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**ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE**

# THE RELATIONSHIP BETWEEN UNEMPLOYMENT, EMPLOYMENT EXPECTATIONS AND HAPPINESS IN TURKEY FOR THE YEARS: 2003-2018

## TÜRKİYE'DE İŞSİZLİK, GELECEK YIL ÇALIŞMA HAYATI BEKLENTİLERİ VE MUTLULUK İLİŞKİSİ: 2003-2018

**Melodi Buket KANLIOĞLU***
**Devrim DUMLUDAĞ****

**Abstract**

This study analyses the relationship between employment/unemployment, expectations, and happiness in Turkey by using the Life Satisfaction Survey conducted regularly by the Turkish Statistical Institute (TUIK) since 2003. In the study, happiness of unemployed individuals comprising of different people between 2003-2018 have been analysed through a comparison of those in employment versus those outside of the workforce. In addition to the relationship between unemployment and happiness; the entire sample between the ages of 18-64 and the unemployed were compared in terms of their employment expectations for the following year for the country as well as their personal employment expectations and happiness. The results of the study indicate that being unemployed is correlated with negative life satisfaction, and there is a negative correlation with happiness and unemployment. As a result of the study, it is determined that there is a difference between those who live in the region with a high unemployment rate and those who live in the region with a low unemployment rate. Accordingly, the life satisfaction of an unemployed person living in an area with a high unemployment rate is less negatively affected than an unemployed person living in an area with a low unemployment rate.
**Keywords:** Employment Expectations, Happiness, Subjective Well-Being, Turkey, Unemployment
**JEL Classification:** I30, I31, J101

**Öz**

Bu çalışma, Türkiye İstatistik Kurumu (TÜİK) tarafından 2003 yılından bu yana düzenli olarak yapılan Yaşam Memnuniyeti Anketi kullanılarak Türkiye'de istihdam/işsizlik, beklenti ve mutluluk arasındaki ilişkiyi analiz etmektedir. Çalışmada, 2003-2018 yılları arasında farklı kişilerden oluşan işsiz bireylerin mutlulukları, istihdamda olanlar ve işgücü dışında olan bireyler ile karşılaştırılarak analiz edilmiştir. İşsizlik – mutluluk ilişkisinin yanı sıra; 18-64 yaş örneklemin tamamı ile sadece işsizlerin gelecek

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yıl ülke ve kişisel çalışma beklentileri analiz edilmiştir.Çalışmanın sonuçları işsiz olmanın olumsuz yaşam memnuniyeti ile ilişkili olduğunu, mutluluk ve işsizlik ile negatif bir korelasyon olduğunu göstermektedir. İşsizlik oranının yüksek olduğu bölgelerde yaşayan işsizlerin görece daha az olumsuz etkilendiği, iş bulma konusunda hem birey bazında hem de ülke bazından gelecek yıla dair olumlu beklentiye sahip olmak mutlulukla pozitif korelasyona sahipken, olumsuz beklentilerin ise negatif korelasyona sahip olduğu gösterilmektedir.
**Anahtar Kelimeler:** Istihdam Beklentileri, Mutluluk, Öznel Iyi Oluş, Türkiye, Işsizlik
**JEL Sınıflandırması:** I30, I31, J101

## Introduction

Unemployment is one of the most significant issues that both developing and developed countries face in the first decades of the twenty first century. With the increasing globalization and automation, there have been several changes in the capital structure. Additionally, the increase in workforce because of the increases in populations over time has also led to certain problems in creating employment. Apart from these developments, crises are also a factor that causes increases in unemployment. [1]

Failure of a country to include its workforce in employment will have negative impact both in micro and macro dimensions. By affecting people's income situations, unemployment lowers their standards of living. Being employed provides the individual with income, socialisation, and a positive well-being. Being unemployed, on the other hand, brings about financial and emotional losses both for the individual and for the state.

One of the consequences of unemployment is its negative impact on people's happiness. While being employed generally has a positive influence on the individual's happiness, being unemployed has a negative impact on it. Living in regions with high unemployment, the gender of the unemployed person, personal working life and the expectations relating to employment in the country, also have different effects on happiness (Clark and Oswald, 1994; Clark 2003).

Turkey, as a developing economy, has been struggling with relatively high unemployment rates for many years compared to other developing and developed countries. The unemployment rate which was 10.50% in 2003 according to TUIK data, increased to 11.00% in 2008 with the global crisis and to 14.00% in 2009. Also, unemployment was 11.00% in 2018.

This study aims to examine the relationship between happiness and city-based unemployment rates, personal expectations about employment and employment expectations in Turkey between 2003 and 2018. We used the dataset for the years 2003-2018 of the Life Satisfaction Survey of the Turkish Statistical Institute.

1 For example, according to data from the World Bank, the rate of unemployment in the world a result of the global crisis in 2008 was 5.35%, in 2009, while the rate of unemployment was 7.20% in the European Union in the year when the crisis hit, it rose to 9.11% in 2009. And in the United States, the rate of unemployment, which was 5.8% in 2008, rose to 9.28% in 2009, and while it was 3.70% in 2019, this rate is expected to rise to 8.90% in 2020 due to the Covid-19 pandemic (IMF, 2020).

The study reveals that there is a negative relationship between unemployment and happiness (while being employed is correlated with positive life satisfaction). Besides, we find that the life satisfaction of unemployed people living in an area with a high unemployment rate is less affected by this situation. Similarly, having positive expectations about employment both on a personal basis and on the basis of the country in general positively influence the life satisfaction of the unemployed while having negative expectations in this regard has a negative influence on life satisfaction.

Following the introduction section, the first part of the study consists of the literature review on unemployment and happiness relationship and the third part consists of the descriptive analysis of the variables used in the study. The fourth part of the study will give information regarding the description of the variables, methodology, findings, and econometric results, and the fifth part will consist of the conclusion.

## 2. Literature Review

Unemployment rate is a significant macro-economic indicator of the individual and the society in which they live. Besides, the unemployment rate is a determinant, which is used in happiness research. Unemployment is defined as people who seek jobs, and who never worked during the reference week (Stewar, 1950). Being unemployed has both financial and psychological effects on the individual.

Some of the researchers used various panel datasets (*British Household Panel Study-GHQ Survey, German Socio-Economic Panel (GSOEP), Household Income and Labour Dynamics Survey of Australia (HILDA), Longitudinal Internet Studies for the Social sciences (LISS) etc.*) to analyse the relationship between unemployment and happiness (Clark and Oswald 1994; Winkelmann and Winkelmann 1995; Clark 2003; Carrol 2005; Winkelmann 2009; Kassenboehmer and DeNew 2009; Van der Meer and Wielers 2016). Studies in general indicate that there is a negative correlation between unemployment and life satisfaction. Some studies stated that negative effects of unemployment are less pronounced in areas with high unemployment rates (Clark and Oswald 1994; Clark 2003). On the other hands, there are also studies showing that financial costs of unemployment are higher than psychological ones, that unemployment cause more harm for men than for women, that self-esteem is affected by unemployment and that subjective well-being is affected by self-esteem and unemployment (Winkelmann and Winkellman 1995; Clark 2003; Van der Meer and Wielers 2016).

Some of the studies that we came across in the literature were based on cross-sectional data (Gallie and Russell 1998; Ahn *et al.* 2004; Vatter 2012; Ohtake 2012; Wulfgramm 2014, Stam *et al.* 2015; Chen and Hou 2018). The findings of studies conducted using cross-sectional data can be explained as: in communities in which women constitute the majority of the unemployed people, the severity of unemployment can be perceived to be low by the community, in communities in which the young constitute the majority, the young are negatively impacted to a lesser degree;

the impact of unemployment on happiness can vary between countries; it is more effective to create jobs than to distribute the welfare among the unemployed in order to increase happiness, and being jobless, experiencing unemployment and having a fear of unemployment are among the factors that decrease happiness. (Gallie and Russel 1998; Ahn *et al.* 2004; Ohtake 2012). Furthermore, the studies indicate that the life satisfaction of the unemployed is determined to a large extent by the labour market policies, and that social norms have little impact on unemployed individuals (Wulfgramm 2014).

There are few studies conducted on unemployment and happiness in Turkey. (See Aysan & Aysan 2017, Susanlı 2018, Kuzu et al., 2019). According to Aysan & Aysan (2017), on the other hand, using the European Quality of Life Survey (EQLS) in this study, find that unemployment reduces people's life satisfaction even if the financial situation and other individual characteristics are kept constant. Kuzu et al. (2019). Using the data of the Life Satisfaction Survey (LSS), they have been examined whether the demographic factors affecting the employment status of people in Turkey for 2015 were related to the happiness of individuals. In the study, it has been found that employment is related to happiness and gender, but also a significant difference was observed between happiness and gender. It has been stated that the relationship gender and unemployment is stronger in men compared to women. Susanlı (2018), who examined the relationship between unemployment and happiness using the LSS data of 2015, found a significant difference between happiness and gender. To include the expectations of the unemployed for working life next year and to make a detailed analysis according to the provinces for 2013 is the aim of this research.

Lastly, some t-time studies are also part of the the literature (Angeles 2010; Feather and O'Brien 1986; Andersen 2009). The findings of the studies in this category suggest that unemployed people feel less competent, more depressive and they tend to have lower life satisfaction, and that the negative impact experienced by people in the middle-income scale is higher (Feather and O'Brien 1986; Andersen 2009).

There are numerous studies in literature regarding expectations and life satisfaction (Gao and Smyth 2011; Michalos 1980; Møller 1996 *etc.*). We have also come across studies, which included a question regarding expectations about employment for the following year (De Juan ve Mochón 2014; Caner 2015). While having better expectations for the following year or for 5 years later is generally linked to positive life satisfaction; having worse expectations has a negative link with life satisfaction. This also goes for expectations regarding working life. We believe that this study differentiates itself from other studies that included expectations regarding following year/years – life satisfaction as it includes questions about expectations toward employment for the country for the following year and expectations regarding the personal employment for the following year.

## 3. Descriptive Statistics

TUIK's the Life Satisfaction Survey for years 2003-2018 was used in the study. TUIK uses a 5-point likert scale in these surveys. Since 10-point scales [2] are more common in happiness surveys around the world, the scale was adapted to a 0-10 scale during the descriptive analysis. Table 1 given below shows comparative average happiness levels and standard deviations of the unemployed people, employed people and also those outsides of the workforce as these people made up the majority of the sample for the survey, for the respective years.

**Table 1:** Happiness Average and Standard Deviation of the Unemployed, Employed and Those Outside of the Workforce for the Respective Years

| | Unemployed | | Employed | | Outside of the Workforce | |
|---|---|---|---|---|---|---|
| Years | Average Happiness | Standard Deviation | Average Happiness | Standard Deviation | Average Happiness | Standard Deviation |
| 2003 | 5.59 | 2.32 | 6.59 | 2.03 | 6.55 | 2.32 |
| 2008 | 5.07 | 2.38 | 6.19 | 2.19 | 6.26 | 2.38 |
| 2009 | 4.80 | 2.55 | 6.17 | 2.23 | 6.22 | 2.55 |
| 2010 | 5.62 | 2.40 | 6.47 | 2.08 | 6.42 | 2.40 |
| 2013 | 5.42 | 2.51 | 6.44 | 2.12 | 6.45 | 2.51 |
| 2018 | 5.35 | 2.50 | 6.10 | 2.11 | 6.35 | 2.50 |

As expected, average happiness of the unemployed is lower than the employed and those outside of the workforce. It is not unusual for those outside of the workforce to be happier than employed people as this group consists mostly of housewives and retirees. Table 2 and Table 3 represent the percentile distribution of the age group 18-64 for the question about their employment expectations for the country and their personal employment expectations for the following year. Accordingly, while we observe a decline in people who responded, "it will be better" for the question about employment expectations in the country, there seems to be an increase in those who responded, "it will be worse". On the other hand, we see an increase in people who said "it will be better" for the question about their personal employment compared to 2009 while the number of people who said "it will be worse" also increased.

**Table 2:** Employment Expectations for the Country in the Following Year for the Respective Years (%)

| It will be better | | It will remain unchanged | | It will be worse | | No idea | |
|---|---|---|---|---|---|---|---|
| Years | Percentage | Years | Percentage | Years | Percentage | Years | Percentage |
| 2003 | 28.7 | 2003 | 30.04 | 2003 | 25.5 | 2003 | 15.76 |
| 2008 | 8.79 | 2008 | 25.04 | 2008 | 53.33 | 2008 | 12.84 |
| 2009 | 12.14 | 2009 | 33.29 | 2009 | 37.12 | 2009 | 17.45 |
| 2010 | 23.47 | 2010 | 31.38 | 2010 | 24.38 | 2010 | 20.78 |
| 2013 | 29.38 | 2013 | 23.31 | 2013 | 23.52 | 2013 | 23.79 |
| 2018 | 17.59 | 2018 | 26.75 | 2018 | 45.11 | 2018 | 10.55 |

2 For detailed information about converting a 5-point likert scale into 10-point likert scale: https://worlddatabaseofhappiness.eur.nl/.

**Table 3:** Personal Employment Expectations for the Following Year for the Respective Years (%)

| It will be better | | It will remain unchanged | | It will be worse | | No idea | | Will not work | |
|---|---|---|---|---|---|---|---|---|---|
| Years | Percentage | Years | Percentage | Years | Percentage | Years | Percentage | Years | Percentage |
| 2009 | 11.83 | 2009 | 42.83 | 2009 | 9.01 | 2009 | 7.81 | 2009 | 29.11 |
| 2010 | 17.42 | 2010 | 38.07 | 2010 | 5.96 | 2010 | 7.67 | 2010 | 30.88 |
| 2013 | 19.28 | 2013 | 35.26 | 2013 | 6.04 | 2013 | 12.03 | 2013 | 27.4 |
| 2018 | 17.82 | 2018 | 43.32 | 2018 | 11.37 | 2018 | 4.64 | 2018 | 22.85 |

## 4. Methodology, Model, and the Econometric Findings

### 4.1. Typical Happiness Equation and Defining the Variables

In the literature the life satisfaction is modelled mostly and in its most basic form as follows:

$$Si=\alpha+\beta Xi+ei$$

$Si$, expresses life satisfaction of the participant and the Greek letters represent the parameters. X represents control variables such as age, gender, education status etc. $ei$ indicates the error term and $\alpha$ indicates the constant term; while the coefficients represent the variables that help determine the subjective well-being of each person. (Veenhoven & Dumludag, 2018).

The dataset used in the study of TUIK's the Life Satisfaction Survey for 2003-2018 is cross-sectional which means observation changes year to year. However, the same questions are not included in the question set every year. Due to the limitations and challenges of the dataset, it is not possible to use a single model for all the years in the dataset, and instead we had to use a pooled analysis as 2003-2008, 2009-2012,2013 and 2014-2018.

As the unemployed people, who constitute the main topic of the study, were asked the question about their "employment status" under a single question in the Life Satisfaction Survey until 2008, the data for 2003-2008 was estimated using a different regression. Employment status and reasons for being unemployed were asked as separate questions between 2009-2012, and for this period the group was analysed within itself. In 2013, the "city" variable was added to the dataset for the first time special to that year, which made it possible for a city-based analysis; hence, this year was estimated by itself. The period between 2014-2018 was analysed separately since the question regarding the employment status for this period was also asked under two separate questions and since place of residence was based on whether it was a municipality or not, rather than making a distinction based on rural-urban areas like it was for 2003-2008 or 2009-2012. Consequently, four separate pools were created as "2003-2008, 2009-2012, 2013 and 2014-2018". The dataset was analysed through "*OrdinaryLeast-Squares Method*" in the cross-sectional study and a dummy variable was employed in the model. The controls are provided in appendix table A2 such as gender, age, income group, educational background, employment expectations

(country and personal), marital status. The *STATA 14.2* package software was used to estimate the model.

### 4.2. Variables

Concepts such as employment, workforce and unemployment are some of the building blocks of economy. Turkish Statistical Institute divides the labour force of non-institutional population into two categories as employed and unemployed during the reference week. [3] On the other hand, the generally accepted unemployment definition in the world is: *"Individuals of 15 years of age or older who are outside of employment during the reference week, who have used at least one of the job search channels to seek employment in the last 4 weeks and who can start work within 2 weeks"* [4] are considered unemployed.

The comparative analysis included only the unemployed, the employed and those outside of the workforce due to limitations such as a dataset which did not contain the question relating to the effect that we wanted to analyse in a clear manner, variations in the questions and/or responses, and majority of the sample being made up of people outside of the workforce.

In the Life Satisfaction Survey by TUIK, the responses "*1-Extremely Happy, 2-Happy, 3-Average, 4 – Unhappy, 5-Extremely Unhappy*" given for the question "How Happy Are You When You Consider Your Life as a Whole?" has enabled us to measure happiness. The target population of the survey is individuals who are 18 years and older. In this study, *Least Square Method (LSM)* was used. "*STATA 14.2*" package software was used for the analysis. The life satisfaction question was integrated into the model as "*1-Extremely Unhappy, 2-Unhappy, 3-Average, 4-Happy, 5-Extremely Happy*".

In the model, while life satisfaction was designated as a dependent variable, independent variables included gender (1= Male, 2=Female), age (18-24, 25-34, 35-44, 45-54 and 55-64), income group (1,2,3,4,5,6), educational background (didn't graduate, primary school, high school and higher education), marital status (never married, married, divorced, deceased spouse), geographical location (rural, urban or city or municipality, not a municipality), employment expectations in the country for the following year (It will be better, It will be worse, It will remain unchanged, will not work).

The model also included dummy variables in order to measure factors and constant effects that cannot be observed. A robust check was performed in order to solve the heteroscedasticity problem born out of the structure of cross-sectional data. Due to the limitations and challenges of the dataset, it was not possible to use a single model for all the years in the dataset, and instead we had to use a pooled analysis. The descriptive of the study is presented in appendix Table A1.

3 For detailed information: TÜİK, https://www.tuik.gov.tr/.

4 For detailed information: TÜİK and International Labour Organization, https://www.tuik.gov.tr/ , https://www.ilo.org/global/lang—en/index.htm.

### 4.3. Econometric Findings

Using the Ordinary Least Squares (OLS) method in the model, primarily unemployment-life satisfaction analysis was performed using pooled cross-sectional data, life satisfaction analysis of expectations was done with the data from 2013 based on age groups and genders, and unemployment-life satisfaction analysis was performed for 2013 based on cities, after which a regression analysis was performed on the age group 18-64 as a whole and separately on the unemployed regarding their employment expectations and life satisfaction. A regression analysis was applied as a single model for questions about employment for the following year due to the low correlation between employment expectations about the country and personal employment expectations.

Table 4 shows the comparative life satisfaction of the unemployed and people outside of the workforce for years 2003-2008, 2009-2012, 2013 and 2014-2018. [5] There is a negative correlation between unemployment and happiness as expressed by the literature. This can be explained by the negative impact of being unemployed on a person's life satisfaction.

**Table 4:** Estimate Results of the Main Model for the Years 2003-2008, 2009-2012, 2013 and 2014-2018

| Dependent Variable | Regression 1: 2003-2008 | | Regression 2: 2009-2012 | | Regression 3: 2013 | | Regression 4: 2014-2018 | |
|---|---|---|---|---|---|---|---|---|
| Life satisfaction (1-5) | Coefficient | Robust S.E | Coefficient | Robust S.E | Coefficient | Robust S.E | Coefficient | Robust S.E |
| Employment Status | | | | | | | | |
| Unemployed | -0.314*** | (0.0261) | -0.337*** | (0.0327) | -0.313*** | (0.0123) | 0.312*** | (0.0233) |
| Outside of the workforce | 0.0506*** | (0.0122) | 0.0424* | (0.0168) | 0.0224*** | (0.00658) | 0.0208 | (0.0125) |
| Number of Observations | 25732 | | 19913 | | 126558 | | 34005 | |
| Adjusted $R^2$ | 0.102 | | 0.117 | | 0.097 | | 0.101 | |

Standard errors are given in parenthesis.

* p < 0.05, ** p < 0.01, *** p < 0.001 indicate levels of significance.

*Employed people have been taken as a point of reference.

**People outside of the workforce include housewives, students, retirees, people unable to work due to health reasons, rentiers etc.

*** The controls are mentioned in section 4.2 and provided in appendix table A2

Number of observations for the year 2013 is higher than all the other years (196.203). Due to the higher number of observations, sub-regressions were applied for age groups and gender

5 For detailed analysis please see; Kanlıoğlu, M.B., (2021). "Türkiye'de İstihdam-İşsizlik ve Mutluluk Arasındaki İlişkinin Analizi: 2003-2018". (Yayımlanmamış yüksek lisans tezi). Marmara Üniversitesi Sosyal Bilimler Enstitüsü İktisat Anabilim Dalı, İstanbul.

only for the year 2013. The impact of the personal employment expectations and employment expectations about the country for the following year on happiness were measured according to age groups and gender. Once again, the age group 18-64 was taken into consideration and people over the age of 65 were taken as missing values. People who replied, "Will remain unchanged" both for personal employment and for employment expectations for the country were taken as the reference group and those who replied "No idea" were taken as missing value. Accordingly, while positive happiness was observed in all age groups who said they expected to have better employment both personally and for the country for the following year, negative happiness was observed in those who said it will be worse. This was explained in literature stating that people who have positive expectations about employment are happier compared to those with negative expectations (De Juan and Mochón, 2014).

The proportion of those who replied to the question about personal employment expectations as "will not work" is insignificant for the age groups 35-44 and 45-54. On the other hand, while this situation leads to a negative life satisfaction only for the age group 55-64, it can be said to cause a positive life satisfaction for the age groups 18-24 and 25-34. Despite being considered to be the age group approaching retirement, not working in the age group 55-64 is thought to negatively affect happiness both as a result of a lack of income and because of the negative situations that can arise out of spending one's time in places such as the house. On the other hand, the positive life satisfaction for the age group 18-24 brought on by the fact that they will not be working is thought to be caused by the composition of the group which is mostly young people who have a desire to continue their education and who live with their families. For the age group 25-34, a positive impact on happiness because of not working might be caused by a group of people who will continue their education and by them being relatively young.

For the question about personal employment for the following year; while the age group 25-34 are happier among the ones who responded it will be better, the age group 18-24 among the ones who said it will be worse are the least affected. In terms of the employment expectations for the country for the following year, this situation is as follows: While the 55-64 age group is happier among the ones who responded that it will be better, once again the age group 18-24 are affected less negatively among the ones who responded that it will be worse. In terms of gender, men are happier among the ones who responded that it will be better in both personal employments for the following year and for employment in the country in general for the following year while the impact on women is less among the ones who responded that it will be worse. The reasons as to why young people seem to be less negatively affected among the ones who responded "it will be worse" for the questions regarding both the personal employment for the following year and the employment in the country are thought to be the young having a more positive mentality compared to the other age groups, living with their parents, and having fewer financial responsibilities. On the other hand, the reasons why women are less negatively affected by both personal employment and the employment in the country are thought to be social reasons such as women being less included in the working life compared to men.

**Table 5:** Results of Expectations for the Year 2013 For Personal Employment and Employment in the Country

| Dependent Variable: LS | Model (1): Ages 18-24 | Model (2): Ages 25-34 | Model (3): Ages 35-44 | Model (4): Ages 54-54 | Model (5): Ages 55-64 | Model (6) Male | Model (7) Female |
|---|---|---|---|---|---|---|---|
| Personal employment expectations | Coefficient Robust S.E | Coefficient Robust S.E | Coefficient Robust S.E | Coefficient Robust S.E | Coefficient Robust S.E | Coefficient Robust S.E | Coefficient Robust S.E |
| It will be better | 0.115*** | 0.146*** | 0.140*** | 0.124*** | 0.118*** | 0.152*** | 00930*** |
| | (0.0158) | (0.011) | (0.012) | (0.0146) | (0.0189) | (0.00842) | (0.00882) |
| It will be worse | -0.205*** | -0.224*** | -0.282*** | -0.264*** | -0.274*** | -0.266*** | -0.228*** |
| | (0.0352) | (0.0229) | (0.0204) | (0.0229) | (0.0291) | (0.014) | (0.0179) |
| Not going to work | 0.0732*** | 0.0750*** | 0.0287 | -0.0159 | -0.0437** | -0.0417** | 0.0149 |
| | (0.0187) | (0.0152) | (0.0147) | (0.0139) | (0.0144) | (0.0139) | (0.00791) |
| Expectations about employment in the country | | | | | | | |
| It will be better | 0.0695*** | 0.0789*** | 0.0771*** | 0.0957*** | 0.108*** | 0.0948*** | 0.0760*** |
| | (0.0152) | (0.0111) | (0.0115) | (0.0129) | (0.0149) | (0.00851) | (0.00774) |
| It will be worse | -0.105*** | -0.156*** | -0.169*** | -0.213*** | -0.237*** | -0.220*** | -0.146*** |
| | (0.0171) | (0.0123) | (0.0125) | (0.0136) | (0.0165) | (0.00947) | (0.00835) |
| Observations | 17622 | 31616 | 31114 | 26626 | 19580 | 58544 | 68014 |
| Adjusted $R^2$ | 0.071 | 0.105 | 0.106 | 0.092 | 0.083 | 0.108 | 0.087 |

Standard errors are given in parenthesis.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ indicate levels of significance.

*Those who responded that it would remain unchanged were taken as a point of reference.

**Those who responded "no idea" are taken as missing value.

*** The age group 18-64 was taken as basis.

As the place of residence of the participants was asked at the city level only for the year 2013, it became possible to assess the unemployment rate of that place for this particular year by taking the data from TUIK. The unemployment rate by cities for the year 2013 was taken from TUIK to be included in the model. Accordingly, average unemployment rate in 2013 across cities was 9.16%. It has been stated in the literature that in places with high unemployment rates, the person

can feel like they are unemployed for reasons outside of their control, as a result of which their life satisfaction is affected less negatively (Clark, 2003). In order to test this hypothesis, the life satisfaction of people for 2013 in places where unemployment rate was higher than average (>9,16) and lower than average (<9,16) is shown in Table 6.

**Table 6:** Results by Cities for the Year 2013

| | Model 1: >9,16 | | Model 2: <9,16 | |
|---|---|---|---|---|
| Dependent Variable: LS | Coefficient | Robust S.E | Coefficient | Robust S.E |
| Outside of the workforce | 0.0245* | (0.011) | 0.0147 | (0.00832) |
| Unemployed | – 0.284*** | (0.019) | – 0.319*** | (0.0162) |
| Observations | 50990 | | 75568 | |
| Adjusted $R^2$ | 0.108 | | 0.104 | |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ indicate levels of significance.
Standard errors are given in parenthesis.
Employed people have been taken as a point of reference.

Accordingly, when we take employed people as a point of reference, being unemployed for individuals living in cities where the unemployment rate is higher than average lowers life satisfaction – 0,284 point on average. On the other hand, being unemployed for individuals living in cities where the unemployment rate is lower than average lowers life satisfaction – 0,319 point on average. We can say that life satisfaction of people living in cities where unemployment rate is lower than the average is lower. The unemployed person living in places where the unemployment rate is high may be looking at the other unemployed people around them to conclude that their circumstance might have other causes, which in turn affects them less negatively. This is in support of the literature (Clark,2003).

Table 7 indicates life satisfaction of the age group 18-64 for the years 2003-2008,2009-2012, 2013 and 2014-2018 for the entirety of the employed, the unemployed and those outside of the workforce according to their expectations regarding their personal employment and employment in the country for the following year. TUIK asks the expectations regarding the working life with these questions: "How will work/employment situation be next year in Turkey?" "1-It will be better," "2-It will remain unchanged", "3-It will be worse" "4-No idea". In 2003, the employed were only asked about their personal employment expectations, between 2003-2008, the responses stated, "not working" as opposed to "not going to work", which was the case for 2009-2018. The question about personal employment expectations as of 2009 was phrased in the following way: "How will your personal work/employment situation be next year?" "1-It will be better," "2-It will remain unchanged", "3-It will be worse" "4-No idea", "5-Not going to work". In order to ensure homogeneity, expectations about employment for the country was taken into consideration between 2003-2008, and for 2009-2018 expectations for both personal employment and

employment in the country were taken into consideration. We aimed to analyse the relationship between expectations about working life and life satisfaction in the light of the data.

In Table 7 those who replied, "Will remain unchanged" for the questions regarding expectations about employment were taken as a point of reference while those who replied "No idea" were taken as missing value. Due to the low correlation of the questions regarding expectations about personal employment and employment in the country amongst themselves, questions for years 2009-2012,2013 and 2014-2018 were analysed under a single model.

Accordingly, when those who replied to the question regarding the expectations about employment in the country as "Will remain unchanged" are taken as a point of reference, it was observed across all 4 pooled models that there was a positive impact on the life satisfaction of those who said, "It will be better" and a negative impact on the life satisfaction of those who said, "It will be worse". TUIK started to measure homogeneously the personal employment expectations of the individuals as of 2009. What sets this study apart from others in the literature is especially the expectations about personal working life and happiness. Accordingly, when people who replied to the question about their employment expectations for the following year as "Will remain unchanged" in the years 2009-2012, 2013 and 2014-2018 were taken as a point of reference, we observed a positive impact on life satisfaction for those who replied, "Will be better" and a negative impact for those who replied, "Will be worse". The respondents of the expectations about the employment in the country for the following year and respondents of personal employment expectations for the following year consist of the same people; however, the people change from year to year as the data is cross-sectional. When expectations about the employment in the country and personal employment expectations are compared within the same years, for 2009-2012 and for 2013, those who said their personal employment will be better were happier than those who said the employment in the country will be better, which was not the case for 2014-2018. In other words, for the years 2014-2018 those who said the expectations about employment in the country will be better had higher life satisfaction than those who said their personal employment will be better.

For those who said it will be worse, it was observed across all pooled models that those who said their expectations about the employment in the country will be worse were relatively less affected than those who said their expectation about their personal employment will be worse. The fact that those with a negative expectation towards the employment situation in the country were less negatively affected can be explained with a way of thinking which suggests "if the employment situation is bad for everyone, if the people around me are in the same situation as I am, then my happiness will not be affected that much".

**Table 7:** Results Based on the Expectations Regarding Employment in the Country and Personal Employment Expectations for the years 2003-2008, 2009-2012, 2013 and 2014-2018

| Dependent Variable | Regression 1: 2003-2008 | | Regression 2: 2009-2012 | | Regression 3: 2013 | | Regression 4: 2014-2018 | |
|---|---|---|---|---|---|---|---|---|
| Life satisfaction (1-5) | Coefficient | Robust S.E | Coefficient | Robust S.E | Coefficient | Robust S.E | Coefficient | Robust S.E |
| **Expectations about employment in the country** | | | | | | | | |
| It will be better | 0.123*** | (0.0131) | 0.101*** | (0.0144) | 0.0860*** | (0.00573) | 0.145*** | (0.0114) |
| It will be worse | -0.161*** | (0.0119) | -0.161*** | (0.0143) | -0.181*** | (0.00627) | -0.151*** | (0.0111) |
| **Personal Employment Expectations** | | | | | | | | |
| It will be better | | | 0.120*** | (0.0155) | 0.127*** | (0.00608) | 0.119*** | (0.0114) |
| It will be worse | | | -0.311*** | (0.0266) | -0.258*** | (0.011) | -0.331*** | (0.0199) |
| Not going to work | | | -0.00401 | (0.0174) | 0,011 | (0.00673) | 0.0115 | (0.0138) |
| Number of Observations | 25732 | | 19913 | | 126558 | | 34005 | |
| Adjusted $R^2$ | 0.102 | | 0.117 | | 0.097 | | 0.101 | |

Standard errors are given in parenthesis.

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$ indicate levels of significance.

*Those who responded that it will remain unchanged were taken as a point of reference.

**Those who responded "no idea" were taken as missing value

*** The age group 18-64 was taken as basis.

Since the personal employment expectations and expectations about employment in the country for the employed, the unemployed and people outside of the workforce in the age group 18-64 were generally taken into consideration and after the estimates, essentially the life satisfaction of the unemployed was analysed, the expectations of the unemployed towards employment were also examined. We believe that this study differs from the others in the literature as it analyses the expectations of only the unemployed towards employment.

Table 8 shows the personal employment expectations and expectations about employment in the country in the following year for unemployed people across all years. Those who said it will be the same were taken as a point of reference and those who said "no idea" were taken as missing value. Despite having the same respondents for the questions about employment expectations in the country and personal employment expectations, employment expectations in the country and personal employment expectations were analysed in a single model like in the previous table due to the low correlation. Accordingly, in the model, those you replied that the employment expectation in the country will be better in 2003-2008 and 2009-2012; those who replied that the employment expectation in the country will be worse in 2009-2012 as well as those who replied "Not going to work" for the question about their personal employment expectations in 2009-2012 and in 2013 were insignificant. Similarly, having better employment expectations in the country and better personal employment expectations positively affect the life satisfaction of the unemployed while it has a negative effect for those who said it will be worse. The unemployed

who stated that their personal employment expectations will be better were happier than those who said the employment expectations in the country will be better; whereas those who said the employment expectations in the country will be comparatively worse than their personal employment expectations were less negatively affected. Therefore, we can say that a more positive personal expectation in unemployed people with an optimistic expectation and a negative expectation in the unemployed people regarding the employment expectations in the country make the unemployed people happier.

**Table 8:** Estimate Results of Employment Expectations in the Country and Personal Employment Expectations of the Unemployed Across the Years

| Dependent Variable: LS<br>Life satisfaction (1-5) | model 1:<br>2003-2008<br>Coefficient<br>Robust S.E | model 2:<br>2009-2012<br>Coefficient<br>Robust S.E | model 3:<br>2.013<br>Coefficient<br>Robust S.E | model 4:<br>2014-2018<br>Coefficient<br>Robust S.E |
|---|---|---|---|---|
| **Expectations about employment in the country** | | | | |
| It will be better | 0.114 | 0.0752 | 0.0953** | 0.169** |
| | (0.0661) | (0.0838) | (0.0299) | (0.0606) |
| It will be worse | -0.201*** | -0.144 | -0.206*** | -0.0763 |
| | (0.0554) | (0.0774) | (0.0303) | (0.0538) |
| **Personal Employment Expectations** | | | | |
| It will be better | | 0.200** | 0.141*** | 0.201*** |
| | | (0.0749) | (0.0285) | (0.0546) |
| It will be worse | | -0.328*** | -0.271*** | – 0.367*** |
| | | (0.0975) | (0.0389) | (0.0758) |
| Not going to work | | -0.0605 | 0.0199 | 0.519*** |
| | | (0.157) | (0.0597) | (0.153) |
| Observations | 1494 | 886 | 7105 | 1650 |
| Adjusted $R^2$ | 0.077 | 0.121 | 0.096 | 0.119 |

Standard errors are given in parenthesis.

* p < 0.05, ** p < 0.01, *** p < 0.001 indicate levels of significance.

*Those who responded that it will remain unchanged were taken as a point of reference.

**Those who responded "no idea" were taken as missing value.

*** The unemployed people between ages 18-64 were taken as basis.

## 5. Conclusion

This study aims to analyse the relationship between happiness and unemployment, expectations towards employment in the country in the following year and personal employment expectations using pooled regressions with the dataset from the Life Satisfaction Survey by the Turkish Statistical Institute between 2003-2018. STATA 14.2 package software was used in the study and methodology included the application of Ordinary Least Squares (OLS) on the pooled years. [6]

Even though studies about expectations and happiness exist in the literature, this study contribute as there seems to be no studies which address the expectations towards employment from two different aspects as the expectations about the country and personal expectations. Even though the dataset of the Life Satisfaction Survey is cross-sectional, a longer period was selected in order to be able to see the trends. Throughout the years, many questions, and the sample size, especially in 2013, was changed by TUIK. In 2013, which included 196.203 observations, the "city" variable was also added to the survey for the first time. Therefore, the relationship between happiness, and personal employment expectations and employment expectations for the country for the following year for people in the age group 18-64 were also analysed according to gender and age group though sub-regressions for this year.

Unemployment remains a significant topic in the world today as it was in the past. The cost of unemployment is not only incurred by the individual, but also by the society in which the individual lives as well as those governing that society. In addition to financial costs, unemployment also causes psychological costs. Being unemployed negatively affect not only the individual's economic situation, but also their quality of life and happiness.

In the light of the results, we have found a correlation between life satisfaction and unemployment. Despite the limitations of the dataset, it is possible to say that the unemployed were less happy than the employed and those outside of the workforce. On the other hand, when people who responded to the questions about the employment expectations in the country and their personal employment expectations as "It will remain unchanged" were taken as a point of reference, a positive life satisfaction was observed in those who replied that it will be better; whereas a negative life satisfaction was observed in those who replied that it will be worse. These results are also valid for the unemployed.

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6 The results of the model were also tested using the ordered probit/logit method, which didn't yield considerable difference in terms of coefficients. Therefore, only the OLS results were included in the article.

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## Appendix

**Table A1:** Descriptive Table of the Entire Sample for 2013*

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Year | 196,203 | 2013 | 0 | 2013 | 2013 |
| Province | 196,203 | 37.16659 | 21.90405 | 1 | 81 |
| Gender | 196,203 | 1.576592 | 0.4941002 | 1 | 2 |
| Age | 196,203 | 44.28938 | 16.38199 | 18 | 99 |
| Marital Status | 196,203 | 2.020667 | 0.6716568 | 1 | 4 |
| Happiness | 196,203 | 2.440549 | 0.8656127 | 1 | 5 |
| Education | 196,203 | 8.705244 | 11.99239 | 0 | 32 |
| Employment Status | 196,203 | 2.74137 | 2.117587 | 1 | 11 |
| Personal Employment Expectations | 172,605 | 2.783975 | 1.573679 | 1 | 5 |
| Expectations about employment in the country | 149,530 | 1.923046 | 0.8296089 | 1 | 3 |
| Income group | 196,203 | 2.21544 | 1.371294 | 1 | 5 |
| Unemployment rate | 196,203 | 9.160333 | 3.766325 | 4.2 | 23.4 |
| Happiness [5 scale recode] | 196,203 | 3.559451 | 0.8656127 | 1 | 5 |
| Age** | 170,406 | 3.032804 | 1.287495 | 1 | 5 |
| Education** | 196,203 | 1.206577 | 0.8973532 | 0 | 3 |
| Happiness [0;10] | 196,203 | 6.398628 | 2.164032 | 0 | 10 |

* Because the number of observations was higher in the relevant year, the results of 2013 were shown.

**Table A2:** Main Regression Estimation with Control Variables*

| Dependent Variable | Regression 1: 2003-2008 | | Regression 2: 2009-2012 | | Regression 3: 2013 | | Regression 4: 2014-2018 | |
|---|---|---|---|---|---|---|---|---|
| Life satisfaction (1-5) | Coefficient | Robust S.E | Coefficient | Robust S.E | Coefficient | Robust S.E | Coefficient | Robust S.E |
| Employment Status | | | | | | | | |
| Unemployed | -0.314*** | (0.0261) | -0.337*** | (0.0327) | -0.313*** | (0.0123) | -0.312*** | (0.0233) |
| Outside of the workforce | 0.0506*** | (0.0122) | 0.0424* | (0.0168) | 0.0224*** | (0.00658) | 0.0208 | (0.0125) |
| Women | 0.0785*** | (0.0115) | 0.0563*** | (0.0140) | 0.0778*** | (0.00576) | 0.101*** | (0.0107) |
| Countryside | 0.0244* | (0.0123) | 0.0831*** | (0.0148) | | | 0.0202 | (0.0197) |
| 25-34 | -0.194*** | (0.0183) | -0.176*** | (0.0217) | -0.183*** | (0.00900) | -0.192*** | (0.0170) |
| 35-44 | -0.268*** | (0.0200) | -0.310*** | (0.0239) | -0.300*** | (0.00971) | -0.292*** | (0.0183) |
| 45-54 | -0.293*** | (0.0211) | -0.338*** | (0.0248) | -0.318*** | (0.0101) | -0.341*** | (0.0190) |
| 55-64 | -0.279*** | (0.0247) | -0.281*** | (0.0268) | -0.249*** | (0.0108) | -0.278*** | (0.0202) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Primary school | | | 0.0938*** | (0.0272) | 0.0476*** | (0.00865) | 0.0563** | (0.0177) |
| Highschool | 0.0405** | (0.0135) | 0.102*** | (0.0297) | 0.0636*** | (0.0102) | 0.108*** | (0.0200) |
| Higher Education | 0.0653*** | (0.0177) | 0.159*** | (0.0319) | 0.0850*** | (0.0112) | 0.193*** | (0.0204) |
| Income group2 | 0.211*** | (0.0193) | 0.169*** | (0.0215) | 0.103*** | (0.00679) | 0.0347* | (0.0137) |
| Income group3 | 0.300*** | (0.0200) | 0.284*** | (0.0212) | 0.136*** | (0.00692) | 0.0500*** | (0.0129) |
| Income group4 | 0.377*** | (0.0200) | 0.345*** | (0.0225) | 0.204*** | (0.00736) | 0.0462*** | (0.0133) |
| Income group5 | 0.506*** | (0.0220) | 0.394*** | (0.0260) | 0.283*** | (0.00867) | 0.0882*** | (0.0139) |
| Income group6 | 0.597*** | (0.0273) | 0.529*** | (0.0305) | | | | |
| Year1 | -0.185*** | (0.0188) | 0.0214 | (0.0170) | | | -0.0111 | (0.0149) |
| Year 2 | -0.164*** | (0.0185) | 0.0192 | (0.0164) | | | 0.0617*** | (0.0148) |
| Year 3 | -0.108*** | (0.0187) | 0.00339 | (0.0162) | | | 0.0331* | (0.0146) |
| Year4 | -0.104*** | (0.0184) | | | | | 0.0274 | (0.0147) |
| Year 5 | -0.140*** | (0.0190) | | | | | | |
| Never Married | -0.309*** | (0.0178) | -0.308*** | (0.0199) | -0.261*** | (0.00829) | -0.280*** | (0.0151) |
| Widow | -0.456*** | (0.0464) | | | -0.368*** | (0.0171) | -0.442*** | (0.0330) |
| Divorced | -0.597*** | (0.0500) | -0.366*** | (0.0457) | -0.525*** | (0.0178) | -0.489*** | (0.0287) |
| Separate | -0.710*** | (0.102) | | | | | | |
| **Country working expectations:** | | | | | | | | |
| Will be better | 0.123*** | (0.0131) | 0.101*** | (0.0144) | 0.0860*** | (0.00573) | 0.145*** | (0.0114) |
| Will be worse | -0.161*** | (0.0119) | -0.161*** | (0.0143) | -0.181*** | (0.00627) | -0.151*** | (0.0111) |
| Personal working expectations: | | | | | | | | |
| Will be better | | | 0.120*** | (0.0155) | 0.127*** | (0.00608) | 0.119*** | (0.0114) |
| Will be worse | | | -0.311*** | (0.0266) | -0.258*** | (0.0110) | -0.331*** | (0.0199) |
| Wil not work | | | -0.00401 | (0.0174) | 0.0110 | (0.00673) | 0.0112 | (0.0138) |
| Constant | 3.620*** | (0.0286) | 3.488*** | (0.0395) | 3.681*** | (0.0142) | 3.649*** | (0.0288) |
| Number of Observations | 25732 | | 19913 | | 126558 | | 34005 | |
| Adjusted $R^2$ | 0.102 | | 0.117 | | 0.097 | | 0.101 | |

**Note:** Standard errors in parentheses $^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

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ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

# AN ANALYSIS OF HOW CHINA IS EMERGING AS THE CHAMPION OF FREE TRADE WITH A LONG-TERM GLOBAL STRATEGY

## ÇİN'İN UZUN VADELİ KÜRESEL STRATEJİYLE SERBEST TİCARET ŞAMPİYONU OLARAK ÇIKIŞINA İLİŞKİN BİR ANALİZ

**Soner KISTAK***

**Abstract**

With the United States (US) distancing itself from free trade during the Trump administration, China has been successfully positioning itself as the new free trade champion. During its disengagement process, the US has also been perceived to have snubbed some of its traditional partners like Turkey in terms of trade policies. These traditional allies have since been wooed by the Chinese through attractive commercial deals. China's Belt and Road Initiative (BRI) is a comprehensive set of infrastructure projects which aim to stimulate trade in Eurasia. With its immense financial resources, China has been investing in logistics and infrastructure projects in more than 72 countries. While criticisms and concerns have been raised, of Chinese state mercantilism for instance, countries interested in diversifying their trade relationships like Turkey have welcomed the free trade approach.

The paper aims to disprove the hypothesis that China's international investments are solely short-term, profit-oriented, and transactional in nature. Instead, the paper argues that these investments should be seen as a part of the long-term strategy of a country that aims to be both a political and economic world power. Moreover, this paper sees China's overall trade contribution positively and argues that their strong position as a trading partner can help strengthen smaller economies' negotiation positions. Hence, countries like Turkey can negotiate and choose the best deals offered by different trading centers. In the post-Covid context, the world economy cannot afford to exclude any major economies. The US and China are encouraged to settle their differences in the context of global rule-based systems.

**Keywords:** Free Trade, China, Belt and Road Initiative (Silk Road), WTO, Turkey, United States
**JEL Classification:** F02, F50, F13

**Öz**

Amerika Birleşik Devletleri'nin (ABD) Trump yönetimi sırasında serbest ticaretten uzaklaşmasıyla, Çin kendisini dünyanın yeni serbest ticaret şampiyonu olarak başarıyla konumlandırmayı başardı. ABD, serbest ticaret politikalarına mesafe koyma sürecinde, Türkiye gibi bazı geleneksel ortaklarını da ticaret

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politikaları düzeyinde kendisinden uzaklaştırdı. ABD'nin ticari politikalarındaki sertleşmesine karşın, bu dönemde ABD'nin geleneksel müttefiklerine Çin tarafından cazip ticari anlaşmalar önerilerek sıcak mesajlar verildi. Çin'in Kuşak ve Yol Girişimi (BRI), Avrasya'da ticareti teşvik etmek amacıyla 72'den fazla ülkede lojistik ve altyapı projelerine yatırım yapmayı öngören bir proje. Çin, muazzam finansal kaynaklarını devreye sokarak bu ülkelerde lojistik ve altyapı projelerini yürütmeye devam ediyor. Her ne kadar, bu girişim için Çin'e devlet merkantilizmi eleştirileri yapılsa da, bu serbest ticaret açılımı Türkiye gibi ticari ilişkilerini çeşitlendirmek isteyen ülkeler tarafından memnuniyetle karşılanmaktadır. Bu makalede, Çin'in uluslararası yatırımlarının sadece kâr odaklı, kısa vadeli ve menfaat temelli olduğu hipotezini çürütmeyi amaçlanmaktadır. Bunun yerine, bu yatırımların hem siyasi hem de ekonomik olarak dünya gücü olmayı hedefleyen bir ülkenin uzun vadeli stratejisinin bir parçası olarak görülmesi gerektiği tezi savunuluyor. Buna ek olarak, bu makale Çin'in genel olarak ticarete katkısını olumlu değerlendiriyor, Çin ile geliştirilecek ticaret ilişkilerinin, küçük ekonomilerin pozisyonlarını diğer ekonomik güçlerle yapacakları ticari müzakerelerde güçlendireceğini savunuyor. Bu nedenle, Türkiye gibi ülkeler farklı ticaret merkezleri tarafından sunulan fırsatları müzakere edebilmeli ve bunların içinden en optimal ticari seçeneklere karar verebilmelidir. Covid sonrası süreçte, dünya ekonomisinin toparlandığı ortamda, küresel ticaret sistemi hiçbir büyük ekonominin dışlanmasını kaldıramaz. Bu araştırmada ABD ve Çin'in küresel ticari pozisyonlarındaki farklılıklarının müzakerelerle giderilmesi, kuralların hâkim olduğu serbest bir ticari rejimin tekrar tesis edilmesi önerilmektedir.

**Anahtar Kelimeler:** Serbest Ticaret, Çin, Kuşak Ve Yol Girişimi (İpek Yolu), DTÖ, Türkiye, Amerika Birleşik Devletleri

**JEL Sınıflandırması:** F05, F50, F13

## 1. Introduction

The world economy is going through major structural changes. In the last three decades, we have witnessed the economic rise of China which, according to the International Monetary Fund (IMF, 2018), has become the second largest economy in the world as of 2018. Coinciding with this rise, China has launched an ambitious program, the 'Belt and Road Initiative' (BRI) which they would like to put in place in the following years. Based on China's track record of long-term investment, we expect this project to be implemented gradually and seriously over the next decade.

At the same time, "once the champion of free trade, the US is now taking a protectionist stance. There is growing dissatisfaction with free trade policies in the US" (Bailey, 2016). Already starting with the 2016 presidential campaign, the trade deficit with China was heavily politicized, particularly by President Trump. Discussions in both major political parties clearly indicate that the "free trade consensus" in the US has been disappearing.

This shift in US trade policy and assertive use of trade embargoes is causing issues for both traditional allies like Turkey and long-term trade partners like China. Concerning Turkey, its long-term interests lie in the diversification of its commercial and trade links. This diversification includes maintaining strong links with both China and the Western bloc. Turkey has been particularly disappointed by US foreign and trade policy under Trump. Although the country favors diverse and constructive relationships with Europe, the US, and Japan, it does not rule out China as an important trading partner. Turkey and China have mutual interests in strengthening their commercial and trade connections.

In the context of the US' diminishing appetite for liberal trade, China has filled in the vacuum and now positions itself as a friendly superpower. Overall, China is the biggest beneficiary of this project as the BRI project will transform the country from an Asian to a fully global power. China would also like to diversify its global outreach away from the China Sea towards land-based commercial routes. Therefore, the revival of the New Silk Road is a certain strategic project for the world's second biggest economy. This objective has also been criticized as mercantilist, opportunistic, and profit-seeking. The paper aims to disprove the hypothesis that China's international investments are solely short-term, profit-oriented, and transactional in nature. Instead, the paper argues that these investments should be seen as a part of the long-term strategy of a country that aims to be both a political and economic world power.

The rest of the paper is organized as follows: The second part discusses recent changes in US free trade policies. Once a champion of free trade, US foreign and trade policies have shifted away from liberal trade policies, particularly with the Trump administration. In this section, the US' relationships with Turkey and China are discussed to explain the extent of this evolution from a historical perspective. In the third part the trade statistics for China, the US, and Turkey are presented to quantify the real on-the-ground situation for these countries. The fourth part focuses on China's response to this trade challenge. As China aims to reduce its dependence on the US in the mid-term, Chinese policymakers pursue trade diversification projects in countries like Germany, Poland, and Italy. The fifth section explains the increasing importance of Chinese trade for Turkey and makes recommendations for a long-term sustainable relationship. In the conclusion, this author reiterates the need to accept China as a global trading power and to consider how its role contributes positively to global trade.

## 2. Changing Attitudes Towards Free Trade in the US: Politicization and Instrumentalization of Free Trade Policies, a Historical Comparison

This paper suggests that there are significant changes taking place in the existing world trade order with the rise of China. Before discussing these changes, we first present how the status quo came about in the post-Second World War context and what the milestones have been in its evolution.

The United States has been the world's strongest free trade supporter for the better part of the past century. Indeed, Bailey (2016) notes that "[there] has been a prevailing consensus among the big wigs of both major US political parties that free trade is broadly beneficial, with trade barriers an obstacle that must be removed". As the ideological heir to the British empire after the second World War, the US has always promoted removing trade barriers all around the world. From the Bretton Woods system to the General Agreement on Tariffs and Trade discussions, and the formation of the World Trade Organization (WTO) to the creation of the G20 structure, the US has always played a leading role in international trade.

Not only has the US benefitted from free trade, but it has also encouraged working together with countries like China and Turkey to integrate them into the global trading regime. This openness for inclusion on the part of the US can be clearly seen in the case of China. Following the US-China trade pact in October 1979, President Carter approved most-favored-nation tariff treatment for China (Oberdorfer, 1979). Despite the opposition from then Secretary of State Cyrus R. Vance, this rapprochement was encouraged by presidential assistant Zbigniew Brzezinski and Chinese flexibility in economic concessions. The US' primary objective was to divide the Communist Bloc and to further isolate the Soviet Union both politically and in trade. The US showed a similar support for China's accession to the WTO back in 2000 and 2001. On the one hand, it was important for China to join the WTO because it wanted to have access to new trading partners and better tariff rates. On the other, the United States wanted China to get integrated into US-led liberal world order. As a result, China became a WTO member on the 11th of December 2001. WTO membership helped the country to boost its international trade during the following decade.

Similarly, the US has also been influential in shaping Turkey's trade policies and moving them in a liberal direction already four decades earlier. As early as 1948, Turkey started receiving economic aid in the Marshall Plan context. Sahin (2000) shows how mostly foreign US experts recommended pro-capitalist and liberal policies for the country. Turkey was advised to focus on agriculture and provide its agricultural production to other pro-Western Middle Eastern regimes. Moreover, Turkey had already been a participant in the then emerging Bretton Woods conference. It took an active role in all then nascent European and international institutions ranging from the IMF to the World Bank, from the Organization for Economic Co-operation and Development (OECD) to the European Bank for Reconstruction and Development (EBRD). Moreover, Turkey signed the Ankara agreement with the European Economic Community in 1963, which was essentially an association agreement aiming to anchor Turkey to the Western bloc. Turkey was encouraged to sign these trade and economic agreements with the Western bloc so it would not fall under the economic influence of its northern neighbor, the Soviet Union. This type of encouragement resembled other US global policies in Latin America and Asia where they developed comprehensive programs to prevent the rise of communism.

After the collapse of the Soviet Union in 1991, the US' enthusiasm for Free Trade subsided, particularly in the Greater Middle East. The American liberal economic approach got replaced by an assertive foreign policy which saw trade as part of its toolkit in imposing itself as the global hegemon. Following the first Gulf War and the arrival of Bill Clinton to the White House in 1992, the US administration adopted the Dual Containment policy in the Persian Gulf. This policy had the objective of isolating Iraq and Iran both economically and politically. This policy had negative consequences for Turkey. As a neighbor and trading partner of both these countries, Turkey had experienced serious export losses to Iraq between 1988 and 2003. In fact, Demir, Özmen and Rashid (2014) estimate that Turkey lost as much as $54 billion in exports to Iraq. Similarly, after reaching $22 billion worth of goods and services exported to Iran in 2012, trade slumped to $10 billion following the toughening of US sanctions on Iran (Duran, 2018). Turkish officials

observed a lack of knowledge from their US counterparts regarding Turkey' geography and how certain unilateral decisions affected Turkey's trade relations. In 2010s, Turkey re-emphasized an export-oriented industrialization model with broad and diverse relations with its neighbors. In this sense, the frequent imposition of trade embargoes by US politicians on Turkey's trading partners did not go well with Turkey's long-term trade strategy

Then in 2018 things took an unexpected in turn in the trade relationship between the US and Turkey: In August 2018, US sanctions directly targeted Turkey over jailed pastor Andrew Brunson. At first, the United States imposed additional duties on imports of Turkish steel, but they were reduced to 25% in May 2019 according to trade data by the Santander Bank group. The Turkish lira then hit a low of 5.11 to the dollar and inflation reached 24.5 percent (Honoré, 2018). Later, in October 2019 following Turkey's disagreements with the US regarding Turkey's border security operations in Syria, the US Justice department filed charges against Halkbank. This was a way for the US Administration to project that it was taking a tough stance against Turkey (Lipton, 2019). The US sanction decisions were driven more by political considerations than legal ones. Several WTO Members, including the European Union (EU) and Turkey, responded to these tariffs by adopting their own tariffs against imports from the United States (Lee, 2019). They justified their tariffs under the WTO Agreement on Safeguards. Both in August 2018 and October 2019, the Turkish public was unpleasantly surprised by the domineering language used by President Trump against Turkey, a long-term military ally and trading partner.

On the issue of China-US trade relations, the 2016 presidential campaign was a turning point, at least from the point of view of political rhetoric Growing dissatisfaction with free trade policies in the US prompted a wide range of Americans to demand more trade protection measures. During the campaign, the trade deficit with China was heavily politicized, particularly by Donald Trump. Similarly, facing competition from Bernie Sanders, Hillary Clinton also had to adopt protectionist language. Discussions in both major political parties clearly indicated that the "free trade consensus" in the United States was disappearing. With the arrival of Donald Trump in the White House in 2016, policy changes started to take place. Between 2018 and 2020 the United States started imposing gradual tariffs under a variety of trade laws, most notably Section 301 tariffs against China. This new protection is significant in magnitude and breadth. Tariffs range from 10 to 30 percent and cover 50 percent of US consumer imports from China and 16 percent of total US consumer imports (Reynolds, 2021). These trade barriers are not limited to the Trump administration as they are now continued by the Biden administration. In November 2020, then President Trump signed an executive order preventing US investors from holding shares in various Chinese companies with few details on how to implement it. However, a 2021 executive order signed by President Joseph Biden has clarified how the ban should be imposed.

President Biden's executive order confirms that the trade war with China was not driven by Trump and represents a fundamental US policy change within an institutional framework. According to Menaldo and Wittstock (2021), given Biden's reversal of many other policies, sustaining this one suggests a deeper change in US trade and investment philosophy.

Ironically, despite Trump's political rhetoric and significant amount of anti-Chinese trade executive orders, the figures in Tables 1 and 3 show that there were only minor changes in trade under his presidency. Nevertheless, they should be seen with a forward-looking perspective. Their concrete effects are likely to manifest in future years' figures once these policies are put into action by the US trade authorities. On the other hand, since China aims to reduce its dependence on the US in the mid-term, Chinese policymakers quickened their efforts to pursue their trade diversification projects such as the New Silk Road.

## 3. Current Trade Situation of the US, Turkey, and China

In this section, we focus on the trade situation of three countries, namely the US, Turkey, and China. **Table 1** to **Table 3** present detailed trade statistics on these countries between 2005 and 2020.

**Table 1:** Trade Outlook for the United States

| Main Country | Trading Partner | Year | Total Trade ($M) | RtW (%) | Exports ($M) | RtW (%) | Imports ($M) | RtW (%) | Net Exports ($M) |
|---|---|---|---|---|---|---|---|---|---|
| USA | World | 2005 | 2,656,852.00 | 100.0 | 924,322.00 | 100.0 | 1,732,530.00 | 100 | -808,208.00 |
| USA | Canada | 2005 | 480,200.00 | 18.1 | 188,256.00 | 20.4 | 291,944.00 | 16.85 | -103,688.00 |
| USA | Euro-zone | 2005 | 388,941.00 | 14.6 | 149,974.00 | 16.2 | 238,967.00 | 13.79 | -88,993.00 |
| USA | China | 2005 | 308,832.50 | 11.6 | 48,994.50 | 5.3 | 259,838.00 | 15 | -210,843.50 |
| USA | Mexico | 2005 | 298,145.00 | 11.2 | 125,660.00 | 13.6 | 172,485.00 | 9.96 | -46,825.00 |
| USA | Japan | 2005 | 207,396.90 | 7.8 | 65,446.90 | 7.1 | 141,950.00 | 8.19 | -76,503.10 |
| USA | Germany | 2005 | 126,641.90 | 4.8 | 39,704.30 | 4.3 | 86,937.60 | 5.02 | -47,233.30 |
| USA | United Kingdom | 2005 | 88,928.00 | 3.4 | 36,547.70 | 4.0 | 52,380.30 | 3.02 | -15,832.60 |
| USA | Turkey | 2005 | 10,959.08 | 0.4 | 5,374.78 | 0.6 | 5,584.30 | 0.32 | -209.52 |
| USA | Rest of the World | 2005 | 873,449.52 | 32.9 | 304,068.12 | 32.9 | 569,381.40 | 32.87 | -265,313.28 |
| USA | World | 2010 | 3,194,430.00 | 100.0 | 1,226,310.00 | 100.0 | 1,968,120.00 | 100 | -741,810.00 |
| USA | Euro-zone | 2010 | 423,547.00 | 13.3 | 174,169.00 | 14.2 | 249,378.00 | 12.67 | -75,209.00 |
| USA | Canada | 2010 | 489,706.00 | 15.3 | 209,319.00 | 17.1 | 280,387.00 | 14.25 | -71,068.00 |
| USA | China | 2010 | 484,942.00 | 15.2 | 101,959.00 | 8.3 | 382,983.00 | 19.46 | -281,024.00 |
| USA | Mexico | 2010 | 385,632.00 | 12.1 | 153,708.00 | 12.5 | 231,924.00 | 11.78 | -78,216.00 |
| USA | Japan | 2010 | 192,582.50 | 6.0 | 69,026.50 | 5.6 | 123,556.00 | 6.28 | -54,529.50 |
| USA | Germany | 2010 | 127,503.80 | 4.0 | 43,130.40 | 3.5 | 84,373.40 | 4.29 | -41,243.00 |
| USA | United Kingdom | 2010 | 93,872.70 | 2.9 | 43,208.70 | 3.5 | 50,664.00 | 2.57 | -7,455.30 |
| USA | Turkey | 2010 | 16,744.90 | 0.5 | 12,323.00 | 1.0 | 4,421.90 | 0.22 | 7,901.10 |
| USA | Rest of the World | 2010 | 1,107,402.90 | 34.7 | 462,596.80 | 37.7 | 644,806.10 | 32.77 | -182,209.30 |
| USA | World | 2015 | 3,667,240.00 | 100.0 | 1,425,580.00 | 100.0 | 2,241,660.00 | 100 | -816,080.00 |
| USA | China | 2015 | 626,748.00 | 17.1 | 144,867.00 | 10.2 | 481,881.00 | 21.5 | -337,014.00 |

| Main Country | Trading Partner | Year | Total Trade ($M) | RtW (%) | Exports ($M) | RtW (%) | Imports ($M) | RtW (%) | Net Exports ($M) |
|---|---|---|---|---|---|---|---|---|---|
| USA | Euro-zone | 2015 | 535,448.00 | 14.6 | 203,723.00 | 14.3 | 331,725.00 | 14.8 | -128,002.00 |
| USA | Canada | 2015 | 531,710.00 | 14.5 | 236,520.00 | 16.6 | 295,190.00 | 13.17 | -58,670.00 |
| USA | Mexico | 2015 | 492,752.00 | 13.4 | 198,011.00 | 13.9 | 294,741.00 | 13.15 | -96,730.00 |
| USA | Japan | 2015 | 199,442.40 | 5.4 | 68,322.40 | 4.8 | 131,120.00 | 5.85 | -62,797.60 |
| USA | Germany | 2015 | 174,184.70 | 4.8 | 50,045.70 | 3.5 | 124,139.00 | 5.54 | -74,093.30 |
| USA | United Kingdom | 2015 | 115,381.10 | 3.2 | 57,575.90 | 4.0 | 57,805.20 | 2.58 | -229.30 |
| USA | Turkey | 2015 | 19,430.69 | 0.5 | 11,603.10 | 0.8 | 7,827.59 | 0.35 | 3,775.51 |
| USA | Rest of the World | 2015 | 1,146,327.81 | 31.3 | 504,957.60 | 35.4 | 641,370.21 | 28.6 | -136,412.61 |
| USA | World | 2020 | 3,738,250.00 | 100.0 | 1,401,670.00 | 100.0 | 2,336,580.00 | 100 | -934,910.00 |
| USA | Euro-zone | 2020 | 580,333.00 | 15.5 | 211,973.00 | 15.1 | 368,360.00 | 15.76 | -156,387.00 |
| USA | China | 2020 | 571,572.00 | 15.3 | 136,123.00 | 9.7 | 435,449.00 | 18.64 | -299,326.00 |
| USA | Mexico | 2020 | 503,276.00 | 13.5 | 177,882.00 | 12.7 | 325,394.00 | 13.93 | -147,512.00 |
| USA | Canada | 2020 | 479,738.00 | 12.8 | 209,356.00 | 14.9 | 270,382.00 | 11.57 | -61,026.00 |
| USA | Japan | 2020 | 191,154.10 | 5.1 | 71,642.10 | 5.1 | 119,512.00 | 5.11 | -47,869.90 |
| USA | Germany | 2020 | 172,878.60 | 4.6 | 57,758.60 | 4.1 | 115,120.00 | 4.93 | -57,361.40 |
| USA | United Kingdom | 2020 | 108,535.60 | 2.9 | 58,329.40 | 4.2 | 50,206.20 | 2.15 | 8,123.20 |
| USA | Turkey | 2020 | 22,540.70 | 0.6 | 11,525.20 | 0.8 | 11,015.50 | 0.47 | 509.70 |
| USA | Rest of the World | 2020 | 1,281,100.60 | 34.3 | 524,839.30 | 37.5 | 756,261.30 | 32.37 | -231,422.00 |

**Note:** The following table shows the trade balance of the United States from 2005 to 2020. The data is presented in 5-year intervals to show the evolution of the trade balances. The data comes from Bloomberg (2021) which bases itself on International Monetary Fund data. The panel starts with the overall trade picture of the United States followed by the decomposition of the total trade, exports, imports, and next imports for selected countries. The selected countries are chosen based on the pertinence of this analysis. All the other countries are included in the rows "Rest of the World". This data is repeated for 2005, 2010, 2015, and 2020. The evolution between 2015 and 2020 is of particular relevance as it corresponds to the Trump Administration whereby protectionist policies were adopted by the US.

**Table 2:** Trade Outlook for Turkey

| Main Country | Trading Partner | Year | Total Trade ($M) | RtW (%) | Exports ($M) | RtW (%) | Imports ($M) | RtW (%) | Net Exports ($M) |
|---|---|---|---|---|---|---|---|---|---|
| Turkey | World | 2005 | 188,247.30 | 100.0 | 71,684.30 | 100.0 | 116,563.00 | 100 | -44,878.70 |
| Turkey | Euro-zone | 2005 | 71,504.10 | 38.0 | 31,788.60 | 44.4 | 39,715.50 | 34.07 | -7,926.90 |
| Turkey | Germany | 2005 | 22,863.32 | 12.2 | 9,243.52 | 12.9 | 13,619.80 | 11.68 | -4,376.28 |
| Turkey | Russia | 2005 | 14,607.91 | 7.8 | 1,738.01 | 2.4 | 12,869.90 | 11.04 | -11,131.89 |
| Turkey | Italy | 2005 | 12,986.71 | 6.9 | 5,425.65 | 7.6 | 7,561.06 | 6.49 | -2,135.41 |
| Turkey | United Kingdom | 2005 | 11,211.07 | 6.0 | 6,520.94 | 9.1 | 4,690.13 | 4.02 | 1,830.81 |
| Turkey | United States | 2005 | 10,959.08 | 5.8 | 5,584.30 | 7.8 | 5,374.78 | 4.61 | 209.52 |

| Main Country | Trading Partner | Year | Total Trade ($M) | RtW (%) | Exports ($M) | RtW (%) | Imports ($M) | RtW (%) | Net Exports ($M) |
|---|---|---|---|---|---|---|---|---|---|
| Turkey | China | 2005 | 7,500.65 | 4.0 | 632.79 | 0.9 | 6,867.86 | 5.89 | -6,235.07 |
| Turkey | Iraq | 2005 | 3,372.13 | 1.8 | 2,913.44 | 4.1 | 458.69 | 0.39 | 2,454.75 |
| Turkey | Rest of the World | 2005 | 69,092.36 | 36.7 | 22,506.22 | 31.4 | 46,586.14 | 39.98 | -24,079.92 |
| Turkey | World | 2010 | 300,755.00 | 100.0 | 115,211.00 | 100.0 | 185,544.00 | 100 | -70,333.00 |
| Turkey | Euro-zone | 2010 | 95,843.30 | 31.9 | 41,362.20 | 35.9 | 54,481.10 | 29.36 | -13,118.90 |
| Turkey | Germany | 2010 | 29,202.60 | 9.7 | 11,653.50 | 10.1 | 17,549.10 | 9.46 | -5,895.60 |
| Turkey | Russia | 2010 | 26,479.57 | 8.8 | 4,878.97 | 4.2 | 21,600.60 | 11.64 | -16,721.63 |
| Turkey | China | 2010 | 20,334.01 | 6.8 | 3,153.21 | 2.7 | 17,180.80 | 9.26 | -14,027.59 |
| Turkey | Italy | 2010 | 17,049.00 | 5.7 | 6,844.50 | 5.9 | 10,204.50 | 5.5 | -3,360.00 |
| Turkey | United States | 2010 | 16,744.90 | 5.6 | 4,421.90 | 3.8 | 12,323.00 | 6.64 | -7,901.10 |
| Turkey | United Kingdom | 2010 | 11,832.44 | 3.9 | 7,151.83 | 6.2 | 4,680.61 | 2.52 | 2,471.22 |
| Turkey | Iraq | 2010 | 7,753.12 | 2.6 | 6,398.54 | 5.6 | 1,354.58 | 0.73 | 5,043.96 |
| Turkey | Rest of the World | 2010 | 121,767.66 | 40.5 | 47,844.35 | 41.5 | 73,923.31 | 39.85 | -26,078.96 |
| Turkey | World | 2015 | 359,606.00 | 100.0 | 145,987.00 | 100.0 | 213,619.00 | 100 | -67,632.00 |
| Turkey | Euro-zone | 2015 | 108,243.10 | 30.1 | 45,989.30 | 31.5 | 62,253.80 | 29.14 | -16,264.50 |
| Turkey | Germany | 2015 | 36,987.10 | 10.3 | 14,251.20 | 9.8 | 22,735.90 | 10.64 | -8,484.70 |
| Turkey | China | 2015 | 28,237.60 | 7.9 | 2,953.90 | 2.0 | 25,283.70 | 11.84 | -22,329.80 |
| Turkey | Russia | 2015 | 24,777.25 | 6.9 | 4,033.25 | 2.8 | 20,744.00 | 9.71 | -16,710.75 |
| Turkey | United States | 2015 | 19,430.69 | 5.4 | 7,827.59 | 5.4 | 11,603.10 | 5.43 | -3,775.51 |
| Turkey | Italy | 2015 | 18,711.43 | 5.2 | 7,368.53 | 5.1 | 11,342.90 | 5.31 | -3,974.37 |
| Turkey | United Kingdom | 2015 | 16,375.89 | 4.6 | 10,583.50 | 7.3 | 5,792.39 | 2.71 | 4,791.11 |
| Turkey | Iraq | 2015 | 10,893.35 | 3.0 | 10,564.70 | 7.2 | 328.65 | 0.15 | 10,236.05 |
| Turkey | Rest of the World | 2015 | 151,648.12 | 42.2 | 64,034.76 | 43.9 | 87,613.36 | 41.02 | -23,578.60 |
| Turkey | World | 2020 | 383,752.00 | 100.0 | 164,238.00 | 100.0 | 219,514.00 | 100 | -55,276.00 |
| Turkey | Euro-zone | 2020 | 112,627.40 | 29.4 | 54,254.30 | 33.0 | 58,373.10 | 26.59 | -4,118.80 |
| Turkey | Germany | 2020 | 36,188.00 | 9.4 | 14,455.20 | 8.8 | 21,732.80 | 9.9 | -7,277.60 |
| Turkey | China | 2020 | 26,760.95 | 7.0 | 3,720.15 | 2.3 | 23,040.80 | 10.5 | -19,320.65 |
| Turkey | Russia | 2020 | 22,939.49 | 6.0 | 5,110.29 | 3.1 | 17,829.20 | 8.12 | -12,718.91 |
| Turkey | United States | 2020 | 22,540.70 | 5.9 | 11,015.50 | 6.7 | 11,525.20 | 5.25 | -509.70 |
| Turkey | Iraq | 2020 | 17,892.72 | 4.7 | 9,691.07 | 5.9 | 8,201.65 | 3.74 | 1,489.42 |
| Turkey | Italy | 2020 | 17,736.31 | 4.6 | 8,536.64 | 5.2 | 9,199.67 | 4.19 | -663.03 |
| Turkey | United Kingdom | 2020 | 17,005.89 | 4.4 | 11,423.50 | 7.0 | 5,582.39 | 2.54 | 5,841.11 |
| Turkey | Rest of the World | 2020 | 163,984.85 | 42.7 | 69,023.19 | 42.0 | 94,961.66 | 43.26 | -25,938.47 |

**Note:** The following table shows the trade balance of Turkey from 2005 to 2020. The data is presented in 5-year intervals to show the evolution of the trade balances. The data comes from Bloomberg (2021) which bases itself on International Monetary Fund data. The panel starts with the overall trade picture of Turkey followed by the decomposition of the total trade, exports, imports, and next imports for selected countries. The selected countries are chosen based on the pertinence of this analysis. All the other countries are included in the rows "Rest of the World". This data is repeated for 2005, 2010, 2015, and 2020. The evolution between 2015 and 2020 is of particular relevance as it corresponds to the Trump Administration whereby protectionist policies were adopted by the US.

**Table 3.** Trade Outlook for China

| Main Country | Trading Partner | | Total Trade ($M) | RtW (%) | Exports ($M) | RtW (%) | Imports ($M) | RtW (%) | Net Exports ($M) |
|---|---|---|---|---|---|---|---|---|---|
| China | World | 2005 | 1,646,325.00 | 100.0 | 986,106.00 | 100.0 | 660,219.00 | 100 | 325,887.00 |
| China | United States | 2005 | 308,832.50 | 18.8 | 259,838.00 | 26.4 | 48,994.50 | 7.42 | 210,843.50 |
| China | Euro-zone | 2005 | 210,703.00 | 12.8 | 148,275.00 | 15.0 | 62,428.00 | 9.46 | 85,847.00 |
| China | Japan | 2005 | 208,907.00 | 12.7 | 108,439.00 | 11.0 | 100,468.00 | 15.22 | 7,971.00 |
| China | Hong Kong | 2005 | 147,316.00 | 9.0 | 135,084.00 | 13.7 | 12,232.00 | 1.85 | 122,852.00 |
| China | South Korea | 2005 | 115,522.00 | 7.0 | 38,648.20 | 3.9 | 76,873.80 | 11.64 | -38,225.60 |
| China | Germany | 2005 | 74,166.30 | 4.5 | 43,498.10 | 4.4 | 30,668.20 | 4.65 | 12,829.90 |
| China | Singapore | 2005 | 37,056.60 | 2.3 | 20,526.00 | 2.1 | 16,530.60 | 2.5 | 3,995.40 |
| China | United Kingdom | 2005 | 36,013.55 | 2.2 | 30,502.30 | 3.1 | 5,511.25 | 0.83 | 24,991.05 |
| China | Turkey | 2005 | 7,500.65 | 0.5 | 6,867.86 | 0.7 | 632.79 | 0.1 | 6,235.07 |
| China | Rest of the World | 2005 | 574,473.70 | 34.9 | 237,925.64 | 24.1 | 336,548.06 | 50.98 | -98,622.42 |
| China | World | 2010 | 3,201,200.00 | 100.0 | 1,807,290.00 | 100.0 | 1,393,910.00 | 100 | 413,380.00 |
| China | United States | 2010 | 484,942.00 | 15.2 | 382,983.00 | 21.2 | 101,959.00 | 7.31 | 281,024.00 |
| China | Euro-zone | 2010 | 421,594.00 | 13.2 | 279,686.00 | 15.5 | 141,908.00 | 10.18 | 137,778.00 |
| China | Japan | 2010 | 329,673.00 | 10.3 | 153,369.00 | 8.5 | 176,304.00 | 12.65 | -22,935.00 |
| China | South Korea | 2010 | 209,597.60 | 6.6 | 71,573.60 | 4.0 | 138,024.00 | 9.9 | -66,450.40 |
| China | Hong Kong | 2010 | 206,588.34 | 6.5 | 197,087.00 | 10.9 | 9,501.34 | 0.68 | 187,585.66 |
| China | Germany | 2010 | 157,830.00 | 4.9 | 83,451.60 | 4.6 | 74,378.40 | 5.34 | 9,073.20 |
| China | United Kingdom | 2010 | 61,522.70 | 1.9 | 50,221.50 | 2.8 | 11,301.20 | 0.81 | 38,920.30 |
| China | Singapore | 2010 | 58,248.30 | 1.8 | 33,665.70 | 1.9 | 24,582.60 | 1.76 | 9,083.10 |
| China | Turkey | 2010 | 20,334.01 | 0.6 | 17,180.80 | 1.0 | 3,153.21 | 0.23 | 14,027.59 |
| China | Rest of the World | 2010 | 1,408,700.05 | 44.0 | 621,523.40 | 34.4 | 787,176.65 | 56.48 | -165,653.25 |
| China | World | 2015 | 3,845,540.00 | 100.0 | 2,243,780.00 | 100.0 | 1,601,760.00 | 100 | 642,020.00 |
| China | United States | 2015 | 626,748.00 | 16.3 | 481,881.00 | 21.5 | 144,867.00 | 9.04 | 337,014.00 |
| China | Euro-zone | 2015 | 444,689.00 | 11.6 | 275,660.00 | 12.3 | 169,029.00 | 10.55 | 106,631.00 |
| China | Japan | 2015 | 303,314.00 | 7.9 | 160,598.00 | 7.2 | 142,716.00 | 8.91 | 17,882.00 |

| Main Country | Trading Partner | | Total Trade ($M) | RtW (%) | Exports ($M) | RtW (%) | Imports ($M) | RtW (%) | Net Exports ($M) |
|---|---|---|---|---|---|---|---|---|---|
| China | Hong Kong | 2015 | 269,394.48 | 7.0 | 261,233.00 | 11.6 | 8,161.48 | 0.51 | 253,071.52 |
| China | South Korea | 2015 | 264,539.30 | 6.9 | 90,250.30 | 4.0 | 174,289.00 | 10.88 | -84,038.70 |
| China | Germany | 2015 | 164,155.40 | 4.3 | 76,685.30 | 3.4 | 87,470.10 | 5.46 | -10,784.80 |
| China | United Kingdom | 2015 | 80,107.70 | 2.1 | 61,227.00 | 2.7 | 18,880.70 | 1.18 | 42,346.30 |
| China | Singapore | 2015 | 68,213.00 | 1.8 | 42,191.30 | 1.9 | 26,021.70 | 1.62 | 16,169.60 |
| China | Turkey | 2015 | 28,237.60 | 0.7 | 25,283.70 | 1.1 | 2,953.90 | 0.18 | 22,329.80 |
| China | Rest of the World | 2015 | 1,760,296.92 | 45.8 | 845,455.70 | 37.7 | 914,841.22 | 57.13 | -69,385.52 |
| China | World | 2020 | 4,508,290.00 | 100.0 | 2,448,030.00 | 100.0 | 2,060,260.00 | 100 | 387,770.00 |
| China | Euro-zone | 2020 | 580,596.00 | 12.9 | 354,679.00 | 14.5 | 225,917.00 | 10.97 | 128,762.00 |
| China | United States | 2020 | 571,572.00 | 12.7 | 435,449.00 | 17.8 | 136,123.00 | 6.61 | 299,326.00 |
| China | Japan | 2020 | 340,009.00 | 7.5 | 163,920.00 | 6.7 | 176,089.00 | 8.55 | -12,169.00 |
| China | South Korea | 2020 | 282,356.00 | 6.3 | 108,855.00 | 4.5 | 173,501.00 | 8.42 | -64,646.00 |
| China | Hong Kong | 2020 | 258,510.96 | 5.7 | 251,385.00 | 10.3 | 7,125.96 | 0.35 | 244,259.04 |
| China | Germany | 2020 | 198,997.00 | 4.4 | 93,715.00 | 3.8 | 105,282.00 | 5.11 | -11,567.00 |

**Note:** The following table shows the trade balance of China from 2005 to 2020. The data is presented in 5-year intervals to show the evolution of the trade balances. The data comes from Bloomberg (2021) which bases itself on International Monetary Fund data. The panel starts with the overall trade picture of China followed by the decomposition of the total trade, exports, imports, and next imports for selected countries. The selected countries are chosen based on the pertinence of this analysis. All the other countries are included in the rows "Rest of the World". This data is repeated for 2005, 2010, 2015, and 2020. The evolution between 2015 and 2020 is of particular relevance as it corresponds to the Trump Administration whereby protectionist policies were adopted by the US

The first observation is that the US and Turkey are trade-deficit countries, whereas China is a trade surplus country. This is true of the four years that we focus on. For example, in 2020, total global net exports stood at – $935 billion, – $55.2 billion, and +$388 billion for the US, Turkey, and China, respectively. If one looks at the relationship between the US and China, we also see that this figure stood at +$299 billion dollars in China's favor in 2020. While lower than where it stood in 2015 at +$337 billion, it clearly shows that Trump's ambitious anti-Chinese trade rhetoric did not make a significant difference in their trade relationship. At the same time, it would not be accurate to explain the US' trade deficit only with China. The US also has a structural trade deficit problem with Eurozone countries as well as with Mexico. As a matter of fact, the US ran trade deficits of – $156 billion with Eurozone countries and – $147 billion with Mexico in 2020. Similarly, China also had a trade surplus of +$128.7 billion with Eurozone countries in 2020. From a historical perspective, we observe that China has been diversifying its trade relationships. For instance, in 2005, the relative weights of the United States and Europe amounted to 18.8% and 12.8% respectively. As of 2020, the same figures stood at 12.7% and 12.9%. Not only have the US shares decreased significantly, the total combined weight of these two trading blocs in China's total trade went down from 31.6% to 25.6%. This is a testimony to China's strategic determination

to globalize its trade and presence across the world, and to reduce any overdependence on any one country. Moreover, China does not always have positive exports with every country either. For instance, in 2020 the country ran deficits with other partners such as South Korea and Germany, from which it imports cars, machinery, and semi-conductors. There are long-term supply-chain contracts established between Germany and China.

Regarding the Turkish trade situation, the country can be seen as a middle-sized trading country with significant potential. While it has made significant efforts to improve its trade, its total trade with the world stood at only $383 billion dollars in 2020. Furthermore, if we are to analyze the country's trade deficit of $55.2 billion dollars, we see that this is mostly caused by its trade with China and Russia. For example, Turkey ran a – $19.3-billion-dollar deficit with China and another – $12.7 billion deficit with Russia. Turkey's imports from China like mobile phones, audio, visual, and other transmission devices, automatic data processing machines and their magnetic or optical readers are the main items constituting the deficit. The deficit with Russia is caused by hydrocarbon imports from this natural gas rich country. On the other hand, Turkey has a much healthier trade situation with its European partners such as the UK, Italy, and Germany. In line with Turkey's global trade policy, it has interests in continuing its good relationship with all parties. It needs to reinforce its links with EU countries, while it needs to rectify its trade composition with China through increased export access to this Asian country.

## 4. China's New Silk Road: Long-Term Trade Strategy Building on a Historical and Cultural Context to Create 21st Century Commercial Links

The Belt and Road Initiative was first mentioned by the Chinese leadership in 2013. Chinese policy makers re-branded the historical trade route to undertake a comprehensive commercial initiative. Although the total number of countries mentioned in the scope of the project vary, there are more than 70 BRI corridor economies (see Table 4), showing the global scale of the initiative.

**Table 4.** List of BRI Participating Countries

| Region | Economy |
|---|---|
| East Asia | People's Republic of China, Mongolia |
| Southeast Asia | Brunei, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam |
| South Asia | Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka |
| Central Asia | Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan |
| Middle East and North Africa | Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Palestinian Authority, Syria, United Arab Emirates, Yemen |

| | |
|---|---|
| Europe and Central Asia | Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Turkey, Ukraine |
| 21st Century Maritime Silk Road | Ethiopia, Kenya, Morocco, New Zealand, Panama, Korea, South Africa |

**Note:** The information (2021) in this table comes from the China International Trade Institute and shows the 72 economies that have cooperation agreements with China in the context of the BRI.

According to a Refinitiv database, as of mid-2020, more than 2,600 projects at a cost of $3.7 trillion are linked to the BRI (Holland & Faulconbridge, 2021). The bulk of these projects are long-term infrastructure undertakings with time horizons in the order of 20 and 30 years. They cannot be considered as short-term profit-seeking endeavors. The BRI project is not a totally new concept and it rather has the objective of reinvigorating the historical trade links that already existed.

### 4.1. Background: Current and Historical Context

The New Silk Road is a general term that has been publicly used since 2013. It applies to the emerging network of infrastructure mega-projects, enhanced transportation routes, and economic and energy corridors designed to increase the connectivity of countries between China and Europe. These span 65 nations, 65% of the world's population, and 40% of the planet's total GDP. Although it had been underway for over a decade, China's 2013 BRI announcement infused the plan with the financial, political, and marketing clout that it needed to have a real impact. (**See Figure 1**)

Currently in its development stages, "the New Silk Road is an endeavor that's spearheaded by big governments and big international development banks. However, without investment from the private sector this project is little more than a naked framework of new highways and rail lines, vacant Special Economic Zones (SEZs) and underpopulated new cities" (Shepard, 2017). From the point of view of bordering countries, the initiative might seem like "a "carrot and stick" strategy or […] a Chinese version of the Marshall Plan" (Wei, 2017). According to Wei (2017) China is taking advantage of its economic growth for political gains abroad. Indeed, while countries may benefit economically through ever increasing Chinese investment, they also risk being subject to its regional dominance. The BRI represents both China's foreign economic strategy and Silk Road implementation plan to cover 55% of the world's Gross Domestic Product (GDP), 70% of its population, and 75% of its energy reserves (Wei, 2017). At the same time, some countries like Pakistan welcome Chinese investment to diversify their economic dependencies and international alliances. Bhattacharjee (2015) suggested that Chinese economic relations and their infrastructure in the BRI context could be seen as a way to alleviate the endemic energy crisis that Pakistan faced. From an economic development perspective, Klement (2021) suggests that "China has tried to escape the middle-income trap by fostering a local high-tech industry that directly competes with high-tech businesses in Japan, Europe, and North America. Furthermore,

China has attempted to build a global supply chain centered on Chinese businesses with the help of the BRI."

At the same time, this project coincides with the economic rise of the country. From the Chinese perspective, this is simply a "return back to the Old-World Order" before European colonization started in the 16th century. At this point, it is important to remember the historical importance of Silk Road.

### 4.1.1. Historical Perspective

The Silk Road, also called Silk Route, is an ancient trade route linking China with the West. It carried goods and ideas between the great Roman and Chinese civilizations. Silk went westward and wools, gold, and silver went eastward (Britannica, 2020).

In her historical explanation, Song (2021) emphasizes that the Silk Road is the world's longest and historically most "important overland trade route. Trade began thousands of years ago because the tradesmen found that ferrying products was profitable, and silk was one of the main trade items. Cultures throughout Eurasia developed economically, technologically, and culturally through trade and travel along the road. ...China has been historically isolated and separated from western civilizations by the world's highest mountains, some of the largest and most severe deserts, and long distances. In between, nomadic people also raided travelers and traders. However, the Shang (1600-1046 BC), Zhou (1045-221 BC), and Han (206 BC-220 AD) dynasties mastered the production of exceptional products greatly valued by the West, such as silk, porcelain, and paper. To reach the West, the most important road was the Silk Road. " (Song, 2021).

### 4.1.2. The Modern Digital Silk Road as of 2015

As part of China's massive BRI, the biggest infrastructure undertaking in the world, Beijing has launched the 'Digital Silk Road' (DSR). Announced in 2015, the DSR has become a significant part of Beijing's overall BRI strategy. Under this mandate, China provides aid, political support, and other assistance to recipient states. As Oropeza García (2020) explains, the DSR also provides support to Chinese exporters, including many well-known Chinese technology companies, such as Huawei. DSR assistance focuses on improving recipients' telecommunications networks, artificial intelligence capabilities, cloud computing, smart cities, and other high-tech areas.

China has already signed agreements on DSR cooperation on investments to at least sixteen countries. Nevertheless, the true number of agreements and investments is likely much larger because many of these go unreported. Memoranda of understandings (MOUs) do not necessarily show whether China and another country have embarked on a close cooperation in the digital sphere. In fact, Erie and Steinz (2021) show that "governments in emerging economies demand

Chinese-built digital infrastructures and emulate China's approach to data governance in pursuit of "data sovereignty" and digital development". China's Digital Silk Road also entails the use of Chinese physical components in the construction of digital infrastructures. This will make Chinese companies key players on the global telecommunications arena.

In this constellation of ventures and technologies, emphasis is given to the relevance of e-commerce both for the enhancement of the Chinese economy and its digital strategy. To this end, we can mention the success of Alibaba's electronic World Trade Platform (eWTP) in terms of progress and project relevance. In Malaysia, the country that is at the most advanced stage in implementing the eWTP, Ali Baba had real success (Bosetti, 2020).

### 4.1.3. China's Health Silk Road in the Post-Corona Context

Chinese diplomacy is making an effective use of Covid vaccines. The larger BRI is framed as a necessary post-corona economic recovery component, but it is the Health Silk Road that is well-praised in China's Covid-era diplomacy. In the fight against Covid, China pursued a friendly policy of "community of common health". President Xi Jinping wanted to use this occasion to help suffering nations and present China as a friendly and responsible superpower. This effort is called "community of common health". China also used its vaccine development with Sinovac vaccines as a way of acting like a global savior. In a way, China is aware that the Coronavirus has worsened trade relations with the US. This is also what Escaith (2021) observes: "This situation is an additional threat for the Multilateral Trade Governance as large-scale trade deflection may induce a cascade of Tit-for-Tat protectionist measures" at a time when the world is fighting with the economic impacts of the Coronavirus.

### 4.1.4. Criticisms of China's Trade Dealings

In its dealing with emerging markets, particularly in Africa, China was first welcomed as a non-judgmental foreign power that brought up no challenges for recipients' political systems or ways of life. While it all started with pragmatic business entrepreneurs, Chinese investors have also been criticized for being Chinese-centric. For example, when doing business in African countries, most Chinese companies brought over Chinese engineers and workers instead of using the local workforce. This has also happened in Asia as in the case of Sri Lanka where the prime example is the Sri Lankan port of Hambantota. "As the story goes, Beijing pushed Sri Lanka into borrowing money from Chinese banks to pay for the project, which had no prospect of commercial success. Onerous terms and feeble revenues eventually pushed Sri Lanka into default, at which point Beijing demanded the port as collateral" (Brautigam & Rithmire, 2021). Mike Pence, Trump's Vice President, often mentioned this example as a case of "debt-trap diplomacy" with military consequences. However, this widely cited Sri Lankan port example does not present the reality of the situation. The Chinese never encouraged such a large-scale project and the China Merchants bank only intervened when Sri Lanka could find no alternative financing from India or the US

(Jones, 2020). Apart from this, there has also been some political criticism from different political entities. Regional rivals like India are also apprehensive about China's economic rise. Pradhan (2019) claims that China's evolving international framework to develop a regional bulwark consolidates its land and maritime position in Asia and will virtually reduce India to a non-power. China's assertive expansion and some countries' negative perception could potentially slow-down the implementation of BRI and, in some cases, cause cancellations. However, China has also been focusing on its image and public relations. As a matter of fact, China's above-mentioned vaccine diplomacy is one such ways.

Needless to say, the comprehensive implementation of the BRI in emerging markets also attracted competition from the EU and US. In 2021, these two blocs announced their intention of announcing their own infrastructure projects to rival the Chinese one. The EU sponsored Global Gateway Strategy (GGS) and the US's "Build Back Better World" (B3W) initiative will further divide the world into competing camps (Khan, 2021). This international competition is likely to cause more friction for Chinese efforts. However, since BRI project already started back in 2013 and is already being implemented, China still enjoys the first move advantage on the global scene. Therefore, we should not realistically expect for a dramatic impact of competing projects on the BRI in the immediate future.

### 4.2. Assessing the Impact of the BRI on Selected Countries from Sector and Company Perspectives: China, Germany, Italy, and Poland

The BRI is a multi-continental and multi-dimensional project with many different global implications. This paper does not intend to discuss the project's scope for each country or all Asian countries even. However, the project's consequences for the selected markets of China, Germany, Italy, and Poland will be discussed before discussing its influence on Turkey in section five. The nature of the projects included in the BRI are infrastructure projects such as seaports, railways, roads, transportation projects, etc. Since most infrastructure projects require intensive capital investments and over 20-year time horizons, they require long-term commitment on the part of Chinese investors. Put differently, these projects require a long payback period and are not appropriate for short-term investors who are after quick gains. The BRI's infrastructure focus lends support to the assessment that BRI is a long-term strategic project as opposed to a short-term one.

#### 4.2.1. China

For China there are both geopolitical and economic motivations behind the initiative. While Xi has promoted the vision of a more assertive China, slowing growth and rocky US trade relations have pressured its leadership to open new markets for its goods. To date, more than sixty countries—accounting for two-thirds of the world's population—have signed on to projects

or indicated an interest in doing so. Alongside the 'Made in China' 2025 economic development strategy, experts see the BRI as one of the main planks of a bolder Chinese statecraft under Xi.

More broadly, Chinese leaders are determined to restructure the economy to avoid the so-called middle-income trap, which has plagued almost 90 percent of middle-income countries since 1960. In this scenario, as low-skilled manufacturing rises, wages go up and quality of life improves, but countries then struggle shifting to produce higher-value goods and services (Chatzky and McBride, 2020). In sum, China aims to make structural changes in the way the global economy works. It no longer wants to be dependent on an economic system that is over-dependent on the US. It wants to create an independent trade infrastructure that it controls and use it to bring prosperity to its partners on a global scale. In 2015, China announced a comprehensive plan that outlines its geographical scope (see Table 4). The scope is truly global in nature; however, this study will focus mostly on East Asia, Central Asia, and Europe.

A growing Chinese market with rising domestic demand will bring great opportunities for foreign products, services, and investment. The transformation of China from an export-oriented economy to a more diversified one with a strong consumption base will make it an attractive country for foreigners. Moreover, Chinese companies will both contribute and benefit from this internationalization and global openness. Many leading Chinese companies are contributing to the success of the BRI. The projects they undertake are of a global nature and they require significant capital investment (Shepard, 2017). It is worth mentioning in an anecdotal fashion some of these Chinese names that play an important international role in the Silk Road's Northern route: : For example, China COSCO Holdings company has acquired Piraeus port in Greece, Kumport terminal in Turkey and Khorgos Gateway in Kazakhstan. Similarly, China Merchants Port, the country's largest public port operator has been actively "extending its reach down the tendrils of the Belt and Road. With investments in 29 ports around the world, the shipping giant is planning to move deeper into Southeast Asia, Turkey, Africa, the Baltics, and Russia over the next years" (Shepard, 2017)

## The Silk Road Fund

In terms of financing, Chinese state banks take the lead. The Silk Road Fund is a state-owned investment fund meant to foster increased investment in countries along the BRI. The Chinese government pledged $40 billion for the creation of the investment fund established on December 29th, 2014. The Silk Road Fund is a limited liability company whose main shareholders are: The Chinese State Administration of Foreign Exchange (65%), the China Investment Corporation (15%), the Export-Import Bank of China (15%), and the China Development Bank (5%). Other Chinese banks active in the initiative include the Agricultural Development Bank of China, the Bank of China, the China Construction Bank, and the Industrial & Commercial Bank of China (OECD, 2018).

Overall, China is the biggest beneficiary of this project as the BRI project will transform the country from an Asian power to a fully global power. Also, China would like to diversify its global outreach away from the China Sea towards land-based commercial routes. Therefore, the revival of the New Silk Road is certainly a strategic project for the world's second biggest economy.

### 4.2.2. Germany

As a global economic power, Germany has a pragmatic and constructive stance towards the BRI. In fact, Germany's then Chancellor Angela Merkel had welcomed the BRI as a means to attract more Chinese investments in Europe and its wider neighborhood. "However, Berlin is also concerned about the initiative's potential to dilute EU investment rules and to erode political unity among member states vying for Chinese investment. Moreover, German media coverage has been mostly negative, with press reports depicting the BRI either as a geopolitical threat or as an over-ambitious endeavor doomed to fail." (Gaspers, 2016).

Given prevailing uncertainties about the geopolitical implications and economic sustainability of the BRI, the German government has actively tried to coordinate Europe's response to and involvement with it through the EU, the Organization for Security and Cooperation in Europe (OSCE), and the G20. Germany is well placed for the role not just as Europe's biggest economy, but also because unlike certain Central, Eastern, and Southern European countries, its economic fortunes do not depend on attracting Chinese investment.

Overall, the German political stance on this issue has been a constructive one. The Belt and Road Initiative offers significant opportunities for German corporations and banks. China is a significant market for the German economy and its corporations. For example, according to official data from the Federal Statistics Office, China topped Germany's foreign trade rankings in 2017 with a total trading value of EUR 186.6 billion highlighting its importance. The BRI route offers significant opportunities for Germany as Europe's largest partner for the BRI (Ebbighausen, 2017).

Thus far, only a few German companies have implemented concrete steps toward participating in China's New Silk Road. One of them is Deutsche Bank, which has ploughed three billion dollars into the Chinese Development Bank and aims to boost economic cooperation between China and Germany within the framework of the initiative. Another bank that aims to capitalize on the BRI is Commerzbank. It finances approximately 30% of Germany's foreign trade and is a leading finance provider for corporate clients in Germany. Furthermore, Commerzbank has an ambitious plan to roll-out the BRI to the German Duisburg Port, the largest inland port in the world, which is positioned as an important and strategic endpoint to the Silk Road. Now already 24 trains from the Far East unload there every week. Meanwhile, Deutsche Bahn, Germany's publicly owned rail company, plans to expand its activities in China. Germany's exposure to BRI transportation projects has been limited to five projects linking existing railroads. Please see Table 5 for more details.

**Table 5:** Germany's Exposure to BRI's Transportation Projects

| Railway Link | Inception | Operator(s) | BRI (re-) branding |
|---|---|---|---|
| Leipzig-Shenyang | Sep 2011 | DB Schenker | Initiated in 2011 without a "Silk Road label". Since 2012, presented in the media as example for "Silk Road" transport links |
| "Yuxin'ou-Railway" Duisburg – Chongqing | Jan 2012 | YuXinOu Logistics Company (Chinese-German-Russian-Kazakh joint venture); Trans Eurasia Logistics | One regular train per week from 2021 onwards; increased frequency to three times per week in 2014; presented by the operators as a "Silk Road" project since March 2014 |
| "Trans Eurasia Express" Hamburg – Zhengzhou | Regular traffic since 2013, further extended July 2015 | Joint project by DB Schenker & Zhengzhou city, operated by Trans Eurasia Logistics; DHL Freight operation since July 2016 | First "pilot train" was operational in Oct 2008 (Xiangtang – Hamburg); actively promoted as "Silk Road" project by new operator DHL Freight since 2015 |
| Hamburg – Harbin | June 2015 | Trans Eurasia Logistics | Promoted under "New Silk Road" label from its very conception |
| Nurnberg – Chengdu | October 2015 | Hellmann Rail Eurasia | Promoted by Hellmann and German as part of "New Iron Silk Road" |

**Source:** MERICS Research

Another company, which is convinced by the BRI, is Siemens. It is among the first global companies to partner with Chinese Engineering, Procurement, and Construction (EPC) in their "go global" endeavor. In fact, Siemens has been joining forces with over 100 leading Chinese EPCs in more than 100 countries and regions for more than two decades. For example, according to a June 6th, 2018 press release, Siemens helped China Tianchen Engineering acquire the biggest order ever won by a Chinese company in Turkey to build one of the world's largest soda ash factories. German companies view the BRI as a business corporation opportunity.

### 4.2.3. Italy

Italy has been one of the first European countries to show an enthusiastic approach to the BRI. In March 2019, President Jinping signed a non-binding agreement with the Italian government to join China's trade route inking 29 deals worth 2.5 billion euros ($2.8 billion) across an array of sectors. Italy thus hopes the project will boost its sluggish economy (Ellyatt, 2019).

Industrial relations between Italy and China date back to the mid-1980s. When Romano Prodi, who would later serve two terms as prime minister, was president of Italy's Institute for Industrial Reconstruction and China asked him to build a factory in Tianjin. In return, his Chinese counterparts helped him build a factory in what was then the Soviet Union. Once he became prime minister in 1997, Prodi led a massive trade mission to China, bringing over 100 companies to promote joint ventures in engineering, pharmaceuticals, foodstuffs, textiles, fashion, and finance (Bindi, 2019).

Italy has good reasons to nurture its friendship with China. Enrico Fardella and Giorgio Prodi of the University of Bologna have studied the BRI's impact on Europe, particularly Italy. They point out that "since a Chinese shipping company bought a controlling stake in the Greek port of Piraeus in 2016, the Mediterranean has become a more important trade hub for China". As a matter of fact, maritime transport is an important part of the BRI because most trade between China and Europe happens by ship, and Italy wants to remain central to these developments. Trade experts warned "that, should Italy remain outside the BRI, it could miss trade opportunities. Specifically, Italian ports on the Adriatic Sea could lose business, should the Port of Piraeus become linked to Central Europe via rail. "

Apart from logistics, we have seen a significant amount of BRI-related investment from Chinese companies in Italy, including capital flowing from privately owned companies. One example is the leisure sector, where private players in China have effectively given it a new lease of life in Europe (Svaluto, 2019). With China integrating into the world economy, Chinese tourists and consumers are likely to favor destinations like Italy. Chinese entrepreneurs are already investing in Italy's tourism and luxury sectors.

### 4.2.4. Poland

In the BRI context, Poland's unique location is an incredible asset. Poland has also attracted many Chinese companies thanks to its excellent geographical location. The country is seen as a launching pad to other key Eastern European markets. For example, as of 2020, Poland accommodated the new AliExpress logistics center, which was a major addition to the e-commerce industry. This center operates as a joint venture between the Alibaba Group, the Shanghai-headquartered Logistics Group (WWL), and the ATC Cargo, a multi modal Polish freight delivery company (Hong Kong Trade Development Council, 2018).

Poland now plays a pioneering regional role in improving trade relations through the railway sector. It is estimated that by the end of 2017, approximately 25 percent of all goods arriving by rail to the EU came through Poland. Rail traffic between China and the EU has increased a hundredfold over the past decade (Góralczyk, 2019). For example, in November 2019, Poland's Gdansk Port received the inaugural Euro-China Train (ECT) as China's BRI carried out a direct link to the Baltic Sea. Adampol, the Polish transportation and logistics company, reported that there is growing interest in the new service, which cuts journey times from China to Gdansk from 40-45 days via sea to 10-12 days via rail. The Baltic Train will also "turbocharge" delivery times for goods between China, Britain, and Scandinavia down to 12-14 days through feeder services from Gdansk, cutting journeys by 3-5 days via the Port of Hamburg (Silk Road Briefing, 2019).

Despite various negative perceptions, the BRI still offers many potential benefits to the Central and Eastern Europe (CEE) region. Aside from the development of rail infrastructure, the energy sector has received some Chinese tenders. There are contracts for power plants in Romania (€7 billion), the Czech Republic (€15 billion), and Bulgaria.

For Poland, the BRI has become the focus of its foreign policy. Poland is located on the main land axis of the Silk Road from China to Western Europe and is therefore an inalienable asset for China. It would be wise to use this asset properly. Yet, unlike comparative successes in their diplomatic relations, so far neither has achieved much success in the economic sphere.

## 5. A Special Look into The China-Turkey Trade Relationship

China has sought to develop a strong long-term relationship with Turkey due to its strategic location and economic potential. The trade links mostly focus on long-term infrastructure projects, banking cooperation, and Covid vaccines supply.

The trade relations between China and Turkey have significantly increased since 2016. An analysis by Alemdaroglu and Tepe (2020) showed how by the end of 2020 China and Turkey had 10 bilateral agreements, including health and nuclear energy related ones. "China is now Turkey's second-largest import partner after Russia. China has invested $3 billion in Turkey between 2016 and 2019" (Alemdaroglu & Tepe, 2020).

Turkish government authorities already appreciated this link 2018 when the Industrial and Commercial Bank of China provided them with a $3.6 billion loan following a 40% lira decrease after Trump tweeted against the country. Moreover, establishing diverse financial relations is in line with Turkey' long-term financial diversification strategy. In a May 2017 Financial Stability Report, the Central Bank of the Republic of Turkey (2017) noted how the diversification in the countries and banks that provide to the Turkish banking sector has increased. According to the authors, this was a welcome development that limits the spillovers of potential financial shocks to a country's banking system. In June 2021, Reuters reported that Turkey's Central Bank agreed with China to increase an existing currency swap facility to $6 billion from $2.4 billion, in a move that could boost foreign reserves. This agreement represents a much-needed positive support for the Turkish Central Bank. While the Turkish Central Bank sought for similar comprehensive deals with Western central banks, the Chinese response has been the timeliest one.

Moreover, China acts as a responsive and agile partner when it comes to trade negotiations. This open and reliable attitude is valued by Turkish policy makers who are somewhat frustrated by the lack of progress in the Customs Union modernization negotiations with the EU. Arbay (2020) suggests that Turkey is keen on starting the negotiations although political conditions, attached as pre-conditions to the modernization of the Customs Union, create disappointment and demotivation. Needless to say, if this difference in attitude and constructiveness between China and the EU continues, we could realistically expect China to become Turkey's first choice in trade partners.

Apart from the economic and financial aspects, the BRI is in line with Turkey's long-term logistical objectives. For example, the country put forward a new Silk Road initiative named the 'Middle Corridor', referring to the country's strategic position. This initiative includes Baku-Tbilisi-Kars

Railway line, which constitutes the main pillar of the Middle Corridor. Concretely speaking, the block container train services are set to arrive from Xi'an, China, entering Turkey via the cities of Kars, Erzurum, Erzincan, Sivas, Kayseri, Kırıkkale, Ankara, Eskişehir, Kocaeli, Istanbul (Marmaray) before entering Europe through Kapıkule (Edirne) (Bilgener, 2019). Figure 1 demonstrates the strategic positioning of Turkey,


**Figure 1:** Mapping the Belt and Road Initiative's Plan and Progress

**Source:** CSIS Reconnecting Asia Project, U.S. Global Investors (2021)

The main aim of the BRI is improving logistical infrastructure and therefore improving the trade scope connecting Asia, Africa, and Europe via roads and sea-lanes. The railway will reduce freight transportation times between China and Turkey from one month to 12 days, the whole route between China and Western Europe taking 18 days with the integration of Istanbul's Marmaray tunnel. China's BRI offers Turkey a source of fresh cash—and Beijing a strategic foothold on the Mediterranean Sea (Alemdaroglu & Tepe, 2020). As part of the infrastructure-building initiative, Turkey completed a railroad from Kars in eastern Turkey via Tbilisi, Georgia, to Baku, Azerbaijan, on the Caspian Sea, from where it links to transportation networks to China. Due to this, some Chinese companies have become interested in Turkish infrastructure facilities. Some major international investments of China Merchants Port Holdings in consortium with COSCO have bought a controlling stake in Turkey's Kumport terminal, focusing on container shipments (Shepard, 2017).

Turkish construction companies, which are highly active in the Central Asian Republics, are also looking forward to cooperating with their Chinese counterparts. Areas of cooperation consist in building roads and airports in the STAN countries, such as Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. Some Turkish companies, such as Koc

Holding-linked Arcelik, are aiming to reinforce their presence in the New Silk Road region. Recently, they acquired Hitachi's foreign business, particularly focusing on this area. This also aligns with Arcelik's strategy to venture deeper into Asia, with the company looking to gain a major presence in markets along the Silk Road (Tavsan, 2021).

On the Healthcare front, the Coronavirus context of 2020-2021 has brought China and Turkey even closer. For example, the Turkish Health Ministry ordered 100 million vaccine doses from Sinovac in January 2021, even though the Chinese producer was only able to deliver 30% of these shipments by May 2021. In the selection process, the cost and technology transfer aspects were the main factors that led Turkey to choose them as the main vaccine supplier. This vaccine diplomacy further improved the image of China in the country: Chinese cooperation was received as a responsible and timely move.

Moving forward, Turkey is a reliable trading and investment partner for China. Its geographical location and its investment friendly attitude are positive factors for overseas investments. While the initial reactions in some European countries like Holland have been somewhat reticent regarding the BRI, Turkish leaders showed no such negative attitude. With its existing customs union with the European Union, Turkey could be a launching pad for Chinese industrial players to enter the European market. There is also a strategic fit in terms of what sector investments Turkey has to offer and what Chinese investors are searching for. In the BRI context, the Chinese target investments in particular sectors like Energy, Logistics, and Mining. Interestingly, as of May 2021, these sectors make up around 50% of Turkish Sovereign Wealth Fund assets, and Turkish policy makers will likely be open about receiving investments in these particular assets. Overall, Turkey can easily absorb around $10-$15 billion of Chinese Foreign Direct Investment (FDI) in the 2021-2025 period. This is a mutually beneficial cooperation opportunity with Turkey offering solid and attractive businesses and China searching for sustainable acquisition targets in key sectors.

Furthermore, when Turkey's historical partners, namely the US and the EU, were not showing full commitment to the country in 2018-2019, Chinese engagement was well-received by the Turkish ruling class.

While the trade and economic cooperation potential between these two countries is significant, there are also areas for significant improvement that need to be rectified to build sustainable long-term links. As can be seen in **Table 2,** Turkey has an unhealthy trade balance with China. For instance, the trade deficit stood at – 22.3 billion in 2015 and – 19.3 billion in 2020. To have a sustainable balanced relationship, Turkish exporters need freer access to the Chinese market and a comprehensive trade deal should take measures to reduce this imbalance to more sustainable lower levels. For example, Turkey should lobby Chinese authorities to have open and freer access to the Chinese market. In the case of the Ukraine, Vlasenko, Gneusheva, and Bublei (2019) advise the country that to avoid becoming mere suppliers of raw materials, Ukraine must rebalance its trade with China and focus on exporting processed food products. This is the only type of

commodity the Chinese will not be able to provide by growing their manufacturing capabilities or replicating previously imported technology. Similarly, Turkey should also carry out a gap analysis in its trade with China. It should identify several sectors where China might be an ideal market for Turkish exporters and where Turkey has competitive advantages. China is interested in keeping Turkey as a long-term strategic commercial partner and enabling more Turkish exports to its market would certainly enhance this relationship.

## 6. Conclusion

The rise of China as a global power has been one of the important geopolitical developments of the last three decades. The BRI is a flagship project of this ascending power. Not only has China put in place a comprehensive plan, but it has also rivalled the Group of Seven richest democracies (G7) to the point of moving them to react with their own global infrastructure projects.

In this paper, we have provided evidence for the hypothesis that these BRI investments should be seen as a part of the long-term strategy of a country that aims to be both a political and economic world leader. Such evidence includes the long-term nature of BRI infrastructure projects, Chinese government trade diversification objectives, active Chinese diplomacy as in the case of vaccine diplomacy, and the geographic scope of the BRI. The nature of BRI projects does not point towards a short-term profit-seeking approach. This is rather a well-planned long-term project which aims to reap the benefits in the distant future. Furthermore, the EU and US reacting with their own long-term GCS and B3B infrastructure projects support our thesis that the BRI is a long-term Chinese strategy for becoming a world power.

China has the right financial and economic resources to be a world trade powerhouse. At the same time, China will be better off anchoring the BRI within the context of existing negotiations on regional or multilateral investment. Put differently, by discussing more openly with other trading blocs like the European Union, the world's second economic power can achieve its BRI objectives in a more efficient smoother manner without attracting fierce competition.

Since 2013, and particularly during the Covid pandemic, China has successfully positioned itself as a friendly superpower. Pragmatic trade deals without political conditions and solid execution characteristics define the Chinese investment style. The Chinese political elite was able to fill the gap left by the West in a clever way. For example, while the West has been snubbing its long-term ally Turkey, the Chinese forged strong financial and economic links with the country. While there are also accusations against China of state mercantilism and debt trapping, their pragmatic trade style has been finding a positive response in different markets including Turkey's. This style cleverly combined long-term strategic objectives with grasping short-term tactical opportunities.

Overall, world trade would greatly benefit if major trading powers, namely China, the US, and the EU constructively discussed in the WTO framework. This would also facilitate China claiming its global economic status without any unnecessary friction.

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ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

# ENVIRONMENTAL AND ECONOMIC IMPACT ANALYSIS OF REDUCING GREENHOUSE GAS EMISSIONS VIA ENERGY SUBSTITUTION AND CARBON TAX

## ENERJİ İKAMESİ VE KARBON VERGİSİ YOLUYLA SERA GAZI EMİSYONLARI AZALTIMININ ÇEVRESEL VE EKONOMİK ETKİ ANALİZİ

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**Abstract**

Accordingly, with the decisions taken under Paris Conference-2015, Turkey has committed to constraint greenhouse gas emissions. An environmentally efficient way to do this is controlling industrial processes and fossil fuel use. Turkey has also determined her energy use targets as documented in Energy Strategy Document in which partial substitution of natural gas used in electricity production with some other energy sources is suggested as an alternative instrument in reducing greenhouse gas emissions. This study aims at developing a policy package to reduce total greenhouse gas emissions and to carry out the environmental and economic impact analysis of the policy package. Findings suggest that energy substitution will not be enough to achieve the targets proposed under Paris Conference commitments. Carbon taxing should be applied besides energy substitution, but rather on all industries it should be applied on selected polluter industries. In this way, while environmental targets are reached contraction in the economy will be less.

**Keywords:** Greenhouse Gas Emissions, Energy Substitution, Carbon Tax, Input-Output Matrix
**Jel Classification:** C67, H23, Q5, R11

**Öz**

Türkiye, 2015 yılında Paris Konferansı kapsamında alınan kararla sera gazı emisyonlarını sınırlamayı taahhüt etmiştir. Çevresel açıdan bunu yapmanın bir yolu endüstriyel süreçleri ve fosil yakıt kullanımını kontrol etmektir. Türkiye ayrıca Enerji Stratejisi Belgesi'nde sera gazı emisyonlarının azaltılmasında alternatif bir araç olarak elektrik üretiminde kullanılan doğal gazın diğer bazı enerji kaynakları ile kısmen ikamesini önererek enerji hedeflerini belirlemiştir. Bu çalışma, toplam sera gazı emisyonlarını azaltmak için bir politika geliştirmeyi ve bu politika paketinin çevresel ve ekonomik etkilerini analiz

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etmeyi amaçlamaktadır. Bulgular, Paris Konferansı taahhütleri altında önerilen hedeflere ulaşmak için enerji ikamesinin yeterli olmayacağını göstermektedir. Karbon vergisi enerji ikamesi ile birlikte tüm endüstrilerden ziyade seçili endüstrilere uygulanmalıdır. Bu yolla çevresel hedeflere ulaşılırken ekonomideki daralma daha az olacaktır.
**Anahtar Kelimeler:** Sera Gazı Emisyonları, Enerji İkamesi, Karbon Vergisi, Girdi-çıktı Matrisi
**Jel Sınıflandırması:** C67, H23, Q5, R11

## 1. Introduction

The level of greenhouse gas emissions of Turkey was 207.8 $mtCO_2e$ (million tons of carbon dioxide equivalents) in 1990, but reached at 467.6 $mtCO_2e$ in 2014. When the greenhouse gas emissions are evaluated according to industrial distribution, it is observed that the energy sector has the highest share with 72.5%, followed by industrial transactions and product usage with a share of 13.4%. The share of energy sector in annual emissions has increased from 64% to 73% in the 1990-2014 period. It was also found that 80% of the annual increase in emissions was attributable to the energy sector. On the other hand, an increase in per capita emissions also occurred in the 1990-2014 period. Emissions per capita in 1990 were 3.77 tons, rising to 6.08 tons in 2014 (TURKSTAT, 2016).

The high demand for electricity and the share of coal used in electricity generation are remarkable and lie behind the high rate of emission increase in Turkey. Emissions from coal combustion amounted to 62.6 million tons in 1990, rising up by 130% to 144.2 million tons in 2012, and approximately one-third of total emissions in 2012 stemmed from coal consumption. Emissions from coal burned in thermal power plants in the period from 1990 to 2012 increased by 219%, trending above the rate of increase in total emissions (Yeldan et al., 2016: 35).

In accordance with the Paris Agreement adopted at the climate change conference on December 2015 in Paris, it was decided that the increase in global average temperature should be kept well below 2 $^0$C compared to the pre-industrial period, and that the parties should struggle to limit the increase at 1,5 $^0$C (Yeldan et al., 2016: 37). Contrary to the Kyoto Protocol, the Paris Agreement, which entered into force on 4 November 2016, has stipulated for the first time all countries to participate effectively in combating climate change. Therefore, this agreement aims to accelerate the investments and actions required for a sustainable, low-carbon future (UNFCCC, 2016). This method, called 'bottom up' approach, has been added to the Paris Agreement under the name of 'Intended Nationally Determined Contributions' (INDC, 2016). According to the Agreement, the party states are obliged to update the INDCs and give information about their national contributions in the line of achieving the purpose of agreement during the global situation assessment meeting to be held every 5 years (Yeldan et al., 2016: 37-38).

To carry out the National Contribution Statement of Turkey, it is beneficial to examine the issue within the relevant national and industrial plans and policies. In this respect, the targets and policies in Turkey's Tenth Development Plan are of great importance (TCKB, 2014). As a result of policies to be implemented according to the Tenth Development Plan covering the period

2014-2018, the real GDP is projected to increase by an average of 5.5%. Parallel to these targets, the Energy Efficiency Law and relevant regulations that incentive for efficient energy use were enacted and enforced, and it was aimed to reduce energy intensity by at least 20% by 2023 in accordance with the Energy Efficiency Strategy Document published in 2012.

Turkey is a country that stands out with its rapid increase in total greenhouse gas emissions rather than its greenhouse gas emission volume. So now it has to follow a steady path to achieve the environmental targets set to contribute to climate change. The most important issue on this path is that the economic policies to be implemented for emission reduction should not contradict the growth targets of the economy. In other words, it will not be reasonable and meaningful to reach environmental targets only by complying with economic goals.

In this study, the environmental and economic impacts of carbon taxing and energy substitution policies were analysed. Policies were applied in accordance with the targets set out in the current economic plan and environmental commitments to reduce greenhouse gas emissions. The main argument of the study is that the economic policies, which could be implemented to meet the greenhouse gas emission targets, conflict with the growth targets of the economy. In other words, if a different policy package is not implemented, the declared emission (growth) targets are an obstacle to the targeted economic growth (emission reduction). The second part of the paper provides a review of the relevant domestic and international literature. Third part presents methodology together with empirical analyses. In section four the study concludes.

## 2. Review of Empirical Literature

The first part of this review focuses on the studies that analyse environmental and economic impacts of carbon tax policy used as an instrument to reduce greenhouse gas emissions. We prefer to provide common features of these studies in the text and a list of literature categorized with respect to focused country and to specific policy instrument [1] is given in the appendix. The second part will review the studies that focus on the same subject particularly in Turkey.

Carbon tax is a widely used policy tool to reduce greenhouse gas emissions, and there are numerous studies in the international literature that discuss the environmental and economic consequences of carbon taxation. The common emphasis of these studies is that carbon tax is effective in reducing emissions, but it is likely to cause a significant contraction in economic activity in which the expected effects of Pigouivan taxation [2] will appear. In preventing or reducing this economic contraction, it becomes important to return the carbon tax revenues to the economy, and to know in what channels these revenues are returned. In addition, neutral taxes come into prominence to avoid the economic contraction against environmental gains. In other words "double dividend theory" at this point can be a solution to the economic contraction

1 Neutral tax: terminology used to name policies implemented to offset/reduce contractionary economic impacts of carbon taxing.

2 Krugman and Wells, 2009: 445-450.

problem either through reduction of other taxes on economic agents or through transferring the collected carbon tax back to the agents in some sort of a subsidy or direct income. [3] The studies in question, generally, have applied a computable general equilibrium model and evaluated the effects of carbon tax and various energy taxes on the environment and economy. In addition, they have emphasized through which channels to return revenues from carbon tax and other energy taxes to the economy in order to prevent or optimally reduce their negative effects on the economy. The studies cover a large set of countries and their industrial and time focus also differs.

In the studies, neutral taxing is applied through reductions in other either direct or indirect taxes. Mostly personal income and/or corporate tax rates are utilized and in some studies reductions in taxes regarding employment/labour market and capital taxation is also used. There are some studies that employ industry specific tax reductions and some decreases the tax rate on consumption. Returning collected carbon tax revenue back to the economic activity is another channel to overcome the adverse impact of carbon taxes on economy. Transferring the tax revenue to households to trigger final consumption expenditure in economy is one channel while providing those resources to firms to create incentive for production is another. Transfer to firms either aim at reducing intermediate input cost or cost of labour to the firm.

There are only limited number of studies on environmental and economic effects of carbon taxation in Turkey. The earliest is Telli et al. (2008) in which a computable general equilibrium model is used to analyse 2006-2020 economic effects of emission reduction policies applied in accordance with Kyoto Protocol. The economy is aggregated into 10 industries that specifically focus on main energy and mining industries. Carbon emission quotas and carbon taxes are used as alternative policy instruments. The latter was found to be more effective in terms of reducing gas emissions. Both instruments create a contraction in the economy however since carbon taxing is more effective, adverse economic effects of this policy is not as high as of carbon quotas.

Another CGE work was carried out by Bouzaher et al. (2015) to evaluate the effects of emissions and waste generation over the period of 2010-2030. They aggregated the economy into 12 industries by focusing more on manufacturing and energy. While they applied emission tax on urban households, they also used tax against industrial and household solid and liquid wastes. Tax revenues were transferred back into green professions and also used to lower employment taxes. In the rural areas tax revenues were used to lower costs of water use efficiency, to improve management and conditions of meadows and to protect agricultural lands. They conclude that to use any environmental policy to reduce wastes and emissions some recovery policies to overcome the adverse economic impacts should definitely be used.

Yeldan and Voyvoda (2015) analysed impacts of commitments given by Turkey accordingly with decision taken in 2015 Paris Congress. They also simulated effects of transferring carbon tax revenues to renewable investment funds. Findings from CGE modelling suggest that in 2030

3 Jaeger, 2013: 2-16.

emission targets will be reached however at the cost of contracting economy until after 2020. Once renewable investments are used in economic activities the economic recovery will start in 2030.

Lastly Yeldan et al. (2016) has simulated economic effects of fossil-fuel taxes to reach %21 reduction in emissions by using a CGE model. Tax revenues were injected back to the economy by lowering taxes on employment. According to their findings sole taxation will result in less emissions at the cost of slower economic growth rates and lower employment. Therefore, tax revenues have to be used to lower employment costs in order to overcome the adverse impacts.

Two more studies, Bhutto and Çağatay (2010); Özeş and Çağatay (2015), are worth to mention here due to the methodology they used for energy substitution. While the former simulates impacts of substituting fuel oil used by households and in industrial production with natural gas, the latter focuses on the substitution of natural gas and with bio-ethanol. Both studies target the impacts in Turkish economy by employing an input-output matrix of the country.

This study shares common grounds with Bhutto and Çağatay (2010); Özeş and Çağatay (2015) in terms of the methodology used for energy substitution. On the other hand, carbon taxation is another common policy instrument used both in this study and in large number of studies in international literature. As a difference, in this study energy substitution and carbon taxation are used together to reach emission targets without creating too big adverse impacts on the economy.

## 3. Methodology and Empirical Analysis

Turkey has announced its national target for greenhouse gas emission reduction through the Intended Nationally Determined Contribution (INDC, 2016) in the 21$^{st}$ Conference of the Parties held in December 2015, before the Paris Agreement, which was adopted with the participation of 195 countries and entered into force on 4 November 2016 (Yeldan et al., 2016: 19). This document explains that in the case of current economic growth targets and assumptions about the amount of energy use, it is aimed to reduce the greenhouse gas emission of 1,175 million tons of $CO_2$ equivalents to be released in 2030 by 21% to 929 million tons of $CO_2$ equivalents. Thus, Turkey aims to keep the target of global warming up to 2 $^0$C by 2030, as envisaged in the Paris Conference. Turkey should also take into account economic growth targets and policies while achieving the greenhouse gas emission targets set out in its National Contribution Statement. An important economic objective to be taken into account in this respect is the general economic growth target set out in the Tenth Development Plan for the period 2014-2018. The average real GDP growth is projected to be 5.5% and 5.9% for the periods of 2014-2018 and 2017-2018, respectively. Another target to be considered is determined in the Energy Efficiency Strategy Document, which aims to reduce energy intensity by at least 20% by 2023 (Energy Efficiency Strategy Document, 2012). By 2018, the targets of primary energy and electricity demands were set at 154,000 BTEPs and 341,000 GWH, respectively, while the share of natural gas and renewable resources in electricity generation was targeted at 41% and 29%, respectively.

A contradictory situation arises when the various commitments and targets mentioned above are evaluated together. This contradiction arises from the energy use consistent with economic growth targets making it difficult for Turkey to fulfil the Paris Conference commitments, in other words, the energy use fulfilling the Paris Conference commitments makes it difficult to achieve economic growth targets. The focal point of the empirical analysis carried out in the present study shows the presence/absence of this contradiction. The hypothesis to be tested through analyses is that Turkey cannot achieve its goal of economic growth in case of fulfilling the Paris Conference commitments. This hypothesis is tested for the year 2018, the last year of the Tenth Development Plan. The proposed policy change under which the study is going to test the hypothesis is carbon tax application and energy substitution.

For calculating economic effects Turkey's year 2012 input-output matrix is used, in which 65 industries are aggregated into 15 industries. By using the well-known Leontief inverse, demand side shocks were introduced and employment multipliers were also calculated. Calculations regarding energy substitution are carried out exogenously and explained in the following sub-sections.

## 4. Emission Reduction Through Energy Substitution

Turkey's National Contribution Statement aimed at reducing the greenhouse gas emission of 1,175 million tons of $CO_2$ equivalents to be released in 2030 by 21% to 929 million tons of $CO_2$ equivalent. The Declaration predicts an annual average increase of 6.3% on total greenhouse gas emissions. Based on this information and the total greenhouse gas emission volume realized in Turkey in 2014, firstly greenhouse gas emissions were calculated for the cases with and without a greenhouse gas reduction commitment in 2018 (Table 1: 581.7 and 535.5 million tons $CO_{2e}$, respectively)

**Table 1:** Total Greenhouse Gas Emission Target Values

| (mn. Tons $CO_{2e}$) | 2018 | 2030 |
|---|---|---|
| **Base scenario** | 581,7 | 1.175,0 |
| **Paris Conference Target** | 535,5 | 928,3 |
| **Reduction Target** | 46,7 | 246,7 |

**Source:** Author calculations.

First part of the scenario analysis reveals the greenhouse gas emissions and economic changes that can meet the changing energy demand when a certain proportion of the total amount of natural gas used in electricity generation is substituted by bio-ethanol [4]. In the scenario, the share of natural gas usage in electricity generation (48.1%) is targeted to reduce the level of natural gas usage (41%) in electricity generation for 2018, which was determined in the Energy Strategy

4 In their empirical analyses, previously Çağatay et al. (2017: p. 222) has concluded the feasibility of using wheat, maize and sugar beet production in Turkey in production of bio-ethanol and hence in reduction of $CO_2$ emissions.

Document. For this purpose, the total amount of natural gas used in electricity generation in 2014 was reduced by 7.1% and the resultant energy deficit was met by increasing the bio-ethanol demand through bio-ethanol net calorie value. This reduction in natural gas usage was reduced from the total emission volume using emission factors, and the increase in bio-ethanol consumption was added to the total emission again using the emission factor (Table 2).

**Table 2:** Results of Energy Substitution

| | | | | | | **Calorie Value in Case of 7.1% Reduction in Natural Gas Consumption (Tj)*** | |
|---|---|---|---|---|---|---|---|
| | **Natural Gas Amount Used for 2014 Year Electricity Production (thousand TEP) (A)** | **Net Calorific Value (Tj / 1000 tons) (B)** | **Total Calories (Tj) (A * B)** | **Emission Factor (Kg/Tj)** | **Total Greenhouse Gas Emission (Kg)** | **Natural Gas Total Calorie Value (Tj)** | **Bio-ethanol Increase to Close Calorie Deficit (TEP)** |
| **Natural Gas** | 10.384,7* | 48** | 498.463 | 56.100 | 27.963.785.520 | 463.072 | 1.291,6 |
| **Bio-ethanol** | | 27,4** | | 79.600 | | | |

**Source:** * Electricity Production Sector Report, 2015.

** IPCC, 2006.

*** The total calorific value of natural gas was calculated by multiplying the value that was obtained when natural gas usage is reduced by 7.1%, with the net natural gas calorific value. The bio-ethanol increase to close the calorie deficit was achieved by dividing the calorie deficit resulting from the reduction of natural gas demand to the bioethanol net calorie value

As a result of the analysis, the total emission of greenhouse gases (24.9 million tons) was found to be less than the target emission (46.7 million tons – Table 1) determined in the Paris Conference.

## 5. Emission Reduction Through Energy Substitution and Carbon Tax

In the second part of the scenario analysis carbon taxation has been introduced in addition to energy substitution as emission reduction after energy substitution was enough to meet the target. Prior to the application of carbon taxation, the industries to which the tax would be applied to achieve the targeted emission reduction were identified. The selection of industries to be focused in this scenario was based on their shares in total emissions. Two industries from them, namely 'electricity, gas, water, treatment, infrastructure' and 'chemicals, plastic products, non-metallic minerals', are the ones with highest emissions share in total emission. The third industry, 'coke and refined petroleum products,' is also important as it is the primary energy industry with a high share of emissions. In this scenario, the amount of total emissions to be reduced is shared only among these three industries.

The amount of emission reduction for 2018, shown in Table 1, was distributed to the industries using the total greenhouse gas emissions of the industries [5]. The drop in production, which

5 The industrial emission shares are multiplied by the target emission amount. Industrial emission data from the WIOD tables were used when calculating industrial emission shares (WIOD, 2017)

will provide the projected emission reductions for each industry, is then calculated by using greenhouse gas emission coefficients per unit production value in these industries. In the next stage, the amount of carbon taxation that would give the necessary production reduction was found by using the industry-based reduction of production value and the tax-production value elasticity coefficients [6] calculated for each industry (Table 3).

**Table 3:** Emission Shares, Carbon Tax Amount and Production Decrease by Industry

| | Industrial Distribution of 21.8 million tons of Emission Reduction (%) | Required Production Decrease (million TL) | Carbon Tax Amounts (million TL) | Share of Industrial Carbon Tax Amount in Industrial Tax Burden (%) (tax on product + production) | Share of Industrial Carbon Tax Amount in Total Carbon Tax (%) |
|---|---|---|---|---|---|
| **Coke and Refined Petroleum Products** | 1,42 | 476 | 63,06 | 0,001 | 4,93 |
| **Chemicals, Plastic Products and Non-Metallic Minerals** | 6,55 | 8.35 | 412,57 | 0,007 | 32,25 |
| **Electricity, Gas, Water, Treatment, Infrastructure** | 13,83 | 10.89 | 803,68 | 0,013 | 62,82 |
| **Total** | 21,80 | 19.71 | 1279,32 | 0,021 | 100,00 |

**Source:** Author calculations.

The results of the inter-industry interaction (indirect effects) caused by the production decrease (direct effects) on the industrial basis and the resultant economic downsizing effect were determined by the demand-side input-output matrix simulations. In addition, an industrial employment decline was determined after economic contraction by using employment multipliers. Direct and indirect production effects are given in Table 4.

First column in Table 4 gives the increase in value of industrial production in case if there were no carbon taxing. Second column presents the decrease in production with respect to required emission reduction in the selected three industries. Third column gives the inter-industry impacts arose due to the fall in production value. The last column provides the decrease in payments to employees which proxies the fall in employment. In the base scenario in case if there was no carbon taxing the overall growth of the economy would be about %4,4 which was still lower than the targeted rate of %5,5. After energy substitution, carbon taxing created a fall in overall growth,

6 Calculation of carbon tax elasticity: Both year's 2002 and 2012 input-output tables were aggregated for 15 sectors, and then elasticity coefficients between tax and supply data for these years were found.

2012 net taxes and subsidies ($Y_{1)}$

2002 net taxes and subsidies ($Y_2$)

2012 value of production ($X_1$)

2002 value of production ($X_2$)

Tax-production value elasticity coefficient: $\epsilon_{\nu\ddot{u}} = \frac{\%\Delta(X_1 - X_2)}{\%\Delta(Y_1 - Y_2)} * \frac{(Y_1 - Y_2)/2}{(X_1 - X_2)/2}$

in other words the economy contracted about %0,4 which meant a fall in growth about %4 with respect to base scenario and a fall about %5 with respect to target growth rate.

**Table 4:** Economic Contraction as a Result of Inter-Industry Interactions

| Thousand TL | Base Scenario* | Industrial Production Decrease (direct effect) | Industrial Production Decrease (indirect effects) | Decrease in payments to Employees |
|---|---|---|---|---|
| **Agriculture, Forestry and Fishery** | 4.759.580 | – | 98.113 | 1.416 |
| **Mining and Quarrying** | 5.392.303 | – | 4.014.356 | 4.300 |
| **Food, Beverages and Tobacco Products** | 6.839.937 | – | 80.013 | 4.475 |
| **Textile, Garment, Leather and Related Products** | 6.248.774 | – | 99.098 | 4.475 |
| **Coke and Refined Petroleum Products** | 3.506.375 | 476.324 | 908.344 | 2.117 |
| **Chemicals, Plastic Products and Non-metallic Minerals** | 8.991.670 | 8.346.376 | 11.198.748 | 5.256 |
| **Basic Metals** | 5.913.483 | – | 224.028 | 10.644 |
| **Motor and Vehicle Production** | 3.673.781 | – | 17.313 | 5.818 |
| **Forest Products, Paper & Furniture** | 3.508.449 | – | 168.044 | 4.475 |
| **Metal, Electronics, Optical and other Manufacturing** | 9.220.704 | – | 379.710 | 8.231 |
| **Electricity, Gas, Water, Treatment, Infrastructure** | 8.517.048 | 10.890.992 | 18.371.799 | 2.117 |
| **Construction and Construction Works** | 15.671.953 | – | 389.508 | 10.761 |
| **Transportation and Storage** | 12.803.013 | – | 794.155 | 3.534 |
| **Wholesale, Retail Trade, Accommodation** | 16.432.551 | – | 780.686 | 6.285 |
| **Service** | 38.967.499 | – | 1.647.416 | 5.491 |
| **Economy-wide average growth / contraction (%)** | 4,4 | | 0,4 | |
| **Economy-wide growth target in 2018 (%)** | 5,9 | | | |
| **Growth target for 2014-2018 period (%)** | 5,5 | | | |

**Source:** Author calculations.

* The base scenario values are calculated using the average real growth rates of the 15 sectors obtained from the WIOD.

Industries with the highest production decline (direct impact) are the industries of 'electricity, gas, water, treatment and infrastructure', 'chemistry, plastic products and non-metallic minerals' and 'coke and refined petroleum products', respectively. Furthermore, industries with the highest industrial economic contraction (indirect impact) are the industries of 'electricity, gas, water, treatment and infrastructure', 'chemistry, plastic products and non-metallic minerals' and 'mining and quarrying', respectively. Industries with the lowest industrial economic contraction

are the industries of 'motor land vehicle production' and 'food, beverages and tobacco products' industries, respectively. Industries with the highest employment decline are the industries of 'constructions and construction works' and 'basic metals', respectively. Industries with the lowest employment decline are the industries of 'agriculture, forestry and fishery', 'coke and refined petroleum products' and 'electricity, gas, water, treatment and infrastructure', respectively.

## 6. Conclusion

In this study, the environmental and economic impacts of greenhouse gas emissions were analysed in accordance with the targets set out in the current economic plan and environmental commitments of Turkey. The economy was aggregated into 15 industries and the environmental and economic impacts of energy substitution and carbon tax applied to the selected industries were evaluated. In the analysis, first a certain proportion of the total amount of natural gas used for electricity generation was replaced by bio-ethanol. However, it was found that environmental targets were not met by sole energy substitution, although there were no adverse impacts on economy. Then, carbon taxation was introduced on most polluting three industries in addition to energy substitution.

Taking into account the main argument discussed in the present study, the application of carbon taxation to reduce greenhouse gas emissions could be an important and effective policy tool for attaining environmental targets. However, according to the research results, achieving environmental targets pushes the economy away from attaining growth targets. Therefore, the issue that needs to be emphasized here is to ensure harmony and balance between environmental and economic targets so that the possible impacts of Pigouvan taxation on the economy is reduced. To achieve this balance, it seems inevitable to implement an additional policy package compatible. In this case, injecting carbon tax revenues back to the economy might be an efficient alternative, as suggested by "double dividend theory" and strongly advised by the empirical literature.

In parallel with our findings, various studies (Conefrey et al., 2008; Estrada and Santabarbara, 2021; Bourgeois et al., 2021; Liu et al., 2021) that examine the recycling of carbon tax revenues to the economy have found that if carbon tax revenues are transferred back to the economy it will create a double dividend effect and have a positive effect on economic growth.

According to the findings, a substitution between the consumption amounts of existing types of energy used in industrial production, in other words, an orientation toward cleaner energy, directly facilitates to achieve environmental targets and hence energy substitution arises as another alternative to reach both economic and environmental targets.

Sole carbon taxation would not be enough to meet environmental targets without contracting the economy. Injection of carbon tax revenue back to the economy might be a solution however we see this as a short-sighted alternative. Because boosting demand will trigger the production

inevitably however production will continue with the existing dirty technology. Therefore, main message would be the country should target clean production technologies and it is obviously and mostly related to type of energy used in production.

We could expect a fall both in production cost and emissions due to the inter-industry interactions if substitution between natural gas and bio-ethanol is realized for electricity production. Therefore, in the medium term Turkey should search for the ways to substitute natural gas with bio-ethanol. However, in the short run; carbon taxing policy implemented with energy substitution would create the opportunity to reduce emissions in a shorter period and with less economic costs.

## Appendix

| A-Studies that emphasize utilization of neutral taxation to overcome adverse impacts of carbon taxation | | |
|---|---|---|
| **Country** | **Authors** | **Policy instrument** |
| China | Li and Lin (2013; 2015) | reductions in value added taxes and in indirect consumption/ direct production taxes |
| | Zhang et al. (2016) | reductions in indirect taxes |
| USA | Glomm et al. (2008), Roson (2003) and Williams et al. (2014) | reductions in capital taxation |
| | Goulder and Hafstead (2013), Rausch and Reilly (2012) | decrease in corporate taxes |
| | Rausch and Reilly (2012), Roson (2003) and Williams et al. (2014) | reduction in taxes in labour market |
| | Gonzalez (2012) | decrease in tax rates regarding manufacturing industries |
| The EU and other Europe | Allan et al. (2014) | income tax reduction |
| | Gemechu et al. (2014) | reductions in income and corporate tax |
| | Combet et al. (2010), Faehn et al. (2009), Manresa and Sancho (2005), Vandyck and Regemorter (2014), Bosello and Carraro (2001), Majocchi et al. (2002) | reductions in taxes regarding labour market |
| South Africa | Alton et al. (2014) | reductions in indirect sales taxes |
| | Heerden et al. (2006) | reductions in direct income tax and in taxes on food consumption |
| Brazil | Grottera et al. (2015) | reduction in labour cost |
| Russia | Orlov et al. (2013) | reductions in tax on qualified and unqualified labour |
| Thailand | Timilsina and Shrestha (2007) | reductions in tax on labour and in indirect taxes on consumption of non-energy goods |

| B-Studies that emphasize redistribution of income to overcome adverse impacts of carbon taxation | | |
|---|---|---|
| **Country** | **Authors** | **Policy instrument** |
| The EU and other Europe | Allan et al. (2014) | increase in public spending |
| | Bureau (2011), Combet et al. (2010), Faehn et al. (2009), Vandyck et al. (2014) | direct transfer to households |
| | Majocchi et al. (2002) | subsidizing exports |
| China | Brenner et al. (2005), Zhou et al. (2011) | direct transfer to households |
| | Liang et al. (2007) | subsidizing production |
| | Lu et al. (2010) | direct transfers to firms and households |
| | Zhang et al. (2016) | various subsidies to households |
| USA | Gonzalez (2012); food aid. Rausch and Reilly (2012) | various transfers to households |
| | Williams et al. (2014) | direct transfer to households |
| Canada | Beck et al. (2015) | direct transfer to households |
| | Dissou and Eyland (2011) | subsidizing production and exports |

| | | |
|---|---|---|
| South Africa | Alton et al. (2014) | social transfers to households |
| Indonesia | Yusuf and Resosudarmo (2007) | direct transfer to households |
| Brazil | Grottera et al. (2015) | direct transfers to lower income group |
| Australia | Meng (2014) | direct transfers to poorest group |
| Thailand | Timilsina and Shrestha (2007) | direct transfer to households |
| **C-Other studies** | | |
| **Country** | **Authors** | **Policy instrument** |
| 25 Developed Economies | Timilsina et al. (2011) | subsidizing use of biofuels |
| China | Sun and Ueta (2011) | reducing electricity price for household use |

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ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

# DEMOGRAPHIC SHIFTS AND TAX BURDEN IN THE IRANIAN ECONOMY: A MACROSIMULATION APPROACH

**Ebrahim REZAEI***

**Abstract**

Using dynamic stochastic general equilibrium (DSGE) model, this paper, addresses the effects of demographic changes on tax dynamics. In fact, the DSGE framework involves main demographic features such as working and retirement periods as well as life cycle characteristics on one hand and other special conditions of Iran's economy such as rigidities in nominal variables, distinct trait of government budget and lack of monetary and fiscal standard rules on the other. After calibration of parameters and determination of steady state values of the variables, we identified some demographic scenarios, such as reduction in the labor growth rate, increasing retirement age and improvement life expectancy and then assessed macro variables, particularly tax share, reaction to these shocks. Our results highlight that, demographic negative shocks have a significant effect on the budget deficit. A plummet (surge) in labor growth rate would increase (shrink) tax share to rebalance (smooth) a probable budget deficit(surplus). An analogous result can be attributed to the life expectancy improvement. However, any upswing (slump) in the retirement age has negative(positive) influence on the tax share. In other words, all positive demographic shocks provide opportunity to smooth tax policies and postpone revenue collection.

**Keywords:** Demographic Shifts, Tax Share, Macro-Simulation Approach, DSGE model.
**JEL Classification:** D58, E21, E50.

## 1. Introduction

All societies have been experiencing quite a mixed variety of changes in climate, diseases infection, environmental challenges, population shifts and a wide range of other alterations. Researchers outline that most of the mentioned evolutions stem from quite an extensive diversity of uncertain sources while the population adjustments' roots, due to their non-cryptic nature, are comparatively elucidated. (Johnson P., 1998, Saunders, 2018) Among affecting factors, precipitous slump in the fertility and mortality rates, net immigration rate, and economic environment are the main explanatory variables of population structures modifications.

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The most unambiguous aftereffect of demographic changes is replacing some older economic and social relations with some new ones. This could be because the population changes have the capability of affecting macro relations such as labor market, public finance, financial market, and ultimately the indices of real sector of economy such as income distribution and economic growth.

The demographic changes, generally, refer to the process by which pre-industrial countries involving with a higher volume of fertility and mortality rates eventually transform to developed economies with low levels of mentioned ratios. From this aspect, demographic transition is a dynamic and multi-dimensional phenomenon. Nowadays, almost all of the rich as well as pour nations have been living with demographic transition. Particularly, industrial countries have been dealt sooner than others. In fact, the global proportion of elder than 65 years of age was 4 percent in 1700, 5 percent in 1950, 7 percent in 2000, and is projected to reach 16 percent in 2050 and finally 21 percent in 2100. (Lee, 2003:168)

Analogous to all developing countries, Iran's society has been experienced two stages of demographic transition over passed times. The first stage covers from 1906 to 1991. During this period, life expectancy rose from 25 to 60 years. The second stage starts from 1992 and continues to be completed in the future. Iran's population's structure lies in "demographic dividend" or "demographic window" phase. It means that as time passes, on one hand, the proportion of young people reduces continuously and on the other the proportion of old people surges. Economists believe that this period is the best opportunity to allocate human resources to production process. (Auerbach, 2012).

As generally mentioned, the first main problem of the Iran's economy in terms of population aging is surging the seniors' share in total population, specially within two last decades. According to statistics, the average growth of aging cohort (over than 65 years) reached 3.3 percent in 2019. So that, the share of aging people escalated from 5.1 to 5.7 between 2009 and 2019. At the same time, the average growth rate of 25-55 years showed an attenuated trend. Among all cohorts, the highest growth rate could be attributed to the 55-59 cohort with 7.26 percent. The second and third ranks were occupied by 50-54 and 60-64's by 5.06 and 4.93 percent, respectively. In consequence of implied alterations, the average age of population soared from 24 to 30 years between 2000 and 2019. The second main challenge of the economy is the lower economic participation rate. Based on available data, senior cohorts have less than 20 percent participation in the economic activities. The primary causes of this predicament, spring from demographic changes as well as other structural reasons. This description outlines that, at the first, the "baby boom" effects of 1980s have abated and secondly, the structure of Iran's population will considerably have modified in coming decade.

To face up with this challenge, Iran's government has been trying to enhance the parameters of population structures by granting quite a mixture diversity of incentives since 2005. However, the fertility rate has been remained under two children for each woman since 2000. Additionally,

the population's growth rate tends to fall under 1 percent in current decade. Furthermore, the net emigration rate could be another rooting cause of structural change. This rate was zero over long term but during recent years it inclines to be positive, significantly. Iran had the highest rate of net emigration (10 emigrants per 1000 population) over Iran-Iraq's war in 1980s.

From the information supplied, it is patent that the prominent aim of this paper is to assess the deep effects of demographic changes on the tax revenues and eventually the fiscal stance of the government. Over recent decade, the share of taxes in Iran's GDP fluctuates between 5.5 and 7 percent. In the normal state this ratio is regarded trivial in comparison with the same performance in other countries. It is evident that the situation would be worse when we assume that some components such as income tax would negatively be affected by demographic changes, particularly in populous provinces such as Tehran and other industrial areas. This, in turn, would influence the budget space of the government and broaden the budget deficit.

However, above statement doesn't mean that the effects of demographic changes are similar in all economies but it depends on the transition process of each country on one hand and the level of countries integration in the world economy on the other. Having said that, this phenomenon seems to be a serious challenge and policy makers need to find solutions to mitigate negative consequences of aging population.

To shed light on the main question, second part of the paper reviews the literature of research, then we introduce our basic model and discuss about parameters which have to be calibrated. It is obvious that the mechanism of the influence of population changes would be modelled based on the theoretical background. The fourth subsection devotes to address the effects of several scenarios and shocks on steady state values of the model and the final section will be concluding remarks and policy implications of the research.

## 2. Literature Review

As mentioned above, it could be expected that the demographic change would affect economy through several direct and indirect channels. Main paths which these effects can be effective on the government revenues are labor, financial as well as goods markets which we introduce some theoretical points related to each of them below. It is worth noting that the certain effects of demographic changes on tax revenues are somehow nebulous in literature and depend on several conditions (or assumptions) which could be important in these channels.

According to the related literature, structural changes of population which arise from low fertility and mortality rates, immigrations, long term care improvements and so on, have a vast effect on macroeconomic variables and markets such as labor market( through participation rates, retirement age, productivity rate, income distribution and immigration channels), goods market( through consumption), financial markets( through savings, capital formation and creation new financial institutions based on population arrangements) and specially public finance(through

government revenues and expenditures). (Zhang et al., 2020; Saunders, 2018; Connors et al., 2019)

Among multifaceted effects of population aging, some economists, such as Yoshino et al. (2019), Nartey (2019), Tine et al. (2020), concentrate on the tax influence of demographic transition. The compelling reason behind this focusing markedly lies on the importance of fiscal sustainability in economy. Along with this line, we apply a small-scale macroeconomic model involving all important parts of markets. Since, as mentioned, our main question is about effectiveness of aging population on government revenues or tax burden, in this section we will theoretically emphasized on the response of public finance variables against demographic shocks.

Before focusing on the effects of demographic changes on the tax revenues, a glance on the effects of mentioned variable on public finance would be helpful in revealing the controversial aspects of the issue. It is evident that the effects of aging population on public finance can be followed in two sides. The first one is its effects on the government expenditure and the second one is reaction of tax revenues. The former has the clearest response against structural change of population. Because the expanding reaction of the social security's expenditure on the one hand and ascending health care costs on the other, are in entire congruence of economists. (Auerbach, 2012; Kudrna, et al. 2014; Van Ewijk et al. 2006) However, regarding to the later, despite the relative convergence on the extension of effects of demographic modifications in recent line of research, the literature was witnessing some dissonance in opinions over pre-assumptions. We discus all chain of points as follows.

In their research, Goudswaard & Kar. (1994, p:52-53) put forward an argument that population aging has two contradictory effects on tax revenues. According to their debate, on the one hand aging people increase tax revenues through expanding the variety of their revenues and on the other hand accretion of over 65 old years' share in total population's composition could be immediate reason for tax revenues decline. In other words, at the first, age-earnings have positive effects on the tax collecting and then accumulating of population in older cohorts would cause negative impact and stymies the revenues expansion. In this point of view, the net outcome would be based on some structural parameters and empirical assessment.

Auerbach et al. (1998) believe that the demographic uncertainties which are likely effective on tax revenues stem from life horizons of individuals. Also, Auerbach (2012) emphasize that the macroeconomic effects of population changes can be divided onto cyclical and long-run effects which should be separated from each other. Cyclical effects can be attributed to variables such as tax revenues as well as government expenditures and long run effects can be assigned to economic growth.

King and Jackson (2000, p:8) develop the claim that the demographic adjustments influence tax revenues through two channels: the first one is the supply side of economy and the second is the saving-investment behavior of economic agents. However, the size and direction of these effects are desperately uncertain.

Manzi et al. (2005) discusses that because of high benefices which older groups receives from government, their effective payments rate (tax rate) is very low. So, aging can decrease effective tax rate significantly.

Carone et al. (2007) develop the claim that the demographic revolutions can potentially eliminate some tax bases and expand or create others. According them, in result of demographic developments, tax burden will be shifted from mobile into immobile bases. So, tax on personal income in aging society cannot be reliable source to finance government's social expenditures.

Sjoquist et al. (2007) emphasize on capital income tax and payroll tax shares in whole tax revenues. Since, older age groups mainly receive capital income so tax system should be modified to contain more this type of taxation. Otherwise, aging population lead tax tumble.

According to Fisher (2008), the effects of population aging on tax revenues depend on the relation of income variation and aging on one hand and variation of marginal and average propensity to consumption on the other. In this case, older age groups possibly allocate main part of their income to health expenditures which are exempted from taxing. So, if the variation of income is low and consumption composition is aging-based then sale and value added tax revenues might be plunged.

Kenneth et al. (2011) assert that whenever economy is under aging pressure it will be desirable to change the tax system from direct – base into indirect – base. Since, tax on personal income will likely be reduced.

Dolls et al. (2017) findings in 27 EU countries lend support to the discussion that the effect of demographic alteration on tax revenues would not be so sever but retirement age extension could be effective in budget balancing in the long-term.

Nartey (2019) puts forward an argument that the old-age dependency ratio picks up property and corporate income taxes while has diminishing effect on individual income tax, other tax (taxes on motor vehicle licenses), charges (tolls on highway, tuition paid to state universities etc.), and all other revenue.

Using an overlapping generation model, Tine et al. (2020) highlight that the precipitous plummet in tax revenues, considerably due to consumption tax drop, is an immediate result of population aging.

In general, in spite of a variety of disputes among researchers, most of mentioned theoretical points imply that if the participation, productivity and effective tax rates remain unchanged, demographic changes (say fertility shrink) can slump tax revenues. In addition, factors such as skyrocketing share of older generations in total population, low capital tax rate in comparison with labor income tax rate, meltdown or fixed wage rate and abated share of age-based incomes have similar (decreasing) effect on tax revenue. These hypotheses have been examined in several empirical studies which Table 1 summarizes main findings of some prominent research around the world.

**Table 1:** Main Results of More Related Research Line

| Author | Country or Religion | Effects of Demographic Changes |
|---|---|---|
| Calahorrano et al. (2019) | Germany | Population aging will intensify tax expenditure |
| Beznoska and Hentze (2017) | Germany | Germany will annually lose 7 billion Euros due to demographic changes |
| Sagiri (2015) | Japan | Tax rate on labor income and consumption tax rate should be increased at least 13.5 and14.3 percent, respectively. |
| Kudrna et al. (2014) | Australia | T/GDP will increase during 2015-2050. |
| Felix and Kate (2013) | United States | Reduces per capita Tax revenues. |
| Miles (1999) | Britain | Budget Deficit will be resulted, so tax revenues should be increased over time. |
| Auerbach et al. (1989) | US, Japan, Sweden and Germany | Tax rate should increase to cover budget deficits. |

As Table 1 represents after demographic changes, tax revenues have to soar to keep the balance of government budget. It's worth mentioning that those studies which don't use the budget balance in their framework, such as Felix and Kate (2013), only captures tax revenue dwindle after demographic changes and these studies don't be able to show how mechanism works.

## 3. Empirical Assessment: The Simulated Model

In the light of previous sections debates, we would be able to build a specific model revealing some important features. First, the model should be able to capture the life cycle behavior of individuals. Second, some special characteristics of Iranian economy such as rigidities, oil revenue shocks, and lack of standard rules for monetary and fiscal policies, should be identified as specific equations in the model. Third, beyond overlapping generation's growth model, our framework should aggregate some macroeconomic variables such as wealth and consumption related to either workers or retirees.

To present a model with mentioned traits, we use tractable DSGE-Life Cycle model which its initial parts already presented by Gertler (1999) and Kilponen et al. (2006). Gertler modified Blanchard (1985)/Weil (1989) framework to allow for life-cycle behavior in overlapping generations model, that is to say his framework introduces random transition from work to retirement, and then from retirement to death. In addition to these adjusts, DSGE structure helps us to consider specific conditions of the Iranian economy.

The model has several remarkable features: dynamics of population, retiree's behavior, workers' behavior, and Government sector. All these facets are explained below, respectively.

### 3.1 Dynamics of Population

In this segment, it's said that, each individual is born as a worker. Conditional on being a worker in the current period, the probability of remaining this person in the next period as a worker is $\omega$

. Otherwise, the probability of retiring is $1-\omega$. The average time to be in the labor force for an individual is thus $\frac{1}{1-\omega}$. Once retirement time comes, the probability of surviving to the next time is $\gamma$ and, conversely, the probability of death in the next period is $1-\gamma$. The average retirement period is thus $\frac{1}{1-\gamma}$.

Let $N_t$ denote the stock of workers at time $t$. It's assumed that $(1-\omega+n)N_t$ new workers are born in $t+1$, implying that the workforce grows at the gross rate $(1+n)$:

$$N_{t+1} = (1-\omega+n)N_t + \omega N_t = (1+n)N_t \tag{1}$$

Given that the number of people in each cohort is large, in the stationary equilibrium the number of retirees is $\left(\frac{1-\omega}{1+n-\gamma}\right)N_t$. The ratio of retirees to workers is thus:

$$\psi \equiv \frac{1-\omega}{1+n-\gamma} \tag{2}$$

Since this ratio is fixed, both the work force and the number of retirees grow at the gross rate of $1+n$.

### 3.2 Retiree Behavior

The representative retiree (with index j) maximizes in period $t$ the objective (Z):

$$Z_t^{rj} = [[(c_t^{rj})^{s1}(m_t^{rj})^{s2}(1-l_t^{rj})^{s3}]^{\rho} + \beta\gamma_t[Z_{t+1}^{rj}]^{\rho}]^{1/\rho} \tag{3}$$

Subject to the flow budget constraint

$$c_t^{rj} + \frac{i_t}{1+i_t}m_t^{rj} + A_t^{rj} = \frac{1+r_{t-1}}{\gamma_{t-1}}A_{t-1}^{rj} + \xi w_t l_t^{rj} + e_t^j \tag{4}$$

Where $A_{t-1}^{rj}$ denotes stock of monetary-physical wealth of retiree. He receives pensions $e_t^{rj}$ and faces an effective wage rate $\xi w_t$. The parameter $\xi \in (0,1)$ captures labor efficiency of retirees with respect to workers. With $i_t$ denoting the nominal interest rate, the term $\frac{i_t}{1=i_t}m_t^{rj}$ describes the using level of real balances, reflecting those real balances are dominated in return by interest-bearing assets. We suppose that: $s3 = 1-s2-s1$.

Following Gertler (1999), taking first order conditions with respect to consumption, leisure and real balances gives:

$$\frac{c_{t+1}^{rj}}{c_t^{rj}} = [\beta(1+r_t)(\frac{1+i_{t+1}}{i_{t+1}}\frac{i_t}{1+i_t})^{s2\rho}(\frac{w_t}{w_{t+1}})^{s3\rho}]^{\sigma} \tag{5}$$

$$1-l_t^{rj} = \frac{s3}{s1}\frac{c_t^{rj}}{\xi w_t} \tag{6}$$

$$m_t^{rj} = \frac{s2}{s1}\frac{1+i_t}{i_t}c_t^{rj} \tag{7}$$

In addition, suppose $\varepsilon_t\pi_t$ is retiree marginal propensity to consume out of wealth. Moreover, $d_t^{rj}$ and $h_t^{rj}$ denoting the disposable income and human capital of retiree, respectively, consider the recursive law of motion for human capital as:

$$h_t^{rj} = d_t^{rj} + \frac{\gamma_t}{1+r_t}h_{t+1}^{rj} \quad (8) \text{ and} \quad d_t^{rj} = \xi w_t l_t^{rj} + e_t^j \quad (9)$$

Then, in combination with the budget constraint, one can establish the consumption function and the law of motion for $\varepsilon_t\pi_t$ satisfy the relationships

$$c_t^{rj} + \frac{i_t}{1+i_t}m_t^{rj} = c_t^{rj}(1+\frac{s2}{s1}) = \varepsilon_t\pi_t(\frac{1+r_{t-1}}{\gamma_{t-1}}A_{t-1}^{rj} + h_t^{rj}) \tag{10}$$

$$\varepsilon_t\pi_t = 1-[(\frac{1+i_{t+1}}{i_{t+1}}\frac{i_t}{1+i_t})^{s2\rho}(\frac{w_t}{w_{t+1}})^{s3\rho}]^{\sigma}\beta^{\sigma}(1+r_t)^{\sigma-1}\gamma_t\frac{\varepsilon_t\pi_t}{\varepsilon_{t+1}\pi_{t+1}} \tag{11}$$

### 3.3 Worker Behavior

Similarly, the representative worker maximizes in period t the objective;

$$Z_t^{wj} = [[(c_t^{wj})^{s1}(m_t^{wj})^{s2}(1-l_t^{wj})^{s3}]^{\rho} + \beta[\omega_t Z_{t+1}^{wj} + (1-\omega_t Z_{t+1}^{rj}]^{\rho}]^{1/\rho} \tag{12}$$

s.t.
$$c_t^{wj} + \frac{i_t}{1+i_t}m_t^{wj} + A_t^{wj} = (1+r_{t-1})A_{t-1}^{wj} + w_t l_t^{wj} + f_t^{\,j} - \tau_t^{\,j} \tag{13}$$

The representative worker faces the full wage rate $w_t$, receives profits $f_t^{\,j}$ and pays lump-sum taxes, $\tau_t^{\,j}$. Again, three F.O. conditions are

$$\omega_t c_{t+1}^{wj} + (1-\omega_t)(\varepsilon_{t+1})^{\sigma/\sigma-1}(1/\xi)^{s3}c_{t+1}^{rj} = [\beta(1+r_t)\mathrm{H}_{t+1}(\frac{1+i_{t+1}}{i_{t+1}}\frac{i_t}{1+i_t})^{s2\rho}(\frac{w_t}{w_{t+1}})^{s3\rho}]^{\sigma}c_t^{wj} \tag{14}$$

$$\mathrm{H}_{t+1} = \omega_t + (1-\omega_t)\varepsilon_{t+1}^{1/1-\sigma}(1/\xi)^{s3} \tag{15}$$

$$1-l_t^{wj} = \frac{s3}{s1}\frac{c_t^{wj}}{\xi w_t} \quad (16), \qquad m_t^{wj} = \frac{s2}{s1}\frac{1+i_t}{i_t}c_t^{wj} \quad (17)$$

And, disposable income of a worker which earns in rigid wages condition is;

$$d_t^{wj} = w_t l_t^{wj} + f_t^j - \tau_t^j \tag{18}$$

Where
$$w_t = A_1 w_{t+1} + A_2 w_{t-1} + A_3 \overline{w} \tag{19}$$

determine from overlapping contracts and $A_i$'s are given by;

$$A_1 = \frac{(1-q)\beta\widehat{w}}{(1+\beta(1-q)^2\widehat{w}^2} \quad (20), \qquad A_2 = \frac{(1-q)\widehat{w}}{(1+\beta(1-q)^2\widehat{w}^2} \quad (21), \qquad A_3 = \frac{q(1-(1-q)\beta\widehat{w}}{(1+\beta(1-q)^2\widehat{w}^2} \quad (22)$$

Where q is the fraction of workers that can reset their wages and 1-q fraction of work force which their wages remain unchanged. Also, worker's stock of human capital, along with marginal propensity to consumption, $\pi_t$, are;

$$h_t^{wj} = d_t^{wj} + \frac{\omega_t}{\Omega_{t+1}}\frac{1}{1+r_t}h_{t+1}^{wj} + (1-\frac{\omega_t}{\Omega_{t+1}})\frac{1}{1+r_t}h_{t+1}^{rj} \tag{23}$$

$$c_t^{wj} + \frac{i_t}{1+i_t}m_t^{wj} = c_t^{wj}(1+\frac{s2}{s1}) = \pi_t((1+r_{t-1})A_{t-1}^{wj} + h_t^{wj}) \tag{24}$$

$$\pi_t = 1 - [(\frac{1+i_{t+1}}{i_{t+1}}\frac{i_t}{1+i_t})^{s2\rho}(\frac{w_t}{w_{t+1}})^{s3\rho}]^{\sigma}\beta^{\sigma}((1+r_t)(\mathrm{H}_{t+1})^{\sigma-1}\frac{\pi_t}{\pi_{t+1}} \tag{25}$$

### 3.4 Aggregation Over the Two Groups

As the final step in setting retiree and worker behavior, using total number of retirees and workers in period t being given by $N_t^r$ and $N_t^w$, all of mentioned endogenous variables i.e. aggregate labor supply and demand, human capital, disposable income, consumption functions of retiree and worker groups, and distribution of wealth have been aggregated. For example;

$$l_t^w = N_t^w l_t^{wj} \qquad , l_t^r = N_t^r l_t^{rj}, l_t = l_t^w + \xi_t^r$$

$d_t^r = d_t^j N_t^r$, $d_t^r = d_t^{rj} N_t^r$, $d_t^w = d_t^{wj} N_t^w$ and so on.

### 3.5 Firm Behavior

Firms produce goods and services in a New Keynesian (NK) market structure which involves some imperfections. Wage and price rigidities are main features of this structure. According the NK structure, in order to produce final goods, firms should take some intermediate and capital goods from related sectors.

Intermediate capital and final goods technologies are as follows, respectively:

$$y_t(z) = (X_t l_t(z))^{\alpha} k_t(z)^{1-\alpha} \tag{26}$$

$$k_{t+1}(u) = \phi(\frac{i_t^k(u)}{k_t(u)})k_t(u) + (1-\delta)k_t(u) \tag{27}$$

$$y_t = [\int_0^1 y_t(z)^{\theta-1/\theta}\, dz]^{\theta/\theta-1} \tag{28}$$

$z \in [0,1]$ and $u \in (0,1)$ represent intermediate and capital goods chain. Also, $i^k(u)/k(u)$ denotes the investment-capital ratio at the firm level and q represents the price elasticity of demand. Profits of representative firm are given by

$$f_t(z) = (\frac{P_t(z)}{P_t} - mc_t)y_t(z) \tag{29}$$

Where $mc_t$, $P_t(z)$ and $P_t$ denote the real marginal costs, the price of good z and the average price level of intermediate goods, respectively. According with Calvo (1983), in each period only a fraction $1-\zeta$ of firms can reset its price optimally, while for a fraction $\zeta$ of firms the price remains unchanged. Let $P_t^*(z)$ denote the optimally changed price in period $t$ by a firm which can change its price. Reflecting the forward-looking dimension of the price-setting decision under the Calvo-constraint, $P_t^*(z)/P_t$ evolves over time according to;

$$\frac{P_t^*(z)}{P_t} = \frac{\theta}{\theta-1}\frac{E_t\sum_{i=0}^{\infty}(\zeta\beta)^i(\frac{1}{P_{t+i}})^{1-\theta}y_{t+i}mc_{t+i}\frac{P_{t+i}}{P_t}}{E_t\sum_{i=0}^{\infty}(\zeta\beta)^i(\frac{1}{P_{t+i}})^{1-\theta}y_{t+i}}$$

Or

$$P_t = (\zeta P_{t-1}^{1-\theta} + (1-\zeta)P_t^{*1-\theta})^{\frac{1}{1-\theta}} \tag{30}$$

Finally, the aggregate resource constraint of economy is given by;

$$y_t + oil_t = c_t + g_t + i_t^k \tag{31}$$

Where *oil* denotes the oil revenue of the economy.

### 3.6 The Government

The nominal budget constraint of the government supposed to be as follows;

$$M_t + Oil_t + T_t + B_t = M_{t-1} + (1 + i_{t-1})B_{t-1} + G_t + E_t \tag{32}$$

The reason for why oil and M introduced in the equation is the Iranian government finances its budget deficit from new money printing and oil revenues during year.

Applying;

$$(1 + i_t) = (1 + r_t)(P_{t+1} / P_t) \tag{33}$$

term the real budget constraint will be;

$$\tau_t = (1 + r_{t-1})(b_{t-1} + \frac{1}{1 + i_{t-1}} m_{t-1}) + g_t + e_t - m_t - oil_t. \tag{34}$$

It must be noted that due to the lack of the government debt data, most of studies about the Iranian economy eliminate B from models, since in DSGE models we needn't time series of this variable and its initial value, which is guessable from other proxies, we keep this important variable in model. In addition, the budget constraint involves benefits ($E_t$) which its path must be clarified in the model.

The aggregate path of real benefits determined by the replacement rate of benefits and wages, $\mu_t$ , could be expressed as follows;

$$\mu_t = \frac{e_t^j}{w_t} \Rightarrow e_t = e_t^j N_t^r = \mu_t w_t N_t^r \tag{35}$$

According the Iranian economy's stylized facts [1], the policy rules of government could be specified as follows;

$$\frac{\tau_t}{y_t} = \tau^* + \gamma_1(\frac{A_t - A_{t-1}}{y_t}) + \gamma_2(\frac{oil_t}{y_t} - \bar{oil}) \tag{36}$$

$$\eta_m = \rho_m \eta_{m,t-1} + (1 - \rho_m)\bar{\eta} + \rho_\eta \varepsilon_{oil} + \varepsilon_\eta \tag{37}$$

$$oil_t = \rho_{oil} oil_{t-1} + (1 - \rho_{oil}) oilbar + \varepsilon_t^{oil} \tag{38}$$

Equations (36) and (37) represent main role of oil revenue in fiscal and monetary policies and explain how oil revenue determines policy rules. Equation (38) illustrates how oil shocks affect the whole system.

1 Several studies show that there is positive relation between tax and oil revenues. Whenever oil revenue tails off tax revenue almost behaves alike.

Where $t^*, \eta_m, \rho_m, \varepsilon_m, \varepsilon_{oil}$ represent long-term tax ratio, money growth coefficient, monetary and oil shocks respectively.[2] and,

$$A_t = p_t^k k_t + b_t + \frac{m_t}{1+i_t}$$

### 3.7 Equilibrium

In equilibrium, behavior of agents (retirees, workers, firms and government) should be consistent at the aggregate levels. In other words, in the equilibrium, the endogenous system of equations which specified in Table 2 must be satisfied. It has to be noticed that before introducing variables in the system we detrended some of them through appropriate measure. (For example; $y_t = Y_t \big/ N_t^w X_t$ where X is the productivity of the labor.)

**Table 2:** Endogenous Variables and Parameter Definitions

| Variable Definition | Symbol | Variable Definition | Symbol |
|---|---|---|---|
| Retiree's human capital | $h^r$ | Physical-monetary wealth | $A_t$ |
| Worker's disposable income | $d^w$ | Real production | $y_t$ |
| Retiree's disposable income | $d^r$ | Total consumption | $c_t$ |
| Marginal propensity to consumption(retiree) | $\varepsilon_t \pi_t$ | Retiree consumption | $c^r$ |
| Marginal propensity to consumption(workers) | $\pi_t$ | Worker consumption | $c^w$ |
| Old-age dependency ratio | $\psi_t$ | Worker's Human Capital | $h^w$ |
| Probability of living of retirees | $\gamma_t$ | Total number of workers | $N^w$ |
| Employment probability of workers | $\omega_t$ | Total number of retirees | $N^r$ |
| Price of capital goods | $p_t^k$ | Relative discount term | $\mathrm{H}_t$ |
| Real money | $m_t$ | Wealth distribution | $\lambda_t$ |
| Labor supply by retirees | $l^r$ | Total Labor supply | $l$ |
| Capital stock | $k$ | labor supply (Workers) | $l^w$ |
| Real wage rate | $w_t$ | Real Interest rate | $r_t$ |

2 We took monetary growth equation from Shahmoradi, & Ebrahimi, (2010).

| | | | |
|---|---|---|---|
| Real return of capital | $r^k$ | Marginal cost | $mc_t$ |
| Tax rate | $t_t$ | Price index | $P_t$ |
| Real profits of firms | $f_t$ | Real Benefits ratio | $e_t$ |
| Types of shocks | $\varepsilon_{it}$ | Nominal interest rate | $i_t$ |
| The growth rate of workers | $nw$ | Investment | $i^k$ |
| Probability of living of retirees | $\overline{\gamma}$ | The growth rate of retirees | $nr$ |
| Productivity growth rate | $x$ | Probability of death of retirees | $1-\gamma$ |
| Employment probability of workers | $\omega$ | Life expectancy (in 1395(2015)) | $T$ |
| Old-age dependency ratio | $\psi$ | Retirement probability of workers | $1-\omega$ |
| Average Retirement period | $T^r$ | Average working period | $T^w$ |
| Intertemporal elasticity of substitution | $\sigma$ | Discount factor | $\beta$ |
| Depreciation rate | $\delta$ | Risk aversion parameter | $\rho$ |
| Preference parameter:money | $s2$ | Preference parameter: consumption | $s1$ |
| Elasticity of Demand (intermediate goods) | $\theta$ | Preference parameter: leisure | $s3$ |
| Relative productivity of retirees | $\xi$ | Oil revenue share(long-run) | $\overline{oil}$ |
| Firms mark up | $\zeta$ | Share of labor | $\alpha$ |

### 3.8 Calibration

After de-trending the system of defined equations and obtaining steady state version of the model, we calibrate the model to match key features of the Iranian economy's data. Tables 3 to 5 delineate the demographic, structural and policy parameters values. In addition, Table 6 sketches some estimated coefficients for some equations.

**Table 3:** Demographic Parameters

| Calibration method | Parameter value | Parameter name | Calibration method | Parameter value | Parameter name |
|---|---|---|---|---|---|
| $\omega = 1 - \frac{1}{T^w} = 1 - \frac{1}{50} = 0.98$ | 0.98 | $\omega$ | United Nations data (1970-2016) | 0.0279 | $nw$ |

| | | | | | |
|---|---|---|---|---|---|
| $1-\omega=0.02$ | 0.02 | $1-\omega$ | United Nations data (1970-2016) | 0.0279 | $nr$ |
| $\psi=\frac{1-\omega}{1-nw+\gamma}$ | $\psi=\frac{1-\omega}{1-nw+\gamma}$ | $\psi$ | $\gamma=1-\frac{1}{T^r}=0.888$ | 0.888 | $\gamma$ |
| Iran's Labor code | 50 | $T^w$ | $1-\gamma=1-0.888$ $=0.112$ | 0.112 | $1-\gamma$ |
| Difference between retirement age and life expectancy | 8.9 | $T^r$ | $X_t=(\frac{y_t}{l_t^{\alpha}k_t^{1-\alpha}})^{\frac{1}{\alpha}}$ | 0.038 | $x$ |
| | | | United Nations data | 73.9 | $T$ |

**Table 4:** Structural Parameters

| Calibration method | Parameter value | Parameter name | Calibration method | Parameter value | Parameter name |
|---|---|---|---|---|---|
| Based on steady state version of model | 0.14 | $s3$ | Rezaei(2010) | 0.98 | $\beta$ |
| Shahmoradi-Ebrahimi(2010) | 4.33 | $\theta$ | Cointegration approach: $s=\frac{d\ln(\frac{c_t}{c_{t+1}})}{d\ln(\frac{p_{t+1}}{p_t})}$ | 0.67 | $\sigma$ |
| Based on data(1970-2010) | 0.096 | $oi\bar{l}$ | Cointegration approch | $\rho=1-\frac{1}{\sigma}$ | $\overline{\rho}$ |
| Getler(1999) | 0.01 | $\xi$ | Shahmoradi-Ebrahimi (2010) | 0.042 | $\delta$ |
| Rezaei(2010) | 0.58 | $\alpha$ | Based on steady state version of model | 0.81 | $s1$ |
| Shahmoradi-Ebrahimi(2010) | 0.30 | $\zeta$ | Based on steady state version of model | 0.03 | $s2$ |

**Table 5:** Policy Rules Coefficients

| Coefficient definition | Coefficient name | Coefficient definition | Coefficient name |
|---|---|---|---|
| Coefficient of money growth equation | $\rho_m$ | Coefficient of oil equation | $\rho_{oil}$ |
| Coefficient of oil revenue in tax rule equation | $\gamma 2$ | Direct tax coefficient in tax rule equation | $\gamma 1$ |
| | | Coefficient of oil shock on money level | $\rho_{\eta}$ |

**Table 6:** Exogenous Variables (Shocks)

| Variable(shock) Definition | Variable(shock) name | Variable(shock) Definition | Variable(shock) name |
|---|---|---|---|
| Life expectancy shock | $\varepsilon_T$ | Productivity shock | $\varepsilon_x$ |
| Retirement probability shock | $\varepsilon_\omega$ | Average of working period shock | $\varepsilon_{Tw}$ |
| Living probability shock | $\varepsilon_\gamma$ | Average of retiree period shock | $\varepsilon_{Tr}$ |
| Monetary shock | $\varepsilon_\eta$ | Oil revenue shock | $\varepsilon_{oil}$ |

When above parameters and coefficients used in the steady state equations system, the steady state values of endogenous variables have been calculated which some of them are reported in Table 7.

**Table 7:** Some Endogenous Variables

| Moments of simulated data | | Moments of data | | |
|---|---|---|---|---|
| Standard deviation | Mean | Standard deviation | Mean | |
| 0.001 | 0.070 | 0.065 | 0.071 | $\frac{\tau}{y}$ |
| 0.012 | 0.59 | 0.017 | 0.58 | $\frac{c}{y}$ |
| 0.053 | 3.48 | 0.076 | 3.60 | $\frac{k}{y}$ |

According Table 7, values of endogenous variables in the steady state are very close to their values in the actual position. So, the result indicates that the model will be able to capture the effects of demographic changes scenarios on endogenous variables, particularly on the tax burden.

### 3.9 Simulation [3]

In this section, main questions of present study could be replied by using the simulation approach. Scenarios I to VI along with figures 1to 5 illustrate the effects of various demographic shocks on t-share (t/y), c-share(c/y) and ca-share (capital/y) variables. These scenarios will respectively be elucidated, in the rest of the paper.

#### 3.9.1 Scenarios I and II: Negative and Positive Shocks on Labor Force Growth Rate

According to the figure 1, one percentage point of standard deviation as negative shock on labor growth force increases t-share to rebalance budget deficit arising from demographic change.

3 The simulation has been performed by Dynare software.

According theoretical points, any reduction in labor force increases government expenditure and the government has to finance this change by increasing tax burden. In contrary, a positive shock on labor growth affects budget constraint in opposite line. Figure 2, reveals the reverse of mentioned process in the Figure 1.

**Figure 1:** Negative Shock on Labor Force Growth Rate

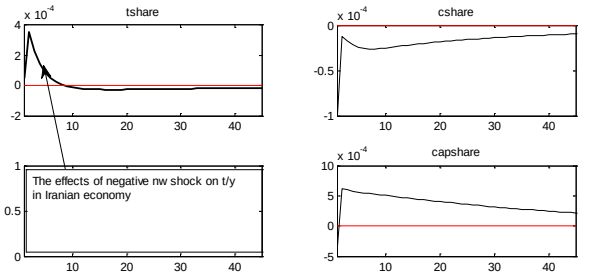
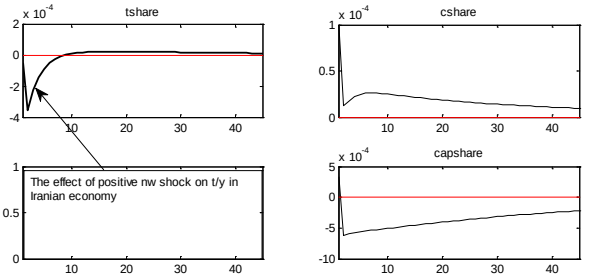



**Figure 2:** Positive Shock on Labor Force Growth Rate



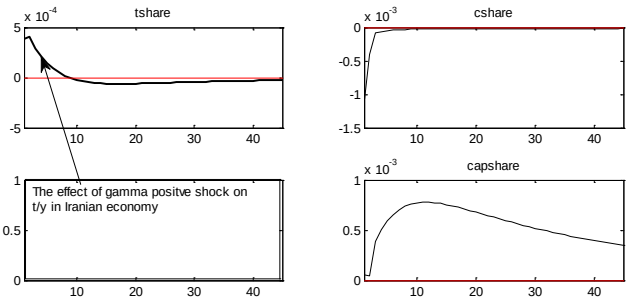

A practical application of pointed result in the figure 1 is that when labor growth rate is reduced about one percentage point, tax policy maker has a 10-year period opportunity to increase tax-share (0.22 percent [4]) to prevent large fiscal deficits.

### 3.9.2 Scenario III: Increasing Life Expectancy

Based on Life cycle theory, it's expected that increasing in life expectancy affects the government expenditure through its welfare programs on aging people. In order to implement these programs, the government has to increase tax rates to cover the budget deficit. As we can see in figure 3 after one percentage point of positive expectancy shocks (i.e., increasing 2.8 year in life expectancy until 2030 in the Iranian's demographic structure based on the United Nations prediction) tax – share in GDP (t-share) picks up almost 0.28 percent to reduce the budget deficit.

4 This value and values reported in other scenarios, calculated based on predicted and stochastic simulated data.

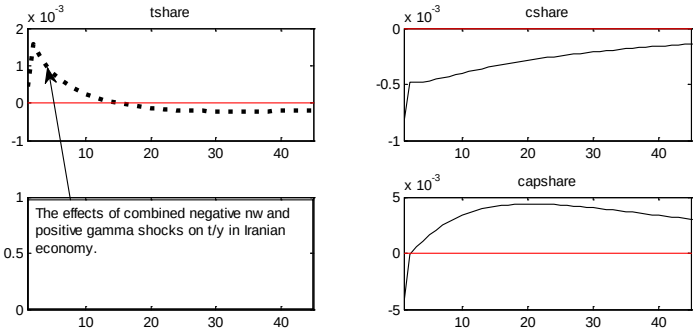
**Figure 3:** Positive Shock on Life Expectancy




### 3.9.3 Scenario IV: Increasing Life Expectancy and Decreasing Labor Growth Rate

Opposite movements of the life expectancy and labor growth rate have a same effect on the government budget constraint. Because, conditional on the fixed productivity growth, both of them reduce tax revenue and increase expenditures. So, the government has to increase the tax burden (through increasing tax rate) to rebalance the budget constraint. The government response is represented in figure 4. As it can be seen in t-share panel, in order to eliminate the budget gap, the government should increase t-share in GDP about 0.61percent during 10 years.

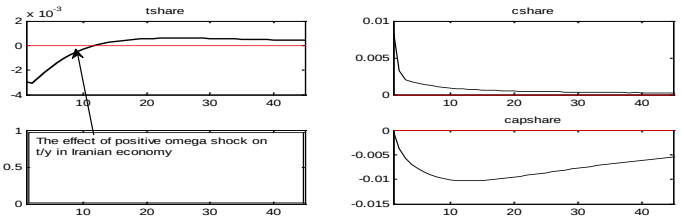
**Figure 4:** Positive Shock on Life Expectancy and Reducing Labor Growth Rate




### 3.9.4 Scenario V: Increasing Retirement Age

Increasing retirement age is a usual policy in population aging economies. This policy postpones expenditure changes and keeps labor force for some additional years in the labor market. So, it provides opportunity to the government to smooth its tax policy by possibly decreasing of tax rates. Figure 5 displays the decreasing response of t-share against increasing retirement age by 2 years.

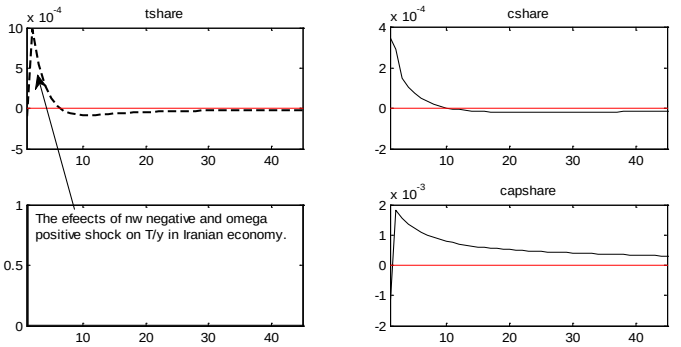
**Figure 5:** Increasing Retirement Age and Response of T-Share




### 3.9.5 Scenario VI: Increasing Retirement Age and Decreasing Labor Growth Rate

As a final scenario we performed simultaneous demographic alteration, i.e., enlargement in working period and reduction of labor growth rate, to analyze t-share response. As previously noted, the former improves tax revenues while the latter impairs them. Therefore, the net effect of these opposite direction shocks will be depended on the relative effectiveness of the two demographic changes. According figure 6, the effectiveness of the labor growth rate wanes the enlargement of working period and increased the tax rate to rebalance the budget constraint. In other words, policy maker should increase t-share at least 0.82 percent to deal with this composite demographic change.

**Figure 6:** Increasing Retirement Age and Decreasing Labor Growth Rate




## 4. Discussion

A glance at the latest trend of demographic alteration in Iran's society discloses that the population measures have dramatically changed since recent two decades. While the mortality rate was 50 in 1000 new born babies in 1990s it plunged to 22 in 1000 within 2011-2018. In addition, the fertility rate dropped from more than 6 babies in terms of each woman from four decades ago to less than 2 babies in recent years. This sharp slump has been changing the structure of Iran's population.

Besides boosting health and medical standards, other policies such as Iran's government programs in controlling population growth and continuous sever economic situations were behind this demographic adjustment. Although it could be mentioned that the government programs were not so effective as factors affecting smart demand for children such as urbanism (rising from 30 to 70 percent in four decades) as well as surging the literacy rate among parents. These factors besides improving other indices like life expectancy (73 years for women and 72 years for men) and net positive emigration have shifted the situation of Iran's population's structure in recent period. Furthermore, adding elderly people dependency soaring, up to 6 percent, would complicate the status of policy making in Iran's economy.

In the context of the mentioned movements what was the main question of our research was the impact of this trend on the tax revenues and budget structure of Iran's state. It was obvious that the effect of population change on the tax revenues is more and less ineluctable, the prominent issue is, however, the role of other modifiers such as technology progress and production factors productivity which can potentially alleviate the negative impacts of demographic alterations. We assumed these mitigating determinants as varying factors, in several scenarios, to measure the effects of generation changes. In this regard, our results were consistent with the theoretical predictions that the government has to concentrate on some alternatives to compensate the ramifications of the challenge. Now, to what extent the government would be able to follow these not-so-simple policies absolutely depends on the package of smart actions. As time being and based on our model output, due to the low-flowing and sticky nature of factors such as productivity and technology, particularly in developing countries like Iran, the easily available policy is setting the tax rates.

## 5. Concluding Remarks

Demographic structure as one of the important elements of socio-economic factors is at the core attention of policy makers and researchers. In fact, its importance springs from position of this variable in economic growth theories. Nowadays, most of the developing and developed countries around the world are experiencing demographic transition and population aging. This statement involves Iran's economy, too, which its situation is not better, if not actually worse than, other countries. But, the principal difference among Iran and other countries is in the timing of transition. So that, developed countries dealt with this problem after industrialization and development stage but Iran has been dealing in early years of its developing stage. So, several demographic-based research and assessments in various fields should be provided to prepare Iran's economy against demographic challenges. Therefore, this study concentrating on the tax revenue effects of demographic transition, tries to analyze several dimensions of potential changes in public finance. Therefore, main findings can be summarized as follows;

1. In order to eliminate the effects of exogenous variables, such as oil revenue, during demographic transition period, our macroeconomic framework supposed that, any budget

deficit could be financed by tax rate changes. Such that if budget constraint was unbalanced due to demographic metamorphosis, then the government was able to change tax rates to cover related fiscal gap.

2. A plunge in the labor growth rate, which had been assessed by reducing one percent of its long-term growth rate (from 0.0279 to 0.0179) and one percentage point of its standard deviation, had same effect on the budget constraint and justified increasing of tax rate to overcome the deficit problem. Although the size(amount) of the reaction was small it was statistically significant.

3. According predictions of international institutions, such as the United Nations, the life expectancy of Iran's people will be constantly increasing in the coming future. Our results showed that this demographic shift would affect the budget constraint through two tax and expenditure channels. So, to compensate these undesirable effects, the government should improve tax share in GDP through hiking 1.5 percent in the average tax rate.

4. Combined effect of reduction in labor growth rate and increasing in the life expectancy can be compensated by increasing 1.65 percent of the average tax rate. However, it should be noted that the tax rate upswings have enormous adverse effect in terms of tax burden on one hand and deteriorating behavior of agents on the other, governments, therefore, have to incline towards "tax base expansion" instead of emphasizing on the tax rate ascending.

5. Combined effect of depletion in the labor growth rate and accrual in the retirement age, as an opposite direction demographic changes, can be managed by increasing at least 1.6 percent of the average tax rate.

6. According to the mentioned results, shifting from labor-based tax system towards capital and wealth-based framework could be an important alternative for Iran's policy-makers to mitigate adverse effects of demographic changes. It has to be clarified that in case of implementing "comprehensive(global) tax system" they should focus more on the capital and wealth bases instead of labor-based system.

7. In order to keep sustainability in the government budget, an imperative action is taking a dynamic optimal taxing approach in appropriate pace with any changes in structural parameters of demographic modifications. This means that the parliament might not be able to determine some targets for revenue collection, as it was traditionally done, before considering the possible impacts of population changes.

As a whole, all of demographic changes, specifically labor growth rate, had a significant effect on the tax revenue in Iran's economy. At the same time, it's worth noting that their effects not being so considerable, provide remarkable opportunity to appropriate response by the policy maker. However, it has to be regarded as a serious future problem in the horizon of Iran's public finance.

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ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

# THE ROLE OF POLITICAL AND INSTITUTIONAL FACTORS ON ECONOMIC FREEDOM: EMPIRICAL EVIDENCE FROM PMG ARDL MODEL ESTIMATION

## SİYASİ VE KURUMSAL FAKTÖRLERİN EKONOMİK ÖZGÜRLÜK ÜZERİNDEKİ ROLÜ: PMG ARDL MODEL TAHMİNİNDEN AMPİRİK KANITLAR

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**Abstract**

This study focuses on investigating the political and institutional factors that impact economic freedom. The factors addressed for the study are those that have resulted in disputed outcomes in prior works—but have not been evaluated holistically. Using annual data collected from 2003 to 2017, a panel ARDL technique was performed for 17 nations to examine both the short-run and long-run impact of political and institutional factors. The results of the study suggest that government effectiveness and political stability have a favorable impact on economic freedom, but government size is not. Furthermore, the study shows that corruption has a detrimental impact on economic freedom. The most likely answer is that corruption is not grease for the economic system's wheels. Surprisingly, the findings suggest that democracy has a negative influence on economic freedom. Hence, as a policy implication, there is a necessity to improve institutions' effectiveness, reduce government size and provide political stability to construct economic freedom on economies.

**Keywords:** Economic Freedom, Corruption, Government Size, Political Stability, Democracy
**Jel Classification:** D70, D73, E14

**Öz**

Bu çalışma, ekonomik özgürlüğü etkileyen politik ve kurumsal faktörleri incelemeye odaklanmaktadır. Çalışma için ele alınan faktörler, önceki çalışmalarda tartışmalı sonuçlara yol açan ancak bütünsel olarak değerlendirilmeyen faktörlerdir. 2003'ten 2017'ye kadar toplanan yıllık verileri kullanarak, siyasi ve kurumsal faktörlerin hem kısa hem de uzun vadeli etkilerini incelemek için 17 ülke için bir panel ARDL tekniği uygulandı. Çalışmanın sonuçları, hükümet etkinliğinin ve siyasi istikrarın ekonomik özgürlük üzerinde olumlu bir etkisi olduğunu, ancak hükümet boyutunun olmadığını göstermektedir. Ayrıca, çalışma yolsuzluğun ekonomik özgürlük üzerinde zararlı bir etkisi olduğunu göstermektedir. En olası cevap, yolsuzluğun ekonomik sistemin çarkları için yağ olmadığıdır. Şaşırtıcı bir şekilde, bulgular

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demokrasinin ekonomik özgürlük üzerinde olumsuz bir etkisi olduğunu gösteriyor. Dolayısıyla, bir politika uygulaması olarak, ekonomiler üzerinde ekonomik özgürlük inşa etmek için kurumların etkinliğini artırma, hükümet boyutunu küçültme ve siyasi istikrarı sağlama zorunluluğu vardır.
**Anahtar Kelimeler:** Ekonomik Özgürlük, Yolsuzluk, Hükümet Büyüklüğü, Siyasi İstikrar, Demokrasi
**Jel Sınıflandırması:** D70, D73, E14

## 1. Introduction

Economic freedom is a key element to establishing a fair distribution of income, boosting foreign direct investment, and the creation of better social and environmental conditions for people (Bengoa and Sanchez-Robles, 2003; Stroup, 2007; Compton, Giedeman, and Hoover, 2014; Lipford and Yandle, 2015; Satrovic 2018; Pitlik and Rode, 2016; Graafland and Noorderhaven, 2020). Economic freedom has also been found to be important for reducing illegal economic activity and increasing tourism income. (Muslija et. al, 2019; Satrovic, 2019). A wide range of scientific research has demonstrated that economic freedom leads to GDP growth. (e.g.: Heckelman, 2000; Dutta and Williamson, 2016). As a result, it is critical to explore the elements influencing economic freedom. Surprisingly, the literature explores political and institutional elements that have sparked lengthy debate due to their contentious relationship. Several pieces of research have been conducted to investigate the origins of economic freedom in the context of economic crisis. (Luo, 2014; Bjørnskov, 2016). Numerous studies have been conducted to determine whether resource ownership and corruption harm economic freedom (Busse and Gröning, 2013; March, Lyford, and Powell, 2017). Some studies examine the relationship between institutional quality and economic freedoms (Kapás and Czeglédi, 2017).

Considering all the relevant literature, this study aims to contribute to the literature in various aspects. This study investigates institutional and political variables that have had controversial results in the literature were discussed together. We were particularly interested in the theoretical debate on the consequences of corruption and economic freedom. It is important to answer whether corruption is a factor that accelerates the wheels of the economy or is a significant obstacle. We also used a combination of ecopolitical and institutional factors to provide a holistic perspective. Secondly, the conducted methodology also had a role in its success. The majority of the work done requires data stationarity based on classic panel data techniques or causality investigations that lack parameter estimates. Therefore, it is not possible to determine any short-run and long-run coefficients of the subjected variables. In this respect, this study employs the panel ARDL technique—which has a prominent place in the literature (*Pesaran and Smith, 1995*). Hence, it is possible to examine the short-term and long-term effects of any subjected variable. As a result, this work can establish whether the variables affecting economic freedom are statistically significant in the short and long run utilizing data from 17 countries from 2003 to 2017. The rest of the work is as follows. The next section contains literature studies on our topic. In the third section, the dataset and the method are explained. In the fourth section, the results of the analysis are included, and 5 sections are the results.

## 2. Literature Review

This section examines the political, institutional, and economic factors that interact with economic freedoms. There is a controversial debate on the role of corruption in economic freedom. The widespread belief is that the increase in corruption harms economic freedom. The notion behind this belief is with economic freedom the markets are more tended to be competitive. Consequently, the companies cannot bear additional costs (i.e., bribing, etc.) that make their conditions uncompetitive. Stating that this widespread opinion is far from practical facts, Bliss and Tella (1997) drew attention to the parallel course of economic freedom and corruption. This is because the authors see bribery as an ingredient that lubricates the wheels of the economy. The debate about this issue gain momentum with the study confirmed a positive impact of corruption on economic freedom (Goel and Nelson, 2005). In a study that covers 100 countries, a positive relationship between economic freedom and corruption is revealed (Billger and Goel, 2009). The results of the study might imply that greater corruption might induce higher economic freedom especially for undemocratic nations (Billger and Goel, 2009). On the contrary, some studies have failed to show any positive association between corruption and economic freedom (Goldsmith 1999; Paldam, 2002; Shen and Williamson 2005; Yamarik and Redmon, 2017).

To discover the determinants behind economic freedom, some researchers have investigated the impact of democracy (Gelb, Melo, Denizer, and Tenev,1999; Rode and Gwartney 2012). Gelb et.al (1999) examine the impact of democracy on economic freedom. Gelb et al. (1999) find that there is a positive association between these variables. This view is supported by De Haan and Sturm (2003), who conclude that raising the democracy level leads to economic freedom increase. Contrary to previously mentioned studies, Lundström (2005) criticizes that economic freedom is a very aggregate index consisting of various components; therefore, these various components might be affected differently. In this vein, Lundström (2005) finds only some components of economic freedom strongly affected by democracy. Rode and Gwartney (2012) proclaim that democracy encourages a market economy system. However, Johnson and Lenartowicz (1998) stated that the socio-cultural structure of society is a more effective determinant of economic freedom rather than democracy. Potrafke (2010) believes the ideology of leading power on government is the fundamental determinant of economic freedom. In a study conducted in 100 countries, Krieger and Meierrieks (2016) find democratic institutions are not successful to achieve economic freedom. Authors attribute the probable leading factor causing this to be political capitalism — which is the mutual interest of political authority and economic authority.

Government size is usually discussed whether it is a prominent factor or not while determining economic freedom. As mentioned in the study of Graafland (2019), one of the four pillars of economic freedom was small government size. However, there are studies that certain countries pair a broad public sector with high taxes and a strong degree of economic freedom (Bergh and Erlingsson, 2009; Huskinson, and Lawson, 2014). Bergh (2020) try to explain this controversy by stating that there can be good big governments designing welfare state or inefficient ones. The first one is according to the standard neoclassical economy doctrine, a large public sector leads

to damage to the economy by creating market failure due to distortions and deterrent factors (Barr, 1992). Also, through the viewpoint of public choice, government policy failures mean the disadvantage of trying to correct market crashes in non-optimal ways (Tullock, 1967). That leads to countries with larger public sectors that are likely to experience greater political manipulation, profit-seeking officials, and corporate lobbying. There are not enough authors interested in the question of whether government efficiency and political stability affect economic freedom. The only study conducted by Jia and Zhou (2017) discovered for China that government efficiency is positively related to economic freedom.

## 3. Data and Methodology

### 3.1 Dataset

The data set used in this study spans 17 nations between 2003 and 2017. The selected countries are Austria, Iceland, Estonia, Greece, Hungary, Ireland, Portugal, Belgium, Denmark, Finland, France, Italy, Latvia, Luxemburg, Germany, Sweden, Turkey. We derived the Index of Economic Freedom from the Heritage Foundation and the government size data (% of GDP) from the World Bank (World Bank, 2020a). The data of government efficiency, political stability—and voice of accountability as a proxy for democracy— gathered from the World Governance Indicator dataset from the World Bank (World Bank, 2020b). Government effectiveness reflects the independence of institutions, service quality, and reliability. The political stability variable is intended to determine the irregularities in the society with terrorism or political elements. voice and accountability variables reflect competencies such as freedom of expression, the ability of society to question authority independently. Additionally, the Corruption Perception Index (CPI) is gathered to represent cross-country perceptions of government corruption from Transparency International (2020). This variable is determined in the range of 0 to 10 points and 10 points reflect excellent success against the corruption phenomenon.

### 3.2 Panel ARDL Approach

In consideration of the question of endogeneity Pesaran, Shin, and Smith (2001), Pesaran and Shin (1998) state that the ARDL co-integration procedure is a useful tool to employ—it offers short-term and long-term estimation. This procedure can be implemented independently from the integration level of independent variables. In this context, there are three different estimation techniques for diagnosing long and short-run estimation. The first mentioned procedure is dynamic fixed effects (DFE) involves non-homogeneity of the slope parameter, but *intercepts were permitted to differ across identities. The DFE procedure led to a simultaneous equation bias regarding the endogeneity among the disturbance term and the lagged value of the dependent variable (Pesaran and Smith, 1995; Baltagi, Grin, and Xiong; 2000).*

The second procedure introduced to literature is Mean Group (MG) is an estimation form to determine the bias due to different slopes in the dynamic structure of panel data. It gives the long-run parameter estimation for each identity by taking the mean of the long-run parameters. Consider typical following ARDL form Equation 1

$$Y_t = c_i + \eta_i Y_{i,t-1} + \beta_i X_{it} + \epsilon_{it} \quad (1)$$

each identity represented by underscore i = 1, 2,…,N. The coefficient $\Phi_i$ is in Equation 2 demonstrates the long-run coefficient

$$\Phi_i = \frac{\beta_i}{1-\eta_i} \quad (2)$$

which leads to the MG coefficient of estimation below Equation 3, and Equation 4

$$E(\Phi) = \sum_{i=1}^{N} \Phi_i \quad (3)$$

$$E(c) = \sum_{i=1}^{N} c_i \quad (4)$$

The aforementioned calculations illustrate the way of the calculation. It measures the average of the calculated coefficients for each identity which does not contain any limitations—that permit to differ both short-term and long-term b coefficients non-homogenously. *The second type of estimation procedure is the pooled mean group (PMG) estimators introduced in the literature (Pesaran et al., 1998). This procedure indicates the non-heterogeneity constraints on long-run parameters. Furthermore, PMG obtains the means of both error correction and short-term parameters of each identity*. In other words, this procedure permits intercepts, short-term parameters, and variances of disturbance term to vary between identities but restricts the long-term parameters to be identical. A researcher can decide between these three models by using the Hausman test—which provides the applier to distinguish whether the long-term parameters are determined to be heterogeneous or not. While long-term coefficients diagnosed are not heterogeneous, the null hypothesis rejected, the MG and DFE procedures are not reliable, but the PMG procedure provides consistent results estimators (Pesaran et al., 1999).

## 4. Results

### 4.1. Descriptive Statistics

This subsection provides general information about the dataset. Among the variables in this study, corruption (cpi), economic freedom (ecfre), and government size (gsiz) are used with natural logarithms. The other 3 variables were included in the analysis as political stability (pols), government effectiveness (geff), and democracy (demo) in levels, respectively. To show the

properties of the data, descriptive statistics is an influential component of research (Yıldız, 2020). As stated at the bottom of Table 1, not all variables were found to be normally distributed as a result of the Jarque Bera normality test.

**Table 1:** Descriptive Statistic

| | cpi | ecfre | gsiz | pols | geff | demo |
|---|---|---|---|---|---|---|
| Mean | 1.868029 | 4.233411 | 3.003834 | 0.755672 | 1.0039 | 1.184976 |
| Median | 1.94591 | 4.255613 | 2.99867 | 0.85967 | 1.009114 | 1.334962 |
| Maximum | 2.272126 | 4.41401 | 3.32988 | 1.688117 | 2.353998 | 1.800992 |
| Minimum | 1.131402 | 3.923952 | 2.48352 | -2.00906 | -0.32033 | -0.70749 |
| Std. Dev. | 0.283537 | 0.096997 | 0.174057 | 0.610459 | 0.634674 | 0.445953 |
| Skewness | -0.47434 | -0.57972 | -0.65644 | -1.73628 | 0.010187 | -1.83873 |
| Kurtosis | 2.088362 | 2.927278 | 3.278948 | 6.957951 | 2.091695 | 6.758734 |
| Jarque-Bera | 18.39278 | 14.3395 | 19.14081 | 294.5687 | 8.77022 | 293.7996 |
| Probability | 0.000101 | 0.00077 | 0.00007 | 0 | 0.012462 | 0 |
| Sum | 476.3473 | 1079.52 | 765.9776 | 192.6965 | 255.9946 | 302.1688 |
| Sum Sq. Dev. | 20.41994 | 2.389727 | 7.69516 | 94.65567 | 102.3139 | 50.514 |
| Observations | 255 | 255 | 255 | 255 | 255 | 255 |

## 4.2 Unit Root Test Results

The panel unit root investigations were implanted to check the stationarity of subjected data (Breitung, 2001; Im, Pesaran, & Shin 2003; Maddala & Wu, 1999; Choi, 2001). The variable of economic freedom was concluded to have a unit root as a result of all the tests. The government efficiency variable has been determined to be stationary by most of the tests applied. The corruption index was determined as a process in I (0) by Fisher ADF and IPS tests. The government efficiency was found to be stationary by the consensus of most of the conducted tests. As a result of the unit root tests applied for the democracy and political stability variable, the results show that this variable is I (0). Lastly, the tests applied to the variable of government size showed that the series is integrated into order one.

**Table 2:** The Results of Panel Unit Root Tests

| **Level** | | **IPS** | | | | | | **Breitung** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **ecfre** | **geff** | **cpi** | **demo** | **gsiz** | **pols** | **ecfre** | **geff** | **cpi** | **Demo** | **gsiz** | **pols** |
| $\tau_T$ | -0.3 | -2* | -2* | 0.1 | -0.1 | -0.6 | 0.68 | 0.1 | -0.5 | 1.9* | -0.3 | 2.1 |
| $\tau_\mu$ | -0.8 | -1* | -2** | -1.1* | -0.5 | -1.1 | | | | | | |
| $\tau$ | | | | | | | | | | | | |
| **First Differences** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\tau_T$ | -6* | -9* | -5* | -15* | -5* | -8* | -3* | -5* | -6* | -4* | -8* | -3* |
| $\tau_\mu$ | -8* | -11* | -8* | -11* | -7* | -9* | | | | | | |
| $\tau$ | | | | | | | | | | | | |
| **Level** | | **Fisher ADF** | | | | | | **Fisher PP** | | | | |
| **Variables** | **ecfre** | **geff** | **cpi** | **demo** | **gsiz** | **pols** | **ecfre** | **geff** | **cpi** | **demo** | **gvsi** | **pols** |
| $\tau_T$ | 40 | 64* | 57* | 44*** | 37 | 42 | 32 | 72* | 42 | 54** | 34 | 42 |
| $\tau_\mu$ | 43 | 48* | 56* | 71* | 35 | 49* | 42 | 46* | 40 | 43 | 32 | 56* |
| $\tau$ | 14 | 46* | 25 | 54** | 21 | 48* | 14.2 | 70* | 44 | 39 | 25 | 67* |
| **First Differences** | | | | | | | | | | | | |
| $\tau_T$ | 103* | 141* | 83.6* | 178* | 86* | 126* | 158* | 178* | 131* | 202* | 108* | 170* |
| $\tau_\mu$ | 135* | 176* | 126* | 177* | 112* | 146* | 154* | 207* | 134* | 213* | 127* | 188* |
| $\tau$ | 212* | 25* | 204* | 230* | 200 | 242* | 211* | 258* | 202* | 260* | 199* | 256* |

Note : *p < 0.10, **p < 0.05, ***p <0.01.

### 4.3 ARDL Estimation Results

This section reports the short-term and long-term effects of factors affecting the variable of economic freedom with ARDL estimators. Before estimation, optimal lag length has been identified according to Akaike Information Criteria (AIC). We are not interpreting the findings of MG and DFE due to the insignificance of the estimation parameters which is also confirmed by the Hausman test. Furthermore, because the short-term coefficients are statistically insignificant, only the long-term coefficients of PMG estimates will be interpreted. Apart from coefficients, the standard deviation of the coefficients is given in parenthesis.

Table 3 shows that rising CPI leads to a decline in economic freedom. This contradicts some of the earlier recent research. (Bliss and Di Tella,1997; Graeff and Mehlkop 2003; Billger and Goel, 2009). The probable explanation is due to the result of excessive regulations causing obstacles in the productive effort and not supporting rent-seeking behavior. This contrasts the view that corruption is the sand of the wheels of the economy (Paldam, 2002; Shen and Williamson 2005, Hall et al. 2020). It might imply that corruption practices seem beneficial mechanisms to circumvent bureaucratic obstacles. Secondly, the improvement in political stability leads to economic freedom being positive in the long run. Political stability is representing the state of being firm of the nations against unconstitutional and violent events. Thus, the presence of it leads to economic freedom to rise. Even though no research has been conducted to analyze this link, ul Haq (2020) highlights that political stability is a significant determinant in economic freedom. Turning now considering the effect of government efficiency on economic freedom, which demonstrates trust in the government's commitment and the quality of public services. It has been discovered that government efficiency has a significant and favorable impact on economic freedom. Democracy seems negatively effecting economic freedom which is in the

same direction as the study of İslam (2018). The probable explanation of this result is that the economic elite transforming its economic power into a de facto governmental authority to hold its commercial interests that these objectives run contrary to economic freedom and preserving profits of the elite. Gehring (2013) also states that there is no need for a link between democratic development and economic freedom because some countries have economic freedom, although they have not developed democratically (e.g., Singapore, China, United Arab Emirates, etc.). The negative relationship between government size and economic freedom is significantly positive. This might be explained through the viewpoint of public choice, government policy failures mean the disadvantage of trying to correct market crashes in non-optimal ways (Tullock, 1967; Berg 2020). That leads to countries with larger public sectors that are likely to experience greater political manipulation, profit-seeking officials, and corporate lobbying. The conclusion from this study is supporting the classical economic doctrine that the governments should not go beyond just covering security, education, justice, and health needs.

**Table 3:** ARDL Estimation Results

| **Dependent Variable: D(ECFRE)** | **PMG** | **MG** | **DFE** |
|---|---|---|---|
| **LONG RUN EQUATION** | | | |
| CPI | -1.18 | -2.92 | 2.13 |
| | (0.15) | (5.43) | (1.00) |
| POLS | 5.66 | 2.97 | 2.62 |
| | (0.41) | (5.52) | (2.34) |
| GEFF | 1.57 | -1.23 | 5.53 |
| | (0.51) | (14.6) | (2.75) |
| DEMO | -4.61 | -5.55 | -3.65 |
| | (0.41) | (11.5) | (3.70) |
| GSIZ | -1.03 | -0.33 | 0.10 |
| | (0.06) | (0.85) | (0.33) |
| **SHORT-RUN EQUATION** | | | |
| COINTEQ01 | -0.43 | -0.30 | -0.29 |
| | (0.09) | (0.21) | (0.04) |
| D(CPI) | 0.68 | 0.41 | 0.26 |
| | (0.05) | (0.86) | (0.38) |
| D(POLS) | -1.29 | 1.28 | 0.65 |
| | (1.49) | (4.74) | (0.82) |
| D(GEFF) | -0.69 | 1.26 | 0.62 |
| | (1.07) | (3.78) | (0.94) |
| D(DEMO) | -0.08 | 2.12 | -2.98 |
| | (1.72) | (6.26) | (1.40) |
| D(GSIZ) | 0.24 | 0.12 | 0.15 |
| | (0.17) | (0.33) | (0.13) |
| C | 43.83 | 10.76 | 14.47 |
| | (9.66) | (23.83) | (3.81) |

## 5. Conclusion

This study has used a panel ARDL procedure to check the political and institutional factors that affect economic freedom. Although the applied method includes 3 different approaches, the results of PMG techniques are relatively robust. Short-term coefficients are not statistically significant in the PMG application, while long-term coefficients are significant. One of the prominent conclusions that arose from the study is that economic freedom was positively affected by corruption in the long term. Although it seems like a surprise at first glance, there was such a controversial result in past studies. To prevent the economic freedom that comes with corruption, directors must decide to reduce the returns from corruption activities. The probable reason for this is the politicians and bureaucrats who have the understanding that there will be no acceleration in the investment if no rent is created for them. As it enhances economic freedom, it can increase inefficiencies in the distribution and usage of government funds provided by central institutions (De Angelis, De Blasio, and Rizzica, 2018). As De Angelis et al. (2018) mentioned that to increase the efficacy of the financing process of the municipalities, EC (European Commission) has developed an automated process to withhold funds to increase the reliability of the funding regulation, so that the Member Municipalities do not report on and approve their overall expenditure before the end of the programming cycle—which does better but still not deal enough with corruption. To prevent the problems caused by such risks, a seriously protected audit system should be established with legal regulations; undesirable factors that created consequences on local institutional quality should be prevented.

Other results obtained from this study show the positive impact of political stability and government effectiveness on economic freedom. These results are not against the previous works, which is a more economically free nation cannot establish disregarding these institutional factors. Additionally, the negative consequence of democracy on economic freedom might seem questionable but found in previous studies İslam (2018). As regarding the study of Lundström (2005), it is more satisfactory to diagnose the impact of democracy on each trivet of economic freedom. Lastly, our finding showing that government size is negatively affecting economic freedom is consistent with the bare bone of liberal economic doctrine.

In line with the results of this study, our recommendation to policymakers is as follows: Political stability should be achieved by providing legal and security measures in the establishment of economic freedom. The necessary supervisory elements must be established within the legal infrastructure to eliminate the positive effect of bribery. In addition, reducing the size of the government and maintaining policies in favor of the classical doctrine is important for economic freedoms. Thus, public resources will not be wasted, and the market economy will be supported. The researchers might also investigate the transmission mechanism of various shocks on economic freedom with structural vector autoregressive models (Yıldız et. al, 2021).

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