is affected by its shocks at a rate of 99.8% (almost 100%) in the first period. In addition, in the tenth month it is affected by own shocks with 95.5%, by the population not included in the labor force with 4% and by the transfers to households with 4%.

When it is examined generally, according to the results from Table 4; there is a transfer from the population not included in the labor force towards both the unemployment rate and the transfers to households.
CONCLUSION

Social assistance as a responsibility of the state has started to gain more place in economic agenda as a sub-item of transfer expenditures with the principle of the social welfare state. In this case; individuals who do not have a minimum subsistence level should be provided social assistance by the state like financial aid and services. Thus, individuals who receive social assistance will be able to live on their own and also be active in social life. Social assistance services, which are supported by constitutional arrangements, are a legal right for the citizens while are tasks to do for the state.

This analysis is based on the criticism that the individuals receiving social assistance are dependent on these social assistance services and that the aids prevented the willingness to work regularly. When the findings obtained are sorted, the response of the population not included in the labor force to a shock to households transfers is negative for the first four months, is transformed into positive in the fifth and sixth months. And the effect of shock is decreasing in the seventh month. In addition, in the estimation of the variance of the population not included in the labor force, the household’s transfers have a determinism rate of 2% in the tenth month. In this case, contrary to criticism, it is understood that people do not give up looking for work with the transfers to households and there is a decrease in the population of not included in the labor force. However, it should not be overlooked that this effect has minimal dimensions.

REFERENCES


CHAOS AND EXCHANGE RATES

Melike E. BİLDİRİCİ*
Bahri SONÜSTÜN**

Introduction
Fundamentals of Classical economy was established depending on dominant physics paradigm, “Newton physics” and Euclidean geometry. The classic and the Neo-Classic paradigm used the linear methods of the Newtonian approach and these methods were applicable till the second half of 20th century. So the theoretical structure of the economics is figured by Newtonian physics and linear algorithms in many papers. In time, the generated linear models are considered as sufficient forms to determine patterns of the economy. But Newtonian approach was seriously criticized by some the economists for the reason of not matching its estimations with real life (Pasinetti, 2000). After improvements at information technologies and globalization, these improvements followed by the increasing amount of interactions between economical agents deteriorated the conditions for analysis and rose the interest for analysis of generated complex structures. After the impressive developments in information and computer technologies in 1980s, nonlinear approach was utilized by branches of some sciences including economics. Non-linear analysis provided the chance to economist and finance specialists to make more complex and consistent forecasts in their analysis.

It should also be noted that although in the 19th century, Newtonian approach and its linear based patterns were accepted by many paper, J.C. Maxwell realized the presence of unpredictability in his studies. At his book “Matter and Motion” (1876), he underlined the sensitivity to starting conditions in physical phenomena (Maxwell, 1876): In 1972, Edward Lorenz has made a speech at 139th meeting of the American Association for the Advancement of Science. The title of his speech was “Does the flap of a butterfly’s wings in Brazil set off a tornado in Texas?” and this speech focusses on presence of chaos. If “butterfly effect” is searched on internet, it can be seen that most of the answer will be related to popular books, games, movies but limited relations to mathematics and physics can be seen. It is obvious that Chaotic theory are spreaded out to social issues. Mandelbrot’s fractals and other theorems did not become popular but chaos theory, often presented through the butterfly effect, affected the population both scientific and non-scientific (Ghys:2012). This condition emphasizes the break from Newton Physics. On Newtonian phy’sics, both the current position and the velocity can be known and future can be predicted with a help of differential equation. This implies the basic principle of determinism, future is determined by current condition according to Laplace (1814) (Ghys, 2012) Maxwell has underlined the unpredictability of nature but most of the cases, he believed the absence of sensitivity to initial conditions son it can be said that Maxwell didn’t define the known chaos that mentioned by Lorenz. Chaos was successfully exposed first at Poincare’s 3 body problem (Poincaré, 1890). Poincare realized that some dynamics and motions are very complicated and Poincare became hopeless when he faced the complicated structure of system dynamics. Hadamard has wrote a paper about geodesics in 1898. At his fundamental paper, he faced the complex structure of the system dynamics. He realized that, a small change at direction of a geodesic can create large scale of different variations of the final shape of the curve. He stated the “symbolic dynamics main concepts (Ghys,2012).
Probably, with the help of Poincare’s approach, Hadamard (1898) has figured out that there is a different view and understanding that Newtonian approach could not match. Small perturbations can cause big differences and with applying this approach to linear equations it’s seen that nonlinear problems can not be solved and offered solutions is not sufficient to analyze the comples system dynamics. According to Poincare, a new science, approach and mathematics is needed. Science of chaos has arisen from this need. Mathematicians put an effort to formulize but Kurt Goedel in 1931 proved that formal systems can not be fully axiomatized (Goedel, 1962) and efforts paused till the evaluation of computers (Hayles, 1990).

Chaos became one of the most important developments to represent the structures of financial time series. Chaos theory is a part of complex systems. Complex systems consist of non-linear interactions of many variables. The chaos theory accept that the systems are quite sensitive to their initial conditions. The movements in the systems exponentially grow in the initial conditions (Bildirici et.al.2017), but the paths are neither increase further nor close to a specific point. It was described as a deterministic system acting randomly (Zhang, 2005).

In this structure, one of the variables which their’s movements in the systems can differentiate is exchange rates. FX markets are the largest financial markets with high liquidity all over the world. FX rates are considered as an important indicator for a country in global monetary markets so understanding the pattern and predicting became a critical issue but these faces some difficulties such as theoretical and experimental. The difficulties are the results of economical, political and psychological dynamics and the highly intense interactions created by these. Technical and fundamental analysis are mostly used technics for prediction. Researchers and analysts comforts some problems on modeling FX data. These datas has trends, seasonality, cycles and irregular movements. In 19th and the first half of the 20th century, fx rates mostly determined by balance of payments, export-import balance.

The exchange rates are mostly influenced by international trade capacities of the countries and many exogenous factors: in the global economy. Especially, after 1990’s, capital investments became more internationally influential. Computer technologies and internet usage increased money transfer volume and speed. With the effect of the improvements on information and computer technologies, the other issues gained important roles on determination of FX rate.

Today, financial movements accelerated and financial investments caused sharp changes at the economic condition of the countries. High mobility of financial investment created volality and nonlinear structure on economic variables. The variables and the weights of these variables changed and they showed non-periodic movement. And these affects created irregular and non-periodic movements on exchange rates. In this condition, linear models became insufficient to make correct analysis for policy makers and investors so more sophisticated methods and tools were needed. These chaotic structures cannot be modelled and estimated by an efficient way for some non-linear models. Some papers to analyze foreign exchange used to GARCH models. GARCH models are not efficient because presence of chaotic behavior in data doesn’t allow making suitable analysis to understand the characteristics of the data. Chaos is a deterministic structure and includes both instability and stability with each other.

In this paper, we focused on presence of chaos on Euro-TL and USD-TL data. To determine the non-linearity on data, BDS test will be utilized. After BDS test, Largest Lyapunov Test and Henon Map will be applied to show the chaotic structure. Lyapunov exponent will be used to gauge the average deviation from starting point of the system.

There are four sections in this paper. The literature analysis is placed is the following chapter after introduction. Econometric methods are mentioned at the third section and finally the results and conclusion take place at fourth section.

**Literature Review**

Frank and Stengos (1988) and Scheindman and Lebaron (1989) showed the proofs of the existence of chaos in markets. Aczel and Josephy (1991) found the presence of chaos with correlation dimension. Vassilicos et al. (1993) found multifractal structure but not chaotic
behavior. De Grauwe et al. (2001) determined the existence of chaotic structure and that exchange rate is impacted by random shocks and that the chaotic structure. After 2000’s, the papers on the chaotic behavior intensified. Fernández-Rodríguez et al. (2003) tested chaotic structure of exchange rates by Lyapunov methods and accepted the deterministic pattern. Torkamani et al. (2007) and Das and Das (2007) are other papers. Torkamani et al. (2007) found the chaotic and complex pattern of foreign exchange rates by the biggest Lyapunov exponent.

Ou and Lai (2010) modelled chaotic behavior of USD-TWD exchange rate by Lyapunov exponent. The findings present positive Lyapunov exponent which demonstrates that analyzed historical exchange rate data exhibit chaotic behavior. They aimed to observe chaotic behavior of exchange rates during the financial crisis. Das et al. (2012) modelled the nonlinear structure of exchange rates by Lyapunov exponent and controls asted foreign exchange rate changes in countries with each other before and after the economic crisis period. The findings show that the more nonlinear pattern of exchange rates indicates to more changes in the exponent and illustrate different nonlinear structures of exchange rates in different countries.


Data and Econometric Methodology

Data
We used daily USD-TL and Euro-TL data from 01/01/2014 to 09/11/2018. The data are downloaded from www.investing.com. First we applied BDS test to examined data, then Largest Lyapunov test and Henon Map is applied to figure out the presence of chaotic structure.

Econometric Methodology

BDS Test
There are many tests used to determine the non-linearity on the data’s and BDS are the most popular method utilized by the researchers to analyze their data. If we consider $t$ for $yt$ as $(0,1,2,...,K)$ and $yt=(yt, yt+1,......)$. For n dimension, correlation integral is;

$$B_{n,e} = \frac{1}{K(K-1)} \sum_{n \leq p \neq K} \sum_{1 \leq k \leq K} 1(y_t^n, y_t^p; e) K_n = K - n + 1$$

and $I(.)$ both indicator function.

If $|y_{t-i} - y_{p-i}| < e$ for $I = 0,1,....,n-1$, the result will be 1. Then united probability will be;

$$\Pr(|y_t - y_p| < e, |y_{t-1} - y_{p-1}| < e, \ldots, |y_{t-n} - y_{p-n+1}| < e)$$

BDS test istatistic will be;

$$BDS_{n,e} = \sqrt{K} \frac{B_{n,e} - B_{n,e}^n}{p_{n,e}}$$

if $\sqrt{K}B_{n,e} - B_{n,e}^n$’s standart deviation is $p_{n,e}$

Largest Lyapunov Exponent (LLE) test
LLE test is one of the most preferred test to forecast the presence of chaos. Main purpose of the test is to calculate the largest Lyapunov exponent that equals to distance of the two trajectories that has different starting conditions. Main characteristic of the chaotic structures is dependency
to primal conditions. System evolves by the time and the trajectories getting moving away from each other. The distance between the trajectories are calculated by LLE test. The distance between the primal and the current conditions is the result of the chaotic behavior. Larger LLE value means stronger larger exponential growth and strong chaos (Torkamani et.al: 2007; Bildirici and Sonustun:2017).

The vector that consists n component is described as;

\[ Y^{i} = [y(t_{i}), y(t_{i} + 1)...y(t_{i} + n)] \]

(1)

The distance between the vectors less than m is as;

\[ m_{k}(m; \lambda, k) = \frac{\|Y_{i}^{n} - Y_{k}^{n}\|}{\lambda} \]

(2)

The calculation of LLE is at below;

\[ L_{s}(m, s) = \hat{A}_{s} \cdot \frac{\log \left[d_{i}(m; \lambda, k)\right]}{N(N - 1)} \]

(3)

For the results bigger than zero points out the presence of chaos. Larger value means stronger chaos and drastically reduces the possibility of forecasting.

**Econometric Results**

**Descriptive Statistics and Unit Root Tests**

Daily FX rates are tested in their first differences using descriptive statistics in first stage. Table 1 show the results:

<table>
<thead>
<tr>
<th>Results for USD-TL</th>
<th>Results for Euro-TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>Median</td>
<td>Median</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Skewness</td>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>Kurtosis</td>
</tr>
<tr>
<td>JB</td>
<td>JB</td>
</tr>
<tr>
<td>1.000396</td>
<td>1.000364</td>
</tr>
<tr>
<td>0.999864</td>
<td>1.000055</td>
</tr>
<tr>
<td>0.009608</td>
<td>0.009112</td>
</tr>
<tr>
<td>1.715504</td>
<td>1.373693</td>
</tr>
<tr>
<td>28.72468</td>
<td>25.92520</td>
</tr>
<tr>
<td>109420.7</td>
<td>86630.85</td>
</tr>
</tbody>
</table>

According to results of Skewness and Kurtosis tests, distribution of the two series diverge from normal distribution.

 BDS tests were given in table 2. Then BDS test show that there may be a chaotic structure in the selected series after the log transformation and first differences. Also there can be threshold effect with non-normal distribution.

<table>
<thead>
<tr>
<th>Results for USD-TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>
Results for Euro-TL

<table>
<thead>
<tr>
<th>Dimension</th>
<th>BDS Statistic</th>
<th>z-Statistic</th>
<th>C(m,n)</th>
<th>C(1,n-(m-1))</th>
<th>c(1,n-(m-1))^k</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.024475</td>
<td>16.39787</td>
<td>3934420.</td>
<td>5337126.</td>
<td>0.493270</td>
</tr>
<tr>
<td>3</td>
<td>0.046104</td>
<td>19.47943</td>
<td>2983433.</td>
<td>5335717.</td>
<td>0.346698</td>
</tr>
<tr>
<td>4</td>
<td>0.061470</td>
<td>21.85478</td>
<td>2314772.</td>
<td>5332402.</td>
<td>0.243452</td>
</tr>
<tr>
<td>5</td>
<td>0.069872</td>
<td>23.88163</td>
<td>1828419.</td>
<td>5330281.</td>
<td>0.171107</td>
</tr>
<tr>
<td>6</td>
<td>0.073252</td>
<td>26.01217</td>
<td>1469626.</td>
<td>5330012.</td>
<td>0.120539</td>
</tr>
</tbody>
</table>

BDS test determined the presence of the chaotic behaviour or non-linear structure in the financial market and, so many interferes cause to irregular moves on the data and this leads to the chaotic behavior.

Henon Map and Lyapunov Results

LLE Test Outcomes and Henon Map

<table>
<thead>
<tr>
<th></th>
<th>USD-TL</th>
<th>Euro-TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
<td>D=1</td>
<td>D=2</td>
</tr>
<tr>
<td></td>
<td>0.36</td>
<td>0.9216</td>
</tr>
<tr>
<td></td>
<td>0.315</td>
<td>0.7552</td>
</tr>
</tbody>
</table>

Largest Lyapunov Exponent test shows the presence of chaos. If the result is positive, then series have chaotic behaviour. Largest exponent result equals to stronger chaos and limits the forecasting ability (Plakandaras et al, 2018).

Chaotic characteristic shows the existence of the chaotic determination and it is expressed as “sensitive dependence on initial state” that means that initial condition possibly follow different trajectories (Bhattacharya and Sensarma, 2006).

According to our result; There are strong chaotic dynamics on series. For the both series, long-term forecasting is very difficult. Henon map shows the chaotic behavior in two dimensioned space. It’s a recurring distinct-time system.

USD-TL & Euro-TL Henon Maps

**Conclusions**

Foreign Exchange rates are one of the most important triggers and variables to determine the performance of an economy. Because of its importance, both investors and policy makers are focussing on the data to make adequate analysis. Due to intense interest on the F/X rates, high
volatility, unexpected changes on pattern of the F/X rate occurs. These features of the F/X rates create complexity. Most of the analysis on F/X rates used the stochastic methods but chaotic behaviour of the F/X rates detoriates the performance of stochastic methods. In our paper, we found satisfying proofs for the chaotic behaviour on both USD/TL and Euro/TL. Due to complex structures and irregular movement in the data, linear methods used will not provide adequate solutions to FX rate analysis. Non-linear methods can make difference on analysis but because of the structure of the foreign exchange data, the methods based on chaos theory are optimum solution. For the future, Chaos and fractal based methods should be taken into consideration for getting better and more accurate analysis.

References


PLAYER OR PROLETARIAT: ANALYSIS OF THE PRODUCTION “IMPRESSIONS” FOR MOBILE GAMES

Emre BiÇiÇi1

1. INTRODUCTION

Today, the game industry is one of the most developed sectors on the market. Especially mobile games have an essential place in the industry. In mobile games, players can spend their leisure time with entertainment provided by mobile games, regardless of location. In that case, we can say that mobile games make a profit from players.

Leisure time is one of the most critical parts of capitalism. In that period people spend their time consuming, entertainment and resting. All these systems are works for reproduction. For example, consumption is a need for production also when people watch TV they are stimulated to consume. Mobile games work like TV; they provide entertainment for players like television offers.

While playing mobile games, players consume contents which include mobile ads. Players manufacture “Impressions” for mobile game companies and they sell this rates to the advertising companies. That manufacturing transforms players into proletarians. In that case, we can examine mobile games with Marxist theories.

In this research mobile games were analyzed with the frame of Marxist theories such as “Digital Labour” and “Leasure Time.” This research aims to understand that “How mobile games exploit the labor of the players?”. In that research mobile game called “crossroads” examined to understand how mobile games exploit the labor of players. After that “Entertainment as a need” was researched with a survey for understanding entertainment as a necessary need.

At this research, the game called “Crossy Road” chosen to examine, because “Crossy Road” was chosen best of 2014 by Apple Appstore also it has lots of awards from a different institution. At the time of writing, “Crossy Road” was played for experience the goal of the research like an ethnographer. To understand the purpose of the study, a case study examination chosen as a research method. After that “Entertainment as a need” was researched with a survey for understanding entertainment as a necessary need.

2. LITERATURE REVIEW

2.1. MOBILE GAMES AND ECPM

Today, with the dissemination of Smartphone, mobile games become one of the most common digital game genres. The first digital game concept should be reviewed to understand the mobile game sector.

Digital game is the commodity which developed for digital platforms to play (Binark and Bayraktutan-Sütçü, 2008:41-42). The mobile game is one of the sub-genres of digital games. From the beginning, mobile games evolved from one color mobile phone technology to 3D supported Smartphone technology (Keş and Kara, 2015:20). As a result of these developments, we can say that mobile games become a new advertising medium for companies.

There are lots of ways to make money from mobile gaming such as in-app purchases, banner ads, and video advertising. Video advertising has a direct order and click order system for watch the

1 Kocaeli University, emrebcc90@gmail.com
advertising. Some mobile game companies use that system with “click to get extra coin” or “1UP” system. Also some of them use direct order system for get impressions. In that case, to understand that system, eCPM concept should be reviewed.

eCPM is a short form of “effective cost per thousand impressions.” With CPM, companies could compare impressions. They can also set their pricing per impression. eCPM could calculate with knowing with the total cost and count of impressions. Formula is that “eCPM = total cost/(impressions/1000)” (https://www.marketingterms.com/dictionary/ecpm/).

To profile of eCPM system shows that to profit, count of players and impression rates are essential for mobile game companies, this is the why some free mobile games prefer that advertising genre. Generally, mobile games are leisure time activity. Reviewing leisure time usage is essential.

2.2. LEISURE TIME

Leisure time is one of the essential parts of the production line because it is the resting time for rework. Leisure time looks like a free time however it is not. Leisure time is a time which planned by the others (Omay, 2008:124-125). This planning transforms leisure time into a period for consuming. Thus profit could be maximized. With the media, leisure time also changes the lifestyle of the people (Aytaç, 2005:6-7).

According to Paul Lafargue, technological change improved the performance of the production machines. Even though instead of human we use the machine for work, people still work too much. They still work five days a week (Lafargue, 1996:37-38). We can say that today leisure time is production time. It is the time for producing “the consuming” and “impression.”

Mobile games are kind of a media which makes you entertain at your leisure time like other media options. While playing mobile games player watches some video ads (for more score points), or they can see some banner ads. In that case, we can say that players are producing “impressions” for mobile game companies. To understand how players consume ads mobile games should be reviewed as a means of production.

2.3. MOBILE GAMES AS A MEANS OF PRODUCTION

According to Marx, social classes come with having the control of the production means. In that society, there are two points. One of them has the power of the production means, the other one who exploit by capitals (Giddens 2015:297). Mobile game companies also have employees but to understand the exploitation of the players’ it is crucial to review labor practices.

To understand the relation between playing and manufacturing first Marx’s “need concept” should be examined with Huizenga’s “Homo Ludens.” Than Christian Fuchs “Digital Labour” concept should be evaluated to understanding social media and labor relation. Finally, to understand the relationship between video ads and impression, ideas about television should be reviewed.

First of all, According to Marx, needs are the results of social production or engagement. Create social needs by production. When society evolves, new products emerge as people deem necessary. With the social evolution, today’s luxury needs become mandatory needs (Fraser, 2008:153-167). On the other hand, according to Huizenga, the game is not a task, it is a leisure time activity. In that case, Game is the freedom. Enjoyment from the game makes you feel like “you need the game.” Because of that game requirement becomes mandatory (Huizenga, 2013:24-25). When we consider these two concepts, we can say that playing mobile games could be one of the needs for entertaining at leisure time.

Second, Digital labor is an idea which developed by Christian Fuchs. According to his digital labor idea, people don’t just need to be fed to survive. Also socializing is a need for survival. Without socializing people will live like an animal. Today social media is a socializing place for people. In that case, communication becomes labor. According to Christian Fuchs, the person
who does not use social media isolated from society. According to Marx, exploitation should not necessarily be a fee. Slaves are an example of this. That's why social media companies goal are to reach as many users as possible (Fuchs, 2015:368-370). That idea will help us to understand the importance of the players.

Third, with the appearance of the television, the difference between consumer and producer started to disappear, because the relation between advertising and television channel companies transform the audience into a commodity. Television channel companies get to profit from the count of the audience (Duman ve Özdoym, 2018:80-81). This argument also works for mobile games because some of them get profit from ads such as banners and video ads.

In conclusion, “consumption” is necessary for production. In that case when we consider all these arguments such as manufacturing “impressions” or “consuming the ads” we can say that mobile game players are the proletariat. Also, we know that proletariat works for his needs, and according to Huizinga, enjoyment of the game can make you feel like “you need to play.”

3. ANALYSIS

3.1. “CROSSY ROAD” AS AN EXAMPLE EXPLOITATION OF LABOUR

Crossy Roads is the mobile game that produced by the game company called “Hipster Whale” at 2014. Genre of the game is the endless arcade runner. Crossy Roads is the game that chosen “the best of 2014” at an app store. The game is the multi-platform game that means it can be download from app store, Google play, amazon apps and Microsoft store (https://www.crossyroad.com/). Crossy Roads is working with adcolony for getting advertising data (https://www.adcolony.com/publishers/).

When player start the game, he will see a screen like figure 1. The goal of the game is that crossing the road without crush and gets the score as much as player can. Players try to cross the street against some obstacles such as cars, trees, and rivers. When the player touches the screen chicken passes one cell. To control the direction of the chicken, the player has to be touch and slide in that direction.

![Fig. 1: In-game view](image-url)

When player crushed, he will see a screen such as figure 2. In that screen, there is a free coin button (on yellow line). If the player clicks on that button, advertising video will be start and end of the video player will get some more coins.
Fig. 2: Free Coins Offer Screen

Coins are essential for players to get new animals. That's why advertising videos offer some coins. In that case, we can say that to collect more coins players watch some video ads. Once the player clicked on the video advertising button, it produces “Impression” for the game company that affects eCPM.

3.2. SURVEY RESULTS

According to TUIK internet is mostly used by young people (http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=2599). For this reason, in the research, people aged between 18-35 were surveyed. Kocaeli University and Arasta Park selected for the collection of research data. Firstly, the survey asked participants whether they played mobile games. Then, they asked if they would like to participate in academic research.

Table 1: Gender

<table>
<thead>
<tr>
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<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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<td>22</td>
<td>22.0</td>
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</tr>
<tr>
<td>Valid</td>
<td>78</td>
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<td>100.0</td>
</tr>
<tr>
<td>Male</td>
<td>78</td>
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</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 1, %22 of the participants are female and %78 of the participants are male.
Table 2: Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
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<tbody>
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<td>18-25</td>
<td>86</td>
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<td>86.0</td>
<td>86.0</td>
</tr>
<tr>
<td>26-30</td>
<td>10</td>
<td>10.0</td>
<td>10.0</td>
<td>96.0</td>
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<td>31-35</td>
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<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 2, %86 of participants are aged between 18-25, %10 are aged between 26-30 and %4 are aged between 31-35.

Table 3: Monthly Income

<table>
<thead>
<tr>
<th>Monthly Income</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1600 TL</td>
<td>73</td>
<td>73.0</td>
<td>73.0</td>
<td>73.0</td>
</tr>
<tr>
<td>1601-2000</td>
<td>7</td>
<td>7.0</td>
<td>7.0</td>
<td>80.0</td>
</tr>
<tr>
<td>2001-3000</td>
<td>10</td>
<td>10.0</td>
<td>10.0</td>
<td>90.0</td>
</tr>
<tr>
<td>3001-5000</td>
<td>3</td>
<td>3.0</td>
<td>3.0</td>
<td>93.0</td>
</tr>
<tr>
<td>5000+</td>
<td>7</td>
<td>7.0</td>
<td>7.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 3, %73 of the participants have monthly income -1600TL, %7 of the participants have between 1601 TL – 2000 TL, %10 - between 2001-3000 TL, %3 – between 3001-5000 TL and %7 of participants earn more than 5000 TL.

Table 4: Is there a need to have fun?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>96</td>
<td>96.0</td>
<td>96.0</td>
<td>96.0</td>
</tr>
<tr>
<td>Valid No</td>
<td>4</td>
<td>4.0</td>
<td>4.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 4, for %96 of the participants having a fun is a need. For %4 is not.
### Table 5: Is there a luxury need to have fun?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>27</td>
<td>27.0</td>
<td>27.0</td>
<td>27.0</td>
</tr>
<tr>
<td>No</td>
<td>73</td>
<td>73.0</td>
<td>73.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 5, while %27 of the participants having fun is a luxury need, for %73 it is not.

### Table 6: How long do participants play mobile games during the day?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30 Min</td>
<td>33</td>
<td>33.0</td>
<td>33.0</td>
<td>33.0</td>
</tr>
<tr>
<td>31 Min - 1 Hour</td>
<td>31</td>
<td>31.0</td>
<td>31.0</td>
<td>64.0</td>
</tr>
<tr>
<td>1 Hour 1 Min - 2 Hours</td>
<td>21</td>
<td>21.0</td>
<td>21.0</td>
<td>85.0</td>
</tr>
<tr>
<td>2 Hours 1 Min - 5 Hours</td>
<td>12</td>
<td>12.0</td>
<td>12.0</td>
<td>97.0</td>
</tr>
<tr>
<td>5 Hours +</td>
<td>3</td>
<td>3.0</td>
<td>3.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 6, %33 of the participants play mobile games maximum 30 minutes in a day. %31 of participants play between 31min – 1 Hour. %21 of the participants play between 1 hour 1 min – 2 Hours. %12 of the participants play mobile games between 2 hours 1 min – 5 hours. %3 of the participants play more than 5 hours in a day.

### Table 7: How often do participants think of playing mobile games during the day?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>37.0</td>
<td>37.0</td>
<td>57.0</td>
</tr>
<tr>
<td>3</td>
<td>28</td>
<td>28.0</td>
<td>28.0</td>
<td>85.0</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>6.0</td>
<td>6.0</td>
<td>91.0</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>9.0</td>
<td>9.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 7 shows that during the day, participants are thinking about playing mobile games at mid and low levels. Only %15 of the participants points more than 3.
Table 8: How often do participants want to play mobile games in their leisure time?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>16.0</td>
<td>16.0</td>
</tr>
<tr>
<td>2</td>
<td>23</td>
<td>23.0</td>
<td>39.0</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>27.0</td>
<td>66.0</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>20.0</td>
<td>86.0</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>14.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 9: Are participants exposed to advertising in mobile games?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>94</td>
<td>94.0</td>
<td>94.0</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>6.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 9 shows that 94% of the participants are exposed to advertising in mobile games. Only 6% of participants are not exposed.

Table 10: Are participants exposed to banner ads while playing mobile games?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>81</td>
<td>81.0</td>
<td>86.2</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>13.0</td>
<td>13.8</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>94.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>System</td>
<td>6</td>
<td>6.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

According to Table 10, 86.2% of participants are exposed to banner ads while playing mobile games. 13.8% of the participants are not exposed banner ads.
Table 11: Are participants exposed to video ads while playing mobile games?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>93</td>
<td>93.0</td>
<td>98.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>94</td>
<td>94.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>System</td>
<td>6</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 shows that 98.9% of the participants are exposed to video ads while playing mobile games. Only one participant (equals to 1.1%) is not exposed to video ads.

Table 12: Do participants feel exploited when they are exposed to advertising while playing a mobile game?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>78</td>
<td>78.0</td>
<td>83.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16</td>
<td>16.0</td>
<td>17.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>94</td>
<td>94.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>System</td>
<td>6</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 12 shows that when participants are exposed to advertising while playing a mobile game, 83% of the participants feel exploited, 17% of participants are not.

Table 13: How participants exposure to ads?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Mandatory ads</td>
<td>62</td>
<td>62.0</td>
<td>66.0</td>
</tr>
<tr>
<td></td>
<td>Preferred Result Monitored</td>
<td>1</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>Both of them</td>
<td>31</td>
<td>31.0</td>
<td>33.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>94</td>
<td>94.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>System</td>
<td>6</td>
<td>6.0</td>
<td></td>
</tr>
</tbody>
</table>
According to Table 13, %66 of participants exposure Mandatory ads, %1 exposure preferred result monitored ads and %33 exposure both of them.

Table 14: Do participants make in-game purchases at mobile games?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>25</td>
<td>25.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Valid No</td>
<td>75</td>
<td>75.0</td>
<td>75.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 14 shows that %25 of participants make in-game purchases. %75 are not.

Table 15: If yes, how much money do participants spend per year for in-game purchases?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100 TL</td>
<td>15</td>
<td>15.0</td>
<td>60.0</td>
<td>60.0</td>
</tr>
<tr>
<td>101 TL - 300 TL</td>
<td>7</td>
<td>7.0</td>
<td>28.0</td>
<td>88.0</td>
</tr>
<tr>
<td>Valid</td>
<td>2</td>
<td>2.0</td>
<td>8.0</td>
<td>96.0</td>
</tr>
<tr>
<td>301 TL - 500 TL</td>
<td>2</td>
<td>2.0</td>
<td>8.0</td>
<td>96.0</td>
</tr>
<tr>
<td>1000 TL+</td>
<td>1</td>
<td>1.0</td>
<td>4.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>25.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing System</td>
<td>75</td>
<td>75.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to Table 15, %61.5 of participants who makes in-game purchases spend between 0-100TL per year. %26.9 spend between 101-300TL. %7.7 spend between 301-500TL. %3.8 spend more than 1000TL per year.

4. CONCLUSION

In this article, research tried to illustrate that “How mobile game companies exploit the labor of the players.” With articulating a definition of Marxist communication theories, research tried to light on analyze of labor at mobile games. At the end of the research, according to survey results we can say that entertainment is a necessary need for participants. Also according to research results, players product the “impressions” for the mobile game companies. In that case, we can say that players are the proletariat for mobile game companies.

REFERENCES


ENVIRONMENTAL PROBLEMS OF ECONOMIC GLOBALIZATION

Fazıl KAYIKÇI

Introduction

Environmental problems were one of the most controversial subjects at last decades. Competition of countries for the sake of growth and development has caused to depletion of natural resources without any planning. However, we cannot bound the environmental problems to the last decades; those problems have been the subject of human being for a long time, today this problem attain new dimensions both quantitatively and qualitatively. With the economic development and mostly globalization, environmental degradation has exceeded the national borders.

Globalization, which was used infrequently before the 1990s, is now in common parlance. It refers primarily to an economic system in which raw materials, manufactured goods, intellectual property and financial transactions flow freely (although not equally) across international borders under the supervision only of an international trade authority. It also refers to the homogenization of language and cultural identity that accompanies this flux of material, ideas and money. Despite its growing strength, the side effects of this pervasive economic strategy remain poorly understood, perhaps because the great majority of them are indirect. This is especially true for the environmental effects (Ehrenfeld, 2003).

Economic globalization is perceived as an historical process of increasing integration of economies around the world through trade, financial flows, movement of people (labor) and knowledge (technology) across international borders. The term has come into common usage since the 1980s. At that time many countries visualized globalization as an opportunity to explore their ability to integrate with the global market. It was thought that global markets offer greater opportunity for people to tap into more and larger markets around the world. Many countries perceived that globalization would open a window to have access to more capital flows, technology, cheaper imports, and larger export markets. But these countries did not have any idea that the benefits of increased efficiency will not go to all countries equally. Moreover, it was not easy for most of these countries to apprehend clearly that they must be prepared to embrace the policies needed, and in the case of the poorest countries, they may need the support of the international community (Salahuddin, 2005).

In this paper, I will try to reveal the effects of globalization on the environment. I will try to discover the facts from economic perspective. In the first section I introduced the subject and I continued with the description of the globalization. In the second section, I presented the view of globalization about the environment. In the third section, I tried to reveal the effects of globalization on the environment and sustainability by considering its economic costs in different types of environmental degradation. And then, I discussed how the negative impacts can be minimized and the positive impacts can be maximized with presenting the theory of Environmental Kuznets Curve. After that the paper continued with the effects of environment on the globalization. In the sixth section, I gave some points in order to protect environment by managing globalization and the outputs of the globalization as well. And in the last section, I tried to make some conclusions about the effects of the globalization on the environment and what can the protective activities be.

1 Yıldız Technical University, Department of Economics, fkayikci@yildiz.edu.tr
Global economic thought and its environmental view

Today’s mainstream economic thought is defined as a science for the efficient utilization of scarce goods. But, the goods are only conceived as market commodities. The effects of the economic activities on ecological scarcities and nonrenewable resource degradation are beyond the view of this economic thought. Economic development needs to be planned so as to include factors such as water resources and their distribution, availability of clean water, rationing and conservation of nonrenewable resources, disposal of wastes, and effects on population and environment associated with the specific locations chosen for industrial projects. However, capitalist economies are only interested in profit maximization and economic growth at any cost including the exploitation of the vast majority of the world’s resources and population. This means rapid absorption of energy and materials and the dumping of more wastes into the environment and widening environmental degradation (Foster, 2002). “The fact that the economic process continually depends on the natural world for both the generation of raw material inputs and absorption of waste outputs is simply taken for granted. More specifically, natural ecosystems are viewed simply as a gift of nature ready to be exploited by humans and in strict accordance to the laws of demand and supply.” (Hussen, 2004: 15).

Beside the Neoclassical economics, which sees no apparent limits to natural resources and economic growth because of the factor substitution and technological improvement assumptions, we have to reshape the economic theory from an environmental and sustainability perspectives by focusing on qualitative economic growth where natural ecosystem is nongrowing relative to the scale of economic activity. We should protect the rights of future generations and also other elements of nature such as animals, trees etc. for their own sake. For example, “Saudi Arabia cannot simply pump more oil at any price just to raise the standard of living of the current generation because the extraction rates of the country’s petroleum deposits are determined in such a way as to maximize the present value of the rent from the intertemporal use of its total petroleum deposits.” (Sisay, 2005: 273)

Economic costs of environmental degradation

Capitalism and its practices with globalization do not consider the environmental consequences of their views and practices as we mentioned above. Now, we are going to see what can be done if we consider the ecological problems and try to provide sustainable development, why and in what ways today’s economic system and globalization causes environmental degradation and pollution, what are the types of those degradations and their costs to the society and nature in an economic sense.

Sustainable Development

Sustainable development can be defined as “restricting the resource using economic activities in order to maintain population/resource stocks within upper and lower bounds regarded consistent with ecosystem stability and resilience”. (Alauddin, 2004: 253) Against the global economic theories and their applications, this approach takes depletion of natural resources and damages caused by pollution into account when evaluating welfare of the society. It implies minimizing the material and energy intensity of goods and services, enhancing recyclability and the use of renewable resources. Some possible rules for sustainability are;

i) Renewable resources, such as forests or fisheries should only be exploited at or below their rates of renewal.

ii) Wastes should only be generated at or below the rates at which they can be absorbed by the assimilative capacity of the environment.

iii) Non-renewable resources should not be exploited beyond the rate at which the stock of these resources can be substituted for by renewable resources or effectively enhanced by technological progress and recycling.
iv) Ecological functions and the provision of amenity and living space should be protected, thus maintaining the carrying capacity of the environment. (Hodge, 1995: 55)

Nelder summarizes this as “A golden rule for the regeneration of the economy; leave the world better than you find it, do not take more than you need, try not to give any damage to the environment and life, and if you do this, compensate.” (Nelder, 1995: 22)

**Market Failure and Globalization as Causes of Pollution**

In general, there are two major sources of market failures which are relevant to the problem of environmental pollution. First one is the lack of a well defined and enforceable system of private property rights in many of the environmental resources. Private economic decision makers are not receiving the correct signals concerning the use of these resources. The second is the public good nature of many environmental services. Private markets will fail to allocate sufficient resources to the production of such goods, resulting in a misallocation of resources.

We know that globalization means a new, interconnected, interdependent and unified world, in which everyone and everybody is in a close proximity to his or her fellow neighbors scattered all over the world, sharing with them life and density in spite of their different ethnical and cultural origins. Thus, it contains some sub concepts which can be considered as causes of the environmental degradation; faster urbanization, industrialization, population growth and economic growth.

Fast urbanization, which can be the result of economical, political, sociological and technological reasons, is one of the most important sub concepts of globalization that deteriorates the environment and nature. Disordered constructions and shanties, inadequate infrastructure, noise, traffic, air pollution, water pollution, solid wastes are the environmental effects of the fast urbanization process. Moreover, fast population growth causes the overuse of the natural resources and decreases their efficiency.

Industrialization is another factor for the environmental problems. Energy sector is the leading one for producing pollution and industrial countries are the leaders of using and producing energy. Most important reason for the climate change in the world is the energy production that depends on the fossil fuels. Considerable amount of air pollution is seen in the areas where industrial factories are located. Also, industrial wastes pollute water and agricultural land, thus decrease the variety and amount of agricultural products.

**Types of Pollution**

The principal types of environmental pollution and depletion are; exhaustion of nonrenewable and slowly renewable resources and global climate change, global warming, destruction of the ozone layer, removal of tropical forests, over fishing, extinction of species, loss of genetic diversity, desertification, shrinking water supplies, lack of clean water and radioactive contamination. We can briefly mention some of the important effects of environmental degradation as;

**Reduced Genetic Diversity in Agriculture**

A profound reduction of genetic diversity in agriculture is now underway. The process has been well documented for food plants, and pertains to vegetables, grains and tree crops. It is likely that losses of non-commercial varieties maintained by individual farmers, especially in Third World countries, are even greater, as representatives of giant seed corporations reach more and more agricultural areas that have been hitherto isolated from global trade.

The impacts of globalization are being experienced not only by domesticated varieties but by wild relatives of food plants. The wild relatives of cereals, vegetables, fruits, nuts and other crops constitute a critical resource for genes affecting disease resistance, pest resistance, yield, vigour, environmental adaptations, high starch content, soluble solids, vitamins, cytoplasmic male
sterility, petaloid male sterility and harvest and transport adaptations. Many of these wild relatives are highly endemic, and their ranges are decreasing sharply because of development, overgrazing, increased herbicide use, logging and conversion of marginal lands to production and export agriculture; all of them related at least in part to globalization (Ehrenfeld, 2003: 101).

Loss of Wild Species

It is not possible to define the particular effect of globalization to the current extinction rate, or even to separate globalization from other, interrelated factors such as human population growth. But it is easy to understand that globalization causes huge reduction in biodiversity. Globalization affects the wild animal populations and plant populations by destroying the living areas of the species for production and trade, including increased logging, land clearing for production agriculture, over fishing of marine fisheries, road-building mining and dam construction; secondary effects of pollution from production agriculture, fish farming, vehicles burning fossil fuel, added electricity generation, nuclear wastes and other sources; tertiary effects of climatic change from excess carbon dioxide, methane, fluorocarbons and other chemicals; adverse effects of ecotourism on wild flora and fauna; and the impact of the soaring numbers of exotic species, carried by the tremendous plane, ship, rail and truck traffic of global trade, on local flora and fauna (Mabogunje, 2002: 8).

Deforestation

Mostly in developing countries, burning forests for the construction and agricultural production or cutting trees for obtaining wood give high damages to the forests. Furthermore, this deforestation causes erosion problem in those countries. For example, “in sub-Saharan Africa, 52 percent of energy supply is obtained from woods. However, Japan imports woods even though 60 percent of its territories are forests. Because Japans are aware of the fact that the economic value of their forests are much higher than they can obtain from wood.” (Çınar, 2003: 51)

Air, water and soil pollution have increased markedly as global trade has increased. For example, in Taiwan, exports have soared as a result of global trade: forests have been cleared for industrial development and tree farms, soil and water have been polluted by pesticides and fertilizer, and 90,000 factories dump their wastes into air and waterways (Ehrenfeld, 2003: 100).

Costs of Pollution

Instead of dynamic optimization, static solutions and neglecting future generations play an important role in causing environmental problems. Because of these kinds of economic decisions, environmental quality decreased sharply when production and consumption increases in all over the world. Hence, environmental quality and clean environment become a scarce resource and an economic good today (Dura, 1991: 70).

Environment performs valuable services for the economy by dispensing, storing and assimilating the residuals generated as a byproduct of economic activity. It provides a hospitable habitat for human being and other living creatures. Certain parts of the environment are suitable for vacation. Also, environment serves as a source of materials inputs to the economy.

Costs of environmental degradation firstly start with the forgone use of environment’s above mentioned and other side benefits. Beside this, cost of cleaning and external cost of pollution are also important; when we direct some funds to the cleaning of environment, we have to give up from some profitable projects; opportunity cost of purchases for cleaning are higher than actual costs. Furthermore, if the employment generating feature of those forgone investments is high enough, it may cause unemployment. In a research of Repetto and others, they estimate that Indonesia’s GDP growth decreases from 7.1 % to 4 % between 1971 and 1984 because of deterioration in three natural resources: land, forests and petroleum (Repetto et. al., 1991).

Globalization and the environment
The environmental impact of globalization is highly controversial. Opponents argue that globalization poses a serious challenge to the regulatory authority of national governments because multinational companies can exploit differences between the environmental regulations of individual nation states. These opponents also suggest that footloose multinational companies use global strategies to relocate polluting activities in their value chains to subsidiaries or suppliers in countries with lax environmental regulations. This threat of 'industrial flight' is presumed to increase the power of multinational companies relative to national governments. Some less-developed countries might even be tempted to use lax environmental regulations and law enforcement to provide the most polluting multinational companies with cheap production and export platforms - turning themselves into 'pollution havens. According to this view, nation states compete with one another to become the low-cost location for multinational companies investment, creating a 'race to the bottom' in which competing countries are caught in a downward spiral of lower and lower environmental regulations (Taylor, 2002: 122).

Vary famous letter about the view of the globalization and capitalism about the environmental problems and the race to the bottom effect will be helpful for understanding the situation more clearly. On December 12 1991, Lawrence Summers, Chief Economist of the World Bank, sent a memorandum to his colleagues which presents views of the orthodox economists on the environment but are seldom offered up for public scrutiny;

"Just between you and me, shouldn't the World Bank be encouraging more migration of the dirty industries to the LDCs [Less Developed Countries]? I can think of three reasons:

1) The measurements of the costs of health impairing pollution depend on the foregone earnings from increased morbidity and mortality. From this point of view a given amount of health impairing pollution should be done in the country with the lowest cost, which will be the country with the lowest wages. I think the economic logic behind dumping a load of toxic waste in the lowest wage country is impeccable and we should face up to that.

2) The costs of pollution are likely to be non-linear as the initial increments of pollution probably have very low cost. I've always thought that under-populated countries in Africa are vastly under-polluted; their air quality is probably vastly inefficiently low compared to Los Angeles or Mexico City. Only the lamentable facts that so much pollution is generated by non-tradable industries (transport, electrical generation) and that the unit transport costs of solid waste are so high prevent world welfare enhancing trade in air pollution and waste.

3) The demand for a clean environment for aesthetic and health reasons is likely to have very high income elasticity. The concern over an agent that causes a one in a million change in the odds of prostate cancer is obviously going to be much higher in a country where people survive to get prostate cancer than in a country where under 5 mortality is 200 per thousand. Also, much of the concern over industrial atmosphere discharge is about visibility impairing particulates. These discharges may have very little direct health impact. Clearly trade in goods that embody aesthetic pollution concerns could be welfare enhancing. While production is mobile the consumption of pretty air is a non-tradable. The problem with the arguments against all of these proposals for more pollution in LDCs (intrinsic rights to certain goods, moral reasons, social concerns, lack of adequate markets, etc.) could be turned around and used more or less effectively against every Bank proposal for liberalization." (Foster, 2002: 61).

When we analyze the memorandum, first we see that the lives of individuals in the third world, which are measured by forgone earnings from illness and death, are worth less than that of individuals in the advanced capitalist countries where wages are often hundreds of times higher. Second, clean environment is viewed as a luxury good pursued by rich countries with high life expectancies where higher aesthetic and health standards apply; cost of production in the world therefore will fall if polluting industries are shifted from the center to the periphery of the world. "Summers argument for dumping toxic wastes in the third world is therefore nothing more than a call for the globalization of policies and practices which are already evident, and which have been unearthed in locations throughout the capitalist world." (Foster, 2002: 63).
How can be the reactions to these arguments to protect the environment? As economic integration broadens and deepens, the scope of demands that citizens feel should be encompassed within the set of baseline standards grows. The process of parallel economic and political integration will not always be smooth. However, creating a sense of community will be necessary if countries wish to deepen their economic ties. This dynamic may create tensions as some countries, particularly those in the developing world, may have an expectation of complete national sovereignty in setting their own environmental standards. But the idea that environmental policy can be made in a political vacuum and be immune from external pressures misunderstands the imperatives of deepening economic integration. At the same time, developed nations which believe that their moral preferences should be accepted by others without question will find themselves facing a major backlash. In sum, absent a solid political foundation, including agreement on how to address shared environmental challenges, the drive for economic integration will falter. (Esty and Ivanova, 2005: 3)

Minimizing the Negative Impacts

Economic theory contends that the free market can be expected to produce an efficient and welfare-enhancing level of resource use, production, consumption, and environmental protection if the prices of resources, goods, and services capture all of the social costs and benefits of their use. However, when private costs, which are the basis for market decisions, deviate from social costs, a “market failure” will occur resulting in allocative inefficiency as well as suboptimal resource use and pollution levels. Intensified international trade and the competitiveness pressures it can generate wield deleterious impacts on environmental quality, as market failures are a hallmark of the environmental domain. Many critical resources such as water, timber, oil, fish, coal, etc. are under priced. Ecosystem services such as flood prevention, water retention, carbon sequestration, and oxygen provision often go entirely unpriced. Because under priced and non-priced resources are overexploited, economic actors are able to spill onto others all or part of the environmental costs they generate and environmental strains are exacerbated.

Another (and related) concern is that globalization and freer trade will lead to competitive pressures that will push down environmental standards. A regulatory “race toward the bottom” might occur as jurisdictions with high environmental standards relax their regulations to avoid burdening national industries with pollution control costs higher than competitors operating in low–standard jurisdictions. While there is little evidence that standards are dropping, the real concern is not about a literal race to the bottom. Rather, the concern arises from the possibility that economic integration will create a regulatory dynamic in which standards are set strategically with an eye on the pollution control burdens in competing jurisdictions. The result may be a ‘political drag’ that translates into suboptimal environmental standards at least in some jurisdictions. These effects might involve not only weakened environmental laws, but perhaps more importantly, lax enforcement of existing rules, or standards not strengthened as much as they would have been.

From a global perspective, international trade increases the environmental burden when domestic differences in environmental policies exist. Environmental regulation raises production costs and this may reduce the market share of domestic companies in global markets. “Under a system of free trade, industries confronted with a strict environmental policy are then less competitive than industries which do not require environmental cost internalization. The industries in the non-internalizing country will increase their share of world output at the expense of the industries in the internalizing country.” (Groot and Nijkamp, 1999: 340). This situation is placed in the literature as ‘eco-dumping’ (Ulph, 1996: 265) concept; lower environmental standards for lower production costs in developing countries to gain advantage for their firms in international trade. Consequently, “free international trade encourages dirty industries to shift their production activities to the countries that have the lowest standards of cost internalization-hardly a move toward global efficiency.” (Daly, 1993: 52).

Diversity in circumstances generally makes uniform standards less attractive than standards tailored to the heterogeneous conditions that exist but not always. Divergent standards across
jurisdictions may impose transaction costs on traded goods that exceed any benefits obtained by allowing each jurisdiction to maintain its own requirements. Upward harmonization (a “race to the top”) may also occur. But this logic only applies to product standards. Standards that relate to production processes or methods are not subject to the same market pressures. Yet, how things are produced matters. Production-related externalities cannot be overlooked. For example, semiconductors manufactured using chlorofluorocarbons contribute to the destruction of the ozone layer. While international environmental agreements are in place, as with the Montreal Protocol on the protection of the ozone layer, trade rules should be interpreted to reinforce the agreed-upon standards. Recreated trade principles that accept the legitimacy of environmental rules aimed at transboundary externalities would make global-scale trade and environmental policies more mutually reinforcing and reduce the risk of the trade regime providing cover for those shirking their share of global environmental responsibilities. (Esty and Ivanova, 2005: 6).

Maximizing the Positive Impacts

Economic growth affects the quality of environment in different channels; scale effects, technological effects, composition effects and income effects. Increasing output requires more input and thus more natural resources are used up in production process. More output also implies more wastes and emissions as by-product, which also contributes to degrade environmental quality. Economic growth, thus, exhibits a scale effect that has a negative impact on environment. However, economic growth has a positive impact on environment through a composition effect: As income grows, structure of the economy tends to change and gradually increases cleaner activities that produce less pollution. Environmental degradation tends to increase as structure of the economy changes from rural to urban or agricultural to industrial, but it starts to fall with another structural change from energy intensive industry to services and knowledge based technology-intensive industry. As a wealthy nation can afford to spend more on R&D technological progress occurs with economic growth and the dirty and obsolete technologies are replaced by upgraded new and cleaner technology, which improves environmental quality. This is the technique effect of economic growth (Dinda, 2004: 435). Income or wealth effects appear when greater financial capacity results in more resources being invested in environmental protection and creates demands for greater attention to environmental quality.

If the technique, income, and composition effects overwhelm the negative scale effect of expanded activity, then the overarching impact will be positive. For some issues and some levels of development the gains seem to outweigh the losses. For example, free trade appears to lower sulfur-dioxide concentrations. Income effects in this case outweigh scale effects. As a recent study by Antweiler, Copeland, and Taylor (2004) show that, a 1-percent increase in the scale of economic activity raises pollution concentrations by 0.25 to 0.5 percent but the accompanying increase in income drives concentrations down by 1.25-1.5 percent via a technique effect. However, it appears that expanded trade and economic activity may worsen environmental conditions in other cases. Regional and global environmental harms, for example, exhibit positive correlation with rising incomes. When harms can be spilled onto other countries or the commons, there is little incentive to pay the costs of abatement since much of the benefit will accrue to citizens in other jurisdictions. Economic integration has broader economic and social impacts. Increasing interdependence often leads to a sense of community that builds a foundation of shared values and gives citizens a basis for demanding that others with whom they trade meet certain baseline moral standards, including a commitment to environmental stewardship.

Environmental Kuznets Curve

Corresponding to the early stage of economic growth, the awareness of environmental problems is low or negligible and environment friendly technologies are not available. Environmental degradation increases with growing income up to a threshold level beyond which environmental quality improves with higher income per capita. This relationship can be shown by an inverted-U-shaped curve (Dinda, 2004: 434).
Looking at the data across countries or across time allows some rough generalization as to the usual outcome of these conflicting effects. For some important environmental measures, an inverted U-shaped relationship appears: at relatively low levels of income per capita, growth leads to greater environmental damage, until it levels off at an intermediate level of income, after which further growth leads to improvements in the environment. This empirical relationship is known as the Environmental Kuznets Curve. The label is by analogy with the original Kuznets Curve, which was an inverted U-shaped relationship between average income and inequality.

Environmental Kuznets Curve is depicted below (Boyce, 2004: 117);

![Environmental Kuznets Curve](image)

**Figure 1: Environmental Kuznets Curve**

The idea behind the Environmental Kuznets Curve is that growth is bad for air and water pollution at the initial stages of industrialization, but later on it reduces pollution, as countries become rich enough to pay to clean up their environments. The dominant theoretical explanation is that production technology makes some pollution inevitable, but that demand for environmental quality rises with income. The standard rationale is thus that, at higher levels of income per capita, growth raises the public’s demand for environmental quality, which can translate into environmental regulation. Environmental regulation, if effective, then translates into a cleaner environment (Frankel, 2004: 9). However, not only the phrase that globalization increases income, but also the phrase that higher income generates more demand for better environment is questionable. It is important to recognize that many aspects of environmental quality are public goods. In order to be effective politically, demand for environmental quality must be articulated through institutions that overcome both free-rider problem and political opposition from the gainers of cost externalization.

**The effects of environment on the globalization**

Just as environmental protection efforts will be shaped by the path of globalization, environmental choices may affect the course of globalization, particularly efforts to liberalize trade and investment flows. At one extreme, a rigid harmonization of policy approaches and regulatory standards could run roughshod over the diversity of environmental circumstances, endowments, and preferences. At the other extreme, uncoordinated national environmental policies might become non-tariff barriers to trade that obstruct efforts to open markets. Deeper economic integration makes countries more sensitive to the regulatory choices and social policies of their trade partners. In the 1970s, when China’s trade with the United States totaled less than $1 billion a year, few US citizens cared about China’s labor or environmental policies. Today, as China emerges as a major trade partner and competitor – and US-China trade has increased almost 100-fold to $92 billion in 2002 – these choices seem much starker. Thus, a key focus of trade policymaking centers on non-tariff barriers to trade and the need for a “level” playing field in the global marketplace (Esty and Ivanova, 2005: 7).

**Managing the process of globalization to protect the Environment and enhance sustainability**

Too much attention has been paid to the economic benefits of globalization and not enough to the social and environmental implications. As a result, the promise and potential of globalization...
as a force of sustainable human development may not be realized. Furthermore, at the same time that globalization attempts to improve the prospects for economic growth worldwide; it may reduce the economic prospects in individual countries, sectors and communities.

To the extent that globalization marginalizes economies, sectors, and people, it results in poverty-induced resource depletion and environmental degradation, which lead to further human deprivation, disparity and disempowerment. The environmental consequences of globalization differ from the economic effects both in time and space: firstly, environmental impacts are more long-term, dynamic and cumulative and they are beset with uncertainty; we don’t really know what the long-term damages are; secondly, environmental impacts involve both physical and non-physical spillovers that may or may not be transmitted through markets such as cross-border pollution, aesthetics, ethical or moral concerns of parties not involved in the transaction.

Globalization generates international interest in what traditionally were considered purely domestic policies, since economic integration implies that trade and investments are now being affected by such policies. Globalization increasingly brings into conflict notions of national sovereignty over production processes with globally-oriented life-cycle perspectives, where consumers want to know the overall environmental impact of what they buy and consume. These needs constrain national government capacities to regulate and necessitate intergovernmental coordination of domestic policies as well as cooperation in the management of the global commons. Without effective international scale governance, globalization may intensify environmental harms wherever regulatory structures are inadequate (Esty and Ivanova, 2005: 3). Thus, it becomes impossible to prevent the world’s environmental crisis from getting progressively worse unless root problems of production, distribution, technology and growth are dealt with on a global scale (Kaplan, 1997: 26); national governments both cannot constrain the pollutions within their borders and impede the entrance of other countries’ pollution into their borders.

Conclusion

The effects of globalization on the environment and the environment on the globalization are multidimensional. It is not easy to determine the whole impacts. Globalization may sustain the economical growth as well as increasing of income. On the other hand, respecting to the globalization, the pollution increases due to the fact that the production volumes are rising. The pollution causes the environment to be damaged and in some cases not easy to overcome with the results.

In this paper I investigated the interrelationship between the globalization and the environment in an economic perspective. I discussed both positive and negative impacts of globalization on the environmental issues after giving brief information about the economic meaning of the globalization. As a result, I think we can derive some suggestions to national governments about the process of managing the globalization to protect the environment and enhance sustainability. These may include: accelerating democratization and institutional development to keep in pace with globalization, reforming domestic policies that both distort trade and have negative environmental impacts (e.g. energy subsidies), correcting existing market failures though efficient incentive systems (economic instruments) that internalize environmental costs, to avert their magnification by trade liberalization and economic integration, improving the effectiveness of environmental policy through the involvement of businesses and local communities in monitoring and enforcement rather than relying on the state’s limited budget and weak regulatory enforcement capacity. “Instruments of empowerment include information disclosure in environmental performance of firms, and provision of training and other capacity building services to communities.” (Panayotou, 2000: 36).

Economic instruments can be summarized as; to support the producers with subsidies to give incentives for making use of the more environment friendly production techniques, to impose quotas on the production of the polluting industries, to set standards in the production process about the environmental quality, to ban the polluting activities legally or to give penalties to those activities, to support the firms for adopting the environmental standards, to privatize of
environmental public goods if they cannot be secured because of their public good nature. However, we should notice that the aim is not to reduce pollution damages to zero but reduce them to socially optimal levels. This implies there will always be some level of pollution. This optimal level is obtained where the marginal social benefit of the decreasing of the pollution equals the marginal social costs of the efforts to reduce pollution.

References


ECONOMIES OF SCALE AND SCOPE IN THE HIGHER EDUCATION: THE CASE OF TURKEY

Gökhan ERKAL*  
Hüseyin ÖZER**

Introduction
In recent years, the analysis of the cost of education has been done frequently by economists. Investment in education for the development of human capital hosts great expectations for the future. The cost of performing education at different levels is of the secondary importance while planning activities in especially universities where higher education activities are carried out. It is of course desirable that the investments to be made are cost effective. Even if the state does not expect any profit from education investments and expenditures, it has always been a matter of discussion whether these investments are cost effective in public conscience. Cost analysis is very important for multi-product production organizations. The high levels of investments made in higher education in recent years reveal that the costs should also be taken into account in the investments to be made. That the universities currently in progress direct their future plans by holding the costs in the foreground provides more efficient use of existing capacity and may prevent cost ineffectiveness.

When the statistics of state and private universities in Turkey were examined between the years 1981-2017, it is noteworthy that the number of universities has increased significantly especially since 2006. Furthermore the number of students and academicians has also increased with the start of student recruitment of newly established universities (Figure 1-3). The increasing number of universities in Turkish higher education raises the question of what the costs of education activities are at the associate degree, undergraduate and graduate levels. From this point of view, in this study the scale and scope economies in educational activities conducted at different levels in Turkish universities are investigated using quadratic cost function developed by Baumol et al. (1982) to study the costs of multi-product organizations. The subject of this study is to determine whether the increase of associate, undergraduate, graduate and research activities will lead to economies of scale and whether co-operation of these activities together will create scope economy by increasing the cost effectiveness.

Figure 1. Number of universities in Turkey by years. (Günay and Günay, 2017: 163)

*Atatürk University, Faculty of Economics and Administrative Sciences, gerkal@atauni.edu.tr  
**Atatürk University, Faculty of Economics and Administrative Sciences, hozer@atauni.edu.tr
The plan of the study is as follow. In the next section, the explanations of scale and scope economies and the methodology of the study are presented. After introducing the data set, findings and interpretations are given in the fourth section. The study is concluded with recommendations in the final section.

Methodology

The pioneering study of Baumol et al. (1982) regarding the cost analysis of multi-product organizations is followed by studies of Mayo (1984), Cohn et al. (1989), Paulsen (1989), Lewis and Dundar (1994), Koshal and Koshal (1999, 2000 and 2001), Robst (2001), Mafoua (2002), Laband and Lentz (2003), Rufino (2006), Longlong et al. (2009), Li and Chen (2012), Zhang and Wothington (2016) on education. The cost analyses (i.e., translog, quadratic and constant elasticity of substitutions) developed by Baumol et al. (1982) can be applied for the organizations such as transportation, banking, health, telecommunication and so on. Cohn et al. (1989) used a three-output flexible fixed cost quadratic function (FFCQ) by using the dataset for the period of 1981-1982 in the USA higher education. They stated that the functional form used allowed them to observe both the differences in fixed costs and the effects of the outputs. In the following years, FFCQ function, which is frequently used in the studies on the economics of education, especially in the studies on the existence of economies of scale and scope.
in higher education, was also preferred in this study. Economies of scale and scope of higher education in Turkey has been previously studied by Dundar and Lewis (1994) using 1991-1992 academic year statistics. In this study, unlike Lewis and Dundar (1994), variables of associate degree enrolment, research expenditures and the students per academician are included in the model. Taking into account FFCQ equations on higher education used by Cohn et al. (1989), Lewis and Dündar (1994), Li and Chen (2012) and Longlong et al. (2009) in their studies, FFCQ equation in this study is developed as follows:

\[ TC = a_0 + \sum_{i} a_i Q_i + \left( \frac{1}{2} \right) \sum_{i} \sum_{j} b_{ij} Q_i Q_j + cCSIZE + v \]  

(1)

The dependent variable TC is the total cost of producing k products, \( Q_i \) and \( Q_j \) show the output of the \( i \)th and \( j \)th product respectively and CSIZE is the students per academician.

Scale and Scope Economies

The higher education activities carried out worldwide are suitable for multi-product organizational structures. Universities in many countries offer associate degree, undergraduate and graduate education activities together. Scale and scope economies are clearly defined by Baumol et al (1982). Economies of scale can be measured in two different ways. The first is ray economies of scale which is used to determine the total economies of scale and is defined as follows:

\[ RE = \frac{TC_{QA,QU,QG,QR}}{MC_A + MC_U + MC_G + MC_R} \]  

(2)

Where \( TC_{QA,QU,QG,QR} \) is the total cost of educational activities offering for QA associate degree enrolment, QU undergraduate enrolment, QG graduate enrolment and QR research activities. \( RE > 1 \) indicates the presence of ray economies of scale. It is also possible to calculate product-specific economies of scale. The product-specific economies of associate degree, for example, can be calculated as follow:

\[ E_A = \frac{AIC_A}{MC_A} \]  

(3)

When \( E_A \) is greater (less) than 1, economies (diseconomies) of scale are set to exist for the product of associate degree enrolment.

As is seen, average incremental cost (AIC) and marginal cost (MC) should be calculated first. AIC is in the following form:

\[ AIC_A = \frac{TC_{QA,QU,QG,QR} - TC_{0,QU,QG,QR}}{QA} \]  

(4)

The incremental cost of multi-product firm for producing an additional output (associate degree enrolment), while holding the other outputs (enrolment of undergraduate and graduate and research activities) constant, is the total cost of producing all of the multi-products firm output except associate degree enrolment. AIC can be obtained by dividing the incremental cost into quantity of associate degree enrolment.

Cost efficiencies to be appeared when multiple products are produced jointly are defined as economies of scope. Production in Turkish higher education typically exhibits joint production since a number of products are produced jointly and the costs of production are not allocated based on any single type of output (e.g., student enrolments at each level or research). Economies of scope in higher education production suggests that a single institution or faculty/college can produce a given bundle of output (i.e., associate degree, undergraduate, graduate, and research) in a less costly manner than in specialized teaching or as independent research institutions (Lewis and Dündar, 1994: 22). In the four-product case of this study, economies of scope can be calculated as follows:

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1 For detailed information on scale and scope economies see Baumol et al. (1982)’s sections 3 and 4.
\[ GE = \frac{TC_{QA,0,0,0} + TC_{0,QU,0,0} + TC_{0,0,0,QR} - TC_{QA,QU,0,QR}}{TC_{QA,QU,0,QR}} \] (5)

\[ GE > 0 \] indicates the presence of economies of scope and demonstrates that joint production of products will provide cost-effectiveness. In other words, “economies of scope” means that joint production of a product with another rather than producing it alone reduces unit costs. Economies of scope can also be calculated for product-specific, such as economies of scale.

\[ PSE_A = \frac{TC_{QA,0,0,0} + TC_{0,QU,0,0} + TC_{0,0,QR} - TC_{QA,QU,QR}}{TC_{QA,QU,QR}} \] (6)

Product-specific economies of scope associated with product A (associate degree enrolment) exist if \( PSE_A \) is greater than zero, which means a certain higher education institution can produce product A more cheaply with other products than a combination of separate higher education’s can.

**Data**

The public universities’ statistics related to the 2017-2018 academic year in Turkey have been examined in the study. Analyses were carried out for 97 universities providing associate, undergraduate and postgraduate degrees. It is known that the investment expenditures of the newly established universities have a large share in the budget. Take into account this situation, it was decided to use education expenditures for the total cost (TC), the dependent variable. The QR variable represents the education and research expenditures of public universities and is derived from university budgets issued by The Council of Higher Education (YÖK). In addition, students per academician (CSIZE), associate degree enrolment (QA), undergraduate enrolment (QU) and the graduate enrolment (QG) were taken from the 2017-2018 academic year statistics published by the Council of Higher Education. QAQU, QAQG, QAQR, QUQG, QUQR and QGQR variables were used to determine the effect of interactions between outputs. The definitions, means and standard deviations of the variables used in the study are shown in Table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
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<tbody>
<tr>
<td>TC</td>
<td>Total cost (million Turkish Liras)</td>
<td>209,846</td>
<td>156,310</td>
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<tr>
<td>CSIZE</td>
<td>Students per academician</td>
<td>26,101</td>
<td>8,604</td>
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<td>QA</td>
<td>Associate degree enrolment in thousands</td>
<td>27,071</td>
<td>140,994</td>
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<tr>
<td>QU</td>
<td>Undergraduate enrolment in thousands</td>
<td>39,668</td>
<td>184,104</td>
</tr>
<tr>
<td>QG</td>
<td>Graduate enrolment in thousands</td>
<td>4,545</td>
<td>4,993</td>
</tr>
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<td>QR</td>
<td>Research expenditure (million Turkish Liras)</td>
<td>10,371</td>
<td>21,974</td>
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<tr>
<td>QA²</td>
<td>Associate degree enrolment squared</td>
<td>20,071,19</td>
<td>193,885,9</td>
</tr>
<tr>
<td>QU²</td>
<td>Undergraduate enrolment squared</td>
<td>35,118,55</td>
<td>33,661,29</td>
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<tr>
<td>QG²</td>
<td>Graduate enrolment squared</td>
<td>45,330</td>
<td>108,945</td>
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<tr>
<td>QR²</td>
<td>Research expenditure squared</td>
<td>585,425</td>
<td>316,419</td>
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<td>QAQU</td>
<td>Associate Degree * Undergraduate enrolment</td>
<td>26,545,11</td>
<td>255,454,1</td>
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<td>QAQG</td>
<td>Associate Degree * Graduate enrolment</td>
<td>223,167</td>
<td>124,5,47</td>
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<td>QAQR</td>
<td>Associate Degree * Research expenditure</td>
<td>27,057,32</td>
<td>244,690,92</td>
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<td>QUQG</td>
<td>Undergraduate * Graduate enrolment</td>
<td>345,599</td>
<td>166,0,871</td>
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<td>QUQR</td>
<td>Undergraduate * Research expenditure</td>
<td>368,675</td>
<td>322,3,87</td>
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<td>QGQR</td>
<td>Graduate * Research expenditure</td>
<td>109,681</td>
<td>299,644</td>
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**Empirical Findings**

The four-output quadratic cost function was estimated by the Ridge Regression method to eliminate the multicollinearity problem resulting from the Least Squares method estimation. Heteroscedasticity problem, furthermore, was corrected by using the White heteroscedasticity-
consistent method as Koshal and Koshal (1999, 2000, 2001) pointed out. The regression results are given in Table 2. According to the estimation results, coefficients of $QG$, $QR$, $QA^2$, $QU^2$, $QG^2$, $QR^2$, $QGQR$, $QAQR$, $QU$, $QUG$ and $QUQR$ were found to be statistically significant while the coefficients of $QA$, $QU$, $QAQG$ and $CSIZE$ were statistically insignificant. The fact that the coefficients of $QA$ and $QU$ were statistically insignificant is thought to be due to the changes in the associate degree and undergraduate enrolment.

Table 2. Estimation results for the four-output quadratic cost function

<table>
<thead>
<tr>
<th>Variables</th>
<th>coefficients (standard error)</th>
<th>tstat.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>155,547 (---)</td>
<td>----</td>
</tr>
<tr>
<td>QA</td>
<td>-0.002 (0.011)</td>
<td>-0.1759</td>
</tr>
<tr>
<td>QU</td>
<td>0.005 (0.006)</td>
<td>0.8908</td>
</tr>
<tr>
<td>QG</td>
<td>8.389** (0.754)</td>
<td>11.1255</td>
</tr>
<tr>
<td>QR</td>
<td>1.310** (0.134)</td>
<td>9.7370</td>
</tr>
<tr>
<td>QA$^2$</td>
<td>-0.00002* (-0.000006)</td>
<td>-2.9679</td>
</tr>
<tr>
<td>QU$^2$</td>
<td>-0.00001* (-0.000004)</td>
<td>-2.9340</td>
</tr>
<tr>
<td>QG$^2$</td>
<td>0.208** (0.033)</td>
<td>6.2250</td>
</tr>
<tr>
<td>QR$^2$</td>
<td>0.002** (0.0003)</td>
<td>4.0740</td>
</tr>
<tr>
<td>QGQR</td>
<td>0.086** (0.011)</td>
<td>7.7664</td>
</tr>
<tr>
<td>QAQG</td>
<td>0.001 (0.002)</td>
<td>0.7984</td>
</tr>
<tr>
<td>QAQR</td>
<td>-0.0001** (-0.00005)</td>
<td>-2.7488</td>
</tr>
<tr>
<td>QAQU</td>
<td>-0.00001** (-0.000005)</td>
<td>-2.9695</td>
</tr>
<tr>
<td>QUQG</td>
<td>0.002* (0.0009)</td>
<td>2.1015</td>
</tr>
<tr>
<td>QUQR</td>
<td>-0.00009* (-0.00004)</td>
<td>-2.4185</td>
</tr>
<tr>
<td>CSIZE</td>
<td>-0.634 (0.607)</td>
<td>-1.0437</td>
</tr>
<tr>
<td>N</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.6310</td>
<td></td>
</tr>
</tbody>
</table>

* Denotes 5% level of significance.
** Denotes 1% level of significance.

The presence of statistically significant negative coefficients for any squared terms in the Table 2 indicate that for the production of those outputs the cost function is likely concave and generative of economies of scale. Findings from the quadratic cost function show the existence of economies of scale in associate degree and undergraduate in Turkish higher education. It means that there are substantial opportunities for economies of scale through the expansion of associate degree and undergraduate enrolment in the universities.
It was also determined that joint production of associate degree with both undergraduate education and research activities leads to the economies of scope. Positive and statistically significant interaction terms for the joint production of graduate education with both research activities and undergraduate education suggests the existence of diseconomies of scope in their joint production.

Economies of scale were calculated for the sample means (100%) and different output levels, based on the estimated cost function in Table 2 and the formulas specified in equations 2 and 3. The results of ray and product-specific economies of scale are presented in Table 3.

Table 3. Degrees of economies of scale for alternative output levels

<table>
<thead>
<tr>
<th>Percentage of Output Means</th>
<th>Ray Economies of Scale</th>
<th>Product-Specific Economies of Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Associate Degree</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>50%</td>
<td>8,092</td>
<td>-2,261</td>
</tr>
<tr>
<td>100%</td>
<td>4,046</td>
<td>-1,130</td>
</tr>
<tr>
<td>200%</td>
<td>2,023</td>
<td>-0,565</td>
</tr>
<tr>
<td>300%</td>
<td>1,349</td>
<td>-0,377</td>
</tr>
<tr>
<td>400%</td>
<td>1,011</td>
<td>-0,283</td>
</tr>
<tr>
<td>500%</td>
<td>0,809</td>
<td>-0,226</td>
</tr>
<tr>
<td>600%</td>
<td>0,674</td>
<td>-0,188</td>
</tr>
</tbody>
</table>

It has been revealed that economies of scale are valid until the average output percentage reaches almost 500% and the cost advantage is achieved if the outputs are increased at the same rate until this level is captured. On the other hand, diseconomies arise when the output level becomes equal to or greater than 400%. The economies of scale were found to be existed for associate degree education. Cost advantage is achieved with the effect of economies of scale even if the associate activities are increased to 600% while keeping the undergraduate, graduate and research activities constant. However, these cost advantages do not exist for undergraduate, graduate or research activities. Even if the scale is reduced for graduate and research activities, cost advantages are higher. It was determined that increasing the license activities alone would not be enough to provide a cost advantage.

Economies of scope were also calculated for sample means (100%) and different output levels as in economies of scale. The results obtained for economies of scope and product-specific scope economies are given in Table 4.

Table 4. Degrees of economies of scope for alternative output bundles

<table>
<thead>
<tr>
<th>Percentage of Output Means</th>
<th>Economies of scope</th>
<th>Product-Specific Economies of Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Associate Degree</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>50%</td>
<td>2,233</td>
<td>0,807</td>
</tr>
<tr>
<td>100%</td>
<td>1,942</td>
<td>0,665</td>
</tr>
<tr>
<td>200%</td>
<td>0,879</td>
<td>0,467</td>
</tr>
<tr>
<td>300%</td>
<td>0,361</td>
<td>0,337</td>
</tr>
<tr>
<td>400%</td>
<td>-0,006</td>
<td>0,245</td>
</tr>
<tr>
<td>500%</td>
<td>-0,279</td>
<td>0,176</td>
</tr>
<tr>
<td>600%</td>
<td>-0,491</td>
<td>0,123</td>
</tr>
</tbody>
</table>

According to this, even if the output level was increased up to three times, it was found that economies of scope were valid. This shows that the joint production of education and research activities will provide a cost advantage up to 400% output level. While performing the associate degree and undergraduate activities together with other activities provides a cost advantage even if the average output level is increased by six times, it is determined that the implementation of the graduate education jointly with other activities in case of the sample average exceeds the cost
disadvantage. For the research activities, even if the mean output level is increased fivefold, it can be said that it will provide cost advantages with other activities.

Conclusion and Recommendations
In this study carried out for 97 public universities in Turkey, it was determined that economies of scale and scope was valid in the Turkish higher education, using the dataset related to the 2017-2018 academic year. As a result of analyzes on economies of scale, it has been determined that the advantages of increasing the capacity in the educational activities to be carried out at the associate degree level are not valid for undergraduate, graduate and research activities. This suggests that the desired cost-effective level of the associate degree activities was not reached yet and thus increasing the output level (student enrolments) in the pre-license activities of the existing universities can provide cost advantages. The fact that economies of scale have also been identified in the associate degree education from the quadratic cost function support this result. Taking into account these results related to economies of scale, it would be useful to ensure that the existing universities reach the optimal level at the different education levels.

Another result is that the economies of scope continue to high output levels. It is expected that a higher education policy to be made for different levels of education and research activities will provide significant cost advantages. In particular, the cost complementarity between education and research activities should be turned into opportunities. Currently, universities that carry out these activities jointly should be supported. In contrast, joint production form that leads to cost-disadvantages should be avoided. It is of great importance to carry out jointly the activities to reduce the unit costs. In particular, the cost advantages resulting from the jointly conduct of research activities with other educational activities should not be missed and new established universities are advised to built the units that will carry out the research activities to the near of the buildings where the training activities.

References


INTERNATIONAL SPILLOVERS OF THE FEDERAL RESERVE’S BOND PURCHASES

Mesut Turkay

Introduction

With the recent global economic crisis of 2008-09, a new era of monetary policy has begun. As a first response to the crisis, leading advanced country central banks reduced short term policy rates and many of them reached zero lower bound. This has made the conventional interest rate tool of monetary policy almost useless and thus central banks started to implement unconventional monetary policies. These policies have been employed increasingly after the global crisis. Among these unconventional monetary policies, especially quantitative easing (QE) policies have taken the center stage.

With the widespread implementation of QE policies, attention of media, policy makers and academics have increased about the impact of these policies on the economy and whether they are effective in stimulating the economy. Weakening growth prospects despite expansionary unconventional monetary policies in the last couple of years have further intensified the debate on the effectiveness of QE policies. Most of the studies in this field focus on the effects of QE policies on advanced countries and there are limited numbers of studies that analyze the impact on emerging market economies. This is one reason that motivates us to conduct a study about the effects of QE on EM economies. This paper aims to investigate the effects of QE policies implemented by Federal Reserve on major EM economies and contributes to the literature by filling this gap. This study also contributes to the policy making of central banks. QE policies lead to important international spillovers and this in turn cause spillback effects on the countries that implement QE. Since EM economies represent a large share of the global economy, QE policies that affect them will have crucial spillback effects. As a policy implication, this study puts forward that advanced country central banks should take spillover and spillback effects into consideration while designing their policies. As another contribution, within the best of our knowledge, this study is the first to use panel VAR model to analyze the impacts of QE policies on the major macroeconomic variables of EM economies.

Main findings of this study are as follows. We find long run co-integration relationship between bond purchases in US and industrial production, inflation, government interest rates and real exchange rate in emerging market economies. Panel VAR model results imply that US bond purchases lower bond yield and inflation, support output and lead to exchange rate appreciation in EM economies. In addition, MBS purchases of Fed and unconventional monetary policies of ECB and BoJ are also found to have significant economic effects on EM economies.

The paper proceeds as follows. Section 2 consists of the related literature review. Section 3 describes our data set and empirical methodology. Section 4 presents the model results and section 5 concludes.

1. Literature Review

The literature concerning the effects of unconventional monetary policy, and quantitative easing in particular, have grown rapidly especially after the global economic crisis of 2008-09. A large number of studies in this field are on the effects of QE policies on domestic financial and real variables. Among the studies about the financial market effects of QE, Bernanke et al. (2004),

1Ministry of Treasury and Finance, Ankara, Turkey

Among the studies that analyze the effects of QE on domestic macroeconomic variables such as growth, inflation, unemployment rate and lending; Ugai (2007), Girardin and Moussa (2011), Schenkelberg and Watzka (2013), Bowman et al. (2015a) and Matsuki et al. (2015) investigate the impact of QE for Japan, Lenza et al. (2010) for Euro Area, Kapetanios et al. (2012) and Paseran and Smith (2016) for UK, Chung et al. (2012), Chen et al. (2012a), Gertler and Karadi (2013), Baumeister and Benati (2013) and Meinusch and Tillmann (2016) for US. Weale and Wieladek (2016) analyze the impact of asset purchases in US and UK on output and inflation. Most of these studies use vector autoregression (VAR) type models and indicate that QE has significant effects on macroeconomic indicators. General finding is that QE increases output and inflation and lowers unemployment rate.

There are relatively less studies about the international spillovers of QE policies. Among the papers that analyze international financial market effects of QE, Chen et al. (2012b), Glick and Leduc (2012), Fratzscher et al. (2013), Neely (2015), Georgiadis and Grab (2016) use event study methodology and find out that QE policies increased global equities and reduced government and corporate bond yields. QE led to exchange rate appreciation and easing of financial conditions in EM countries. On the other hand, Moore et al. (2013), Chen et al. (2014), Bowman et al. (2015b) employ panel regression method to investigate the global financial market impact of QE programs and point to similar findings. Ahmet and Zlade (2014), Kiendrebeogo (2016) and Lim and Mohapatra (2016) examine the effects of QE on capital flows into emerging market economies by using panel regression and find empirically that QE boosts capital flows to EM economies. Duca et al. (2016) shows that QE policies increase corporate bond issuance worldwide. Tillmann (2016) builds a Qual VAR model to study the effects of QE on EM financial indicators and find that it has a strong impact on financial variables such as bond yields, equity prices and exchange rates.

Most of the studies on the international macroeconomic spillovers of QE policies use VAR type models. Among these, Gambacorta et al. (2014) employ a panel structural VAR model for selected advanced countries and find out that unconventional monetary policies increase output and prices only temporarily. Dahlhaus et al. (2014) uses Factor-Augmented Vector Autoregression (FAVAR) model to investigate the effects of QE in US on Canadian economy and conclude that QE in US boosts output and prices in Canada. Barroso et al. (2015) and Carrera et al. (2015) employ structural VAR models to analyze the impact of QE on Latin American countries. Model findings imply that QE in US increase output, lending, equity prices and capital flows to Latin America. Chen et al. (2015) analyze the effects of QE policy in US on both advanced and emerging market economies using global vector error correction model (GVECM). Model results indicate that the effect of QE on emerging market economies is larger compared to advanced economies. QE policies both supported recovery in EM countries and also contributed to overheating.

As summarized above, although there are relatively more studies on domestic economic effects of QE policies, the number of studies on international spillovers of QE policies is limited. Especially, those about the effects of QE on emerging market economies are scarcer. Therefore, it
is important and necessary to enrich the related literature. This study contributes to the existing literature by filling this gap.

2. Data and Methodology

In our study, we use monthly data that covers global crisis and post-crisis period from 2008:1 to 2015:12 for 18 emerging market economies according to data availability. The countries included in the study are: China, Colombia, Brazil, Hungary, Czech Republic, India, Korea, Indonesia, Peru, Mexico, Philippines, Malaysia, Poland, Turkey, Singapore, South Africa, Taiwan and Thailand. Data for industrial production and consumer price index are taken from World Bank Global Economic Monitor database, real exchange rate from BIS database and data for quantitative easing and government bond yield are received from Bloomberg. Data are expressed in logarithmic form and are seasonally adjusted, except for government bond interest rates which are used in levels.

This section advances as follows. First, panel unit root test is conducted to find out whether the analyzed variables are stationary. Second, we perform panel co-integration test to investigate the long-run relationship between the variables. Third, PVAR model is built to investigate the effects of quantitative easing in US on major economic variables in emerging market economies.

2.1 Unit Root Test

It has been the norm to start empirical studies in economics with unit root tests to analyze the stationarity of the variables. In this context, we use both Maddala and Wu (1999) and Pesaran (2007) panel unit root tests which are used extensively in the literature.

Maddala and Wu (1999) propose a Fisher-type test:

$$ P = -2 \left( \sum_{i=1}^{N} \ln p_i \right) \rightarrow \chi^2(2N) \quad (1) $$

that combines the p-values of each cross-sectional unit.

The null and alternative hypotheses can be defined as:

$$ H_0 = p_i = 1, i = 1, 2, ..., N \quad (2) $$

against the alternatives

$$ H_A = p_i < 1, i = 1, 2, ..., N; p_i = 1, i = N_1 + 1, N_1 + 2, ..., N \quad (3) $$

Unit root tests are performed separately for each cross-section units. The Augmented Dickey-Fuller (ADF) regression is:

$$ y_{it} = \alpha_i + p_i y_{it-1} + \sum_{j=1}^{p_i} \theta_{ij} \Delta y_{it-j} + \epsilon_{it} \quad t = 1, 2, ..., T \quad (4) $$

This equation is applied separately for cross-section units and ADF t-statistic is calculated for individual series. P-value is used to compute test statistics and it is compared with the critical value (Baltagi, 2013).

Other than first generation Maddala and Wu (1999) test, we also employ second generation Pesaran (2007) unit root test that takes cross section dependence into account. Pesaran (2007)
augments standart ADF regression with the cross section averages of lagged levels and first-differences of each series. It is called cross-sectional augmented Dickey–Fuller (CADF) test. The test is based on the AR(p) equation below augmented with the lagged and current values of \( y_{t} \).

\[
y_{it} = \alpha_{i} + \gamma_{i} y_{it-1} + \ldots + \delta_{i0} y_{t} + \delta_{i1} y_{t-1} + \ldots + \delta_{ip} y_{t-p} + \epsilon_{i,t} \tag{5}
\]

In order to obtain the CIPS statistic, we transform the equation above into first difference and compute individual ADF statistics (CADF) for every cross section. The simple average of the CADF statistics gives the CIPS statistics:

\[
CIPS = \frac{\sum_{i=1}^{N} CADF_{i}}{N} \tag{6}
\]

For the cross sectionally invariant variable, that is quantitative easing, we use Ng-Perron (2001) unit root test.

### 2.2 Co-integration Test

After unit root tests, we investigate whether there is a co-integration relationship between the variables. For this purpose we use the Durbin-Hausman co-integration test introduced by Westerlund (2008). One important reason we prefer this test over others is that it can be employed even when variables are integrated of different order.

Durbin-Hausman test has two dimensions: the panel dimension (DHp) and the group dimension (DHg). The Durbin-Hausman panel (DHp) test assumes that the autoregressive parameter is the same for all cross-sections. With this assumption, if the null hypothesis is rejected, we conclude that there is co-integration for all cross-sections. The Durbin-Hausman group (DHg) test allows the autoregressive parameter to change cross-sections under the alternative hypothesis. Therefore, the rejection of the null hypothesis shows that there is co-integration for some individuals.

In order to derive the calculation of Durbin-Hausman test, assume that we consider the panel data model below:

\[
y_{it} = \alpha_{i} + \beta_{i} x_{it} + z_{it} \tag{7}
\]

\[
x_{it} = \delta x_{it-1} + w_{it} \tag{8}
\]

We assume that \( z_{it} \) obeys the following set of equations.

\[
z_{it} = \lambda_{i} F_{t} + e_{it} \tag{9}
\]

\[
F_{jt} = \rho_{j} F_{jt-1} + u_{jt} \tag{10}
\]

\[
e_{it} = \phi_{i} e_{it-1} + v_{it} \tag{11}
\]

Here \( F_{t} \) is a k-sized vector of common factors \( F_{jt} \), \( \lambda_{i} \) is the conformable vector of factor loadings. In order to obtain Durbin-Hausman test, we take first difference of the equation (9). It becomes:

\[
\Delta z_{it} = \lambda_{i} \Delta F_{t} + \Delta e_{it} \tag{12}
\]
Since Δz_{it} is not known, we can not estimate λ_i and ΔF_t directly. We get OLS estimates and implement principal components. We write it as:

$$\Delta \hat{z}_{it} = \Delta y_{it} - \hat{\beta}_i \Delta x_{it} \quad (13)$$

$\Delta \hat{F}_t$ is principal component estimator of $\Delta F_t$ and can be acquired by calculating $\sqrt{T - 1}$ times the eigenvector from the greatest eigenvalues of the $(T - 1) \times (T - 1)$ matrix $\Delta \hat{z} \Delta \hat{z}$. $\hat{\lambda}$ is calculated as

$$\hat{\lambda} = \frac{\Delta \hat{F} \Delta \hat{z}}{T - 1} \quad (14)$$

Defactored and first differenced residuals can be calculated as:

$$\Delta \hat{\epsilon}_{it} = \Delta \hat{z}_{it} - \hat{\lambda}_i \Delta \hat{F}_t \quad (15)$$
$$\hat{\epsilon}_{it} = \sum_{j=2}^{T} \Delta \hat{\epsilon}_{ij} \quad (16)$$

The null hypothesis of no co-integration is asymptotically equal with testing whether $\phi_i = 1$ below:

$$\hat{\epsilon}_{it} = \phi_i \hat{\epsilon}_{it-1} + \text{error} \quad (17)$$

One other estimator that we need to form Durbin-Hausman test is the Kernal estimator and can be written as below:

$$\hat{\omega}_i = \frac{1}{T-1} \sum_{j=1}^{M_i} \left(1 - \frac{j}{N_i + 1}\right) \sum_{t=j+1}^{T} \hat{u}_{it} \hat{u}_{it-j} \quad (18)$$

The $\hat{u}_{it}$ is OLS residual found from equation (17). $M_i$ is bandwidth parameter which shows the number of autocovariances of $\hat{u}_{it}$ to calculate the kernel estimator. $\hat{\omega}_i$ is consistent estimator of $\omega_i^2$ and variance estimate is expressed as $\hat{\sigma}_i^2$. We build two variance ratios $\hat{S}_i = \hat{\omega}_i / \hat{\sigma}_i^2$ and $\hat{S}_n = \hat{\omega}_n / (\hat{\sigma}_n^2)$, where

$$\hat{\omega}_i = \frac{1}{n} \sum_{i=1}^{n} \hat{\omega}_i^2 \text{ and } \hat{\sigma}_n^2 = \frac{1}{n} \sum_{i=1}^{n} \hat{\sigma}_i^2 \quad (19)$$

After all these calculation, Durbin-Hausman test is calculated as below:

$$DH_g = \sum_{i=1}^{n} \hat{S}_i (\hat{\phi}_i - \bar{\phi})^2 \sum_{t=2}^{T} \hat{\epsilon}_{it-1} \quad DH_p = \hat{S}_n = (\hat{\phi} - \bar{\phi})^2 \sum_{i=1}^{n} \sum_{t=2}^{T} \hat{\epsilon}_{it-1} \quad (20)$$

$DH_g$ shows group statistics and $DH_p$ shows panel statistics.

### 2.3 Panel VAR Model

We employ panel vector auto regression (PVAR) model using a least squares dummy variable (LSDV) estimator of Cagala and Glogowsky (2014) to analyze the relationship between US Federal Reserve bond purchases and industrial production, CPI, government bond interest rate and real exchange rate in emerging market economies. Optimal lag order is chosen to be 1 by
using Akaike, the Bayesian and the Hannan-Quinn information criteria. First order PVAR model can be written as:

$$Z_{i,t} = \alpha + \Gamma_z Z_{i,t-1} + \sum_{i=2}^{n} \alpha_i D_i + e_{it} \quad (21)$$

Where $i=1,2,...,N$ (N=18), $t=1,2,...,T$ (T=96) and $\Gamma_z$ is the lag operator. $Z_{i,t}$ is a five variable vector consisting of QE, IP, CPI, IR and RER; in which QE is total Federal Reserve bond purchases, IP is industrial production, CPI is consumer price index, IR is 10 year local currency government bond interest rate and RER is real exchange rate of selected emerging market economies. As for other variables, $\alpha$ is intercept, $D_i$ is a dummy variable for the $i$th country and $e_{it}$ are idiosyncratic errors. If we include dummy variable for each country as well as an intercept, we fall into dummy variable trap. One of the individual dummies is dropped because we include a constant and use N-1 dummy variables. By adding dummy for each country, we control for unobserved heterogeneity. Each dummy is absorbing the effects particular to each country.

When N is large, least squares dummy variable estimator is not practical due to the need of large number of dummy variables. We prefer LSDV estimator over Generalized Method of Moments (GMM) since the properties of GMM estimators hold when N is large and GMM estimators can be biased and imprecise in panels with small N (Bruno, 2005). Since we have a time series panel with relatively small N and large T ($T > N$), it is better to use LSDV estimator. This estimator is consistent and the bias is negligible with large macro panels such as we have.

One important issue and question is whether we need stationary variables in the VAR system. Sims (1980) and Sims et al. (1990) argue that we should not take the difference of the variables even when there is unit root. They claim that the aim of the VAR analysis is to find the relationships among the variables, not to estimate the parameters. Sims et al. (1990) show that if co-integration exists among variables, VAR system can be estimated in levels. Due to these influential studies, we estimate our model in levels. Estimation in level form is found to be stable.

The Cholesky ordering in our VAR system is such that the variables that appear early in the system are relatively more exogenous than the following. These variables influence the following variables both contemporaneously and with a lag. On the other hand, the variables that appear later in the system impact the former variables with a lag. Quantitative easing variable comes first in our specification since it is relatively exogenous for EM countries. Domestic factors are thought to lag behind global factors in spillover analysis. Industrial production and inflation appear earlier than government interest rate and real exchange rate because the former variables impact the latter ones contemporaneously while the latter ones influence the former variables only with a lag. Interest rate and exchange rate are the most endogenous variables in our system. Cholesky ordering of our variables follows the literature and we order output and prices before financial market indicators similar with Souza and Zaghini (2008), Belke et al. (2010) and Brana et al. (2012).

Once the coefficient estimates of the model are obtained, we calculate the impulse response functions (IRFs) to analyze the impact of Federal Reserve bond purchases on major macroeconomic variables of EM economies. Impulse responses show the response of an endogenous variable over time to a shock in another variable in the system.

3. Results

Unit root test results present mixed evidence of the stationary of the variables. Pesaran’s (2007) CIPS test and Maddala and Wu (1999) unit root test results imply that some of the variables are I(0) while the others are I(1). According to Ng-Perron (2001) unit root test, quantitative easing variable is non-stationary; it is I(1). Durbin-Hausman test results imply that there exists co-
integration among variables. That is, there is long run relationship between bond purchases in US and major macroeconomic variables in EM countries. Results of the tests are presented below.

### Table 1. Panel Unit Root Test Results

<table>
<thead>
<tr>
<th>Series</th>
<th>MZa</th>
<th>MZt</th>
<th>MSB</th>
<th>MPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>QE</td>
<td>-0.538</td>
<td>-0.298</td>
<td>0.554</td>
<td>19.664</td>
</tr>
<tr>
<td>ΔQE</td>
<td>-17.963***</td>
<td>-2.996***</td>
<td>0.167***</td>
<td>1.364***</td>
</tr>
</tbody>
</table>

* *, **, *** show the level of significance at 10%, 5% and 1%, respectively. For CIPS tests the null hypothesis assumes non-stationary. While MW test assumes cross-section independence, CIPS test assumes cross-section dependence.

### Table 2. Ng-Peron Unit Root Test Results

<table>
<thead>
<tr>
<th>Series</th>
<th>MZa</th>
<th>MZt</th>
<th>MSB</th>
<th>MPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>-4.061***</td>
<td>-4.471***</td>
<td>ΔIP</td>
<td>-20.560***</td>
</tr>
<tr>
<td>CPI</td>
<td>2.569</td>
<td>1.631</td>
<td>ΔCPI</td>
<td>-16.972***</td>
</tr>
<tr>
<td>RER</td>
<td>0.659</td>
<td>-1.692**</td>
<td>ΔRER</td>
<td>-20.055***</td>
</tr>
<tr>
<td>IR</td>
<td>-0.049</td>
<td>0.011</td>
<td>ΔIR</td>
<td>-18.846***</td>
</tr>
</tbody>
</table>

### Table 7. Westerlund Durbin-Hausman Test Results

<table>
<thead>
<tr>
<th>Westerlund (2008) Durbin-h Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHg</td>
<td>-2.165**</td>
</tr>
<tr>
<td>DHp</td>
<td>-2.915***</td>
</tr>
</tbody>
</table>

* *, **, *** show that test statistics are significant at the 10%, 5% and 1%, respectively.

After testing for stationary and co-integration, we estimate panel VAR model to analyze the short run dynamics. Figure 4 demonstrates impulse response functions derived from the estimated panel VAR model. Each column of the figure gives the impulse responses (over 20 months) to a one-standard-deviation positive US bond purchase shock. The responding variables are named at the top of each row/chart. The upper (green) and lower (red) lines plotted in each graph are one-standard-error bands, while the line in the middle (blue) corresponds to the mean response.
Impulse response results show that a positive shock to US bond purchases lowers government bond interest rates in emerging market economies and lead to exchange rate appreciation in the short run. This is mainly due to surging capital flows into EM countries through transmission channels such as portfolio balance and signaling. Results imply that the effect of bond purchases on industrial production is positive and permanent. The peak effect of QE on industrial production occurs in about 1 year. Impulse responses indicate that bond purchases have a negative influence on inflation in the short run, but this effect disappears over time. It seems that opposite forces of inflation lowering impact of exchange rate appreciation and inflation increasing effect of booming economic activity balance each other over time. Our results are broadly similar with previous studies such as Chen et al. (2012b), Bowman et al. (2015b), Barroso et al. (2015), Carrera et al. (2015), Chen et al. (2015), Georgiadis and Grab (2016) and Tilmann (2016) which show that QE lowers government bond interest rates, lead to exchange rate appreciation and support economic activity in EM economies.

Fig. 1. Impulse-Response Functions to a Positive US Bond Purchase Shock

We also analyze the impact of mortgage backed securities (MBS) purchases of Federal Reserve (Fed) on major economic indicators of EM countries. According to impulse responses shown in figure 5, different from government bond purchases, MBS purchases do not have a significant effect on government interest rates. The results concerning real exchange rate, industrial production and inflation are very similar to bond purchases.
Unconventional monetary policies of other leading central banks such as ECB and BoJ also have crucial effects on emerging market economies. Hence, we investigate the impact of these policies in our PVAR setting. Model results show that unconventional monetary policies of ECB and BoJ that lead to balance sheet expansion lower government bond yield and inflation in EM economies. No significant effect is found on industrial production. Results may be provided upon request.

We test the robustness of the results with the alternative specifications. First, we run the model with more lags (2 to 4) and find very similar results. Second, instead of running the model in levels we use first differences of the variables. Impulse response in figure 6 below provides the results. The same results apply and we find that bond purchases by Federal Reserve lower government interest rate and inflation, increase industrial production and lead to real exchange rate appreciation in the short run.
4. Conclusion

Unconventional monetary policies performed by leading advanced country central banks in the post global economic crisis period have both domestic and international economic effects. Due to the widespread use of these policies, it has been more and more important to analyze the spillovers they create. So far, the studies on international spillovers of these policies are relatively rare. This study aims to fill this gap and contribute to the existing literature by investigating the impact of Federal Reserve bond purchases on major economic indicators of emerging market economies. Results imply that there is both short and long run relationship between Federal Reserve bond purchases and EM macroeconomic variables. In the short run, bond purchases lower government bond interest rates and inflation, lead to real exchange rate appreciation and support economic activity. In addition, there is a long run co-integration relationship between bond purchases and EM macro indicators. We also find that MBS purchases by Fed and unconventional monetary policies of ECB and BoJ also have significant economic effects on EM countries. The results are found to be robust to alternative specifications.

The results of this paper are in line with the existing literature and give important lessons to central bankers. Central bankers in advanced countries should be increasingly aware that their policies create important international spillovers to emerging market economies. Since EM economies represent a considerable share in the world economy, spillovers might also create spillbacks to advanced countries. On the other hand, central banks in EM countries should
monitor the policies of major advanced country central banks closely and take into consideration their policy decisions and future expectations when conducting monetary policy.

References


PASS-THROUGH EFFECT BETWEEN BITCOIN, USD/EUR AND GOLD: A DYNAMIC CORRELATION AND REGRESSION MODELING APPLICATION

Hasan Murat Ertuğrul

1. INTRODUCTION

Cryptocurrencies, which especially emerged because of search for a new monetary system after the 2008 global financial crisis, are accepted as the strongest alternatives to the current currencies and payment systems. Nakamoto (2008) blamed the destructive effects of the banking system and expressed that electronic payment system between two parties depends on the guarantee of the third party and this demand for trust is misused by guarantee providing banks. In this context, Bitcoin and all successor crypto currencies aim to establish a system that does not require the need of trust to the third parties.

After 10 years from the Nakamoto (2008) paper, the volume of the crypto money market, mostly (%43) dominated by Bitcoin, has exceeded 250 billion dollars and a total of 1,633 crypto currencies are traded on 11,736 separate exchanges (Coinmarketcap). However, these crypto currencies are still not accepted as currencies in our daily life and they are mostly considered as an investment tools instead of currencies.

In this study, we tried to investigate currency properties of the Bitcoin by analyzing whether there is a pass-through relationship between Bitcoin and USD/EUR exchange rate and gold returns.

In the empirical modeling, we used both dynamic correlation and dynamic regression models to analyze the pass through relationship between Bitcoin return and other asset returns including USD/EUR and gold as well as the pass through relationship between USD/EUR return and gold return. If we find strong correlation and relationship between Bitcoin and other assets according to regression analysis, it is possible to accept Bitcoin as a currency. Vice versa, if no significant relationship exists according to both correlation and regression analysis, we cannot accept the Bitcoin as a currency. To our knowledge, this is the first paper using both dynamic correlation and regression models to investigate the pass-through relationship between Bitcoin and USD/EUR exchange rate and gold returns. In this respect, we try to make a contribution to the existing literature.

The rest of the study is organized as follows. Section 2 presents a literature review. Section 3 describes the data and methodology employed in the empirical analysis. Section 4 submits the results and Section 5 concludes.

2. LITERATURE

There is an improving literature which investigates whether Bitcoin is currency or asset. Most of the papers in the literature employ ARCH type models in order to detect the relationship between Bitcoin and current currencies.

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1Ministry of Treasury and Finance, Ankara
Yermarck (2015) employed correlation analysis between Bitcoin, currencies and gold and concluded that Bitcoin seems to be a more speculative instrument instead of a currency. Baek and Elbeck (2015) also modeled Bitcoin returns with the selected economic variables and found Bitcoin market highly speculative. Glaser et al. (2014) aimed to investigate whether Bitcoin is an asset or a currency by employing ARCH type models. They found that Bitcoin users assume their investment as a speculative asset and therefore they found that Bitcoin could be assessed as an asset, instead of a currency.

Dyhrberg (2016) focused on the hedging capacities between Bitcoin and current currencies. Dyhrberg (2016) investigated financial asset properties of Bitcoin employing asymmetric GARCH models and found that Bitcoin lies somewhere between currency and commodity for financial markets and portfolio management and concluded that it could be used as a tool for portfolio management.

Baur et al. (2018) replicated Dyhrberg (2016) paper with the same sample and econometric models. The authors employed an extended sample and found different results from Dyhrberg (2016). Their findings from the original and extended sample indicate that Bitcoin returns exhibit different characteristics compared to U.S. dollar and gold.

Ji et al. (2018) employed data driven directed acyclic graph methodology in order to analyze the relationship between Bitcoin and other asset classes by focusing on contemporaneous and lagged relationships. According to contemporaneous analysis, they found that Bitcoin market is highly isolated from other asset classes. Also, they found lagged relationship between Bitcoin and some assets.

Samah et al. (2018) investigated dynamic relationship between Bitcoin, gold prices and exchange rates by using EGARCH and DCC-EGARCH models and found that Bitcoin has relationship with other assets and could be used for portfolio and risk management.

In this study we investigate pass through relationship between Bitcoin return and other asset returns including USD/EUR and gold and pass through relationship between USD/EUR return and gold return by using Kalman Filter model for dynamic regression analysis and DCC GARCH model for dynamic correlation analysis.

3) DATA and METHODOLOGY

In the empirical modeling we used return rates of Bitcoin, USD/EUR exchange rate and gold. We obtained data from Bloomberg data terminal. We employed return rates instead of price level data to omit stationary problems. We used daily data covering the 19.07.2010-03.01.2019 period. Descriptive statistics of the variables are presented in Table1.

<table>
<thead>
<tr>
<th></th>
<th>Bitcoin Return</th>
<th>USD/EUR Return</th>
<th>Gold Return</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>0.712</td>
<td>-0.004</td>
<td>0.008</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>67.705</td>
<td>3.061</td>
<td>4.687</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>-45.170</td>
<td>-2.382</td>
<td>-9.073</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>6.762</td>
<td>0.561</td>
<td>0.961</td>
</tr>
<tr>
<td><strong>Skewness</strong></td>
<td>1.188</td>
<td>0.015</td>
<td>-0.532</td>
</tr>
<tr>
<td><strong>Kurtosis</strong></td>
<td>17.744</td>
<td>4.686</td>
<td>9.218</td>
</tr>
<tr>
<td><strong>Jarque-Bera Test</strong></td>
<td>20500 [0.000]</td>
<td>261.728[0.000]</td>
<td>3662.07[0.000]</td>
</tr>
<tr>
<td><strong>Number of Observations</strong></td>
<td>2208</td>
<td>2208</td>
<td>2208</td>
</tr>
</tbody>
</table>
According to Table 1, there are huge differences between daily mean returns, maximum and minimum values of Bitcoin and other assets. Monthly mean return rate for Bitcoin is 0.7%, whereas daily return rates for USD/EUR and gold is only -0.004% and 0.008%, respectively. Also, there is a huge gap between standard deviation of Bitcoin and other assets. According to Jarque-Bera test results, normal distribution assumption is not valid for any return variables. Also, the higher kurtosis values suggest the existence of fat tail characteristics of the distribution of Bitcoin, USD/EUR exchange rate and gold.

In the empirical modeling, we first check the stationary of the return variables by employing both Ng-Perron and Zivot-Andrews (1992) tests. After stationary check, we investigate correlation matrix between the variables.

After static correlation analysis, we employ the Dynamic Conditional Correlation-GARCH (DCC-GARCH) model to investigate time-varying correlation between Bitcoin return and other asset returns. We use DCC-GARCH methodology in order to detect the dynamic correlation relationship between the variables and investigate the tendency of the correlations throughout our sample.

DCC-GARCH model was first proposed by Engle (2002) in order to compute the dynamic conditional correlations between two variables. DCC-GARCH model is a generalized version of Bollerslev’s (1990) constant conditional correlation estimator. The important benefit of employing DCC-GARCH methodology is to detect probable shifts in conditional correlations over sample period. Thus, it is possible to detect dynamic correlation relationship between two variables by using the time-varying properties of DCC-GARCH model. Another benefit of DCC-GARCH model is to estimate correlation coefficients based on the standardized errors. In addition, DCC-GARCH model assumes heteroscedasticity directly (Chiang et al., 2007). Lastly, the DCC-GARCH produces more precise estimates than the GARCH estimators (Tekin et al., 2017).

After investigating dynamic correlations between Bitcoin and the other asset returns, we investigate dynamic regression coefficients by using Kalman Filter model. Kalman Filter model analyzes the time varying regression coefficients between Bitcoin and other asset returns and USD/EUR and gold returns.

4) RESULTS

In order to analyze the stationary of the variables, we used both conventional unit root tests including Ng-Perron test which provides robust results over other conventional unit root tests (Ertugrul and Soytas, 2013) and structural break unit root tests including Zivot-Andrews (1992) test. According to stationary test results, both Ng-Perron test and Zivot-Andrews (1992) tests indicate stationary for all variables at levels. After stationary analysis, we investigated correlation matrix between the variables. Correlation matrix is presented in Table 2.

<table>
<thead>
<tr>
<th></th>
<th>Return_Bitcoin</th>
<th>Return_USD/EUR</th>
<th>Return_Gold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return_Bitcoin</td>
<td>1</td>
<td>0.028</td>
<td>-0.010</td>
</tr>
<tr>
<td>Return_USD/EUR</td>
<td>0.028</td>
<td>1</td>
<td>0.306</td>
</tr>
<tr>
<td>Return_Gold</td>
<td>-0.010</td>
<td>0.306</td>
<td>1</td>
</tr>
</tbody>
</table>

In order to save space we do not report unit root test results. The results can be provided upon request.
Table 2 indicates that the correlation between gold return and USD/EUR return is approximately 31%. Although there is high correlation between conventional currencies, the correlation between bitcoin and other assets returns are very small, 3 percent for Bitcoin and USD/EUR return and (-) 1 percent for Bitcoin and gold return.

After static correlation analysis, we investigate dynamic correlations between the Bitcoin return and the other asset returns including USD/EUR and gold and dynamic correlations between USD/EUR and gold returns by employing Dynamic DCC-GARCH model. Dynamic correlations between USD/EUR and gold returns are presented in Figure 1.

![Figure 1: Dynamic Correlations between USD/EUR Return and Gold Return](image)

According to Figure 1, the average of dynamic correlations in our sample period is 35.5% which is similar to static correlations. Dynamic correlation coefficients indicate that there is positive and strong relationship between USD/EUR and gold returns.

After investigating dynamic correlation coefficients between USD/EUR and gold returns, we tried to analyze dynamic correlation coefficients between Bitcoin and USD/EUR returns and Bitcoin and gold returns. Because of the extreme volatility of Bitcoin prices, the correlation between Bitcoin return and other asset returns has been very low. We tried to implement Engle's Dynamic Conditional Correlation methodology to calculate dynamic correlations between Bitcoin and gold returns and Bitcoin and USD/EUR returns. However, the correlations could not be calculated due to extremely volatile nature of Bitcoin prices. These findings indicate that the Bitcoin cannot be used as a hedging instrument.

After dynamic correlation analysis, we finally investigate dynamic regression relationship between Bitcoin and other asset returns and dynamic regression relationship between USD/EUR and gold. Our dynamic modeling approach based on Kalman filter model was proposed by Harvey (1989). The Kalman filter modeling approach is the form of state space representation. A linear state space is presented in eq(1) and eq(2) below,

\[ y_t = c_t + Z_t \alpha_t + \epsilon_t \]  
\[ \alpha_{t+1} = d_t + T_t \alpha_t + \nu_t \]  

123
where $\alpha_i$ is a 2*1 vector of unobserved state variables, where, $c_i, Z_i, d_i$ and $T_i$ are adaptable vectors and matrices, and where $\epsilon_i$ and $v_i$ are zero mean vectors with Gaussian disturbances. Eq (2) indicates that unobserved state vector $\alpha_i$ is defined as a first-order vector auto-regression. The Kalman filter is recursively parameter estimating modeling which updates the estimation when adding every new observation (Ertugrul, et al., 2017)

The Kalman filter specification for Bitcoin and USD/EUR returns, Bitcoin and USD/EUR returns and gold and USD/EUR returns are presented in equations 3, 4, 5 and 6 respectively.

$$R_{Bitcoin_t} = \alpha_0 + \alpha_1 R_{USDEUR_t} + \varepsilon_t$$  \hspace{1cm} (3)

$$R_{Bitcoin_t} = \alpha_0 + \alpha_1 R_{Gold_t} + \varepsilon_t$$  \hspace{1cm} (4)

$$R_{Gold_t} = \alpha_0 + \alpha_1 R_{USDEUR_t} + \varepsilon_t$$  \hspace{1cm} (5)

$$a_{i,t} = a_{i,t-1} + v_{i,j}$$  \hspace{1cm} (6)

The estimation results of Kalman Filter models in eq(3), eq(4) and eq(5) are presented at Table 3.

<table>
<thead>
<tr>
<th>Equation (3)</th>
<th>Equation (4)</th>
<th>Equation (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_Bitcoin</td>
<td>0.339</td>
<td>0.524*</td>
</tr>
<tr>
<td>R_USDEUR</td>
<td>0.339</td>
<td>-0.068</td>
</tr>
<tr>
<td>R_Gold</td>
<td>0.524*</td>
<td>3.822*</td>
</tr>
<tr>
<td>Constant</td>
<td>3.821*</td>
<td>3.822*</td>
</tr>
</tbody>
</table>

*indicates significance level at 1%

According to Table 3, USD/EUR return has positive and statistically significant effect on gold return. The coefficient is found as 0.524 which indicates that one percentage point increase in USD/EUR return causes 0.524 percentage point increase in gold return. As dynamic correlation analysis, the dynamic regression analysis results indicate that there is no statistically significant relationship between Bitcoin return and other asset returns. We could not find any statistically significant regression coefficients for both USD/EUR and gold returns on Bitcoin returns. These findings support the DCC-GARCH model findings.

The time varying parameter estimation for USD/EUR and gold returns by employing Kalman Filter approach are presented in Figure 2.
According to Figure 2, dynamic regression model findings support the dynamic correlation model results. The dynamic correlation between USD/EUR and gold returns decreases between July and December 2011. Therefore, the effect of USD/EUR return on gold return declines in the same period. The periods in which dynamic correlation coefficients are decreasing such as the periods as February 2015 and June 2016 coincide with the periods in which dynamic regression coefficients are also declining.

We could not compute dynamic regression coefficients for Bitcoin and USD/EUR returns and Bitcoin and gold returns because the regression coefficients for USD/EUR and gold returns are found to be statistically insignificant. According to Kalman Filter model results, the Bitcoin cannot be used as a hedging instrument for current currencies like dynamic correlation model. Because there is not any significant dynamic correlation and dynamic regression relationship between the Bitcoin and other asset returns, Bitcoin cannot be used as hedging instrument for current currencies.

5) CONCLUSION

There is a developing literature which focuses on the question of whether cryptocurrencies are asset or currency. Cryptocurrencies are still not accepted as currencies in our daily life and they are mostly considered as investment tools, instead of currencies.

In this paper we investigate pass-through relationship between Bitcoin and other asset returns including USD/EUR and gold returns and pass-through relationship between USD/EUR and gold returns by employing dynamic correlation and dynamic regression analysis in order to answer the question whether the cryptocurrencies are currency or not.

In the empirical modeling, we employed return rates instead of price level data to get rid of stationary problems. We first checked stationary properties of the variables and found that all variables investigated are stationary. Then, we investigated static correlation between the return variables.

After static correlation analysis, we analyze dynamic correlation relationship between the Bitcoin and the other asset returns including USD/EUR and gold returns and we investigate dynamic correlations between USD/EUR and gold returns by employing Dynamic DCC-GARCH model. We found positive and strong dynamic correlation coefficients between USD/EUR and gold returns; however, we could not obtain dynamic correlation coefficients for Bitcoin and other assets because of volatile nature of Bitcoin price.
After dynamic correlation analysis, we finally investigate dynamic regression relationship between Bitcoin and other asset returns and dynamic regression relationship between USD/EUR and gold. Similar to the dynamic correlation model findings, we found out that USD/EUR return has positive and statistically significant effect on gold return. However, we also found that, USD/EUR and gold returns have statistically insignificant effect on Bitcoin return.

To sum up, we could not find any significant dynamic correlation and dynamic regression relationship between the Bitcoin and other asset returns. Both DCC-GARCH and Kalman Filter model results indicate that the Bitcoin cannot be used as a hedging instrument for current currencies in line with the papers in the literature including Baur et al. (2018), Ji et al. (2018), Yermarck (2015), Baek and Elbeck (2015) and Glaser et al. (2014).

For the future researches, the dynamic correlation and regression models can be applied to the cryptocurrencies in order to investigate and detect the pass-through relationship between Bitcoin and other cryptocurrencies.

REFERENCES:

INCREASING TRADE RISKS AND ITS RESULT FOR GLOBAL ECONOMY

Nuray TERZİ

1. INTRODUCTION
Global production has been promoted by the widespread liberalization of trade in many decades. It has facilitated movement of goods and services, and has promoted a more competitive environment and promoted deeper and a more efficient financial system. Lower trade barriers have allowed many firms to globalization of their production process via foreign direct investment. This has stimulated the foreign trade. Increased movements of goods and services have affected global production (Carbaugh, 2006).

However, global trade lost this trend with the global financial crisis. Global trade has been slowly in recent terms. While global trade increased more than GDP growth rate before financial crisis, global trade has decreased since 2012. This leads to new jeopardy and brings the mind a new global crisis. Therefore, this study will attempt to analyze the increasing trade risks and results for global economy. In order to achieve this, the study is organized as follows. The following section examines the global trade and trade risk. The third section gives the effect of changes in trade liberalization, international business barriers, the geographical, demand composition and value chains. The next section assesses the results of trade risks. Finally, this study presents a conclusion.

2. LITERATURE REVIEW
The global trade volume was rapidly increasing before the great recession. The liberalization policies implemented since 1947 have been influential in the increase of global trade. The first step of the liberalization policy around the world has been taken with the tariffs and the general agreement of trade. With this agreement, developed countries and then developing countries started to reduce tariff rates by means of interviews.

An increase in trade openness contributes to higher global living standards. If trade openness increases one percentage point, per capita income raises between 3 and 5 percent in the long run (Cerdeiro and Komaromi, 2017). This effect declines in the years following financial crisis. In addition, the global trade integration with participation of global value chains has provided a decline in poverty (WB and WTO, 2015).

The trade liberalization process was stimulated by the Uruguay Round between 1986 and 1994. After China’s economy became a member of WTO in 2001 and regional and bilateral free trade agreements grew up, global trade gained a momentum (François et al., 2016). But this trend had been declined before the great recession. Moreover, in the Doha, the setback of multilateral trade negotiations obstructed further decreases in tariffs. Although the global financial crisis caused a limited increase in trade protectionism, non-tariff barriers in varies product such as steel has risen (Berthier et. al. 2017).

Until the financial crisis, world trade increased faster than world GDP. World trade extended more than GDP rate between 1980 and 2007. The great recession led to unseen fluctuations in world trade. The growth in world trade slowed, reaching its lowest rate since financial crisis. The world trade has increased about 3.3 % a year since 2012, confront with a 5.9 % increase in a year from 1986 to 2011 (Fig. 1)
A decline in trade openness leads to decreased global trade. The ratio of trade openness which is measured as the ratio between the average of exports and imports of goods to gross domestic product has fallen slightly both developing economies and transition economies, and has fallen in developed economies since 2011. In developing economies, trade openness decreased from 31 in 2006 to 22 between 2006 and 2016. The rate fell from 27 to 22 in the same term in transition countries. In developed economies the rate has been quietly low. It became 19 percent in 2016. (Fig. 2).

3. THE REASON OF THE INCREASING TRADE RISKS
Several reasons can be proposed to explain the increased trade risks. One reason is a decrease in trade liberalization. The term before financial crisis experienced an increase in liberal trade. From 1990 to 2010, more than five hundred new regional trade agreements were made, and this number was about four times of the previous two decades (Quaglietti, 2018). The steps of liberalization in trade have started to decline in recent years, while trade policy restrictions have risen. Following Fig. indicates a decline the number of agreements in related to free trade after crisis (Fig. 3).

---

Fig. 1. World Trade and Production

Fig. 2. Trade Openness Index
Fig. 3. Regional Trade Agreements by years
Source: Trade Agreements Database

Doha trade round provides to new forms of liberalization in trade, provided to a sharp decrease in rates in tariff among countries. However, liberalization in trade has started to decline in recent years because of increased trade restrictions and the decreased trend in tariff rates before crisis and it has come to a standstill. More than 30 new trade-restrictive measures were brought by G20 countries from October 2017 to May 2018. Trade restrictive measures include tariff increases, taxes imposition, duties in export and customs procedures. This means to about six restrictive measures in a month and it is more than the recorded during the previous term (Fig. 4).

Fig. 4. G20 Restrictions Measures in Trade (average per month)
Source: WTO

Second reason is an increase in trade barriers in international business environment. According to DIHK survey, “Going International 2018”, which is included 2100 German companies, trade barriers in international business environment has risen in terms of an increasing proportion of entrepreneurs. Especially, safety requirements and local certification requirements have increased in one year.
Third reason is an effect of composition of demand and composition in geography. The changes in demand composition can also play a significant role in stimulus of trade. Determinants of demand lead to different trade intensities. For example, investment in business is a higher trade expenditures category than public consumption. Additionally, private consumption places between these two expenditures (ECB, 2016). Indeed, Berthier et. al (2017) indicates that business investment has provided about 1.0 point contribution in a year to demand since 2012, confront with 1.6 points contribution from 2000 to 2011, leading –0.6 points contribution to the slowdown to demand. The contribution of private consumption to slowdown in global demand became about 0.7 points. On the other hand, public consumption hasn’t affected the global demand; the contribution of public consumption has become stable since 2000. This effect of demand composition contributed about 15% a decline to trade between 2000 and 2014. The effect of geographical composition can also be characterized a decline in trade openness between the 2000-2014 periods. North America, especially United States, and emerging Asia are the most contributions to the slowdown. They account for about a third of the overall slowdown.

<table>
<thead>
<tr>
<th>Table 1. Contributions of Economies to Slowdown in the Openness Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>-0.80</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Source: Berthier et.al. (2017)

China’s economy has contributed a slowdown to trade. The integration of China’s economy to world economy has grown over the last two decades. The trade openness in China stimulated to supply and then global trade, providing a decrease the price of goods. Therefore, China’s economy has been a fundamental source of cross country demand. However, the effect of China has started to decline because of the global imbalances, leading a decrease in investment and export in world economy. A study shows China’s trade elasticity declined from 1.8 in 1980-2007 to 0.8 in 2012-15. Another reason a slowdown to global trade is competitiveness. Appreciation of China’s currency has increased since 2005. This has led to decline the ratio of exports to GDP since 2010 (ECB, 2016).

Participation in value chains of regions is last reason. This has increased in all regions since 1995. It declined temporarily with the financial crisis. After the financial crisis, this trend started to increased again. However, this trend stagnated in recent years, especially, in North America. Asia has also the lower contribution to global value chains since 2013 (Bethier, et. Al, 2017).
4. THE RESULTS OF THE TRADE RISKS
The effect of trade risks can be seen in different ways. After an increase in tariff rates, higher prices can lead to an increase in the cost of firms’ production, and decline in individuals’ purchasing power, especially when the goods cannot be substituted for others (Bloom, 2009). For example, steel price in the US rose after the tariffs on imported steel were announced (Fig. 6). Because steel is a basic input for manufacturing and construction, these trends will lead to higher prices. Tariffs will cause inflation, affecting negatively firms, consumers, and global economy (Carstens, 2018).

![Fig. 6: US Steel Price, Dollars per Metric Tonnage](source: Steel Benchmarker, 2018)

After higher tariffs rate increases prices in the US, monetary policy will change, leading to an increase in interest rates. In Fig. 7 gives the broad effective exchange rate for United States, presenting a strong dollar in recent years. This will extend the interest rates to the world economy and will stimulate a strong dollar. This also will affect exporting firms in the world. Especially, emerging countries can face serious challenges such as capital outflows, slower growth rate, and a setback in financial conditions.

![Fig. 7: Broad Effective Exchange Rate for United States](source: Bank of International Settlements)

Increased trade risks also lead to economic uncertainty and investment can decline. Under uncertainty, consumers delay their expenditures leading and businesses to postpone investment (Bloom, 2009). US capital goods new orders decreases from March 2018 to October 2018 (Table 2). Moreover, an appreciation in dollar can lead to a decline in credit supply and demand, and worsening financial conditions for many emerging economies, causing unemployment and...
Economic Issues: Global and Local Perspectives
ISBN: 978-1-5342-9999-3

... decreased investment. A decline in dollar credit may also affect global value chains, negatively (Cartens, 2018).

<table>
<thead>
<tr>
<th>Oct 31, 2018</th>
<th>86.8</th>
<th>March 31, 2017</th>
<th>81.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 30, 2018</td>
<td>92.3</td>
<td>Feb 28, 2017</td>
<td>83.3</td>
</tr>
<tr>
<td>Aug 31, 2018</td>
<td>97.5</td>
<td>Jan 31, 2017</td>
<td>80.0</td>
</tr>
<tr>
<td>July 31, 2018</td>
<td>86.6</td>
<td>Nov 30, 2016</td>
<td>78.6</td>
</tr>
<tr>
<td>June 30, 2018</td>
<td>90.2</td>
<td>Oct 31, 2016</td>
<td>91.0</td>
</tr>
<tr>
<td>May 31, 2018</td>
<td>90.3</td>
<td>Sept 30, 2016</td>
<td>81.2</td>
</tr>
<tr>
<td>April 30, 2018</td>
<td>90.1</td>
<td>Aug 31, 2016</td>
<td>79.5</td>
</tr>
<tr>
<td>March 31, 2018</td>
<td>94.9</td>
<td>July 31, 2016</td>
<td>79.6</td>
</tr>
<tr>
<td>Feb. 28, 2018</td>
<td>88.9</td>
<td>June 30, 2016</td>
<td>72.0</td>
</tr>
<tr>
<td>Jan. 31, 2018</td>
<td>83.1</td>
<td>May 31, 2016</td>
<td>82.1</td>
</tr>
<tr>
<td>Dec. 31, 2017</td>
<td>87.5</td>
<td>April 30, 2016</td>
<td>87.6</td>
</tr>
<tr>
<td>Nov. 30, 2017</td>
<td>85.9</td>
<td>March 31, 2016</td>
<td>80.9</td>
</tr>
<tr>
<td>Oct 31, 2017</td>
<td>83.6</td>
<td>Feb 29, 2016</td>
<td>80.2</td>
</tr>
<tr>
<td>Sept. 30, 2017</td>
<td>86.6</td>
<td>Jan 31, 2016</td>
<td>88.6</td>
</tr>
<tr>
<td>Aug 31, 2017</td>
<td>81.6</td>
<td>Dec 31, 2015</td>
<td>74.2</td>
</tr>
<tr>
<td>July 31, 2017</td>
<td>79.5</td>
<td>Nov 30, 2015</td>
<td>89.9</td>
</tr>
<tr>
<td>June 30, 2017</td>
<td>94.8</td>
<td>Oct 31, 2015</td>
<td>92.1</td>
</tr>
<tr>
<td>May 31, 2017</td>
<td>79.2</td>
<td>Sept 30, 2015</td>
<td>82.9</td>
</tr>
<tr>
<td>April 31, 2017</td>
<td>80</td>
<td>Aug 31, 2015</td>
<td>86.7</td>
</tr>
</tbody>
</table>

Source: https://ycharts.com/indicators/us_capital_goods_new_orders

Additionally, a decline in financial linkages and increased uncertainty will extend more broadly, leading volatility in global financial markets. A shift towards a higher protectionist policy will also negatively impact growth rate in the long term, by reducing productivity growth and employment (Quaglietti, 2018).

5. CONCLUSION

World economy tries to maintain sustainable economic growth after great recession. However, the uncertainties create greater trade restrictive actions and this leads to economic slowdown. Table 3 summarizes the reasons of trade risks and its result for global economy. While reasons of trade risks are a decrease in trade liberalization, an increase in business trade barriers, demand composition, geographical composition of growth, and participation in value chains of regions, results for global economy are higher production cost, dollar appreciation, lower investment, lower credit supply and lower potential output.

<table>
<thead>
<tr>
<th>Reasons of Trade Risks</th>
<th>Results for Global Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A decrease in trade liberalization</td>
<td>Higher production cost</td>
</tr>
<tr>
<td>An increase in business trade barriers</td>
<td>Dollar appreciation</td>
</tr>
<tr>
<td>Composition of demand</td>
<td>Lower investment</td>
</tr>
<tr>
<td>Geographical composition of world growth</td>
<td>Lower credit supply</td>
</tr>
<tr>
<td>Participation in value chains of regions.</td>
<td>Lower potential output</td>
</tr>
</tbody>
</table>

Further trade restrictions will carry large risks for future. Restrictions on trade will bring pain not gain for all countries. (Cartens, 2018). Therefore, one possible solution is to become more strong the World Trade Organization (WTO). WTO is a key player in promoting international trade. A multilateral approach within the WTO is the best way to open the markets, globally. Second
solution is to strengthen the digital trade in the world. Digital trade increases very high speed. Future agreements must take account of the increasing digitalization of world trade (DIHK, 2018). Third one is closer integration. New trade agreements and closer integration of countries into the world economy could also give a fresh impetus to global trade. In order to achieve all of this, there is a need to make stronger global cooperation and collaboration among countries to promote a further trade recovery. Global conflict will lead to higher economic disaster.

REFERENCES

EFFECTS OF CHANGE IN OIL PRICES ON THE GROWTH: THE CASE OF TURKEY CASE 2000-2017

Özlem ÜLGER¹
Muhammed İNAL**

1. Introduction

Oil that is in nonrenewable resources group in energy resources classification occupies a remarkable space as an intermediate good, raw material, power supply, and energy source in the world economy. The significance of petrol does not only result from being an energy resource but also it has the characteristics of an irreplaceable basic input because of being intensely used its derivatives in industry.

First meet of unrivaled petrol with humanity goes back to B.C 2000s. Petrol is accepted as a significant resource for all governments in terms of both economy and security. Therefore, there were several wars and conflicts in history. The first oil war outbroke for Hit oil between Babel and Assyrians. Oil security structure and government-enterprise-market relations have changed by Arab-Israel War in 1973. The USA follows new policies with the thought that decreasing the oil demand to increase the oil security, seeking for a partner to collaborate about oil and being more effective in oil sector by using the military power.

Oil price is determined by microeconomic dynamics that affect petrol supply and demand. However, also the political and geographical factors are important indicators to determine the oil prices. Crude oil need in Turkey is met by international agreements; North Sea Brent Crude is used as the base for the price in these international agreements. Brent oil price is determined by oil produced in the North Sea between England and Norway with less sulfide and high quality and delivery price of crude oil with fewer sulfides in Sullom Voe Terminal in the North of Scotland. Adding the local prices to this price or subtracting the local prices from this price determine the prime cost. Since every sector in the economy is dependent on the oil, the fluctuations in oil prices have significant effects. Fluctuations in oil prices affect economies that export and import petrol in different ways.

In this paper, first of all, the effect of the oil prices in Turkey on the growth was analyzed. In this context, we informed on the development of oil in Turkey in the historical process. Afterward, development of oil in the world, shocks, and crises in oil prices were given. Finally, the effect of oil prices in Turkey on economic growth was scrutinized.

2. Oil Development of the Historical Process in Turkey

The word of petrol is composed of “Petro” (Rock) and “Oleum” (Oil); it means rock oil. Oil is a pretty complex component that includes hydrogen, oxygen, and sulfur; it has no simple formula. Normally, oil can be in solid, liquid or gas state. Liquid petrol that is called crude oil to distinguish it from refined petrol has a commercially important position (Kuru, 2015). Oil was used to warm and lighten in China in the 4th century. Moreover, while gas oil was utilized as a lighting tool in the periods mentioned, whale oil was used in gasoliers. Being used oil in gasoliers by Polish Ignacy Lukasiewicz in 1853 is a milestone; the importance of oil has increased with each passing day after that day. Mirzoeff who was a businessman established the first petroleum

¹ Batman University, Faculty of Economics and Administrative Sciences, ozlem.ulger@batman.edu.tr
² Batman University, Faculty of Economics and Administrative Sciences, muhammed.inal@batman.edu.tr
refinery in Baku in 1861. Discovery of the oil-powered engine towards the end of the 19th century increased the importance of oil more (http://petrol-petroleum.blogspot.com).

Energy requirement was started by sedentism from hunting. Besides, human met their needs by renewable energy resources such as water and wind in ancient times when agriculture, husbandry and basic handicrafts were utilized. Coal was preferred instead of wood in early Middle Ages. Railroad transportation has become widespread by using steam engines in 1765. Formation of consumption economy by mass production increased the fuel demand; paraffin oil was obtained by coal in 1848; by asphalted schists in 1838. Petroleum gas was extracted from the first commercial oil well by Drake in the USA in 1859; using gasoliers have become popular. Thus, oil has occupied an important position in daily life and the economy of humanity (Erik&Koşaroğlu, 2016:122)

Much as the intensive use of the modern oil industry in 1859 started by the first oil well of Drake in Titusville, it is a raw material whose history goes back to time immemorial. Asphalt was found in eye niches in the sculpture of Sumerian Emperor Adab who lived three thousand years before Christ. Moreover, the burned brick ends of 112 meters long bridge that was built by Nebushadnezzar, King of Babilon were made of asphalt. Besides, while Semiramis who was the queen of Babylon used asphalt for the walls of 1000 meters long tunnel under the Euphrates, Greek Historian Heradot mentioned on the oil slick that the sea in Tunisia, Babylon and the Greek islands (Taşman, 2007: 14).

Petroleum exploration works started in Turkey in republic period before 85 years; General Directorate of Petroleum Affairs entered into service in 1933. The first drilling in Turkey was performed in Mardin Province in 1934. “Mineral Research and Exploration Institute” was established by 2804 numbered law in 1935 (PIGM, 1956:3). Drilling works that were started in Raman in Batman by Mineral Research and Exploration Institute in 1939 finished in 1940. Batman Refinery was established to increase the oil in 1942 (Haykır&Demir, 2017:256). Petroleum Law came into force in 1954. It is seen that foreign oil companies made investments in Turkey till 1965 to perform search and production activities. Geographic proximity of Turkey to countries which have large oil and natural gas reserves increased the importance of Turkey in terms of capital; 52 foreign oil companies activated by the end of 1965 (Parman, 2014:15).

Turkish Petroleum Corporation (TPC) was established in 1957. TPC is in charge of conducting a drill, production, refinery, and marketing activities. 898 wells were dug; 373 of them were utilized for exploring. 62% of search operations were performed by the Turkish Petroleum Corporation; 38% of search operations was actualized by the private sector. First petroleum exploration works were actualized in see in İskenderun Gulf in 1970; Hamitabat that is the first natural gas production station entered into service. Adiyaman-Sarlı Petroleum Pipelines was opened by finding oil in Adiyaman in 1971. Kırıkkale Refinery put into service in 1986; natural gas reservoirs were discovered in Trakya region in 1988 (Kantarci&Yardımcı, 2014: 205).

Besides the microeconomic variables in determining the oil prices, there also are political and geographical factors that affect oil supply and demand. There is no mathematical formula in determining the oil prices. However, the variables that determine the prices emerge via different operation channels. The first of these channels was the demand-side channel that submits the effects of economic growth, taxes, and speculations. The second of these channels is the supply-side channel that includes factors such as supply production capacity, quality of oil, weather conditions, production-issuance costs, inventory status of Organization of Petroleum Exporting Countries. The last channel that is composed of the political and geographical factors was established on embargoes, political risks, occupation and conflicts, geopolitical reasons and nonhomogenous distribution of reserves (Öztürk&Kılıç, 2018: 139).

The dependence on petroleum products is one of the reasons for oil to be an indicator of economic stability. Moreover, the oil price has the critical importance for the world economy
when it is considered that the oil is internally most traded material in terms of both volume and the value. Prices of energy-dense goods and services are among the energy prices that constitute the essential share of the oil. In one sense, oil price is based on the prices of other fuels. Because of these reasons, sudden changes in oil prices have various consequences in terms of both oil producing countries and oil consuming countries (Ghalayini, 2011: 130).


**Fig. 1: Crude Oil Prices in Turkey (2000-2017)**


Fig. 1 shows Turkey’s crude oil prices value in Brent $/bbl for the 2000-2017 period. While it is seen that the crude oil prices were 28 dollars in 2000, the oil prices showed an upward trend as from 2002. A continuous increase can be observed by outbreaking Iraq-US war in 2003. A serious increase was experienced in oil prices until 2008 because of the Hurricane Katrina in 2006 and political and financial problems in the Middle-East; the level of the prices was at the level of 90 dollars. There was a decrease in oil prices as the result of reversing economic conjuncture by the effect of the global crisis in 2009. Afterward, the prices started to rise based on the growing demand. Price per barrel was approximately 110 dollars in 2011 and 2012. Oil prices that ranged at the level of 100 dollars until 2014 showed a rapid decrease based on the global economic recession and excess supply. Oil prices have started to increase after the USA reached the record level and the increases in numbers of drilling platforms.

It is seen when the investigations are analyzed that the fluctuations in oil prices cause significant results on the economic activities. It is expected that these results need to be different in oil-importing countries and petroleum exporting countries. Under these circumstances, although the increase in oil prices is evaluated as positive in terms of the petroleum exporting countries, the same increase is accepted as negative by the oil-importing countries (Rodriguez & Sanchez, 2004:2).

With reference to the research of Indextmundi (2015), petroleum consumption (oil import) in Turkey in 2014 was 724 thousand barrels per day; 90% of the oil that is consumed in Turkey is imported from the foreign countries. Annual petroleum production of Turkey increased by 2,6% between the years of 1974 and 2014. Dependency to the oil import also increased to meet the domestic demand. Oil import of Turkey realized as approximately 430 bin Brent/dollars in 2004. While the annual average of petroleum production was 46,5 bin b/d in the period of 2004-2014, an annual average of oil import was 369 bin b/d in the same period (Terzi & Pata, 2016:226).
Fig. 2 shows the million ton values in Turkey for the years between 2000 and 2016. While total crude oil and refined petroleum products import of Turkey in 2000 was 31 million tons, total oil production was 2.7 million tons. With reference to these data, the least production actualized in 2007 by 2.1 million tons. A continuous decrease was observed in oil production between the years of 2000 and 2007. There was an increase in production as from 2008, the production reached a peak in 2010 by 2 million 130 thousand tons. Even though there was a decrease at 5.2% in 2011, an increase can be observed as from 2012. Civil wars and conflicts that happened in border neighbors of Turkey have made petroleum production more strategically. The decline in petroleum production should be stopped by increasing the incentives and production investments to attract foreign investments and increase the search-production investments in the medium and short term. In Turkey, petroleum production was actualized in Batman, Adıyaman, Siirt, Diyarbakır, Şanlıurfa, and Mardin Provinces.

Oil market becomes different from other raw material markets due to being a nonrenewable resource. It is concluded that oil will deplete at the end of the 21st century. As the oil is drilled from the underground, there occurs a decrease in reserves; this situation creates a scarcity prime on the oil prices. Indeed, scarcity prime effect is composed of the arbitrage principle. Namely, if a raw material cannot be renewed and there is a decrease in underground stocks at the same time, it is expected for the price to increase as much as hand-changing assets every year. Otherwise, the owners of raw material do not immediately drill it from underground or they convert it into a financial asset after drilling. Scarcity prime effect reveals that the oil in underground needs to increase as much as the interest yield of the financial assets every year. To make an analogy, it is possible to like the scarcity prime effect to the idiom called "the scorpion stings itself in bad". As the demand for oil increases, the supply for the oil needs to increase at the same time. Otherwise, there occurs an excess demand; this situation will cause oil prices to increase. However, as petroleum production increases, the underground stocks will diminish; this circumstance will cause higher oil prices and less petroleum to be produced in the future. There will occur an upside pressure on the oil pressure as an increase is observed in oil supply paradoxically (Yetkiner&Berk).
Fig. 3: Crude Oil Import in Turkey (2000-2018) (Million Ton)


Fig. 3 shows the imported crude oil as million tons for the period between 2000 and 2018. With reference to this data, while the average of crude oil import in Turkey was 22 million tons between 2000 and 2008, the oil prices in 2008 increased from 65 dollars to 100 dollars. At the same time, crude oil import declined under 15 million tons by the effect of the global financial crisis and the increase in crude oil prices in 2009. Crude oil import in Turkey reached 25.7 million tons by increasing as 6.43% in 2017 in comparison with the previous year. The most import was realized by Iran, Russia, and Iraq.

3. Oil Development in the World

Oil is one of the most important energy resources in terms of the world states as well as the oil has a power that can affect the import and export balances. This power determines many of the factors of the economy in areas such as precious stones and other underground treasures in the stock market and USD/EURO ratios. All the countries in the world are petroleum product consumers; almost 100 states that form ‘Petrol Club’ are in oil-producing countries. Oil price is concerned the producer countries in the ‘Petrol Club’ and all the consumer countries. Because oil is a great and powerful source of income for oil producing countries; again, oil is the expense source for the consumers. We can analyze oil producing countries under 4 groups in sharing the income that is generated from the oil sales as a part of the GDP (Beri kan & Hüseyinli, 2017: 30-31).

- High rate (43-49%) - Saudi Arabia, Kuwait, Qatar, Nigeria;
- Average rate (17%-27%) - Norway, Algeria, Venezuela, Iran;
- Low rate (10%) - Mexico, Indonesia, Malaysia, China, Russia;
- Lower rate - United States (0.5%), Australia (1.5%), Canada (1.5%).

Changes in prices of crude oil that is one of the most important powers of the global economy have a remarkable effect on economic growth and the welfare of the world population. Demand for oil has started to increase by the increase in daily oil use. Therefore, the oil market that has a global market and vital importance for the world economy will continue to change (Mgbame, Donwa & Onyeokweni, 2015: 80). However, several wars and clash of arms have happened to have oil or control the oil. Namely, oil is crucial to have a political power. Accordingly, the oil market takes shape based on various political, socio-cultural and technological factors (Kuru, 2015).

There happened a 40% decrease in purchasing power of oil barrel although there was seen an increase in oil demand in petroleum exporting countries in the period after the World War II,
namely, the period before the first oil shock. Moreover, USA has lost the control power on the crude oil price and also the power to determine price upper limit as from 1971. OPEC gained more strength by the first oil shock that started in October 1973 after the Arab-Israel War. The oil embargo was declared and the crisis outbroke after the reprisal of OPEC countries because of the support of the USA and other European countries for Israel during Yom Kimpur War until 1974. The embargo reached Holland, several European countries and Japan (Nikolas, 2011: 9).

Table 1: Oil Price Changes and Significant Socio-Economic Developments

<table>
<thead>
<tr>
<th>Date</th>
<th>Socio-Economic Developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1862-1865</td>
<td>Crude oil prices showed an increase in line with the growing demand at the end of the civil war in the USA.</td>
</tr>
<tr>
<td>1865-1890</td>
<td>New oil wells were drilled in the USA in 1877; Standart Oil company started to control more than 95% of all the crude oil refineries in the country.</td>
</tr>
<tr>
<td>1890-1892</td>
<td>The biggest recession of the history happened by the sharp fall in the oil prices in the USA.</td>
</tr>
<tr>
<td>1891-1894</td>
<td>American petrol industry started to enlarge by discovering Titusville oilfield; oil prices actualized at a medium level in 1895.</td>
</tr>
<tr>
<td>1894</td>
<td>Global epidemic cholera affected the oil export to Europe and also caused petroleum production to delay</td>
</tr>
<tr>
<td>1920</td>
<td>Oil need in a large measure emerged because of becoming widespread the auto sector.</td>
</tr>
<tr>
<td>1931</td>
<td>Oil demand decreased by the ‘Great Depression’. There was seen low prices as 0,87 dollars/barrel.</td>
</tr>
<tr>
<td>1947</td>
<td>Oil that was supported by advertisements after the war caused a great increase in car sales country-wide. There was a shortage of gasoline in many states of US.</td>
</tr>
<tr>
<td>1956-1957</td>
<td>Almost 10% of the world oil market was precluded after the Suez crisis; all the oil-producing countries except the Middle East endeavored to meet this deficit.</td>
</tr>
<tr>
<td>1973-1974</td>
<td>After the Yom Kippur War, petroleum exporting countries imposed embargo to the countries which supported Israel. Crude oil prices increased from 3 dollars to 12 dollars per barrel in March 1974 when the embargo finished.</td>
</tr>
<tr>
<td>1978-1979</td>
<td>Iran stopped the petroleum production and export to a large extent because of the revolution happened in the country.</td>
</tr>
<tr>
<td>1980</td>
<td>Oil export from the Middle East was interrupted to a large extent by Iran-Iraq War.</td>
</tr>
<tr>
<td>1980'ler</td>
<td>Increase in oil demand all around the world decreased the crude oil prices from 35 dollars/barrel to 12 dollars/barrel. USA (11.9 million barrel/per day) and USSR (11.2 million barrel/per day) were two of the important oil-producing countries in 1985s.</td>
</tr>
<tr>
<td>1986</td>
<td>Saudi Arabia tried to regain its strength in the global oil market by increasing the petroleum production over against the decrease in oil prices. Saudi Arabia increased 3.8 millions of barrels of daily petroleum production in 1985 to 10 millions of barrels in 1986.</td>
</tr>
<tr>
<td>1988</td>
<td>Iran-Iraq War finished in August; both two countries started to petroleum production again</td>
</tr>
<tr>
<td>1990</td>
<td>Saddam Hüseyin invaded Kuwait where he charged with stealing the oil market share of Iraq. Iraq army set fire 700 oil wells of Kuwait after the war. As a result of those developments, Kuwait decided to stop oil export until 1994.</td>
</tr>
</tbody>
</table>
1999 | Thailand, Indonesia, and South Korea started to recover after the financial crisis of Thailand in 1997. And so, the demand for petroleum in the region increased.
---|---
Early 2000s | Oil prices started to increase by growing the American and the world economies; oil prices reached a peak after 1981.
2001-2003 | Being invaded Iraq by the September 11 attacks caused concerns on the stability of the Middle East on the petroleum production.
Mid 2000s | Fluctuation in petroleum production and prices in Asia reached the oil prices to high levels.
2008 | Oil prices declined by 78.1% in July-December period after the global crisis.
2011 | Arab Spring' affected whole Middle East; the civil war in Libya caused to be experienced period in terms of the export balance of the region.
2014 | There was seen a decline in oil prices after the US increased the shale gas and petroleum production. Moreover, decisions that were made by OPEC in November 2015 affected oil market prices of 2015.
2015 | Oil export reached the highest level of the century in the USA. Oil prices were traded at 50 dollars level on 22 July.
2018 | President of the United States, Donald Trump who goes to a trade war with several countries, especially China and the European Union started an oil war with Iran on the other front line. The USA tried to block the income stream of Iran. After this attempt, the price per barrel of crude oil increased more than 2 dollars and exceeded 70 dollars by the concern of supply to get into hot water.


The table shows the price changes and significant socio-economic developments. The most notably case was the petrol shock in the 1970s. It is seen when the oil prices are analyzed that the prices quadrupled first and tripled at second; this sudden increase raised inflation and caused the economy to lose speed in developed countries. Therefore, each increase in oil prices has been followed carefully. Some of the predictions may fail because of that oil is affected by several politic and economic events. For example, some of the investigators estimated that the oil prices would increase throughout the 1980s; however, prices surprised everybody by declining by 50% (Erik & Koşaroglu, 2016:133). It is seen that four important petrol shocks were experienced in the 1960-1999 period. Price per barrel increased from 3.4 dollars to 13.4 dollars based on petroleum embargo of OPEC in the 1973-1974 period. Significant effects of the Iran revolution on oil supply increased the prices from 20 dollars to 30 dollars between 1978 and 1979. The third shock wave that emerged by being invaded Kuwait by Iraq increased the oil prices from 16 dollars to 26 dollars. Finally, oil prices per barrel increased from 12 dollars to 24 dollars by the shock in 1999; this was the shock whose effects were felt at maximum (Cunado & Gracia, 2003:137).

Increases in oil prices have significant effects on these economies because of the intense use of crude oil in developed countries. With the collapse of the stock exchange in 1973-1974; 1973 oil shock is the first case that has a permanent economic effect from the Great Depression. The world financial system that could not recover after the collapse of the Bretton Woods Agreement followed the way of increasing oil prices until 1986 (Nikolas, 2011:10).
### Table 2: Factors That Affect Oil Prices

<table>
<thead>
<tr>
<th>Changes in regional and global supply in the short and long term</th>
<th>New investments in oil production or refinery capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Disasters, wars and supply interruptions based on public disturbance</td>
<td>New reserve discoveries</td>
</tr>
<tr>
<td>Seasonal demand changes</td>
<td>The future of global supply and demand balances</td>
</tr>
<tr>
<td>Stock management</td>
<td>Global economic growth</td>
</tr>
<tr>
<td>Transport availability and transportation cost</td>
<td>Petroleum production and refining costs</td>
</tr>
<tr>
<td>The size of commercial transactions in the market</td>
<td>Technical progress</td>
</tr>
<tr>
<td>Short-term decisions of oil producing countries</td>
<td>Long-term policies of oil producing countries and oil companies</td>
</tr>
<tr>
<td>Developments in alternative energy sources</td>
<td>Population growth</td>
</tr>
<tr>
<td>Short-term and long-term changes in economic conditions</td>
<td>Regulations and public policies</td>
</tr>
</tbody>
</table>


The table shows the factors that affect world oil prices. It can be said with reference to the table that changes in regional and global supply balances, wars, discovering new reserve areas, transportation costs cause significant effects in changing oil prices.

![Crude Oil Prices (1970-2015)](https://read.oecd-ilibrary.org)

According to USA Energy Information Directorate, demand with production, oil discoveries on a global scale, financial markets, and demand and stock markets of countries who are not the member of OECD (i.e China, India, and Saudi Arabia) affect the oil prices. Oil prices have displayed remarkable deviations based on the factors above from the 1970s to the modern day. Fig. 4 shows the deviations of oil prices (Mucuk, Gerçeker & Ay, 2013). As is seen in Table, Arab oil embargo in 1973 constituted an important price effect with Arab crude oil prices that increased from 1.84 US dollars/barrel in 1972 to 10.98 US dollars in 1974. Iran revolution started in 1981 when the prices increased approximately 40 US dollars/barrel; afterward, the prices showed a decline by degrees. There was seen a serious decrease in prices in 1986 when Saudi Arabia considerably increased petroleum production. Oil prices peaked by the first Gulf crisis in 1990; there was seen a regression in crude oil prices by the impact of Asia financial crisis. Prices increased again by target reliefs and increased stocks that were applied by OPEC in 1999. There was a decline in oil prices in 2001 and 2002; however, the war expectancy in Iraq increased the prices over 30 US dollars/barrel in the first quarter of 2003. Prices remained at a high level in late 2003 and in 2004. Crude oil prices considerably increased in late 2005 after Hurricane Katrina and Rita damaged US gulf coast. The pressure of oil consumption in developing economies, notably China on the supply-demand balance caused prices to remain high in 2006 and 2007. Another reason for this stabilization is that the prices were 24% higher in 2006 in comparison with the previous year. In early 2008, the prices reached 150 US dollars/barrel in July by exceeding the threshold of 100 US dollars/barrel; the oil prices peaked as nominal and real. Prices decreased to the level of 40 US dollars/barrel since the beginning of 2009 because of the effect of high levels and starting the global financial crisis; however, the prices remained at a high level between 70 and 80 US dollars/barrel by the end of the year. Crude oil prices steadily increased in 2010 and 2011; again, the prices reached 122 US dollars/barrel by increasing the demand after the recession in March 2012. These high prices caused an explicit period on the supply. After the prices fluctuated at 105 US dollars/barrels until August 2014, the prices declined 50 US dollars/barrel in January 2015. Prices remained at 40 US dollars/barrel after the regression to 60 US dollars/barrel in June 2015 (OECD, 2016: 110).

**Fig. 5: Oil Production and Consumption in the World (2000-2017)**


Fig. 5 shows the petroleum production and consumption as million ton in the world for the periods of 2000-2017. While there was 3,618.1 million tons of production in 2000, there was 3,556 million tons of consumption in the same year. In 2017, while the production was 4,387.1 million tons, the consumption actualized as 4,621.9 million tons. It is observed when the last 20 years are reviewed that there are too few changes in the share of oil in the total energy consumption. There is a common view that petroleum production/consumption and oil price will create an effect on the economic growth in the future (Terzi & Pata, 2016: 225). Petroleum production of US was placed on the top around the world by 13,06 million barrels per day by a
5.6% increase in 2017 in comparison with the previous year. There was observed a decrease in petroleum production of Saudi Arabia and Russia that imposed a restriction on crude oil production levels in 2017 to reduce the excess supply in the global petrol market.

Fig. 6: BRENTOil Prices in 2013-2017 Period


Fig. 6 shows Brent and BTI oil prices for the period of 2013-2017. As is seen in Table, the sudden and unexpected decline in 2014 continued in 2016 as well. The most basic factor in decreasing oil prices is the increase in petroleum production based on the US. In 2016, oil prices regressed 27 million $/v level that was the lowest level of the last 20 years; afterward, the prices have started to recover in time. Petroleum exporting countries in the leadership of OPEC members and Russia removed 1.5 v/g from the market and reduced the excess supply; they also caused prices to increase. Another reason for prices to decrease in 2016 is that Iran oil entered the market by removing the sanctions; besides, there happened a significant increase in global oil supply. Oil prices decreased under 40 million $/v after reaching 55 million $/v level before 2017. Prices reached 70 million $/v level towards the end of 2017. The slowdown in global oil supply and the decrease in dollars can be shown as the reason for increasing oil prices in 2017.

There is an inverse correlation between the value of the dollar and the oil prices. Oil trade is performed by dollars; an increase in the value of dollars causes the cost of importing countries to increase. Accordingly, gaining the value of dollars against the currency units of importing countries increases the share of oil import in the budget. Consequently, there can be seen a decrease in oil demand; oil prices decrease based on this circumstance as well. Within this equilibrium, the Federal Reserve decided to increase the interests that remained low as from 2008 crisis; this decision caused the value of dollars to increase. Oil prices were pressured downward by the appreciation of dollars. Moreover, another reason for being on the decline of oil prices until the end of 2016 is raising the global oil stocks to the record high. It is seen when OECD data are analyzed that oil stocks of countries reached the highest level of all times by increasing to 1,7 billion barrels (TPC:2017:16-17).
Table 3: 2000-2017 Spot Raw Material Prices

<table>
<thead>
<tr>
<th>Year</th>
<th>Dubai $/bbI</th>
<th>Brent $/bbI</th>
<th>Nigerian Forcados $/bbI</th>
<th>West Intermediate $/bbI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>26.2</td>
<td>28.5</td>
<td>28.42</td>
<td>30.37</td>
</tr>
<tr>
<td>2001</td>
<td>22.81</td>
<td>24.44</td>
<td>24.23</td>
<td>25.93</td>
</tr>
<tr>
<td>2002</td>
<td>23.74</td>
<td>25.02</td>
<td>25.04</td>
<td>26.16</td>
</tr>
<tr>
<td>2003</td>
<td>26.78</td>
<td>28.83</td>
<td>28.66</td>
<td>31.07</td>
</tr>
<tr>
<td>2004</td>
<td>33.64</td>
<td>38.27</td>
<td>38.13</td>
<td>41.49</td>
</tr>
<tr>
<td>2005</td>
<td>49.35</td>
<td>54.52</td>
<td>55.69</td>
<td>56.59</td>
</tr>
<tr>
<td>2006</td>
<td>61.5</td>
<td>65.14</td>
<td>67.07</td>
<td>66.02</td>
</tr>
<tr>
<td>2007</td>
<td>68.19</td>
<td>72.39</td>
<td>74.48</td>
<td>72.20</td>
</tr>
<tr>
<td>2008</td>
<td>94.34</td>
<td>97.26</td>
<td>101.43</td>
<td>100.06</td>
</tr>
<tr>
<td>2009</td>
<td>61.39</td>
<td>61.67</td>
<td>63.35</td>
<td>61.92</td>
</tr>
<tr>
<td>2010</td>
<td>78.06</td>
<td>79.50</td>
<td>81.05</td>
<td>79.45</td>
</tr>
<tr>
<td>2011</td>
<td>106.18</td>
<td>111.26</td>
<td>113.65</td>
<td>95.04</td>
</tr>
<tr>
<td>2012</td>
<td>109.08</td>
<td>111.67</td>
<td>114.21</td>
<td>94.13</td>
</tr>
<tr>
<td>2013</td>
<td>105.47</td>
<td>108.66</td>
<td>111.95</td>
<td>97.99</td>
</tr>
<tr>
<td>2014</td>
<td>97.07</td>
<td>98.95</td>
<td>101.35</td>
<td>93.28</td>
</tr>
<tr>
<td>2015</td>
<td>51.2</td>
<td>52.39</td>
<td>54.41</td>
<td>48.71</td>
</tr>
<tr>
<td>2016</td>
<td>41.19</td>
<td>43.73</td>
<td>44.54</td>
<td>43.34</td>
</tr>
<tr>
<td>2017</td>
<td>53.13</td>
<td>54.19</td>
<td>54.31</td>
<td>50.79</td>
</tr>
</tbody>
</table>


The table shows the spot raw material prices between the periods of 2000 and 2017. There is seen an increase in Brent oil prices as from 2001. Oil prices exceeded 67 dollars by the developments in Iran in 2007. West Texas type crude oil barrel found a buyer by 72,20 dollars. There was seen a serious decrease in oil prices in 2009 by also the effect of the global crisis; prices regressed to 60 dollars. Oil prices started to increase again based on increasing global demand after 2009; prices averagely reached 105 dollars in 2013. As is seen in Table, the oil prices that showed a decrease after 2013 was at the level of 53 dollars in 2017.

4. Effect of Oil Prices in Turkey on Economic Growth

The energy that is one of the irreplaceable factors of economic and social development is provided from fossil resources like coal and natural gas, notably, oil. From the end of the 19th century, oil replaced coal that was the main energy source of the First Industrial Revolution. Although the consumption patterns changed in time and new energy resources emerged, oil has
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not lost its importance. 90% of the energy that is essential to be produced several products is met by oil and petroleum product in spite of increasing the concerns on climate change and being continued to investments toward renewable energy resources by the governments. The dependency to oil structurally affects the national economies due to the changes in oil prices. While the increases in oil prices affect several macroeconomic variables such as terms of trade, real national income and balance of payments in oil-importing countries, the increases in oil prices also cause financial crises, unemployment, high inflation and decrease in oil import and investments. High oil prices cause national income of oil-importing countries to decrease. Since reducing oil consumption is not possible in increasing the ratio of oil prices, oil expenses increase and the national income that is reserved for other expenses decrease (Öztürk & Kılıç, 2018:139).

Fluctuations in oil prices of Turkey that is among petroleum dependent countries have various effects on the Turkish economy. These effects are as follows (Kartarcı & Yardımcı, 2014:206-207);

- Increasing the oil prices causes the cost of oil that is a basic production input to increase. This circumstance and decreasing the oil use cause the petroleum production to decrease.
- Increasing oil prices affects international terms of trade. This situation causes the current deficit to increase and also cause to occur a fiscal deficit. Accordingly, purchase power and welfare level in the country decrease.
- Increases in oil prices increase the money demand; increasing money demand causes interest rates to increase; consequently, the economic growth will be affected negatively.
- The increase in oil prices causes inflation to increase as well. Namely, the increases in oil prices trigger the general level of prices to rise. Moreover, reducing the demand and investments that are not about the oil causes tax revenues to decrease as well. This circumstance provokes public deficits and interest rates to increase.
- Rises in oil prices create significant effects on production structure. Remaining the oil prices at high levels for a long time also affect other sectors that use production methods based on the oil. This situation provokes companies to be in search of more different production methods to reduce the dependency on oil. Thus, the employment between capital and labor will decrease in the long run in the economy.

Oil generates the most important share of import items of Turkey that is an oil importer. Namely, Turkey meets 90% of the petrol need by import; this situation makes Turkey an oil-dependent (Aktaş, Özenç & Arıca, 2010:1). Positive or negative developments that occur in international oil market create a remarkable impact on macroeconomic variables in countries such as Turkey that imports a large part of the oil need (Çelik & Akgül, 2011: 13).

Oil prices may have an effect on economic activities via different communication channels. The first of these communication channels is the classical supply-side effect that causes supply to decrease. With reference to this channel, there will be observed an increase in cost production; reproducitively growth with output will decelerate. Secondly, an increase in oil prices causes trouble in terms of the terms of trade for oil-importing countries. Thus, the capital transfer from oil-importing countries to oil-exporting countries will actualize; this situation will cause the purchasing power of companies and households to decrease. Thirdly, the rise in oil prices increases the money demand based on the real balance effect. Interest rates will increase and there will be a delay in economic growth because of the failure of monetary authorities in meeting increasing supply and money demand. Fourthly, we can say that the rise in oil prices causes inflation. Fifthly, the rise in oil prices creates a negative effect on consumption, investment, and share prices. Finally, lasting long the increase in oil prices may cause a change in production structure and also unemployment. Indeed, the rise in oil prices may provoke oil-intensive sectors to adopt new production methods that use oil so as to be less intensive. Oil prices may affect economic activity because of all these reasons (Lardic & Mignon, 2006:848).
Economic growth has played a crucial role in industrial innovation in recent years. Economists have accepted the sharp movements in oil prices as a significant source of the economic fluctuations since the first fluctuation in crude oil prices in 1973s. For example, Hamilton (2005) argued that 9 of 10 recessions in the US came into prominence by the great increases in the crude oil prices (Aimer, 2016:18). With reference to the expressions of González and Nabiyev (2009), oil prices did not increase; however, the fluctuations are worse and more distinct in comparison with the fluctuations in the 1990s; the fluctuations create unexpected results. Li and Zhao (2011) pointed out that the fluctuations in crude oil prices from the 1970s to 2011s are more irregular than the fluctuations have emerged since 2002. The fluctuation in oil prices decelerates growth in several different channels from the increase in production costs and inflationary expectation (Ndungu, 2013).

Fig. 7: Relationship Between Crude Oil Prices and GDP in Turkey


Fig. 7 shows the relationship between crude oil prices and GDP. It is seen when the graphic is scrutinized that the rise in oil prices create a positive impact on GDP. The increase in oil prices causes a general level of prices to increase and GDP to decrease in terms of Turkey. However, there is an exact opposite situation in the Fig.. Namely, the decrease in oil prices has caused a continuous shrinkage in the Turkish economy and also affected the economic growth negatively. In the same way, the decrease in oil prices caused global economic growth expectations to decrease as well. The reason for this circumstance derives from the low oil demand elasticity. Being found the relationship between growth and oil prices as positive is normal for Turkey that has continuous intermediate goods import and is a foreign-dependent country in terms of oil input.

Conclusion

The purpose of this research was to determine the effects of change in oil prices on the economic growth in Turkey between the years of 2000 and 2017. It is inevitable for fluctuations in oil prices to affect the oil-importing countries as the result of using oil in highway construction, aviation, and energy generation besides being a basic production input.

While the energy that is consumed today is obtained from several energy resources, the share of fossil resources in all the resources is almost 87%. The position of oil has been placed on the top among the basic energy resources when the developing countries are evaluated in the last 50
years. The significance of energy demand and need in production and consumption of a country such as Turkey is an undeniable fact. Oil is the common input for all the production sectors based on the dependence of Turkey's economic structure on crude oil and its derivatives.

Fluctuations in oil prices are accepted as an important power supply when the fluctuations in oil prices are evaluated on a country basis. The fluctuations in oil prices need to be separately evaluated in terms of oil-importing and oil-exporting countries. In this context, there will actualize an income transfer from oil-importing countries to oil-exporting countries when there is seen an increase in oil prices. Economies of oil-exporting countries will be positively affected by export proceeds and real incomes based on increasing oil prices. Much as increasing the oil prices is seen as positive for oil-exporting countries, this increase will affect the economy negatively because of the cost inflation in the long run. The rate of growth will decelerate with cost inflation and national economies; unemployment will increase; capacity utilization will decrease and the inflation will increase based on all these factors. The rise in oil prices will cause current deficits, inflation and budget deficits in oil-importing countries. However, the low price elasticity of oil demand will positively affect the oil demand.

It can be seen when we evaluate in terms of Turkey who meets 90% of oil need by import that production costs and general level of prices will increase based on the rise in oil prices; GDP will decrease at the same time. However, it is concluded that the relationship between growth and oil prices of Turkey is positive based on the low demand elasticity of oil. It is generally expected that the relationship between growth and oil prices needs to be found as the reverse in terms of the developing economies. However, it is normal for this relationship to be positive in Turkey when the following items are considered; there is a low oil demand elasticity; there is imported intermediate goods; Turkey is foreign-dependent in terms of input.

References


QUANTUM AND NEO-CLASSICAL ECONOMICS

Melike E. BİLDİRİCİ*
Bahri SONÜSTÜN**

Introduction
18th, 19th and 20th (may be) century’s social and economic environment shaped the Classical approach and Newtonian physics was preferred to establish an analytical infrastructure. Rational behavior and homogeneity became the basic principles of Neo-classical economics. So, at neoclassical paradigm, rationality was the most featured characteristic of representative agent and the economy was consisted of rational agents. So rationality brought the inevitable equilibrium to economics according to Neo-classical paradigm. General equilibrium established by Arrow and Debreu (1954) was an important feature. Disequilibrium is an exceptional condition and perfect market structure and dynamics called as invisible hand provided equilibrium.

Due to the linear approach and Newtonian approach, the Neoclassical Economics mostly focused on mathematical harmony and ignored the variables that create the complexity. Unique equilibrium is one of the most important features in the neoclassical approach. This theory is established by Arrow and Debreu (1954). Disequilibrium is an exceptional condition and market dynamics called as invisible hand solves this problem. Only a single equilibrium can exist in economics and perfect competition provides the single equilibrium. But in real life, every agent has its own motives and effected by other variables when taking decisions. The variables and the weights of the variables that effect the economical agents always change, so there cannot be a single constant equilibrium and due to the presence of motives of economical agents, rationality can vary on agents and conditions.

According to Classical and its follower Neo-Classical paradigm’s mechanical behavior, general equilibrium is an important feature and one of the most important pillars of the theories. Understanding of the equilibrium in economics is certain balance between production and consumption side actors. The balance mentioned is kept by market dynamics called “invisible hand”. Stability and calculability are the main goals behind the equilibrium phenomenon and ideal of famous economists such as Smith, Keynes etc.

Every paradigm was established in accordance with the conditions of the related period and principles of the paradigm were suitable for the period’s economic conditions. After the second half of the 20th century with the improvements in mathematics, the computer sciences and adaptation of quantum physics created the motion on the dynamics of economics. Because of this motion, basic principles of paradigms became insufficient to keep the accordance with complex dynamics of real life (Pasinetti, 2000). With the changes in world trade and technological improvements, social and economic conditions drastically changed. New developments such as computer sciences, non-linear dynamics and quantum physics etc. brought new implications and opportunities to all sciences and these directly affected the economic structure. Especially, information of economic agents is important element in economic model. But in real life experience, the economic agents have asymmetric information and this reality affects the market dynamics and unlimited substitution of human factor on production because theory of homogeneity in production took an important hit.

After the quantum physics, Newtonian dynamics were questioned with the help of shocking empirical findings of researches which were underestimated by dominant physics paradigm. Newtonian approach described and portrayed the real world in a simple and deterministic way. This was a complete shift change in Physics and affected the economical paradigm because dominant paradigm took the Newtonian approach as a guideline for analytical infrastructure.

The similarity of Quantum mechanism’s pressure on Newtonian approach was witnessed on
economical paradigm. Nano parts\(^1\) of economics, individuals, their behavior and effects on society were also criticized by Quantum mechanics (Hubbard:2017). Quantum theory brought the dominant paradigm closer to real life especially uncertainty conditions. Uncertainty didn’t take place on theoretical view of dominant paradigm. By the 1960’s, due to market conditions, optimum theory has arisen. This theory attempted to bring the economics parallel to real life. According to optimum theory, it is not possible to keep a stable and consistent equilibrium in economics and point out the difficulty to estimate the economical agent’s behavior. This theory brought the dominant paradigm closer to real life while Heisenberg’s indeterminacy paradigm’s increasing pressure on dominant paradigm (Vukotić:2011).

In this paper, we will primarily explain the quantum physics in the following section. In the third section, Quantum Newtonian Physics Comparison will be explained. The four section, The Critics of Neoclassical Economics, Quantum Theory and Impact on Economic Theory will be given and conclusions will be given at last section.

Quantum Physics, Paradigm and Theory
Quantum theory has been developed by focusing on wave nature and an existing initiative on atomic and subatomic particles. Mechanics of Quantum paradigm started to describe the behavior of atomic and subatomic particles in the light of wave-particle duality concept. Characteristics and main features of micro particles were determined with the help of wave function. With the quantum theory, unique theories and principles such as uncertainty, equilibrium were discussed. Probabilistic view on Quantum paradigm was developed by Schrödinger. Another important theory in Quantum physics is Heisenberg’s uncertainty principle that figures out the unavailability of determining the two physical property of an object with acceptable accuracy (Drabik, 2011). According to Stenholm and Suominen (2005), quantum theory became the most successful theory in physics. Many contributions have made to telecommunication and information technologies by the help of quantum theory. Today many disciplines such as nuclear technology, electronics, molecular biology, nano technology etc. use Quantum theory (Agrawal and Sharda:2010).

With the Quantum theory, separating the whole to the parts and try to understand it with dismantling is withdrawn. Uniting the parts and considering the system as a whole has taken its place, with the Quantum paradigm. Wave and particle differentiation has abandoned and interaction of parts brought to the front. According to David Bohm ‘apparently it must be rejected the idea that the Universe could be divided on separate parts and apply a submission that the whole world is united. In every case where quantum phenomena play crucial role, separate ‘parts’ of the Universe can essentially change in time because of inevitable and inseparable connections between them. Thus, it is emerged to the picture of the Universe as the picture of indivisible but flexible and constantly changing object (Zverev and Tishin:2009).

Quantum paradigm insists on integrity of system parts and system itself. According to Quantum phenomenon, feature and behavioral dynamics of parts are driven and defined by the system itself. This correlation is the result of inseparability of the system according to Quantum approach. If we consider the relationship of employees and the company, it is obvious that characteristics of company and the work results drives and effects the employees. (Zverev and Tishin:2009)

Quantum Newtonian Physics Comparison
Quantum Theory is considered one of the most important discoveries of modern science due to its ability to explain and forecast the energy and matter’s dynamics at sub-atomic nature. Quantum physics is a sophisticated theory that consisted of very complex theories and supported by experiments those took a century. Basics of quantum dynamics are;

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*Yıldız Technical University, Department of Economics, melikebildirici@gmail.com
**Yıldız Technical University, SocialSciencesInstitute, bahrison@gmail.com
A. Uncertainty Principle: Contribution of Heisenberg to Quantum Physics. It is one of the best known principle of Quantum paradigm.

B. Correspondence Principle: According to this principle, Quantum theory produces typical forecasts like Newtonian approach in large systems compared to quantum scaled systems.

C. Quantum Principle. In macro environment time, energy and space operates, flows smoothly and always continues but at subatomic level, things are discrete and not operating continuously. Energy and particles exist in discrete conditions. Energy of a particle can increase or decrease on fixed intervals on some conditions. For example, atom of an object can have integer amount of electrons, cannot have one and a half electron and also electron can have certain energy level (Hubbard:2017).

Newtonian approach brought a successful approach and view on most of the visible systems of physical world and helps to construct many physical structures but if the atomic and subatomic environment and particles are considered, Newtonian approach was not quite successful as Quantum mechanics. Subatomic world acts and behaves totally different that Newtonian mechanics predicted. Particle-Wave dynamics approach brought a different view on physics. Two physical feature of a particle cannot be calculated correctly because of wave behavior of particle. According to particle-wave dynamics, two different things can be at the same place in the same time and the same thing at the same time can be different places.

In classical physics phenomena, physical processes are separated and independent from observational conditions. Observation has no influence on experiment according to classical view but quantum paradigm presents that observation of the observer can cause radical changes due to observations impact on physical conditions. The cause of change is the result of measuring instrument.

Quantum theory has fewer variables compared to classical paradigm and classical paradigm aims to predict the future condition but Quantum theory focusses on probabilities of possible results rather than concrete results.

Quantum Theory and Impact on Economic Theory

Quantum theory, the new experience of physics will lead the economics. Quantum economics opposes the Neo-Classic paradigm’s basic principles. Quantum physics did not refuse Newton’s paradigm. At the conditions that Newton’s theory was created, Newton physics is still viable but the conditions changed drastically with the time.

Newton approach of economics was operational on traditional economics, nation-states, national economies that has boundaries among, but although global markets era changed and global economy must be considered as a whole. Unity of different economies creates enormous effects on overall economic conditions that differ from simple sum of separate economies. Interactions and interdependencies cause radical changes in global economy. This deviation will affect and influence to develop a new economic theory (Vukotić, 2011).

Quantum economics does not consider utility maximization and equilibrium as acceptable pillars (Orell, 2018). Quantum based approach can offer an acceptable understanding of real life because the technology and latest developments born from technological evolution generates complexity and chaos. If the complexity is considered, same features can be seen in global economy. Dynamic, irregular, hard to predict, big and unexpected changes caused by small perturbations like butterfly effect. Dominant paradigm’s one of the main principle, equilibrium, can be destroyed by the quantum approach on economics. According to theory of complexity, equilibrium is a case of “point of attraction”. This new approach was not understood in economics and required a new view on economics, a new economic paradigm.

The quantum economics allow to the information interpretation and the mental action of human on understanding and taking decisions. (Khrennikov, 2014). If the quantum logic’s doctrines are considered, same result can be revealed.

Quantum economists accepted the quantum probability (QP) calculus The QP-approach is an operational method that defines the outcome’s of the observation’s probability distribution. Calculus of Hermitian operators are used for the definition. To define the mentioned non-
classical data, quantum formalisms is utilized by scientists. (Khrennikov, 2014). Black-Scholes-Merton’s theory’s quantum extension provides a rational and testable model of explaining irregularities.

This understanding brings to the fact of nothing in nature can be isolated from each other. In a system, every element can be affected by different element, system and even observers. Interactions between economical units became much more complex, organized behavior of the individuals created the difference on social behavior but Neo-Classical economics approach mostly neglected these interactions and changes (Carbone et al, 2007). Classical and Neo-Classical paradigm used Newtonian approach and linear dynamics for analyzing but dynamics of economics are highly volatile and has complex structure so Neo-Classical approach and its quantitative structure based on mathematical elegance was not providing sufficient analytical capacity (Arthur et al, 1997). Utility maximization is an important issue in Neo-Classical paradigm. Every economical agent is considered rational and making its decisions to maximize its utility. But the different approaches and motives behind the decisions of individuals and highly complex and the relations among the society prevents the utility maximization in real life so Rationality and Rational Expectations Theory do not have a realistic match in real economic life (Granoveter, 1985).

Since Quantum focuses on subatomic environment, micro cosmos in this approach is also applicable on understanding the individual behavior on economics (Aerts, D’Hooghe, 2009). And Quantum approach also can examine multiple equilibriums in the economics. Multiple equilibriums or disequilibrium can be realized in economics so ability to measure and examine the possible options at the same time can provide a larger view to policy makers to make correct suggestions and take better decisions.

**Conclusion**

In economics, every paradigm has its own fundamentals and these fundamentals were shaped considering the related period. Neo-Classical Theory and Classical Theory have the same principles. After the 19th century, with the help of technological improvements, accelerating volume of global economics and globalization, understanding the economic conditions became highly related to understanding of complex nonlinear interactions in economics. Equilibrium based and limited theoretical paradigm of Neo-Classical school became insufficient to understand the dynamics of economics. Most important feature of the Neo-Classic paradigm is certainty and equilibrium. In real life, under the chaotic economic and social interactions, there is disequilibrium. Single and stable equilibrium can only be exceptional case with very low probability. Economic structure is highly affected by large amount of interactions and this leads economics to an evolving and continuously changing structure. This kind of structure can have disequilibrium or multiple equilibriums. Importance of variables is always changing so uncertainty is the key characteristic of economics.

Neo-Classical economics uses the linear approach, Newtonian physics and Oclid geometry. Quantum approach provided a larger aspect (Gul, Sonustun, 2012). After 1950’s, developments in information technologies and invention of computers made this methods applicable for all sciences including economics. Analyzing non-linear dynamics and providing sufficient forecasts on uncertainty became possible and these methods provide better explanations on economic problems.

While Neo-Classical approach restricts its models to changes and evolution, Quantum approach embraced the highly complex dynamics of economics (Day, 1994). After 1980’s, with the globalization, most of the markets connected with each other and a single shock transfer to the other economics. A change in a market effects all economies (Goncalves, 2013), so forecasting the business cycle became much more complex by non-linear, Quantum and chaotic models.
References
THE IMPACT OF TOURIST INFLOWS ON RESIDENTIAL SALES IN TURKISH PROVINCES: A SPATIAL ECONOMETRIC ANALYSIS

Burcu Türkcan1
Utku Akseki**

Introduction
Tourism sector can be regarded as a pillar of an economy which needs significant foreign currency. In 2017, share of tourism sector in the world’s Gross Domestic Product (GDP) was %10.4 and the share in the total employment was %9.9. In Turkey, share of tourism employment in total employment was %7.8 and share of tourism in total GDP was %16.7 for the same year. Tourism sector, having a high share in the overall economy, plays an important role in providing foreign exchange for Turkish economy. Also, linkages between tourism and the other sectors are an important issue. For instance, it has been considered that tourism sector directly affects 38 sectors (Dilber, 2007). In this study, we will focus on the relation between tourism sector and housing market within the context of house sales.

The relationship between tourist movements and housing markets has been discussed in the literature for decades. Accommodation of tourists might realize into different ways as temporarily or permanently. Williams and Hall (2000) conceptualize that tourist (especially retired tourists) accommodation can be classified into four groups. While some tourists rent dwellings for accommodation, some tourists purchase dwellings for the purpose of short accommodation as second home owners. Besides, some tourists might accommodate longer time relatively, depending on legal permission. Finally, some tourists may prefer to stay in the country permanently.

As mentioned above, some people may visit a country as second home owners. In the literature, some studies focus on the meaning of second home tourism, its effects on the economy, environment etc... The study conducted by Clout (1972) might be considered as one of the remarkable pioneering works in the field of second home tourism. Jaakson (1986) analyzes ‘the meaning of second home tourism’ for Canada. Kaltenborn and Clout (1998) examines the concept by using survey method in Norway. Quinn (2004) proceeds to discussion about the meaning of second home ownership, based on a survey containing 76 homeowners living in Ireland. Alipour et. al. (2017) examines the impact of second home tourism in ‘the Caspian Sea region of Iran’. Bayezit (2003) investigates the impact of second home on the economy of the coastal region between Marmara Ereğli and Gelibolu. The findings of the study suggest that second homes have negative impacts on the economy. Moreover Muller (2002) concentrates on German tourists purchasing dwellings in the countryside of Sweden, making a survey with 91 German tourists.

On the other hand, there are limited studies analyzing the link between tourist flows and housing sector in the Turkish literature. Generally authors (Mutluer and Südaş, 2005; Kadi, 2014) investigate the relationship between sectors with regard to purchasing dwellings of foreigners in Turkey. However, in our study, we take into account both domestic and a foreign tourist to measure the impact of tourist flows on housing sales. In this context, we aim to contribute to the literature in two respects. First of all, a wide spatial data set is used in the empirical analysis for Turkey. Secondly, the most comprehensive spatial econometric analysis is conducted for Turkish

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1Assoc. Prof. Dr., Ege University, Faculty of Economics and Administrative Sciences, Department of Economics, burcu.turkcan@ege.edu.tr
**Assist. Prof. Dr., Ege University, Faculty of Economics and Administrative Sciences, Department of Economics, utku.akseki@ege.edu.tr
provinces. In this regard, a spatial panel data analysis is conducted for 81 Turkish NUTS3 regions and the time period of 2008 – 2017.

**Indicators of the Tourism Sector in Turkey and in the World**

Tourism affects the overall economy by providing foreign exchange, encouraging investments in human capital, increasing the employment opportunities and creating economies of scale and economies of scope. Also, impact of tourism activity on the overall economy could be presented based on sectored linkages (William and Hall, 2000:3-5). In this context, literature related to the tourism sector uses three concepts as direct effect, indirect effect and induced effect to analyze the tourism sector’s impact on the economy. Direct effect points to ‘internal spending’ (e.g. ‘residents domestic travel and tourism (T&T) spending, businesses’ domestic travel spending, visitor exports, individual government T&T spending’). Indirect effect refers to investment effect not just for current time and also for the future. Finally, induced effect represents spending of employees in tourism sector (World Travel and Tourism Council, 2018). Based on direct indirect and induced effects, Table 1 shows main tourism and travel indicators for the world between the years 2012-2018. Direct contribution of tourism and travel to world GDP has continuously increased from 2086.8 in 2012 to 2674.2 in 2018. Total effect of Travel and tourism on GDP was 6758.8 in 2012 and 8604.5 in 2018. Total contribution of travel and tourism to employment is the same as total contribution to GDP, increasing from 2012 to 2017 gradually.

**Table 1 Main indicators in Travel and Tourism in the World: (USD billion, real 2017 prices)**

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
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<tbody>
<tr>
<td>Direct Contribution of</td>
<td>2086.8</td>
<td>2169.1</td>
<td>2258.5</td>
<td>2362.3</td>
<td>2456.2</td>
<td>2570.1</td>
</tr>
<tr>
<td>Travel &amp; Tourism to GDP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other final impacts (indirect and induced)</td>
<td>2070.1</td>
<td>2161.8</td>
<td>2253.2</td>
<td>2321.7</td>
<td>2429.3</td>
<td>2526.9</td>
</tr>
<tr>
<td>Domestic supply chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Investment</td>
<td>705.6</td>
<td>724.4</td>
<td>760.6</td>
<td>804.8</td>
<td>848.6</td>
<td>882.4</td>
</tr>
<tr>
<td>Government Collective</td>
<td>393.9</td>
<td>401.2</td>
<td>408.8</td>
<td>421.5</td>
<td>434</td>
<td>444.4</td>
</tr>
<tr>
<td>Spending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imported Goods from</td>
<td>301.3</td>
<td>314.8</td>
<td>326.6</td>
<td>359.3</td>
<td>381.7</td>
<td>418.7</td>
</tr>
<tr>
<td>Indirect Spending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>1201.2</td>
<td>1246.6</td>
<td>1290.1</td>
<td>1337.2</td>
<td>1386.9</td>
<td>1429.8</td>
</tr>
<tr>
<td>Total contribution of</td>
<td>6758.8</td>
<td>7017.8</td>
<td>7297.8</td>
<td>7606.7</td>
<td>7936.7</td>
<td>8272.3</td>
</tr>
<tr>
<td>Travel &amp; Tourism to GDP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct contribution of</td>
<td>108131</td>
<td>109640</td>
<td>111658</td>
<td>114014</td>
<td>116095</td>
<td>118454</td>
</tr>
<tr>
<td>Travel &amp; Tourism to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total contribution of</td>
<td>276819</td>
<td>283329</td>
<td>290135</td>
<td>298802</td>
<td>306003</td>
<td>313221</td>
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<tr>
<td>Travel &amp; Tourism to</td>
<td></td>
<td></td>
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<tr>
<td>employment</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Other indicators</td>
<td>1050.4</td>
<td>1123.9</td>
<td>1235.7</td>
<td>1287.8</td>
<td>1332.8</td>
<td>1391.7</td>
</tr>
<tr>
<td>Expenditure on outbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>travel</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Source: WTTC (2018b).

Table 2 mainly reports the impacts of tourism and travel on GDP and employment in Turkey. Direct effect of tourism on GDP is 91.8 million Turkish Liras in 2012. This value increased to 113.2 in 2015 and decreased to 99.7 in 2016. In 2017, this indicator, representing direct effect of
tourism on GDP, received the highest value, 116.7, for the period 2012-2017. Increase of domestic expenditure from 90.6 in 2015 to 97.5 in 2017 is one of the important issues in explaining surge in direct effect. Indirect and induced effects in tourism sector are remarkable points for overall economy too. Change in these effects develops in line with direct effect. Total contribution of Travel and Tourism to GDP is considerable to evaluate the economy generally. While the value is 258.2 in 2012, it increases to 335.5 and 359.1 in 2015 and in 2017 respectively.

Table 2 Main indicators in Travel and Tourism in Turkey: (TRYbn, real 2017 prices)

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
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<tr>
<td>Direct contribution of</td>
<td>91.8</td>
<td>100.2</td>
<td>109.1</td>
<td>113.2</td>
<td>99.7</td>
<td>116.7</td>
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<tr>
<td>Travel &amp; Tourism to GDP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other final impacts</td>
<td>66.4</td>
<td>72.4</td>
<td>78.8</td>
<td>81.8</td>
<td>72</td>
<td>84.3</td>
</tr>
<tr>
<td>(indirect and induced)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Domestic supply chain</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Capital Investment</td>
<td>40.2</td>
<td>45.9</td>
<td>57.9</td>
<td>60.9</td>
<td>70.8</td>
<td>74.9</td>
</tr>
<tr>
<td>Government Collective</td>
<td>16.6</td>
<td>17.9</td>
<td>18.9</td>
<td>19.8</td>
<td>22</td>
<td>22.4</td>
</tr>
<tr>
<td>Spending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imported Goods from</td>
<td>-9.6</td>
<td>-7.2</td>
<td>-9.2</td>
<td>-10</td>
<td>-11.6</td>
<td>-12.3</td>
</tr>
<tr>
<td>Indirect Spending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Induced</td>
<td>52.8</td>
<td>59.1</td>
<td>66.1</td>
<td>69.7</td>
<td>67</td>
<td>73.1</td>
</tr>
<tr>
<td>Total contribution of</td>
<td>258.2</td>
<td>288.5</td>
<td>321.6</td>
<td>335.5</td>
<td>319.9</td>
<td>359.1</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Direct contribution of</td>
<td>467.8</td>
<td>473.6</td>
<td>488.5</td>
<td>482.9</td>
<td>415.4</td>
<td>461.8</td>
</tr>
<tr>
<td>Travel &amp; Tourism to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total contribution of</td>
<td>1947.5</td>
<td>2005.5</td>
<td>2124</td>
<td>2094.7</td>
<td>1976.4</td>
<td>2093.6</td>
</tr>
<tr>
<td>Travel &amp; Tourism to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other indicators</td>
<td>11.3</td>
<td>13.3</td>
<td>14.6</td>
<td>17.3</td>
<td>15.7</td>
<td>17.1</td>
</tr>
<tr>
<td>Expenditure on</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>outbound travel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


The Data Set and the Estimated Model
In this study, a balanced panel data set with 81 regions and 10 years is used. In this context, residential sales, domestic tourist inflows, foreign tourist inflows, unemployment rate and inflation rate variables are used to estimate the model. Table 3 below shows the variables and their notations.
Table 3: Notations for the Variables Used in the Model

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Sales</td>
<td>res</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>inf</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>unemp</td>
</tr>
<tr>
<td>Domestic Tourist Inflows</td>
<td>dom</td>
</tr>
<tr>
<td>Foreign Tourist Inflows</td>
<td>for</td>
</tr>
<tr>
<td>One Year Lagged Value of Domestic Tourist Inflows</td>
<td>domlag</td>
</tr>
<tr>
<td>One Year Lagged Value of Foreign Tourist Inflows</td>
<td>forlag</td>
</tr>
<tr>
<td>Weight Matrix times the Dependent Variable</td>
<td>W*res</td>
</tr>
</tbody>
</table>

Residential sales are the dependent variable and it captures both firsthand and secondhand dwellings. Domestic tourists are the Turkish tourists made check-in to the touristic facilities in Turkey. Moreover foreign tourists are the foreigners made check-in to those facilities. Unemployment rate is the rate for the adult population over 15 years old. And inflation rate is the average of CPI (consumer price index) changes through 12 months with the base year of 2003. The multiplication of weight matrix by the dependent variable checks the validity of clustering inclinations of regions. The model below shows the estimated spatial model with these variables. \( I \) indicate the regions and \( t \) indicates the time dimension.

\[
\text{Res}_{it} = \beta_1 + \beta_2\text{inf}_{it} + \beta_3\text{unemp}_{it} + \beta_4\text{dom}_{it} + \beta_5\text{for}_{it} + \beta_6\text{domlag}_{it} + \beta_7\text{forlag}_{it} + \beta_8W^*\text{res}_{it} + e_{it} \quad (1)
\]

**The Method and the Empirical Results**

Spatial econometrics is a sub branch of econometrics examining the spatial impacts in analyzed issues (Anselin, 2003). As generally accepted, spatial impacts exist because of spatial dependence and spatial heterogeneity. The main distinction comes from the structure of the dependency. This structure may refer economic or social network space as well as geographical location or distance space. From this aspect, spatial econometrics is quite important for both national and regional analyses. In this study, spatial methods are also used with a large panel data set, in order to detect the relationships between residential sales and tourist inflows.

Panel data sets have some superiority over time series and cross-section data sets. First of all, panel data provide multidimensional observation possibilities about each unit of the data set. Secondly, they increase the degrees of freedom and decrease the possibility of multicollinearity between the independent variables. Consequently, the econometric analyses by panel data bring about more reliable empirical results (Hsiao, 2002: 1 – 3).

Table 4: Pooled model with spatially lagged dependent variable and spatial fixed effects

<table>
<thead>
<tr>
<th>Dependent Variable = res</th>
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</thead>
<tbody>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>corr-squared</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Asymptot t-stat</th>
<th>z-probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>inf</td>
<td>-0.001365</td>
<td>-0.402697</td>
<td>0.687171</td>
</tr>
<tr>
<td>unemp</td>
<td>-0.003209</td>
<td>-1.438626</td>
<td>0.150256</td>
</tr>
</tbody>
</table>
The first step of any spatial analysis is constructing a weight matrix. It shows neighborhood relationships of cross section units and clustering behavior can be observed through this tool. This matrix is a symmetrical one and its size changes as to the number of cross section units in the data set. In this study, 81 Turkish NUTS3 regions (provinces) are examined and hence the weight matrix has 81*81 dimensions. The neighborhood relationship is set as to the queen contiguity approach.

In the second step of the estimation process, three different versions of spatial models - pooled, fixed effects and random effects - are estimated and LR (Likelihood Ratio) test results are compared. In this study it has been found that the best fitted model is the pooled model with spatially lagged dependent variable and spatial fixed effects. The estimation results are summarized in the Table 4.

Estimation results underline that the main determinants of regional residential sales are regional domestic tourist inflows, regional foreign tourist inflows, one-year lagged value of regional domestic tourist inflows and the spatial clustering indicator. Spatial weight parameter indicates that there is a spatial clustering inclination of regional residential sales and this result proves that geographically close regions exhibit similar regional residential sales rates.

**Conclusion**

National and regional economies expect to gain some benefits by investing in tourism industry. These basic expectations are: positive contributions to the balance of payments by foreign currency inflow; contributions to GDP by the enhancement of services sector; income and employment creation; and positive multiplier effects (Holden, 2005: 90). Consequently, tourism is considered as a key sector especially for the underdeveloped and developing countries. In this context, Turkey has also been directing its investments to tourism industry since 1970s. In this respect, the link between tourist flows and housing sector in Turkey has been analyzed in this study. Under the spatial econometrics approach, a balanced panel data set with 81 provinces and 10 years has been formed. Residential sales, domestic tourist inflows, foreign tourist inflows, unemployment rate and inflation rate variables have been used in the study. Empirical findings suggest that domestic tourist inflows, foreign tourist inflows, one-year lagged value of domestic tourist inflows and the spatial clustering indicator are the main determinants of residential sales. So the spatial clustering indicator suggests that geographically close regions have similar regional residential sales rates. Also all these results indicate that as domestic tourist inflows increase in regions, residential sales are affected positively. On the other hand, foreign tourist inflows negatively affect the regional residential sales. This result may probably occur due to the congestion effect. When the regions become to be too crowded, then living in such a region may be unattractive for newcomers. The spatial estimation results underline that regional residential sales are affected mainly by domestic tourist inflows and also regional clustering inclination occur during the analyzed years.

**References**


THE REFLECTIONS OF EXCHANGE RATE SHOCKS TO MACROECONOMIC INDICATORS IN TURKISH ECONOMY

Mücahide KÜÇÜKSUCU*  
Sevilay KONYA**

Introduction
Changes occurring in exchange rates in open economies affect the main macroeconomic indicators. Monetary authorities are trying to determine the exchange rate policy with instruments. With the beginning of the globalization process, the importance of exchange rate variable in terms of macroeconomic indicators is an undeniable fact.

While exchange rate shocks are considered as sudden increases in foreign exchange, interest rate, inflation, exports, imports, unemployment and growth affect many economic indicators and lead to a long-term crisis. The foreign exchange increases occurring in 2018 January have affected Turkey as well as Argentina, Brazil, Russia, Mexico. As of January 2018 the exchange rate increases affecting Turkey's economy have also affected macroeconomic balances in economy negatively and caused the formation of crisis. Together with the occurrence of crisis expectation, CBRT raised the interest rates by intervening to the market.

In addition, the government announced a program under the title "New Economy Program". In the new economy program, the basic messages are given as balancing, discipline and change. The new economy program covers the period of 2019-2021. With this program new targets have been determined. They determined inflation rate as 20.8% for 2018, 15.9% for 2019 and 9.8% for 2020. The budget deficit target is targeted as 1.8, 1.9 and 1.7, respectively. It is projected that the ratio of current account deficit to GDP shall be 3.3% in 2019, 2.7% in 2020 and 2.6% in 2021. It is expected that 79 million public resources shall occur in 2019. Another macroeconomic size targeted in the new economy program is unemployment. Unemployment is expected to be 11.3% in 2018, 12.1 in 2019 and 11.9% in 2020. The program which was announced due to the high level of inflation was Total Fight against Inflation Program. Important targets have been identified within the scope of the Fight against Inflation Program. These are; to provide finance support up to 14% to enterprises for the TL loans, to provide low interest loan with a 6-month maturity up-to 200.000 thousand dollars for SMEs, not to increase electricity and natural gas by the end of the year, and to make all companies have 10% discount.

Under the light of these evaluations, the purpose of this study is to research the reflections of the Foreign exchange shocks taking Turkey's economy under effect as of January 2018 on the macroeconomic indicators. Therefore, the conceptual framework of exchange rate shocks will be discussed in the first part and the reflection of exchange rate shocks on macroeconomic indicators will be expressed on the second part. Finally, the study shall be finalized with general evaluation.

Conceptual Framework of Exchange Rate Shocks
The exchange rate policy may be named as all measures taken by the governments related with foreign exchange in order to influence the external payment imbalances for making international payments in a certain order. These measures often arise with the directing of the international monetary system rather than the measures taken by individual countries (Karlu, 2014: 696). The sudden changes in the exchange rate in 2018 are seen as a Foreign exchange shock structure. Foreign exchange shocks are named as sudden and high rate changes in foreign exchange. The effect of foreign exchange shocks on the country's economy occurs through various macroeconomic indicators. The first effect of the Foreign exchange shock occurs in inflation. The

* Necmettin Erbakan University, Institute of Social Sciences, akpinar.m@hotmail.com  
** Selçuk University, Taşkent Vocational School, sevilaykonya@selcuk.edu.tr
effect seen in inflation may be either direct or indirect. If the sudden depreciation occurs in
Turkish lira, the cost and the price of all products increase. The second effect of foreign exchange
shock occurs on exports, and the rapid depreciation in Foreign exchange makes the exported
products more competitive in international markets. Another effect is observed in the
employment market. This effect channel is explained by the Philips curve. In other words,
unemployment decreases as inflation decreases. Prices are the last effect channel of foreign
exchange shocks. Foreign exchange shocks affect prices in two ways. The first of them is that the
cost of importing a country increases as the cost of a country loses value. The second effect is
related to the profit margin of the companies. In other words, companies can reflect cost to
consumers according to the level of competition (Şenerdem, 2018). The sudden increases in the
foreign exchange rate result in the expectation of a crisis in the market.
The sudden decreases and the increases in exchange rates lead to uncertainty and unrest on the
economy and households. Sudden increases occurring in exchange rates increase the prices of
commercial goods by increasing the prices of imported intermediate goods used in production. In
this way, it causes weakening of the competitiveness of the domestic producers in the
international markets and causes the negative effects on the business groups carrying out activity
with foreign exchange. Therefore, the sudden changes in exchange rates have a negative impact
on the economy and disrupt the economic indicators. Therefore, countries try to stabilize
exchange rates by intervening to exchange rates from time to time by using various methods,
mainly monetary policy instruments managed by central banks (Kartal, Depren and Depren,
2018: 211).
The increase in the USA dollar, which began at the beginning of January 2018, has affected all
countries of the world. The graph below shows the performance of Argentine Peso, Turkish Lira,
Brazilian Real, Indian Rupee, Mexican Peso versus US Dollar. As can be seen in the Fig., the
most depreciating Foreign exchange was the Argentine pesos and the Turkish Lira.


The reflections of exchange rate shocks in Turkey on Basic Macroeconomic Indicators
When the exchange rate management Turkey is considered, it is seen that Central Bank of the
Republic of Turkey interferes to the foreign exchange showing sudden increases from time to
time with monetary policy tools. The said intervention methods include changing the upper and
lower band of the interest rate corridor, making changes in the policy rate, making direct foreign
exchange buying / selling auctions, changing the rates related with amounts required to be kept
in CBRT as foreign exchange or TL due to the deposits collected by the banks. CBRT tries to
stabilize exchange rates and prevent sudden ups and downs by intervening in the exchange rates
stated above (Kartal, Depren and Depren, 2018: 211). CBRT's interventions offer temporary
solutions and cannot prevent the depreciation of the money in other words devaluation expectation created in the markets. The devaluation expectation occurring in the markets will cause depression in the real markets and will turn into a winding that feeds itself in the form of expectations, devaluation and crisis. In such a case, the change in the bank and money crises, in other words crisis spiral, is mostly seen in fixed exchange rate regimes or in countries connecting their money to any basket. One of the economies experienced this process in past, is Turkey's economy (Karaçor, 2006: 383-384). Undoubtedly, the foreign exchange shocks started in January 2018, has led to the deterioration of macroeconomic indicators of Turkish economy.

**Foreign Trade in Turkey in the Period of Exchange Rate Shocks**

One of the major problems encountered by Turkey's economy is foreign exchange bottleneck problem. One of the main reasons for this problem is the failure in providing foreign trade balance. To solve foreign exchange bottleneck will be through ensuring the balance of foreign trade. At the same time, this situation will accelerate the development (Terzi and Zengin, 1999: 48).

Foreign trade is one of the macroeconomic variables most affected by the exchange rate. Theoretically, an increase in the exchange rate will increase exports and decrease imports. In this case, it will contribute to the provision of external balance. The decrease in the exchange rate will decrease the exports and make the imports more attractive and will negatively affect the external balance. An increase in the exchange rate means that the foreign exchange price of exported products shall decrease and the TL price of imported products shall be increased. While the decrease in the exchange rate caused the foreign currency prices of the export products to increase, it caused the price of imported products to decrease. These changes in price affect demand and also export and import amounts (Capital, 2005).

Export Fig.s are important in terms of the balance of payments of the country as well as the infectiousness of economic crises. A 10% decrease in exports compared to the same month of the previous year may be a signal indicating the possibility of a crisis in the following 24 months (Karaçor, Alptekin and Gökmenoğlu, 2012: 141). Table 1 shows the foreign trade Fig.s in 2017 and 2018. In January 2018, while our exports were 12.4 billion dollars, it was realized as 13.1 billion dollars in February. Our imports were 21.5 billion dollars in January and 18.9 billion dollars in February. In August 2018, exports amounted to 12.3 billion dollars while imports amounted to 14.8 billion dollars. From January 2018 to September, our foreign trade balance has been consistently on. In 2018, the ratio of imports to imports increased in support of the theory. August and September of 2018 are the months when the foreign exchange bottleneck is felt most. In August 2018, our exports contracted by -6.7% and our imports contracted by -22.7% as a result of the contraction in foreign exchange bottleneck and domestic demand.

**Table 1: Foreign Trade by Month (2017-2018)**

<table>
<thead>
<tr>
<th>Months</th>
<th>Export (FOB)</th>
<th>Import (CIF)</th>
<th>Balance of Trade</th>
<th>Foreign Trade Volume</th>
<th>Rate of exports meeting imports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value</td>
<td>Change</td>
<td>Value</td>
<td>Change</td>
<td>Value</td>
</tr>
<tr>
<td>January</td>
<td>11 247 586</td>
<td>17.8</td>
<td>15 591 509</td>
<td>15.9</td>
<td>- 4 343 923</td>
</tr>
<tr>
<td>February</td>
<td>12 089 909</td>
<td>-2.2</td>
<td>15 825 998</td>
<td>1.6</td>
<td>- 3 736 089</td>
</tr>
<tr>
<td>March</td>
<td>14 470 814</td>
<td>13.4</td>
<td>19 017 539</td>
<td>7.0</td>
<td>- 4 546 725</td>
</tr>
<tr>
<td>April</td>
<td>12 859 939</td>
<td>7.6</td>
<td>17 787 683</td>
<td>9.9</td>
<td>- 4 927 744</td>
</tr>
<tr>
<td>May</td>
<td>13 582 080</td>
<td>12.3</td>
<td>20 923 446</td>
<td>21.7</td>
<td>- 7 341 366</td>
</tr>
<tr>
<td>June</td>
<td>13 125 307</td>
<td>2.0</td>
<td>19 173 756</td>
<td>-1.6</td>
<td>- 6 048 449</td>
</tr>
</tbody>
</table>
Table 2 shows the exports according to ISIC (International industrial classification of all economic activities). While most of the manufacturing classification is taken by the manufacturing industry, the sector that has the lowest share has been real estate, leasing and business activities.

Source: Turkish Statistical Institute

Table 2: Exports by Sectors (2017-2018, ISIC REV 3)
Table 3: Imports by Sectors (2017-2018, BEC)

<table>
<thead>
<tr>
<th>BEC</th>
<th>Total</th>
<th>Investment goods (capital)</th>
<th>Raw material (intermediate goods)</th>
<th>Consumer Goods</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>233 799 651</td>
<td>33 116 139</td>
<td>171 461 765</td>
<td>28 487 529</td>
<td>734 218</td>
</tr>
<tr>
<td>January</td>
<td>15 591 309</td>
<td>2 134 592</td>
<td>11 888 355</td>
<td>1 520 476</td>
<td>48 086</td>
</tr>
<tr>
<td>February</td>
<td>15 825 998</td>
<td>2 287 231</td>
<td>11 603 891</td>
<td>1 898 496</td>
<td>36 381</td>
</tr>
<tr>
<td>March</td>
<td>19 017 539</td>
<td>2 462 454</td>
<td>14 194 635</td>
<td>2 284 898</td>
<td>75 552</td>
</tr>
<tr>
<td>April</td>
<td>17 787 683</td>
<td>2 533 086</td>
<td>12 900 718</td>
<td>2 308 323</td>
<td>45 555</td>
</tr>
<tr>
<td>May</td>
<td>20 923 446</td>
<td>2 604 613</td>
<td>15 674 190</td>
<td>2 592 105</td>
<td>52 539</td>
</tr>
<tr>
<td>June</td>
<td>19 173 756</td>
<td>2 611 460</td>
<td>14 000 755</td>
<td>2 521 143</td>
<td>40 398</td>
</tr>
<tr>
<td>July</td>
<td>21 490 791</td>
<td>3 053 248</td>
<td>15 919 303</td>
<td>2 396 488</td>
<td>121 753</td>
</tr>
<tr>
<td>August</td>
<td>19 161 715</td>
<td>2 858 859</td>
<td>13 908 832</td>
<td>2 350 017</td>
<td>44 006</td>
</tr>
<tr>
<td>September</td>
<td>19 978 413</td>
<td>2 709 960</td>
<td>14 833 566</td>
<td>2 367 527</td>
<td>67 360</td>
</tr>
<tr>
<td>October</td>
<td>21 217 241</td>
<td>3 120 922</td>
<td>15 338 016</td>
<td>2 748 425</td>
<td>9 878</td>
</tr>
<tr>
<td>November</td>
<td>20 546 983</td>
<td>2 861 207</td>
<td>14 964 425</td>
<td>2 674 374</td>
<td>46 977</td>
</tr>
</tbody>
</table>

Source: Turkish Statistical Institute

Table 3 shows the import according to BEC (Classification of Broad Economic Groups). While the most share in the import grouping is raw materials (intermediate goods), the least share is taken by the group defined as the other.
Interest Rates in Turkey in Foreign Exchange Rate Shock Period
To increase the interest rates in order to overcome the expectations of the depreciation of the foreign exchange in the economy will cause some costs (Bensaid and Jeanne, 1997: 1465). These costs will arise in basic macroeconomic sizes. The consequences such as unemployment and the increase in debts will occur.

Table 4 shows the interest rates of the Central Bank in 2017 and 2018 in the economy of Turkey. It may be expressed that the Central Bank interest rates realized in the January-May period as 7.25; 16.25 in the June-August period; 22,50 in September. It is aimed to decrease the exchange rate by increasing interest rates. As can be seen from the table, interest rates have increased significantly in 2018 after 2017. The reason for the increase in interest rates can be attributed to high exchange rate increases.

Table 4: Central Bank Interest Rates (2017-2018)

<table>
<thead>
<tr>
<th>Month</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
</table>

Source: IMF, International Financial Statistics

Foreign exchange in Turkey at the period of exchange rate shock
Fig. 2 shows the monthly average exchange rates. The Fig. shows the 12-month period of 2017 and the period of 2018 until October. In 2018, exchange rates increased from January to September. As can be seen in the graph, Turkish Lira depreciated against the US dollar from January 2018 until September. It is seen that TL has started to gain value since October.
The Fig. below shows the annual change in TL against the Dollar and the Euro. As of August 2018, there has been a sharp decline in 2018.

**Inflation Data in Turkey at the Period of Exchange Rate Shocks**

As known, inflation is expressed as the continuous increase trend in the general level of prices. Inflation is measured by official indexes which show consumer and producer price developments and published by TUIK: (http://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Banka+Hakkinda/Egitim-Akademi/Terimler+Szlugu/).

Under the light of this explanation, the effect of the exchange rate shock experienced in the recent years in Turkey on the producer price and consumer price will be analyzed separately.
Producer price index (PPI) is the price index that measures the price changes by comparing the producer prices over time in the products that are produced and sold in the national economy during a specific reference period. When we look at monthly PPI data of 2017-2018, the change has increased rapidly since May 2018 when compared to the same month of the previous year. In September, it reached its peak and was recorded as 46.15%. When we look at the most recent data of October data, it was recorded as 45.01% with a small decrease. When we look at the rate of change according to the annual averages, the PPI data of October 2018 is 23.73% above the annual average. When we compare to 2017, a significant deterioration in the producer price index is evident. In September 2018, the rate of change compared to August was 10.88%, which is a historical peak in terms of inflation. The increase in October is around 1%.

It is possible to say that there was a serious deterioration in 2018, that the exchange rate shock experienced in the economy caused serious inflationary pressures on producer prices according to PPI data.

Table 6: Monthly Consumer Price Index Data for 2017-2018

<table>
<thead>
<tr>
<th>Year</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>11.23</td>
<td>11.14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Source: Turkish Statistical Institute
The consumer price index is the index that measures the changes in the prices of goods and services purchased by consumers. Firstly, when the CPI is calculated, the expenditures of goods and services are compiled within one year by a sample group representing the whole country. According to this expenditure structure, relative shares of goods and services within the index are determined. Here, the goods and services consumed by the sample population have a higher weight, while the less consumed ones have a lower weight. Prices of designated goods and services are collected from all provinces on certain days of each month. CPI is calculated with the prices determined and the weights determined at the beginning of the year (http://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Banka+Hakkinda/Egitim-Akademik/Terimler+Sozlugu/).

When we look at monthly CPI data for the years 2017-2018, horizontal data was recorded as 12.15% in May compared to the same month of the previous year. It was around 15% in June and July. In August, 17% was 24% in September and 25% in October. When we look at the rate of change in the CPI according to the annual average, it is 7% in January 2017, while an increase is observed in the last months of the same year. In December 2017, the value of 11% was observed to be 13.75% in September 2018. In October, the highest value of the period reached 14.9%. In September 2018, CPI data is negative in terms of other months. In terms of rate of change compared to the previous month, CPI reveals a significant change in September-2018 period. According to the previous month, the CPI change in September is 6.30%, differentiating from all Fig.s in the period we discussed. In October, the uptrend continued, but the rate was cut a little and 2.67%.

The main difference between the CPI and PPI data is their scope. While there is no services sector in PPI, service sector has a predominant place in CPI basket. The PPI consists of two main sectors: 83.66% of the manufacturing industry and 16.34% of the agriculture, while the CPI consists of twelve main items. Food and non-alcoholic beverages with 24.09 percent, transportation with 17.99 percent, and housing with 16.68 percent are the top three sectors with the highest weight.

While PPI is calculated, since the weight of the data related to the manufacturing industry and the products included in the manufacturing industry are dependent on imports and being related with the mobility in the foreign exchange, PPI becomes higher as can be observed today. In a sense, PPI is more affected by exchange rate shocks. Due to the depression in the markets, the producer has not yet fully reflected the price increase to the consumer. This thesis is confirmed by the obvious difference between PPI and CPI data.

**Unemployment data in Turkey in the Period of Exchange Rate Shocks**

After the inflation data, unemployment data is an issue that should be emphasized in our opinion during periods of exchange shock. It is understood that the economy is faced with a stagflations crisis if our detection of high inflation is accompanied by high unemployment.

It will be meaningful to draw a conceptual framework for unemployment before data is evaluated. The labor force is composed of those who are not yet able to find a job, in other words, those who are unemployed. The labor force participation rate is the ratio of the labor force to the working age population. Persons who have no jobs, who are looking for jobs and who have attempted to do so are identified as unemployed. Unemployment rate is defined as the ratio of the unemployed to the labor force:

When we look at labor force data from January-2018 July 2017, it is seen that 31 million 200 thousand rose to 32 million 300 thousand. Employment increased from 27 million 500 thousand to 28 million 700 thousand. The number of unemployed decreased from 3 million 700 thousand to 3 million 500 thousand. The number of people employed in agriculture decreased from 5 million 400 thousand to 5 million 200 thousand in January 2017. The number of people employed in the industry increased from 5 million 200 thousand to 5 million 700 thousand. During the period, the number of people employed in the construction sector was around 2 million. The number of people employed in the service sector increased from 14 million 800 thousand to 15 million 800 thousand. The service sector is the sector that contributes the most to employment in the period.

When we look at the number of employment, it is seen that the exchange rate shocks were not adversely affected during the period discussed. At this point, labor force participation rate, employment rate, unemployment rate, non-agricultural unemployment rate and unemployment rate data in the young population will be analyzed for a more detailed analysis.

### Table 8: 2017-2018 Monthly Labor Force Data (%)

<table>
<thead>
<tr>
<th>Years</th>
<th>Employment Participation Rate</th>
<th>Employment Rate</th>
<th>Unemployment Rate</th>
<th>Non-Farm Unemployment Rate</th>
<th>Young population unemployment rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017-January</td>
<td>52.5</td>
<td>46.2</td>
<td>11.9</td>
<td>14.2</td>
<td>21.9</td>
</tr>
<tr>
<td>February</td>
<td>52.6</td>
<td>46.5</td>
<td>11.7</td>
<td>14.0</td>
<td>21.9</td>
</tr>
<tr>
<td>March</td>
<td>52.7</td>
<td>46.6</td>
<td>11.5</td>
<td>13.7</td>
<td>21.8</td>
</tr>
<tr>
<td>April</td>
<td>52.7</td>
<td>46.8</td>
<td>11.2</td>
<td>13.3</td>
<td>21.6</td>
</tr>
<tr>
<td>May</td>
<td>52.7</td>
<td>46.8</td>
<td>11.2</td>
<td>13.2</td>
<td>21.2</td>
</tr>
<tr>
<td>June</td>
<td>52.7</td>
<td>47.0</td>
<td>10.9</td>
<td>13.0</td>
<td>20.8</td>
</tr>
<tr>
<td>July</td>
<td>52.9</td>
<td>47.1</td>
<td>11.0</td>
<td>13.1</td>
<td>20.7</td>
</tr>
<tr>
<td>August</td>
<td>52.9</td>
<td>47.3</td>
<td>10.6</td>
<td>12.6</td>
<td>20.4</td>
</tr>
</tbody>
</table>

Source: Turkish Statistical Institute
When we look at the labor force participation rate showing the ratio of labor force to the working population, it is seen that it was 52.5% in January 2017. Until December 2017, it increased gradually and increased to 53.1%. In July 2018, it was 53.2%. The employment rate was recorded as 47.9% in 2017 with a continuous increase from 46.2%. After January 2018, it showed a decreasing trend and became 47.4% in July. The unemployment rate decreased in 2017 on a monthly basis. This value was 9.9% in December when it was 11.9% in January. The same ratio stood out in January and February of 2018, but rose to 11% in July. Non-agricultural unemployment rate declined from 14.2% in January 2017 to 11.9% in December of the same year. While it fell to its lowest level in January 2018 and 11.8% in February, a deterioration started after March and increased to 13% in July. When we look at the unemployment rate data in the young population, it decreased to 18.9% from 21.9%.

Unemployment data show that, except for unemployment data in the young population, employment rate, labor force participation rate, unemployment rate and non-agricultural unemployment rate have been recovering in 2017 before the exchange rate shocks. However, it is clear that there has been an increase since the first months of 2018. The lack of data after July hampers our understanding of the real situation. As understood from the previous section, the deterioration period in September is the highest in terms of inflation data.

**Consumer Confidence Index in Exchange Shock Period**

In our study, we will look at changes in the consumer confidence index, which is shaped by the fluctuations in the exchange rate. It is an indicator that the responses to the different questions of the Consumer Tendency Survey are evaluated together to summarize the developments in consumer confidence.

<table>
<thead>
<tr>
<th>Year</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>66.9</td>
<td>65.7</td>
<td>67.8</td>
<td>71.3</td>
<td>72.8</td>
<td>70.0</td>
<td>71.3</td>
<td>68.7</td>
<td>67.3</td>
<td>65.2</td>
<td>65.1</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>72.3</td>
<td>72.3</td>
<td>71.3</td>
<td>71.9</td>
<td>69.9</td>
<td>70.3</td>
<td>73.1</td>
<td>68.3</td>
<td>59.3</td>
<td>57.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Turkish Statistical Institute

The consumer confidence index, which was 66.9 in January 2017, reached 72.8 in May in the same year. The index, which entered into a declining trend after this month, was 65.1 in December. While it was 72.3 in January 2018, it increased to 73.1 in July. It decreased in August and October and decreased to 57.3. The index value we encountered in October is the lowest of the period. The fluctuations in the exchange rate caused a decline in the consumer confidence index.

After analyzing the consumer confidence index data in general terms, we will examine the confidence index data in the construction sector, which is a locomotive sector for the Turkish economy.
Table 10: Construction Sector Confidence Index Purified from 2017-2018 Monthly Basis and Effects of Season

<table>
<thead>
<tr>
<th>Years</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>74,8</td>
<td>76,4</td>
<td>85,8</td>
<td>85,7</td>
<td>86,3</td>
<td>86,7</td>
<td>85,5</td>
<td>88,3</td>
<td>83,5</td>
<td>84,2</td>
<td>82,4</td>
<td>81,6</td>
</tr>
<tr>
<td>2018</td>
<td>87,0</td>
<td>83,8</td>
<td>78,9</td>
<td>78,8</td>
<td>77,2</td>
<td>75,3</td>
<td>77,1</td>
<td>68,8</td>
<td>57,3</td>
<td>58,7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Turkish Statistical Institute

It is important to understand what is going on in the economy before the 2017 exchange rate shocks. The construction sector confidence index, which was 74.8 in January, was recorded as 88.3 in August. It decreased to 81.62 with a gradual decrease until December. It was 87.0 in January 2018 and it was 75.3 in June. Although we saw some recovery in July, it was 68.8 in August. In September, the seasonally adjusted construction sector confidence index fell to 57.3, the lowest level of the period in which we discussed, and became 58.7 in October. In the construction sector compared to 2017, there is a notable decline in the 2018 confidence index. The Foreign exchange shock seems to have reduced confidence in the construction sector. After looking at changes in the construction sector, we will discuss the retail trade confidence index data which was purified from the effect of season.

Table 11: Retail Trade Sector Confidence Index Purified from 2017-2018 Monthly Basis and Effects of Season

<table>
<thead>
<tr>
<th>Years</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>95,9</td>
<td>97,9</td>
<td>97,7</td>
<td>101,6</td>
<td>102,8</td>
<td>100,7</td>
<td>107,3</td>
<td>108,5</td>
<td>105,9</td>
<td>104,0</td>
<td>99,9</td>
<td>100,6</td>
</tr>
<tr>
<td>2018</td>
<td>106,2</td>
<td>104,7</td>
<td>102,6</td>
<td>100,3</td>
<td>97,1</td>
<td>94,4</td>
<td>97,3</td>
<td>93,4</td>
<td>88,5</td>
<td>87,0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Turkish Statistical Institute

The retail trade confidence index, which was 95.9 in January 2017, displayed a rising graph until August and was 108.5 in August. It reached 105.9 in September and 104 in October and 100.6 in December. While it was 106.2 in January 2018, it decreased gradually to 94.4 by June. In July, it increased slightly to 97.3. However, it has regressed since August and decreased to 87, the lowest value of the period in October. The exchange rate shock in 2018 also significantly reduced the retail trade confidence index.

Finally, we will discuss the service sector confidence sector data which is purified from the effects of season.

Table 12: Service Sector Confidence Index Purified from 2017-2018 Monthly Basis and Effects of Season

<table>
<thead>
<tr>
<th>Years</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>87,5</td>
<td>92,9</td>
<td>96,9</td>
<td>99,9</td>
<td>102,0</td>
<td>98,8</td>
<td>103,7</td>
<td>105,4</td>
<td>103,3</td>
<td>101,1</td>
<td>99,7</td>
<td>96,2</td>
</tr>
<tr>
<td>2018</td>
<td>102,0</td>
<td>100,7</td>
<td>99,1</td>
<td>97,1</td>
<td>92,0</td>
<td>91,2</td>
<td>91,9</td>
<td>88,0</td>
<td>79,4</td>
<td>75,7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Turkish Statistical Institute

In January 2017, the service sector confidence index which is purified from the effects of season rose to 102 from May until September. It was 98.8 in June and decreased to 96.2 in December. While it was 102 in January 2018, it decreased to 91.2 in June and decreased to 75.7 in October. The negative mobility in the exchange affected other sectors as well as negatively affecting the service sector.
Conclusion and Evaluation
As of January 2018, the Turkish economy experienced a sharp rise in exchange rates and a sharp depreciation of the Turkish lira. When compared to other developing countries, the depreciation of the Turkish lira is negative.

The main aim of our study is to reveal the rates of exchange rate shock to the selected macroeconomic indicators. In this context, data on foreign trade, interest rate, exchange rate, inflation, employment and consumer confidence index were analyzed with 2018 year-end data in order to show 2017 year post-shock and post-shock situation.

When we consider import and export data in foreign trade, we see that the ratio of exports to imports reached 88% in 2018. The contraction in imports is so sharp that it is -22% in August 2018 and -18% in September. In terms of exports, August has been remarkable and decreased by -6%. However, in the following month, exports increased by 22%. Due to rising exports and declining imports, the foreign deficit is very close to the balance.

The second variable that comes to the fore in relation to the exchange rate is interest. There is a significant relationship between interest rates and exchange rates in terms of determining monetary policy. When the currency rose, the exchange rate was raised by the Central Bank. The benchmark interest rate, which remained flat in 2017, increased from 7.25% to 16.25% in June when we reached January 2018. In September, the benchmark interest rate was announced by the Central Bank as 22.5%. This interest rate is preserved in October. It is understood that the Central Bank had to act on an interest weapon to combat the currency shock.

The USD / TL exchange rate, which fluctuated between 3.5-4 TL in 2017, increased from January to September in 2018. The Turkish Lira has suffered a rapid depreciation. It is observed that TL has started to valuate by decreasing its losses against the dollar since October.

Inflation data were evaluated separately in our study as PPI and CPI. When we look at monthly PPI data of 2017-2018, the change has increased rapidly since May 2018 when compared to the same month of the previous year. In September, it reached its peak and was recorded as 46.15%. When we look at the rate of change according to the annual averages, the PPI data of October 2018 is 23.73% above the annual average. When we compare to 2017, a significant deterioration in the producer price index is evident. In September 2018, the rate of change compared to August was 10.88%, which is a historical peak in terms of inflation. PPI data It is possible to say that there was a serious deterioration in 2018, that the exchange rate shock experienced in the economy caused serious inflationary pressures on producer prices. When we look at the rate of change in the CPI according to the annual average, it is 7% in January 2017, while an increase is observed in the last months of the same year. In December 2017, the value of 11% was observed to be 13.75% in September 2018. In October, the highest value of the period reached 14.9%. In September 2018, CPI data is negative in terms of other months. In terms of rate of change compared to the previous month, CPI reveals a significant change in September-2018 period. According to the previous month, the CPI change in September is 6.30%, differentiating from all Fig.s in the period we discussed. In October, the uptrend continued, but the rate was cut a little and 2.67%. Exchange rate shocks have caused a noticeable increase in inflation rates.

Unemployment data constitute another group of data we have dealt with in our study. It can be seen that the rate of employment, labor force participation rate, unemployment rate and non-agricultural unemployment rate excluding the unemployment data in the young population have been a recovery in 2017 before the exchange rate shocks. However, it is clear that there has been an increase since the first months of 2018. The lack of data after July hampers our understanding of the real situation because, as we will understand from the previous section, the deterioration period in September is the highest in terms of inflation data. When we evaluate the available data, there is no stagflationist crisis in the economy with both high unemployment and high inflation.

When we look at the consumer confidence index data, it can be seen that the consumer confidence index, which was 66.9 in January 2017, reached 72.8 in May within the borders of the same year. The index, which entered into a declining trend after this month, was 65.1 in
December. While it was 72.3 in January 2018, it increased to 73.1 in July. It decreased in August and October and decreased to 57.3. The index value we encountered in October is the lowest of the period. The fluctuations in the exchange rate caused a decline in the consumer confidence index.

Turkey's established data sets and the period we have dealt with outside employment and the trade balance is clearly seen from the shock adversely affected. It is evident that the Turkish Lira faced a higher depreciation in the period when the local currencies of all other developing countries depreciated. More resistance to foreign exchange shocks will be possible through the implementation of structural reforms in the economy.

References
FRAGILITY AND SUDDEN STOP RISKS ARISING FROM SHORT-TERM CAPITAL MOVEMENTS: TURKEY CASE

Ergül Halisçelik

INTRODUCTION

This chapter focuses on the short-term capital movements (hot money) and their economic consequences, which have become more important with difficulties in the growth based on cheap external financing. Abundant liquidity after the 2008 global crisis reversed in the last period and caused a global liquidity contraction. Turkish Economy having strong trade and financial ties with the world economy was affected by US Federal Reserve Bank’s decisions to raise interest rates in recent years because of its economics fragilities resulting from its current account deficit and its finance.

International capital movements and financial liberalization, which gained momentum with the collapse of the Bretton Woods system in the early 1970s, provided a different dimension and increased the pace of globalization. Particularly, the volume and fluidity in the short-term speculative capital movements, also known as hot money, increased beyond the international goods and services flows. One the one hand, hot money movements, which have recently reached a very large scale, have reduced the resource requirement of developing countries, on the other hand, it has led to macroeconomic instability with the formation and/or deepening of financial and economic crises, especially by increasing the fragility in developing countries where financial markets are relatively shallow. Short-term capital movements flow to Turkey increased as a result of the process of financial liberalization started in 1980 and gained momentum after the fully liberalization of capital movement in 1989 with government Decree No. 32.

After the liberalization process, Turkey's economy has become more open and more responsive to global developments. As a result of the applied inadequate and wrong economic policies, Turkey’s transformation process interrupted several times with sometimes economic crises resulting external factors (1997/1998 and 2008) and sometimes with economic crises arising from its own internal factors (1994/2000 and 2001). In the formation and deepening of these crises, capital movements that were liberalized in 1989 were effective in short-term speculative capital outflows. Turkish economy has become more dependent on short-term capital inflows called “hot money” to finance its chronic current account deficit problem especially after the switch from closed foreign exchange regime to open foreign exchange regime in 1989 (Bağdadioğlu and Halisçelik, 2012; 15-16).

Excessive price increase in imported oil and accelerating international interest rates during the 1970s led to serious external government deficits in developing countries. The Washington Consensus recommended market guided solutions for these problems. In parallel with this consensus, many developing countries as well as Turkey started to implement various blends of ten economic policies and reforms listed below (Williamson, 1989; Todaro and Smith 2009: 551-552):

- Fiscal discipline
- Redirection of public spending priorities
- Tax reform
- Unified and competitive exchange rates

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1 Senior Treasury Controller at Republic of Turkey Ministry of Treasury and Finance, Part-Time Lecturer at Hacettepe University, Baskent University and TED University, E-mail: ehcelik@gmail.com
 Turkish economy transformed from import substituting to market based economy with the Stabilization Program of 1980 in line with the Washington Consensus supported by major international funding organizations, especially the World Bank and the International Monetary Fund. In this context, instead of the public sector, private sector started to pioneer in economic growth. Various structural policies were implemented to integrate national financial markets with international financial markets. In the transformation process initiated in 1980, the extent of macroeconomic indicators changed considerably. Today, Turkey is integrated with European and world markets through both trade and financial channels and it has become a more diversified economy.

However, recent developments in the world economy have already increased volatility in many developing countries including Turkey through trade and financial channels. Besides the current political risks in the country, the applied economic policies have increased the risks of current account deficit and financing it. The Turkish economy became more fragile due to the external factors, in particular free movements for short term capital flows. The common feature of the economic crisis experienced in the transformation process of Turkey is the presence of large amounts of short-term capital inflows in the pre-crisis and large-scale capital outflows during crisis period causing contraction of the economy (Aslan, Terzi and Siampan, 2014).

As can be seen from the Table 1, Turkey's macroeconomic indicators have fluctuated depending on many factors, internal as well as external. After experiencing the transformation in the economy, Turkey grew by annual average of 4.10% for the period of 1980-1990 in which it started to see the effect free of capital movements. Turkey grew by annual average of 3.62% with lower current account deficit (about 0.9% per year) and high budget deficit (annual average of 7.2%) for the period of 1990-2002. On the other hand, Turkey’s annual average growth rate was 4.73% for the period of 2003-2012, with low budget deficit of 3.2% and the high current account deficit of 5.18%. In other words, Turkey’s growth has become fragile due to it is either financed by the deficit in the internal balance (budget deficit) or the deficit in the external balance (current account deficit).

| Table 1: Basic Macro Economic Indicators of Turkey, 1990-2017 |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| GNP (Billion $) | 152 | 272 | 500 | 772 | 862 | 863 | 851 |
| Growth (%) | 9.3 | 6.6 | 9.0 | 8.5 | 6.1 | 3.2 | 7.4 |
| Unemployment (%) | 8.2 | 6.6 | 10.6 | 11.1 | 10.3 | 10.9 | 10.9 |
| Inflation (% CPI) | 60.3 | 54.9 | 8.2 | 6.4 | 8.81 | 8.53 | 11.92 |
| A-Central Government Debt Stock (% of GNP) (B+C) | 46.99 | 73.69 | 51.1 | 40.8 | 29.0 | 29.1 | 28.2 |
| B-Domestic Debt Stock (% of GNP) | 14.40 | 29.00 | 38.6 | 30.4 | 18.8 | 18.0 | 17.2 |
| C-foreign Debt Stock (% of GNP) | 32.59 | 44.69 | 13.6 | 10.4 | 10.2 | 11.2 | 11.0 |
| Budget Balance (% of GNP) | -2.2 | -10.6 | 1.06 | -3.5 | -1.0 | -1.1 | -1.5 |
| Primary Balance (% of GNP) | 0.5 | 5.7 | 5.98 | 0.7 | 1.3 | 0.8 | 0.3 |
| Current Account Balance ( % of GDP) | -1.7 | -3.7 | -4.2 | -5.8 | -3.7 | -3.8 | -5.6 |
| Current Account Balance (Billion $) | -2.6 | -9.9 | -21.0 | -44.6 | -32.1 | -33.1 | -47.5 |
| D-Net Capital Movements (Except 4,0 | 12.9 | 37.3 | 57.9 | 10.5 | 23.0 | 38.5 |
In this context, this study consists of 6 sections, including the introduction and conclusion. While in the introduction part, the subject, importance, purpose and scope of the study are given, in the second part of the study, the conceptual framework on hot money is provided. In the third part, hot money movements until 2008 global financial crisis and in the fourth part the policies and changes of hot money from global crises to today are analyzed. In the fifth part of the study, vulnerabilities caused by capital movements and the risk of sudden stop are analyzed. In the last (sixth) part of the study, the results are evaluated, useful and applicable suggestions on these issues are provided.

1. LITERATURE ANALYSIS: CONCEPTUAL FRAMEWORK ON HOT MONEY

The phenomenon, which is defined as "hot money" in the public opinion, refers to the fact that the residents take advantage of the interest rate parity in favor of the local currency by bringing their short-term funds to the domestic market. However, in case the interest rate parity turns against the local currency, the residents leave from the local currency and return the foreign currency and transfer the short-term funds abroad (Kumcu, 1994:52). Short-term capital inflows towards emerging economies offering high return opportunities by utilizing interest-exchange arbitrage lead to problems such as inflationary pressures, appreciation of the local currency and deterioration in current account balance, and may cause financial crises with the capital outflow (Süer, 2009).

While hot money is generally used for portfolio investments, it is emphasized that it has a rapid reaction to changes in the country with its speculative nature. It is also hypersensitive to the financial and political risks in a country. Indeed, the most important feature of the hot money movements which react quickly to the changes in returns and risks is that they can act very abruptly (Çelik, 2008: 34).

Instant hot money inflows are often thought to lead to a balloon in local asset prices, and to cause excess credit expansion, inflation, overvalued exchange rate, and a current account deficit. In addition to these, hot money investors quickly take their funds to abroad with the excess of hot money inflows, the formation of balloons in the asset prices, the stock market rise and the risk of the balloon exploding soon (Karunaratne 2002:12). As a result, hot money outflows are believed to result in declines in local asset prices and perhaps a rapid recession in local credit volume, which bring the country into a recession and a possible external debt crisis (Evans, 2013:1).

The recent global financial crisis has depolarized assumptions about the liberalization of capital movements. Nowadays, many economists call on the United States to relax countries’ bilateral investment treaties and free trade agreements to regulate their capital movements.

Today, even the International Monetary Fund (IMF), one of the biggest advocates of financial freedom, has approved the restriction and regulation of capital movements for the control of hot money, especially for protecting the developing countries and for reducing global macroeconomic volatility, and began to see these policies as a legitimate tool (Montero, 2013:1).

According to Chari and Kehoe; there is a high correlation between rapid growth in emerging economies and international capital flows (Chari and Kehoe, 2003:24). While, large-volume of capital inflows lead to rapid growth in the economy, large capital outflows result in a contraction in the economy (Guo and Huang, 2010:74).
The Central Bank of Turkey (CBRT)'s hot currency definition includes portfolio investments in the balance of payments, short-term capital flows and net errors and omissions. Portfolio investments consist of the purchase and sale of foreign investors' shares in the domestic market and domestic government bonds. Short-term capital inflows consist of short-term loans extended by the banks to the abroad, short-term loans used by foreign banks and non-bank private sector from abroad and short-term deposits held by foreigners in domestic banks. While CBRT defines hot money as the capital flows which are expected to respond rapidly to the expected rates of return and changes in risks, it emphasizes that sudden movement is more important than its amount. Hot money includes elements such as speculation, excessive fluctuation and rapid mobility, but it is also highly sensitive to factors such as international interest rates, the possibility of change in exchange rates, changes in tax rates, inflation expectations, other economic problems and political instability (Süer, 2009:3, 23).

Hot money inflows are driven by relatively high real interest rates in the national markets, and as a result of the increase in foreign exchange supply, the national currency is overvalued against foreign currencies. While the appreciation of the national currency makes the import goods relatively cheaper, the foreign trade balance and the related current account deficit increase as the export sectors lose their competitive advantage. Under these circumstances, while economic growth is becoming more and more dependent on foreign sources, a sudden instability in the national economy can arise as a result of the risks created by the delicate balance between real interest and exchange rate. Therefore, in recent years, many institutions, including the IMF, have moved away from the policy that any long-term capital control should be lifted in order to ensure the effective functioning of financial markets. They also emphasize the benefits of capital controls such as providing macroeconomic independence and reducing financial fragility (Ergül, 2012:1-2).

There is a risk that the hot money will have a destructive effect on the markets both at the entrances and exits. Therefore, hot money is seen by policymakers as a possible culprit of instability in developing countries.

The destructive effect of hot money and creating instability varies depending on the level of development of the market in which the movement takes place (the impact is greater in small economies with less developed and shallow financial markets) and the intensity of the capital movement (the level of capital inflows). Tobin's tax practices, which J. Tobin suggested in the 1970s to prevent foreign currency speculation and to take taxes from international foreign exchange and effective transactions in order to protect countries from short-term speculative capital, is frequently brought to the agenda for eliminating this disruptive effect of hot money. Tobin Tax has some advantages such as preventing speculative foreign currency movements, reducing the volatility in the foreign exchange market, minimize negative effects on national macroeconomic policies and creating income for host countries. On the other hand, it has also some disadvantages such as difficulties in political and technical implementation, negative impact of international transaction and liquidity volume, abolition of financial liberalization, causing inefficiency in international markets, inadequate to prevent speculation and uncertainties in using income from this tax (Şen, Keskin and Öz, 2004).

Feldstein and Horioka (1980), who determined that domestic investments in OECD countries are very sensitive to domestic savings, initiated a discussion on the financial integration of developed countries and the openness of financial markets. In a world where capital markets are integrated and political risks are negligible, it is a rational outcome that savings go to the country with the highest return. While capital inflows between countries create large current account deficits for some countries, they also create surpluses for others. Even if this is theoretically true, different results may occur in real life. For example, in the USA, while the current account deficit was 1.7% of GDP on average between 1992 and 1998, this deficit only financed 10% of the investments, while domestic savings were used in the financing of the remaining investments (Oğuz, 2013:42-43).
2. HOT MONEY MOVEMENTS UNTIL 2008 GLOBAL FINANCIAL CRISIS

The financial liberalization policies started in the developed countries in the 1970s. These policies were implemented by developing countries that have difficulty in finding external resources in order to solve the debt crises after that the pressure and suggestions of the international financial institutions such as the IMF and the World Bank. In this context, first controls and restrictions in the domestic financial market then on capital movements were abolished. Thus, borrowing with bank loans in the 1980s was replaced with hot money investments in the form of portfolio investments in the 1990s (Sarno and Taylor, 1999: 361). However, the short-term capital movements made the financial structure fragile in response to macroeconomic stability (Da Silva and Yoshitomi, 2001: 15).

In this process, while international capital flows become more short-term and speculative status, it began to affect the economies of developing countries including Turkey and it also started to shift to the most private markets through official channels. With the liberalization process started in 1989, there was a dramatic increase in capital flows directed to Turkey, especially portfolio investments and short-term capital inflows, defined as financial capital. In parallel with these increases, the fragile structure in Turkish economy has been effective in occurring and deepening the crises of 1994 and 2000-01 in Turkey like crises in Mexico (1994), Asia (1997), Russia (1998), Brazil (1999) and Argentina (2001) (Keskin, 2008:1-2).

Turkey achieved high growth rates with the creation of large amounts of financial expansion in international markets until 2008 global financial crisis; this trend underwent some occasional interruptions with internal and external reasons. In general, cheap credit facilities were realized as net capital transfers from international financial markets. In order to close saving deficit, Turkey benefited from short-term capital inflows by implementing high interest rate and low exchange rate policy. Turkey planned to increase economic growth by using these hot money sources both for internal (consumption, investment) and for external demand (Küçükefe, 2017).

Implementation of these policies providing economic growth in Turkey was financed more with hot money until 2007 and production became to be based more on current account deficits and imports. Turkey, like other similar developing countries, became a country that attracted more investment. However, the fact that the growth was achieved through the inflow of hot money led to the current account deficit and high external borrowing.

Table 2: Net Capital Flows to Turkey from 1984 to 2007 (Millions of Dollars)

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Capital Movement (1+2+3+4)</th>
<th>Foreign Direct Investment (1)</th>
<th>Portfolio Investment (2)</th>
<th>Long-Term Capital Movement (3)</th>
<th>Short-Term Capital Movement (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>1.075</td>
<td>113</td>
<td>0</td>
<td>1.614</td>
<td>-652</td>
</tr>
<tr>
<td>1985</td>
<td>1.741</td>
<td>99</td>
<td>0</td>
<td>163</td>
<td>1.479</td>
</tr>
<tr>
<td>1986</td>
<td>2.124</td>
<td>125</td>
<td>146</td>
<td>1.041</td>
<td>812</td>
</tr>
<tr>
<td>1987</td>
<td>1.891</td>
<td>106</td>
<td>252</td>
<td>1.453</td>
<td>50</td>
</tr>
<tr>
<td>1988</td>
<td>-958</td>
<td>354</td>
<td>1.178</td>
<td>-209</td>
<td>-2.281</td>
</tr>
<tr>
<td>1989</td>
<td>780</td>
<td>663</td>
<td>1.386</td>
<td>-685</td>
<td>-584</td>
</tr>
<tr>
<td>1990</td>
<td>4.037</td>
<td>700</td>
<td>547</td>
<td>-210</td>
<td>3.000</td>
</tr>
<tr>
<td>1991</td>
<td>-2.397</td>
<td>783</td>
<td>623</td>
<td>-783</td>
<td>-3.020</td>
</tr>
<tr>
<td>1992</td>
<td>3.648</td>
<td>779</td>
<td>2.411</td>
<td>-938</td>
<td>1.396</td>
</tr>
<tr>
<td>1993</td>
<td>8.903</td>
<td>622</td>
<td>3.917</td>
<td>1.370</td>
<td>2.994</td>
</tr>
<tr>
<td>1994</td>
<td>-4.257</td>
<td>559</td>
<td>1.158</td>
<td>-784</td>
<td>-5.190</td>
</tr>
</tbody>
</table>
As can be seen in Table 2, after the liberalization of capital movements in 1989, its effects started to appear in the following year. Since 1990, capital flows to Turkey has been increased in volume but flows has been fluctuated. While net capital inflows were only 780 million dollars before capital liberalization was introduced in 1989, it increased at a great rate after 1990s when the effects of liberalization of capital movements started to be seen. Net capital inflows reached to $8.9 billion in 1993, $6.9 billion in 1997, $9.6 billion in 2000, and record level of $48.5 billion in 2007.

On the other hand, between 1984 and 2007, there was a net capital outflow in 1988, 1991, 1994, 1998 and 2001. Internal and external conjuncture, political and economic conditions were effective for these outflows. Significant amount of capital outflows occurred in Turkey because of the 1991 Gulf crisis, the 1994 economic crisis of Turkey, the impact of the Asian and Russian crises in 1998 and finally in November 2000-February 2001 crisis of Turkey. The highest net capital outflow took place in 2001 with 14.6 billion dollars due to the problems created by the economic crisis arising from Turkey’s internal dynamics.

While the share of portfolio investment and short-term capital flows in total capital inflows was quite high, the share of foreign direct investments was quite low in the period of 1984-2004. However, in the following period after 2004, while the share of direct investments and other long-term capital flows in total capital flows increased, the share of portfolio investments and short-term capital flows started to decline.

### 3. THE POLICIES AND CHANGES OF HOT MONEY FROM GLOBAL CRISES TO TODAY

The 2008 global economic crisis erupted along with the shortcomings in the mortgage market and the decline in real estate prices in the US. The shortcomings in the mortgage system caused the regulatory and supervisory factors to lose their influence in the credit market. The crisis in the financial system has deepened as mortgage holders with a high risk ratio experienced difficulty in loan repayment. This unsafe environment in the markets caused a liquidity problem by lowering the lending rate in the interbank system. As a result, the problem rapidly spread at the global level, leading to a blockage of the integrated financial system. The following issues can be shown as the main reasons of the crisis (Şahin, 2013:5-6):

- Liquidity abundance and sloppy loans,
- The problem experienced in securitization creates domino effect on the market,
- Reflection of the insecure environment in the financial system to the fiscal system,
- Inefficiency of supervisory and regulatory bodies.

With the global crisis, the problems started worldwide at the end of 2008 have followed a
different spectrum in developed countries and developing countries especially since the second half of 2010. As a result of the historic low interest rates generated by the expansionary monetary policies implemented by the developed countries, international investors turned to developing countries which yielded higher returns. As a result of these policies, capital flows towards developing countries have gained momentum since the second half of 2012 and fluctuation in this trend has increased. The monetary authorities in developing countries, including Turkey, applied macro-prudential policies to take control and correct internal and external balances occurring due to the volatility in capital flows. However, increased capital inflows and low borrowing costs created new risks, particularly in developing countries, as firms increase their indebtedness rates and open positions in their foreign currency. This continued to pose a risk to the financial stability in these countries which can occur because of sudden movements in interest and exchange rates. The CBRT, as an independent monetary authority, went on implementing flexible monetary policy by taking into account the macro financial risks caused by global uncertainties. The CBRT also carried on using structural and cyclical monetary policy instruments that reduce the sensitivity of the economy to financial shocks (TCMB, 2013).

That freedom of capital movements, fixed exchange rate and independent monetary policy application cannot exist at the same time is expressed as an impossible trinity or a triple trilemma (impossible trinity or trilemma) hypothesis in the economy literature. The trilemma describes, as implied by the Mundell-Fleming model, the choice between two out of the three macroeconomic policy options: monetary autonomy, free capital mobility or fixed exchange rates. According to this hypothesis, it is not possible to implement an independent monetary policy in an economy where the free capital movements and fixed exchange rate regime is applied. In this case, monetary policy is applied taking into account the trends in capital movements and exchange rates (Biswas, 2018:1-2).

Since the US chose the free capital movements and the independence of the monetary policy, the exchange rate regime was determined as the floating exchange rate regime. While the Euro area countries prefer the free movement of capital and the fixed exchange rate regime, the European Central Bank determines the monetary policy on behalf of member countries. In China, while a fixed exchange rate regime is applied and monetary policy is determined independently, capital movements are controlled. On the other hand, Turkey kept capital movements under control for many years by implementing fixed exchange rate and an independent monetary policy. However, in parallel with the financial liberalization policies starting from the 1980s, capital movements were released while the floating exchange rate regime and independent monetary policy were introduced. Today, capital movements is free in Turkey, while the exchange rate in the market is determined by the floating exchange rate regime, the CBRT, which in fact has independence instrument in its monetary policy (although it is widely believed that it cannot use the interest policy freely). It constantly intervenes in the floating exchange rate by making currency purchases and selling for the reason of price or financial stability (Eğilmez, 2013).

The fact that the US short-term interest rates approached zero at the end of 2008 and other developed countries followed this policy led to a large amount of hot money in the emerging markets, especially in Asia and Latin America. The central banks of the emerging markets have started to raise their reserves and lose their monetary control by buying the dollar in order not to lose their competitive advantage in trade due to this hot money inflow. Despite the appreciation of the local currency of emerging markets, the average inflation in these markets has reached higher levels than that of developed economies and world commodity prices have risen rapidly. Yet, the emergence of the banking crisis in Europe in the summer of 2011 led to the contraction of bank loans at the global level and consequently the shrinkage both in the hot money flow and in the commodity market. Since this reason, the emerging markets were forced to reduce their foreign exchange assets. Consequently, in December 2011, the value of the currencies of emerging markets and commodity prices excluding oil declined while the dollar appreciated. This cycle, whichever foreign exchange regime is applied, makes the world monetary system more fragile because of the wide variation between the interest rates of the currencies. Therefore, there
is a need for international monetary adjustment, which limits the difference in interest rates by taking into account the need for exchange rate buffer, such as financial controls, which would limit the hot money flow at the global level (McKinnon, 2012:549).

Because of the expansionary monetary and fiscal policies implemented in the aftermath of the 2008 global crisis, liquidity abundance was experienced on a global scale. As a result of the increasing liquidity, the high volume of hot money is directed towards developing countries with high return on risk appetite. However, this tendency has started to decline in the first quarter of 2013 as a result of the announcement that FED will change its bond purchase policy, which is effective in the improvement of macro-economic indicators and financial markets of developed countries, especially the USA, and also especially the formation of liquidity abundance at global level (Sorel, 2015).

In parallel with the global development, as seen in Table 3, hot money inflows towards Turkey started to decline.

**Table 3: Net Capital Flows to Turkey from 2008 to 2017 (Millions of Dollars)**

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Movement (1+2+3+4)</th>
<th>Capital Movement (1)</th>
<th>Foreign Direct Investment (2)</th>
<th>Portfolio Investment (3)</th>
<th>Other Investment (4)</th>
<th>Reserves (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>37.520</td>
<td>17.302</td>
<td>-5.014</td>
<td>24.174</td>
<td>1.058</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>9.087</td>
<td>7.032</td>
<td>227</td>
<td>1.940</td>
<td>-112</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>45.131</td>
<td>7.617</td>
<td>16.083</td>
<td>34.240</td>
<td>-12.809</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>66.132</td>
<td>13.812</td>
<td>22.204</td>
<td>28.303</td>
<td>1.813</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>42.595</td>
<td>6.069</td>
<td>20.170</td>
<td>15.888</td>
<td>468</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>46.724</td>
<td>8.325,</td>
<td>24.476</td>
<td>5.716</td>
<td>8.207</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** CBRT, 2019, Electronic Data Delivery System

4. **FRAGILITY CAUSED BY CAPITAL MOVEMENTS AND THE RISK OF SUDDEN STOP**

There are different classifications for the emerging economies. While IMF classified 25 countries as emerging economies by taking into consideration their economic growth, inflation, trade and fiscal conditions, Goldman Sachs announced Brazil, Russia, India and China (BRIC) as the emerging markets with the brightest economic growth potential. Morgan Stanley declared the Brazil, India, Indonesia, South Africa and Turkey in 2013 as the "Fragile 5" because of the fact that their currencies under the most pressure against the U.S. dollar among the emerging economies. Common economic indicators such as high inflation, weakening growth, large external and high dependence on fixed capital inflows leave these countries’ currencies vulnerable (Onder, Taş and Hepşen, 2015).

The original member countries of “Fragile 5” announced first by the Morgan Stanley in 2013 were Brazil, India, Indonesia, South Africa and Turkey. The member of the “Fragile 5” countries sometimes changed except Turkey. Morgan Stanley revised “Fragile 5” classification in December 2016 and included Colombia, Indonesia, Mexico, South Africa and Turkey to its list by taking into consideration some economic indicators such as foreign exchange reserves to external debt ratio, current account balance, foreign holdings of government bonds, USD debt, inflation, and real rate differential. In November 2017, credit ratings agency Standard & Poor's (S&P) Global listed Turkey, Argentina, Pakistan, Egypt, and Qatar as Fragile 5 (Kuepper, 2018).
Along with a financial crisis in a region of the world economy, investment opportunities around the world are affected and beginning to fall. While global investors are looking for new safe and high return investment opportunities for their capital, some countries benefit from these investment opportunities with the short term capital (hot money) inflows. However, countries that benefit from high volume rapid capital inflows become more vulnerable and unprotected to the opposite shock. As a result of the emergence of political and/or economic risks and the transformation of the current conditions against of investment country, capital outflows from these countries are taking place and financial crises arise in these countries (Korinek, 2011:1).

In the economic literature, “sudden stop”, which is often related for developing countries, is a term used to describe the sudden slowdowns and stagnations in capital inflows to a market. It can be due to external reasons such as political or economic instability related to the country’s economy, the contraction of internal or global liquidity conditions and the effect of transmission. A sudden stop in the market is followed by depreciation in the currency, rising in interest rates, sharp declines in expenditures and production. This definition was first used by the economists Dornbusch, Goldfajn, and Valdes in 1995 after the Mexican crisis. Empirical studies have shown that these sudden stops in capital flows are more common in developing countries, especially for “Fragile 5” countries mentioned in Table 4 (Calvo, Izquierdo and Talvi, 2005: 18).

According to Karunaratne (2002), while developing countries feel that they need to allow capital inflow especially as hot money for many positive factors such as economic growth, financing shortage and technology transfer, but at the same time, they face the risk of a rapid national income collapse in case of the sudden escape (capital outflow) or sudden stop of these funds (Karunaratne, 2002:6).

Hutchison and Noy (2006) have shown in their empirical study that the crisis deepens more, especially if the currency crises are combined with the sudden stop of hot money, affecting the output in the country negatively (about three times) (Hutchison and Noy, 2006: 245). The sudden stop in capital movements can be caused by the internal dynamics of countries with economic or political reasons as well as the crises in the external factors due to uncertainty environment and liquidity problem. For example, FED’s interest rate hikes are seen as important global risks in terms of decreasing or stopping capital inflows for the developing countries.

The Economist magazine published the “Capital Freeze Index”. This index measures the fragility of the national economies against the risks that would arise when a sudden stop of hot money inflows occurs. In other words, the index measures that which countries’ economies are more fragile in case of risk related to an abrupt capital stop. Created for 26 developing countries, index is generally based on three main indicators: current account balance, private sector loan growth and foreign debt to reserves ratio. The Economist measured the vulnerability of 26 emerging markets to a capital freeze by combining these three factors (sub-indexes) into a final index (The Economist, 2015).

According to index, prepared the first time in 2012, Turkey is considered to be the most risky or the most vulnerable economy in case of sudden stop of hot money. Turkey’s overall risk score for the vulnerability to a sudden stop in capital inflows is 226 (current account risk score is 81, private sector loan growth risk score is 93 and foreign debt to reserves ratio risk score is 52) where the maximum overall risk score is 300 and maximum risk score for the every sub-indicator is 100. Turkey is followed by Ukraine (overall risk score is 185), Argentina (overall risk score is 149), Venezuela (overall risk score is 147) and Brazil (overall risk score is 137). These 5 countries can be also called “Fragile 5” in 2012. The most risky country for every sub-indexes (indicators) is different: while the Ukraine is the most risky for current account, Turkey is for the private sector loan growth and Venezuela is for the foreign debt to reserves ratio.

This index was re-measured by using 2014 data. According to the capital freeze index in 2014, Venezuela was declared as the most risky country. According to 2014 index results: Venezuela, among the emerging 26 countries, is considered to be the most vulnerable economy with the overall risk score of 228 (current account risk score is 28, private sector loan growth risk score is
100 and foreign debt to reserves ratio risk score is 100). Venezuela is followed by Turkey (overall risk score is 219, while current account risk score is 78, private sector loan growth risk score is 80 and foreign debt to reserves ratio risk score is 61), Ukraine (overall risk score is 170), Indonesia (overall risk score is 160) and Algeria (overall risk score is 137). These 5 countries can be also called “Fragile 5” in 2014. While the Turkey is the most risky for the current account, Venezuela is for the private sector loan growth and Ukraine is for the foreign debt to reserves ratio (The Economist, 2015).

As described above, although there are different countries in different periods in the “Fragile 5” lists, Brazil, India, Indonesia, S. Africa and Turkey are the most seen emerging economies in the lists. As seen in Table 4, these emerging countries had different performance for some macroeconomic indicators leaving these countries vulnerable. These countries are also more fragile in case of risk abrupt capital stop.

Table 4: Some Macroeconomic Indicators of Fragile 5 Countries for the Periods of 1980-2002 and 2003-2016

<table>
<thead>
<tr>
<th>Countries</th>
<th>Growth (%)</th>
<th>Inflation (%)</th>
<th>Unemployment (%)</th>
<th>Budget Balance (% of GNP)</th>
<th>Public Debt (% of GNP)</th>
<th>Current Account Balance (% of GNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989-2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>2,1</td>
<td>70,1</td>
<td>6,3</td>
<td>-4,9</td>
<td>71,5</td>
<td>-1,9</td>
</tr>
<tr>
<td>India</td>
<td>5,4</td>
<td>8,0</td>
<td></td>
<td>-8,3</td>
<td>73,3</td>
<td>-0,9</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5,0</td>
<td>12,8</td>
<td>5,0</td>
<td>-0,7</td>
<td>74,5</td>
<td>0,1</td>
</tr>
<tr>
<td>S.Africa</td>
<td>1,9</td>
<td>9,6</td>
<td>22,0</td>
<td>-1,2</td>
<td>40,1</td>
<td>0,2</td>
</tr>
<tr>
<td>Turkey</td>
<td>3,9</td>
<td>70,0</td>
<td>7,5</td>
<td>-10,7</td>
<td>66,8</td>
<td>-0,6</td>
</tr>
<tr>
<td>2003-2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>2,5</td>
<td>6,7</td>
<td>9,2</td>
<td>-4,2</td>
<td>66,3</td>
<td>-1,4</td>
</tr>
<tr>
<td>India</td>
<td>7,7</td>
<td>6,9</td>
<td></td>
<td>-7,8</td>
<td>73,5</td>
<td>-1,7</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5,6</td>
<td>6,8</td>
<td>7,9</td>
<td>-1,1</td>
<td>32,1</td>
<td>0,0</td>
</tr>
<tr>
<td>S.Africa</td>
<td>2,8</td>
<td>5,6</td>
<td>24,8</td>
<td>-2,4</td>
<td>37,4</td>
<td>-3,8</td>
</tr>
<tr>
<td>Turkey</td>
<td>6,1</td>
<td>9,0</td>
<td>9,9</td>
<td>-3,1</td>
<td>40,4</td>
<td>-5,2</td>
</tr>
</tbody>
</table>

Source: Eğilmez, 2018:223

5. CONCLUSION

International capital movements and financial liberalization, which gained momentum with the collapse of the Bretton Woods system in the 1970s, provided a different dimension and increased the pace of globalization. Particularly, the volume and fluidity in the short-term speculative capital movements, also known as hot money, increased beyond the international goods and services flows. While hot money movements have reduced the resource requirement of developing countries, it has led to macroeconomic instability with the formation and/or deepening of financial and economic crises.

Developing countries need foreign capital inflows to finance the current account deficits and growth. But, the sudden stop of these inflows due to internal or external shocks creates serious economic vulnerabilities in the economies. While developing countries feel that they need to allow capital inflow especially as hot money for many positive factors, but at the same time they face the risk of a rapid national income collapse in case of the sudden escape (capital outflow) or sudden stop of these funds. Empirical studies have shown that these sudden stops in capital flows are more common in developing countries.
“Capital Freeze Index” measures the fragility of the national economies against the risks that would arise when a sudden stop of hot money inflows occurs by using the indicators of current account balance, private sector loan growth and foreign debt to reserves ratio. Although there are different countries in different periods in the “Fragile 5” lists, Brazil, India, Indonesia, S. Africa and Turkey are the most seen emerging economies in the lists.

The Turkish economy has become more open and responsive to global developments after the liberalization process started in 1980s. It has become more dependent on short-term capital inflows to finance its chronic current account deficit problem. Recent developments in the world economy have already increased volatility in many developing countries including Turkey through trade and financial channels. Turkish economy has become more fragile due to the external factors, in particular free movements for short term capital flows. While, large-volume of capital inflows leads to rapid growth, large capital outflows result in a contraction in the economies. Developing countries including Turkey which have serious economic vulnerabilities should complete their transformation process to have stronger economies and to response to the economic crises more successfully. This transformation and their success will depend on their government’s adjustment of the structural reforms in line with the changes in the world economic situation.

REFERENCES


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THE POWER OF RATING AGENCIES UNDER ACTOR - SYSTEMS DYNAMICS FRAMEWORK

Vahit Ferhan BENLI

Introduction

“We live again in a two-superpower world. There is the U.S. and there is Moody’s. The U.S. can destroy a country by levelling it with bombs: Moody’s can destroy a country by downgrading its bonds”. Thomas L. Friedman, New York Times, 1995.

This research aims to dissolve the ambiguity about the power of credit rating agencies (CRAs) within the context of the global financial architecture. Our goal is to shed light on the various players in the “ratings-game” within their role inside this architecture and dissolve their modi operandi in this financial power game (Eichengreen, 1999, p. 22). Whether a country meets ex-ante conditionality, should be known in advance, before the country knocks the doors of IMF Flexible Credit Lines or the European Central Bank’s Overnight Funding Facilities (OMT). The relevant supranationals should be aware of the situation, whether a country is asking for financial support is fulfilling the ex-ante conditionality principles (Missale, 2104, p. 42). The fulfilment condition of these criteria in advance makes those institutions dependent on the greater cooperation with the CRAs. The CRAs derive their power from the operations that are camouflaged more effectively than in these higher-profile institutions and are therefore even more deserving attention for research (Sinclair, 2005, p. 175).

On the other hand, if IMF decides for crafting the inclusion of a private funding alternative for crisis resolution in a country, market participant decisions and actions find inroad to the capital markets in all over the world. As the Fund has also limited number of funding sources to sustain investor confidence for the country in financial distress, the fund also relies more heavily on continuing the meeting of performance criteria for the vulnerable country. The first point to note, in this respect, is the central role played by the credit rating agencies in providing evidence about the financial and economic performance of the governments, which help to the controlling of accessibility to the sovereign bond markets. In this regard, the long-term bond markets play crucial role in refinancing and honouring the debts of governments that begun to act as like a “global supra-government” (Roos, 2019, p. 228). Yet, this very basic description raises the question, “who are the credit rating agencies that are incorporated into the accounts of global governance, like IMF or the World Bank and do possess a “non-state authority” to shape and reshape the financial system in the relevant country (ibid, p. 175).

Rating agencies, as being identified by the U.S Congress- and the Securities and Exchange Commission (SEC) as the “gate keepers of the U.S capital markets”, play very significant role in influencing the way, how international capital movements take place between various financial systems. In the past three decades, credit rating agencies have had significant influence on the terms on which developing countries can tap international capital markets (Tennant, D.F./Tracey, M.R. 2016, p.2). Contemporarily, it is virtually impossible to raise funds at lowest funding cost as possible without being rated from top two of the top three global rating
agencies such as Moody’s, Standart and Poor’s and Fitch from the global capital markets. As gatekeepers to the global capital markets their downgrades or upgrades give important signals to the players inside the financial arenas. Their historical role in influencing the markets and players goes back to the late 19th century. However, their influence in the last three decades on financial and capital markets has become bolder since August the 15th, 1971, when President Richard Nixon ordered to sustain the conversion of USD to gold. With the suspension of Bretton Woods agreement, the faith of the world of international finance was changed also forever (Eatwell, J. and Taylor, L. 2000, p.1). The “white plan” which was orchestrated by the famous US economist Harry Dexter White against the proposals of J.M. Keynes by the year 1944 ended up completely with the collapse of the Bretton Woods system as of 1974 (Wolf 2014, 14). The postwar international monetary system, which was based on the “fixed exchange rate around the U.S Dollar” had enabled Washington to replace City of London as the new financial center of the world, while taken a full control on the international capital movements. This strategic move also enabled the U.S economy to protect their industries from currency fluctuations for the next thirty years by using U.S Dollar as vehicle currency within the world trade and finance. This long-term, fundamental change in the financial setting of the international monetary system proved to be the “redefinition of legitimacy in designing the international economic system” and a significant shift in the balance of power towards U.S global interests (Kissenger 2014, 365). The U.S answer to the question of legitimacy was inherent in reconstruction of a \textit{market based financial architecture}, a system that would enable a market-oriented funding capabilities to the U.S financial institutions and corporates who would and should go global under heavily regulated and squeezed domestic U.S bond markets. Such a strategy would require an adherence to the market principles, transparent information highways, sound banking, competition and lower market entry and exit barriers for the global players (IMF and the World Bank 2001, p.50).

Within the milieu of this market minded framework, the U.S authorities wanted to open the national economies to global competition where an interlinked, market-oriented global financial architecture would also serve to the global financial stability. Unfortunately, this overenthusiastic and ambitious strategy resulted in multiple market failures almost in every continent of the world. According to Kissenger, who was the mastermind of the global American financial supremacy, “the dynamics of the economic globalization within the borders of individual economic and financial frontiers of several countries are “punctuated” by periodic financial crisis with different intensities in Latin America in the 1980s, in Asia in 1997, in Russia in 1998, in United States in 2007 and in Europe after 2010”. Though each crisis followed different patterns, their common feature has been speculation and systemic underappreciation of risk (ibid, 369). As we will be elaborating in more detail the importance of risk surveillance on the side of the Bretton Woods institutions, the “surveillance of risk” on the part of IMF was even a deficient issue which should have been much more taken seriously before and during the global crisis of 2007. This deficiency in assessing risks of sovereign borrowers is meant to be compensated by the sophisticated analysis and rating models of the credit rating agencies. The IMF as the standard setter for data dissemination would also rely on the relevant “self-organizing private sector bodies to carry out the compliance exercise itself, where the self-organizing committee is composed of national regulators, the rating function could be privatised. It could be spun-off to commercial concerns such as Fitch-IBCA with expertise in the relevant areas (Eichengreen 1999, p. 34). In this regard, Eichengreen is of the opinion why the Fund should not start with a similar strategy with respect to rating country compliance with standards of IMF. So it would not be a very big surprise to see the big three CRAs in providing “ratings” for the compliance of the Article IV surveillance processes for its members in the very near future. Henry Kaufman is also defending a supra-regulator who would provide public ratings fo the credit quality of the market participants under its authority and the IMF would also similarly provide ratings of the economic and financial strength of its members, where those ratings would be publicly available (Kaufman 1998 cited in Eichengreen 1999, p. 126). In this regard, the CRAs get a functional and positional power from the
supranational institutions such as IMF and the World Bank, which see the CRAs as “other private sources of positive market feedback” and work closely in arms-length dimensions together.

The Eurobond Market as Provider of Legitimacy for Supreme Financial Power

As said above, the issue with “legitimacy for being the supreme power of the financial architecture” was solved within the borders of “market discipline” by the U.S authorities. The knowledge of the existence of huge supply of offshore U.S dollar liquidity alone has assured the dollar its continued role as dominant currency of issue in the Eurobond market. Being consecrated as an international reserve asset, the dollar reserves of “communist countries such as China and Soviet Union” served very well to the establishment of the Eurobond markets in “offshore accounts” outside the U.S such as London, Frankfurt, Zürich or Paris. The huge supply of offshore U.S dollar liquidity has enabled the green buck with its new designation as “Eurodollar” to position itself as the main vehicle currency of the forthcoming Eurobond market by the early 1960s. In 1963, the U.S government under President Kennedy took decisions to halt the capital outflow from the country by initiating the “interest equalization tax - IET” and by restricting directly the multinational U.S companies to fund themselves from the foreign capital markets if they want to go global by investing in foreign countries (Smith, Walter, Delong2012, p. 75). This prohibitive action of the U.S Treasury succeeded in discouraging U.S investors from buying foreign securities and this action was to proved to be a catalyst for the emergence of the Eurobond market. The IET was further strengthen by the obligatory actions for U.S companies to fund their overseas investments from the other financial markets outside the U.S financial territory also gave substantial boot to the Eurobond issuance (Clarke, N. 1993, p. xxi). The enactment of capital controls by U.S authorities between 1964-1973 combined with a second massive Eurodeposit inflow in 1973-74 “recycled” from trade surpluses of OPEC (Organisation of Petroleum Exporting Countries) proven to be a catalyst for the emergence of the Eurobond market, where a homogenous perception of the borrower’s credit standing and debt repayment capabilities are necessary and fundamental issues in both domestic and Eurobond markets. So it is the first and very much principle feature of the Issuers in the Eurobond market that they should have substantial business operations and sufficient credit standing to permit of unsecured borrowing and a visibility among international investors. These evaluations are conducted by independent rating agencies since almost a century (ibid, p.15) and this also is one of the raisons d’être of the CRAs.

Issuer Ratings as the Driver of Market Characteristics in Eurobond Market and the Privitisation of Risks

Since the abondonement of pegged/fixed exchange rates in 1974, the issuers in the Eurobond market are confronted with significant fluctuations in “price risks” consisting of forex- and interest rates jumps. Under the Bretton Woods system, foreign exchange risk was borne by the public sector and the governmental monetary authorithies of the G10 countries. When that system collapsed, risk was privitised (Eatwell, J. and Taylor, L. 2000, p.2). Risk privatization challenged the global financial system and their players tremendously. With the major price risks transferred onto the players rather than souvereigns, major restrucurings of financial institutions took place to balance the increasing volatility and credit risks on the financial markets. To face and mitigate those risks and even to exloit the opportunities provided in the Euromarkets, big international banks start going global either by establishing new entities or by accessing the markets via syndicated lending facilities with big deal table blockers. The period 1969-1972 was a period where the originators in the market were searching strong partners with stong placement power to dominate the market. Strong partnerships in syndicated deals were also meant better-than-market terms, advancement in liquidity for the bonds in the secondary markets and better issuer-ratings for successful launch of the deal in the market. Therefore, the credibility and ratings of the deal originators were of utmost importance for the success in Eurobond markets. Enrico Braggioi, who was born in Turkey and trained as a
banker in U.S and Great Britain was one of the first “deal team heads” of the Eurobond markets and the former managing director of Banca CommercialeItaliana, emphasized the importance of the rating with the following statements. “The period from 1974 to 1978 was a great lesson for everybody. The most difficult thing for Italian banks during the last twenty years has been to be an international banker when your home country at risk, with a weak economy and a weak political situation. It is a challenge, when you try to have a better rating than your country, even though creditors can recognize what you do, that is difficult” (Braggiotti, E. 1988, pp. 685-691). In this regard it is really worth to mention the memoirs of famous president of UBS (Union Bank of Switzerland) about those days. “We saw that when the Euromarket opened, after the interest equalization tax in the United States, that would be one of the main markets of the world and that be really international a bank had to be as strong as possible in this place… Yes, this has been a fascinating time. And it’s a challenge, too because there are risks; you don’t know if you really will finally perform in this international market, which is very competitive. And you invest quite a part of your earnings in this buildup. But we are optimistic” (Senn, N. 1988, pp 625-632). The awareness of risks resulted in strong alliances between the syndicate leaders who would target attainment of higher ratings even than their sovereign grades.

On the issuer side, the market was tapped by the full range of international borrowers. The most highly rated but least numerous categories of the issuer are the supranational and regional development bodies such as World Bank. In terms of credit quality sovereign borrowers, international banks and blue chip global corporates with AAA ratings were among the primary visitors of the market basically in located in London. They are very much “visible” to the investors through their AAA ratings and this visibility is promoted through periodic market coverage reports, market comments and issue ratings, which is essential attribute of an issuer in a public market (Clarke, N. 1993, p.128). Investors generally look for strong credit and rely on credit ratings. As a yardstick, the investors and creditors would rely on the assigned long-term and short-term rating scales provided by the rating agencies. Each credit standing of a borrower is designated by the appropriate alphanumeric classifier. To make a case in point, e.g. Moody’s appends numerical modifiers 1, 2, and 3 to each generic rating classification from Aa through Caa. The modifier 1 indicates that the obligation ranks in the higher end of its generic rating category; the modifier 2 indicates a mid-range ranking; and the modifier 3 indicates a ranking in the lower end of that generic rating category. Additionally, a “(hyb)” indicator is appended to all ratings of hybrid securities issued by banks, insurers, finance companies, and securities firms (Moody’s 2018, p.6).

Research Design

Toward a New Framework of Actor – System Dynamics (ASD) Theory

Having identified the nuances and sources of power and authorithy that heighten the significans of rating agencies, our main research subject will be consisting of a unique analysis of questions about “power” attached to the credit rating agencies, which lies in the hearth of the souverein debt financing. In this sense, the research design of this paper essentially comprises three sections. The first section focuses on the identification of rating agencies as “powerful agents” and the concept of power within the context of rating remains an ambiguous one. Therefore, we will be focusing more to the key features of the rating agencies power primarily and the we will be differentiating as “structural financial power “and as “meta-power”, namely the “power over power” (Burns, p. 112). They are the instances of non-state power in the globalised world. Due to the complexity of the subject matter, the second section needs a new methodology to resolve the authoritative codes of CRAs. The new theoretical framework, “Actor-System Dynamics (ASD) theory is used to analysed a spectrum of key rating based processes such as downgrade, default, outlook and rating migrations. Within the borders of the ASD framework, a third category of research question deals with the CRAs as essential agents that may use information to force, to structure and restructure of financial systems. Very few CRAs such as Moody’s and Standard &Poor’s enjoy an extended status of
government-certified NRSROs (Nationally recognized statistical rating organizations) since 1975 (Kruck, p. 39), which may provide them regulatory powers as well. CRAs may exercise their authority in several ways indeed. Hence, in case a specific network structure is formed, then it is possible to identify and predict how rating agencies influence the entire system and interact with other systemic agents. The same idea could be used in reverse direction as well. For instance, in case a valid network structure is established, the power of the rating agencies could be calculated in advance based on the context and/or market interactions among the players and the decision-makers (Easley, D. and Kleinberg, J., 2010, p.77). Having identified the Actor-System dynamics of CRAs, a third category of research question will be clarifying the problem of bias with respect to the decisions of CRAs. Finally, the implementation of ASD theory will take place in recent downgrade of sovereign rating of Turkey.

A Word on Methodology
The research methodology of this paper is based on a qualitative methodological approach where the ASD theory takes a centered positon. ASD’s minimal set of concepts are used for the analysis of CRAs and a formal theoretical ASD model is developed within the context of Turkish financial system. As power is an ambiguous term to operationalise, the real world problems are analysed on conceptual basis omitting the bird’s eye view of regression analysis. The project combines structural power analysis with a case study to identify the exact structures, systems, actors and their interactions under their constraints resulting in concrete outcomes representative in a financial system.

Key Features of ASD Framework
ASD theory’s point of departure is that the power of a rating agency and their control processes can be usefully defined and modelled in terms of social action theory. Any financial system in the world worth of exercising rating upon it, is managed and driven by the Financial Actors or Financial Agents, who can make decisions and operate inside the system purposefully. Actors organize and process information, make decisions and act purposefully. The financial actors act and interact in such a way that their interests are defined under specific settings and processes. Their interaction capabilities are constrained in definable contexts or settings. There are also institutions that directly or indirectly structure and regulate financial processes. Further material and technological factors with exogeneous and endogenous factors may also constrain certain actions and interactions of the actors. The interactions, decisions and actions among the actors may result in concrete outcomes with effects of purposeful action. Power is understood as the capability of one actor of class of actors to mobilise resources and generate control activities among other actors and spheres of the system (Burns, p. 113). The end effect may cause intended or unintended restructuring upon the system and the human actions. The figure below represents these elements of the ASD framework.
The Definition of Power in the Context of Rating

Our point of departure, namely the concept of power is introduced in a completely new framework which distinguishes different types of power. Power in the context of rating is understood as a very much capable actor of class of actors which may derive their influence and power from their positioning at the center of a financial system labelled as ‘gate keepers’ but more from their influence to mobilise financial resources to other actors in certain spheres of the global financial system through the usage of their decisions and informations by the market participants (Burn, 1985, p. 113 and Gaillard, 2012, p. 184). The range of influence may vary from politicians to investors over creditors and issuers up to regulators. All of these actors may be influenced by the decisions of the rating agencies on the basis of funding cost, lower risk adjusted return and on lower solvency requirements basis. The power of rating agencies does not imply any coercion as functional agents of rational market actors, but merely their power is based in generation of a ‘consent’ vis-à-vis other actors about the financial faith of the ‘target actor’ (Sinclair, 2005, p. 176). The existence of complex and diversified constellation of agents in the financial system routes us to differentiate between three different modes of power (Burns, 1985, pp. 124-125):

1. **Orientative Power or Influence over Information Processing:** This power is based on the information that credit rating agency can structure data, define a situation of the target actor, model the risk constellation of an entity or create perceptions and beliefs about action conditions over a sovereign borrower.

2. **Power of Control Potentiality over Evaluation Processes:** CRA has knowledge of financial norms and can specify appropriate evaluations and specify goals and econo-financial preferences in appropriate settings (financial system and corporates).

3. **Sanctioning Power through Coercion or Remuneration?** CRA has the possibility to deprive the sovereign of some valuable resources through the downgrade to junk level. It has or it can control over means of destruction. The CRA may reward the sovereign by upgrading the country to investment grade from speculative grade.

4. **Constraint Power:** CRA has the possibility to structure or regulate action resources, or exercise limiting or determining practices about their feasibility sets.

5. **Meta-Power:** The CRA has the capability to shape and reshape the bases of power; it is also called the power over power. Meta-power is also called as relational control power that is
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controling over social relationships and structures. Its exercise has more long-term consequences.
As described above, the CRA might use power towards its counter parties in different forms.
The nature of the power usage will be the subject of section 2.

The Nature of Power and Control among the Rating Agencies

Credit Rating Agencies as Dynamic Agents of Structural Power
Ratings are forward-looking opinions of the relative credit risks of financial obligations issued
by non-financial corporates, financial institutions, structured finance vehicles, project finance
vehicles, and public sector entities. Long-term ratings are assigned to issuers or obligations with
an original maturity of one year or more and reflect both on the likelihood of a default on
contractually promised payments and the expected financial loss suffered in the event of default
(Altman 2011, p. 443). Short-term ratings are assigned to obligations with an original maturity
of thirteen months or less and reflect the likelihood of a default on contractually promised
payments. The credit rating agencies are commercially private entities, which can generate
conclusions about the creditworthiness of governments within their sovereignty and about
the debt repayment capacities of corporate obligors to repay their debt on time and at the
agreed amount. The notion of measurement of default is on the forefront of rating processes.
Recently, besides analysis for determination of default probabilities of the rating entities,
special ratings about the loss given default (LGD) on different financial facilities are also
provided by the rating (Gaillard, N. 2102, p. 13). The universe of rating process is composed of
by the following approaches (Moody’s Rating Process, 2013).

Fig. 2. The Universe of Rating Process of Moody’s

As depicted by the abovediagramme, the rating process entails multi dimensional information
sources, methodologies, rating systems and networks to make conclusions about the final
judgements on the “future ability and willingness of an issuer and/or governments to make
timely payments of principle and interest on a security over the life of the instrument. The
CRAs outputs are used to guide the investment and lending decisions of the agents. As
indicated before they also serve to the market surveillance mechanisms of various institutions
including the IMF. Ratings have been incorporated into government regulation since 1931 and
in 1975, the SEC further provided them a special quasi governmental status called NRSRO –
Nationally recognised statistical rating organisations (Sinclair, p.42). The latest and most
significant regulatory move came from the BSBC (Basel Committee for Banking Supervision)
in 2004, where the ratings are accepted as an indispensable part of the regulatory capital
adequacy calculations under Basel II standards.
Implementing Actor-Oriented Systems Analysis on Moody’s Rating Agency: Case - Sovereign Rating of Turkey

Downgrade as Systemic Form of Power
The above mentioned vast amount of tools and analytical methodologies combined with risk modelling advancements give Moody’s its epistemic authority to define a transmission pathway for the delivery of policy and managerial orthodoxy to the sovereign governments (Sinclair, p. 177). The most conflictual and dramatic impact of the recent Moody’s rating report is on the assessment of a balance of payment crisis in its recent rating report for Turkey. This significant actor takes the decision to downgrade the Government of Turkey’s long-term issuer rating to B1 from Ba3 level and keeps its negative outlook (Moody’s Rating Action, 2019, p.1). Moody’s asserts its ‘orientative power of influence’ by stating that, “Today’s downgrade reflects Moody’s view that the risk of a balance of payment crisis continues to rise, and with it the risk of a government default”.

Designation of Default as Indicator of Sanctioning Power
With the contextualisation of the ‘default’ argument above, Moody’s anticipation is motivated by generating consent about the vulnerability of the country to an ‘acute and highly disruptive balance of payment crisis that ultimately would significantly constrain the capacity and perhaps the “visible willingness of the government to service its debt is more aligned single B rating” (Moody’s, ibid, p. 1). The statement hints more about the exercise of a more coercive power at a degree of ‘punishment’. As the probability of default due to the imbalance of payment of the country materializes as Moody’s stated, this commentary may weaken the investor and creditor confidences severely and surely with the increasing fragility of the markets to shift towards ‘bankruptcy’ of the country”.

Exercising Constraint Power
Particular references to the institutional strength and policy effectiveness on the side of central bank of Turkey (CBT) are assessed as “Low” (Moody’s Credit Opinion, 2019, p. 3). “In our view, policy predictability, the effectiveness of economic policymaking and the rule of law – important aspects of institutional strength – have steadily eroded in recent years. Intense political pressure exerted on key regulatory institutions such as the central bank has persistently undermined their credibility”. With the critical assessment of the institutional demence, Moody’s analyststry to constraint the debt service capacity of major financial institutions in Turkey. By using a mental technology to deprive the reputation of the major financial institutions in Turkey, Moody’s is trying to give a new direction to the sovereign debt financing markets to constrain there financing capabilities of the financial institutions.

Power for Control Potentiality
Moody’s report is fortified with poltical norm and value systems backed by the indoctrination of NATO principles. Moody’s can in this sense specify appropriate goals and political evaluations that has nothing to do with the creditworthiness of Turkish government. By providing comments on the political and military developments of the country, the powerfull agent is trying to control the military capabilities of Turkey. This is stated by Moody’s as “External pressures are exacerbated by the ongoing disagreement between Turkey and the United States, this time relating to Turkey's purchase of the S-400 missile system from Russia. Thesanctions which the US Congress will consider if the purchase goes ahead, while largely undefined to date cast a further shadow over Turkey's economy and financial system”. No other wording would spell the power for control potentiality better than this verse in the sovereign rating report of Moody’s for Turkey.
Conclusion
Despite all critics about the wrongdoings and falsified judgements of the credit rating agencies, they are powerful agents of the global financial architecture. They have still massive control and structuring capabilities among the financial systems and the players on those markets. Based on the analysis of the ASD theory, they can exercise various types of power on souvereigns with severe intended and unintended consequences on the agents and the systems. Through their coercive methods they might pose real challenges to the financial systems especially to those under severe balance of payment distorted countries. CRAs are the meta-powers of the global financial architecture.

References