Some Observations on the Convergence Experience of Turkey

July 2013
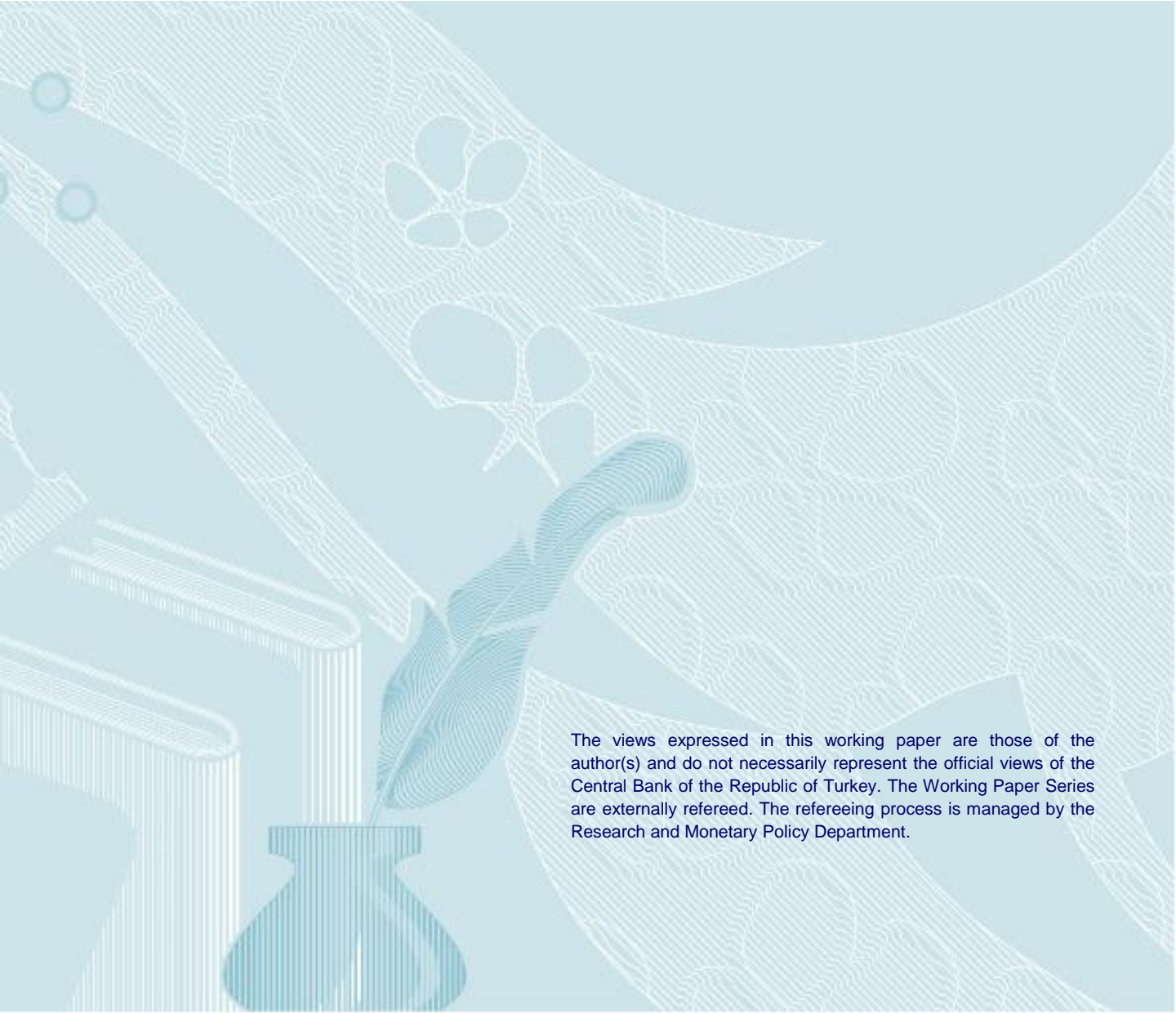
Murat ÜNGÖR

Some Observations on the Convergence Experience of Turkey

Murat Üngör[1]

Research and Monetary Policy Department
Central Bank of the Republic of Turkey

July 2013

Abstract

This study, without providing a complete picture of the country's economic development, aims to bring about a better understanding of the convergence experience of Turkey. We explore some aspects of the convergence process of Turkey and provide some international comparisons tracking the changes in both nominal and real per capita income figures. With respect to the per capita income, Turkey is closer to Brazil than to Korea. From the 1960s until now, Korea is closing the gap in per capita income that separates the country from the richest countries of the world. On the other hand, Brazil and Turkey lost ground in the last two-three decades of the 20th century. After the lost decades, Turkey had high growth rates during 2002-2007. We perform a growth accounting exercise and discuss the importance of productivity growth in Turkey's long-run growth. Lastly, we carry out an exercise, in which we decompose the growth rate of nominal per capita income into the growth rates of real GDP and population in Turkey; the rate of inflation in the U.S.; and the appreciation of the Turkish Lira. We present several alternative scenarios for the time-path of per capita income in Turkey.

"Once upon a time there was a field called development economics-a branch of economics concerned with explaining why some countries are so much poorer than others, and with prescribing ways for poor countries to become rich."
— **Paul Krugman** (1997, p. 6)

"By the problem of economic development I mean simply the problem of accounting for the observed pattern, across countries and across time, in levels and rates of growth of per capita income."
— **Robert E. Lucas, Jr.** (2002, p. 19)

"But historically nothing has worked better than economic growth in enabling societies to improve the life changes of their members, including those at the very bottom."
— **Dani Rodrik** (2007, p. 2)

"Understanding why some countries are rich while some others are poor is one of the most important, perhaps *the* most important, challenges facing social science."
— **Daron Acemoglu** (2009, p. 8)

1.   Introduction

Why are some countries rich and others poor? Why do income levels differ among countries? Why do growth rates differ? Why does per capita income increase over time? These questions and some related ones are among the most important questions in economics. In the last decade, these intellectually stimulating questions have become subjects of the public and policy-related discussions in Turkey, since the country has shown high growth rates. In fact, Turkey's GDP growth rate in 2010 averaged about 9% ranking it in first place in Europe and it accelerated to 11% in the first quarter of 2011 outpacing China's growth rate.

Turkey, with per capita GDP (at current US$) of $10,524 in 2011[2], is an upper middle income country with a population around 75 million and a GDP around US$0.8 trillion, making it the 18th largest economy in the world as of 2011 (see Appendices A.1 and A.2 for details).[3] This study aims to bring about a better understanding of the convergence experience of Turkey. We provide some insights, based on international comparisons, to contribute to the understanding of the Turkish growth experience using a relatively theory-free approach. We are aware of that an argument that is not disciplined by a clear theoretical framework would be less illuminating. Having this in mind, we present some facts regarding the historical growth experience of Turkey. This approach, we believe, is still informative and may provide insights for future theoretical as well as empirical work. Without providing a

---

[2] The World Bank, World Development Indicators Database (online access).
[3] Bakır (Dünya, April 19, 2013) states that Turkey is the 17th largest economy as of 2012.

1

complete picture of the country's economic development, we intend to explore some aspects of the convergence process of Turkey.
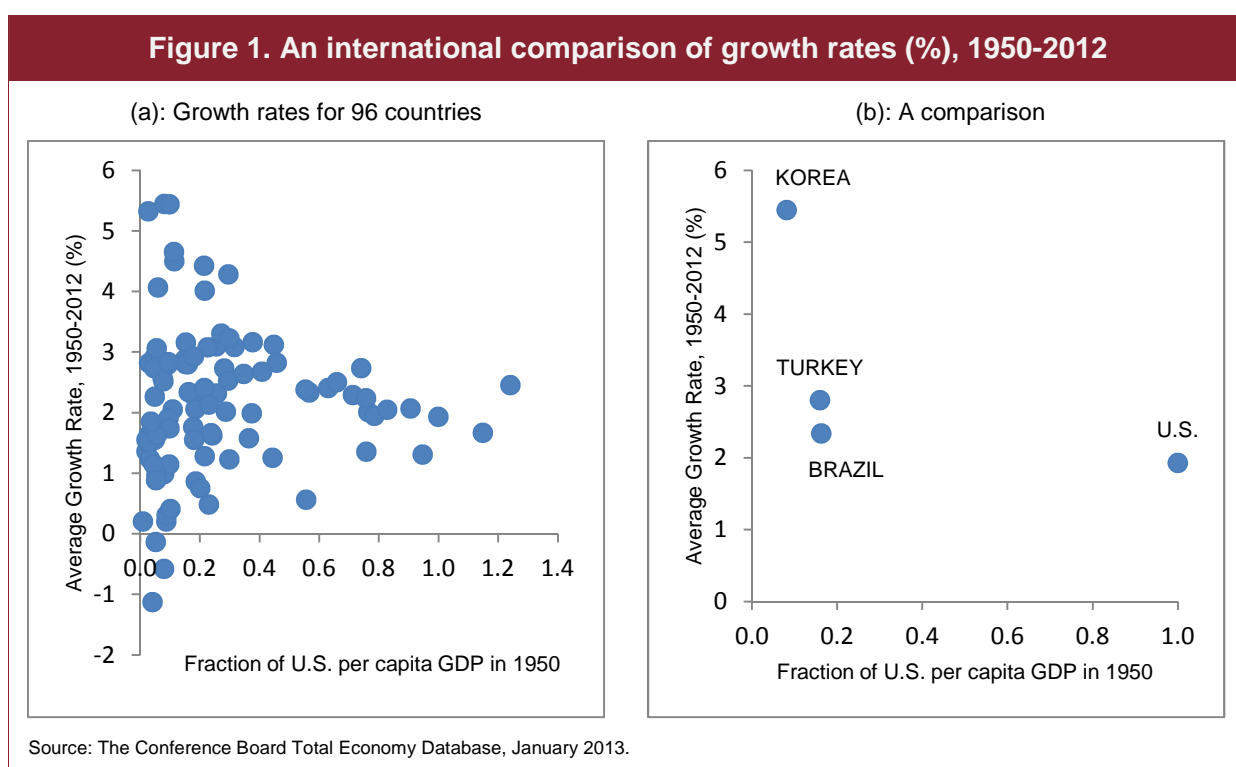
We first focus on the convergence experience of Turkey. We use per capita real income as a measure of economic development and, based on this indicator, compare the performances of different countries with that of the United States. We provide comparisons with different countries and country groups to infer which countries have similar relative per capita income levels/growth rates throughout the time. Our observations provide motivation for rendering possible comparisons of the similarities and differences in Turkey and Latin America. Specifically, we report some data for Turkey and Brazil, in comparison with Korea, to see whether these two countries have similarities in their convergence experiences. We also study the recent economic performance of Turkey, within a growth accounting framework, calculating the contributions of capital, labor, education, and total factor productivity (TFP) to growth. During 2002–2007, output per worker grew more than 5% per year and TFP growth accounted for around half of this growth on the back of the reforms and structural transformation policies implemented in the post-2001 period. We argue that Turkey's efforts for development should not be only based on increasing the current sources of production, but also using them more effectively and efficiently.

The last section of the paper focuses on the time-path of nominal per capita income. We carry out a decomposition exercise, in which we break down the growth rate of nominal per capita income into the growth rates of real GDP and population in Turkey; the rate of inflation in the U.S.; and the appreciation of the Turkish Lira. We present a set of calculations, based on several assumptions, for the possible values of per capita income in the near future and discuss the importance of the real GDP growth (in Turkish Liras) for the behavior of (nominal) per capita income.

This study is organized as follows. Section 2 explores the historical convergence experience of Turkey presenting some international comparisons. Section 3 takes a close look at the development experiences of Brazil and Turkey in comparison with Korea. Section 4 examines the supply side factors of growth, decomposing changes in output per worker into different components. Section 5 provides some figures based on the calculations with per capita income differences at current US dollars. Section 6 concludes.

2.   Convergence Experience of Turkey

The issue of catching up with the developed economies by the less developed ones is often carried out using the real GDP per capita indicator. We start with carrying an international comparison of growth rates to a broad context, offering comparisons of per capita income (real GDP per capita) for 96 countries.[4] Figure 1(a) plots a comparison of growth rates after 1950 against the ratio of per capita income in 1950 to per capita income in 1950 in the United States.[5]

Figure 1. An international comparison of growth rates (%), 1950-2012

(a): Growth rates for 96 countries

(b): A comparison

Source: The Conference Board Total Economy Database, January 2013.

The United States has been the industrial leader since the early 20th century and the average annual growth rate of per capita GDP is close to 2% during 1950-2012.[6] The growth rates in Figure 1(a) range from a low of -1.13% per annum in DR Congo to a high of 5.45%

---

[4] Many studies on economic growth and development present similar pictures to Figure 1(a) [see, among many others, Romer (1987), Barro (1991), Helpman (2004), and Acemoglu (2009)].

[5] See Appendix A.3 for the list of the countries in Figure 1(a). Data are from the most recent version of the Conference Board Total Economy Database (January 2013). The level estimates are expressed in 2012 U.S. dollars, and converted at purchasing power parity to adjust for differences in relative price levels between countries.

[6] The United States has a constant growth path with 2% growth per year in the 20th century. For example, Kehoe and Ruhl (2010) plot the data on real GDP per working-age person in the U.S. during 1900-2008 and state that the average growth rate during this period was 1.99% per year.

per annum in Korea. Figure 1(a) reveals the great dispersion in realized growth rates in the sample and suggests the absence of any strong correlation between beginning of relative level of income and growth in the post-war world.

Figure 1(b) shows the selected countries from Figure 1(a): Brazil, Korea, Turkey, and the United States. Relative income was 16.0% in Turkey and 16.2% in Brazil in 1950. On the other hand, it was only 8.1% in Korea. Brazil and Turkey have experienced average growth rates of less than 3%, whereas Korea has experienced average growth rates of more than 5% between 1950 and 2012. Figure 1(b) motivates two questions: (i) How does GDP per capita in Turkey relative to the United States evolve during 1950-2012? (ii) Which countries can be classified as peer countries of Turkey in terms of the behavior of per capita income? Figures 2 and 3 suggest possible answers to these questions.

Figure 2. GDP per capita relative to the U.S. (%), 1950-2012

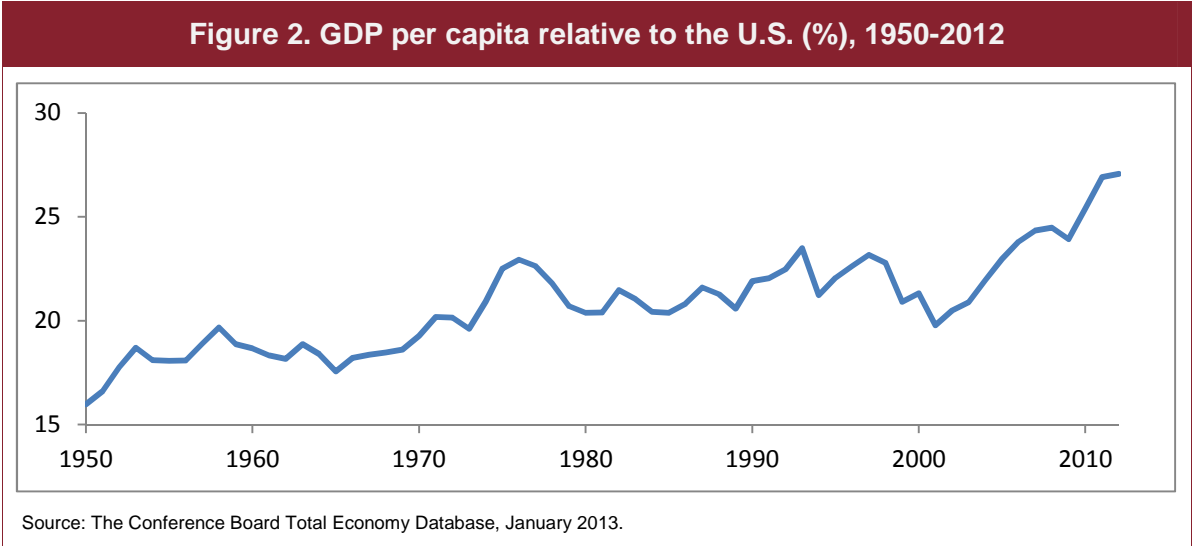Source: The Conference Board Total Economy Database, January 2013.

Figure 2 shows GDP per capita in Turkey relative to the United States between 1950 and 2012. Historically, per capita GDP in Turkey does not show a significant catching up. For example, GDP per capita in Turkey increased from 16% of the U.S. level in 1950 to around 23% in 1976. Turkey experienced a relative deterioration starting with 1977 on as the GDP per capita shrank to about 20% of the U.S. level in 2001.[7] However, there has been an

---

[7] The high growth rate till 1977 was attributable to the import-substituting industrialization strategy of economic development and to increased foreign borrowing and remittances of more than a half million Turkish workers in the European countries, mainly in West Germany in addition to the public sector growth. For example, Pamuk (1981) notes that remittances exceeded one billion dollars for the first time in 1971, representing additional purchasing power equivalent to 8-9% of Turkey's GNP. The ending of foreign lending, in the end of 1976, and subsequences caused large disrupts in domestic production. The import substitution policies were implemented until 1980. On January 24, 1980, the Turkish government announced a major economic reform program, which is

upward trend after that and GDP per capita in Turkey relative to the United States reached to 27% in 2012.

Figure 3 shows GDP per capita in Turkey and in a set of different countries, relative to the United States during 1950-2012. Panel (a) in Figure 3 presents a comparison of Turkey and two of the so-called Asian Dragons: Korea and Taiwan.[8] The remarkable catching up of East Asia is visible, since per capita income in Korea (Taiwan) reached to about 67% (80%) of the U.S. level by 2012. Taiwan's (Korea's) per capita income passed Turkey's per capita income in 1973 (1979). Panel (b) in Figure 3 displays a comparison of Turkey and the region of Southern Europe (Greece, Portugal, and Spain).[9] Relative income in Southern Europe was 26% of the U.S. level in 1950 and reached to about 58% in 2012. This region had caught up significantly with the U.S. by the mid-1970s, while Turkey had remained relatively stagnant.

Panel (c) in Figure 3 exhibits a comparison of Turkey and Latin America (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Venezuela).[10] Relative income in Latin America was around 25% of the U.S. level of per capita income in 1950. Although Korea and Taiwan continued to grow at a steady pace during the 1980s, Latin America experienced a relative deterioration from 1980 on as the per capita income of the group decreased to around 24% of the U.S. level in 2012. Panel (c) in Figure 3 is consistent with the argument of Rodrik (2012, p. 158) that the very last decade in Latin America shows the process of convergence, but the convergence gap between the average income levels in Latin America and in the United States is wider now than it was in the 1970s.

Per capita income in China was less than 3% of the U.S. level of per capita income in 1950 [see Panel (d) in Figure 3]. Economic reforms, which started in 1978, have driven a rapid transition from central planning toward a market-oriented system integrating with the world economy. China grew at an annual average rate of 2.6% during 1950-1977 and then at a rate of 7.4% during 1978-2012. In 2012, per capita income in China was around 21% of the

---

also known as a stabilization and structural adjustment program [see, for example, the edited volumes by Aricanli and Rodrik (1990) and Şenses (1994)].

[8] The Four Asian Tigers or Asian Dragons is a term used in reference to the economies of Hong Kong, Singapore, South Korea, and Taiwan. Hong Kong and Singapore are not included in Panel (a) in Figure 3, since they are rich city-states. For example, according to the Conference Board Total Economy Database, per capita income in Hong Kong was very close to that of the U.S. level in 2012 and per capita income in Singapore was higher than that of the U.S. level in 2012.

[9] See Adamopoulos and Akyol (2009) and İmrohoroğlu et al. (2013) for detailed studies regarding a comparison of Turkey and the region of Southern Europe.

[10] Population data for Colombia in 1980 seems to be misreported in the Conference Board Total Economy Database. We use the World Bank Development Indicators Database in getting the population growth rates to correct the population value in Colombia in 1980.

U.S. level of per capita income. China, the world's most populous country, is also the fastest growing country since 1978 and the Chinese economy has become the second largest in the world (see Table A.1 in the Appendix).[11]

Figure 3. GDP per capita relative to the U.S. (%), 1950-2012

(a): Turkey vs. Asian Dragons

(b): Turkey vs. Southern Europe

(c): Turkey vs. Latin America

(d): Turkey vs. China

Source: The Conference Board Total Economy Database, January 2013.

---
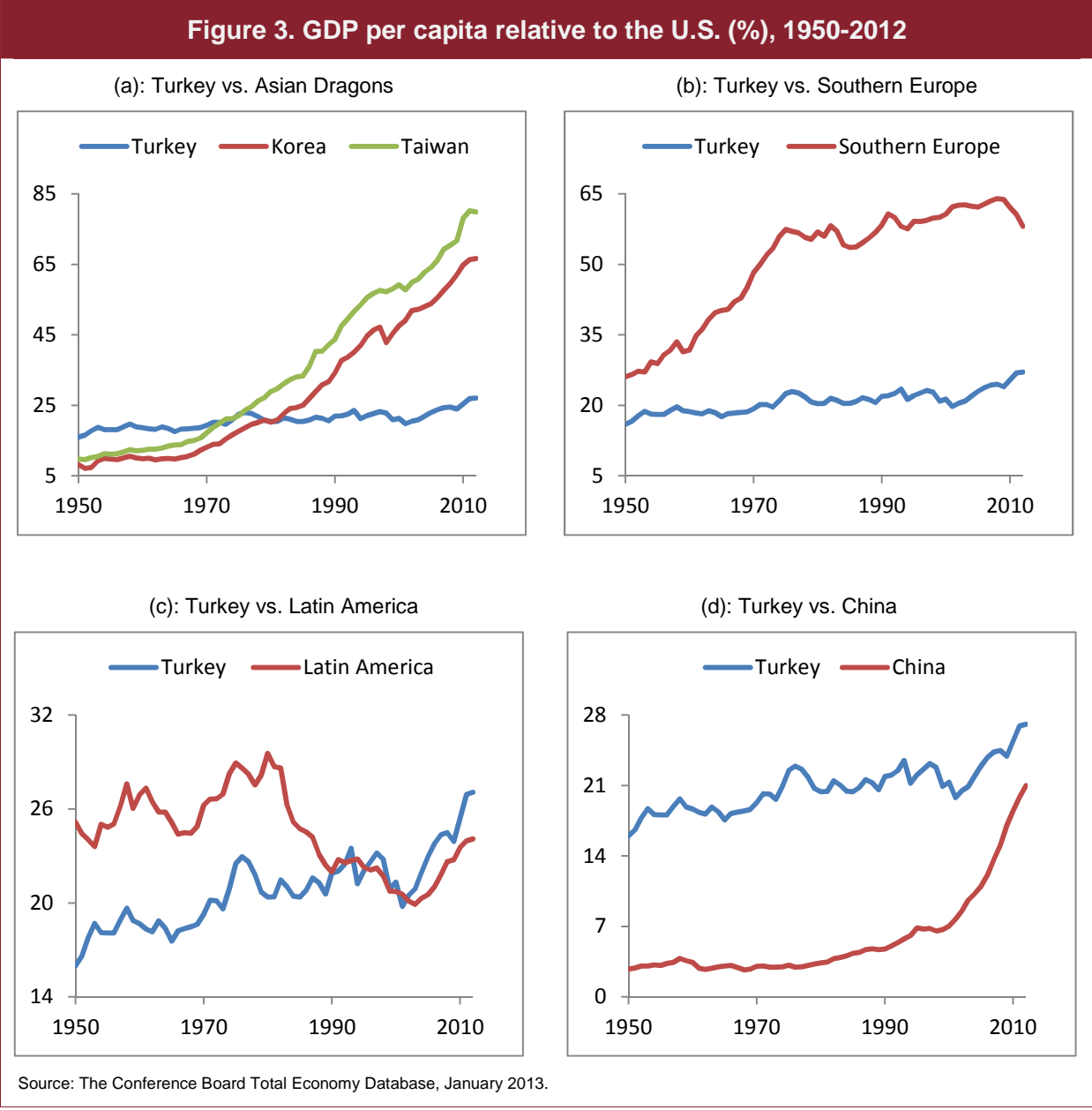
[11] See the edited volume by Brandt and Rawski (2008) for a comprehensive analysis of China's growth experience in the past two decades of the 20th century.

3.   A Peer Country of Turkey: Brazil or Korea?

The analysis above suggests that the time-path of real per capita income in Turkey, in comparison with other country groups, looks like the one observed in Latin America as a group. Figure 4 plots the relative per capita income in Turkey and in Brazil. Although Turkey's per capita income has been higher than that of Brazil since 1990, we observe that per capita income levels are comparable in these two countries. Figure A.2 in the Appendix plots the relative per capita income in Turkey and in other Latin America countries (mentioned in Figure 3). A simple eyeballing suggests that Brazil can be named as a peer country (in terms of the behavior of per capita income) of Turkey in comparison with other Latin America countries.

Figure 4. GDP per capita relative to the U.S. (%), 1950-2012

Source: The Conference Board Total Economy Database, January 2013.
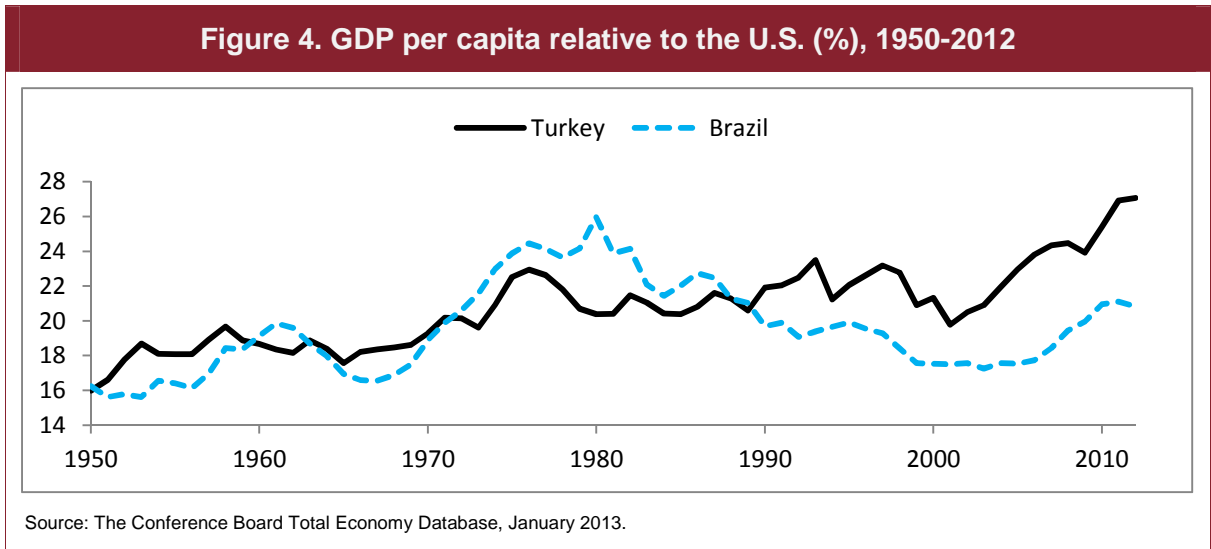
Cole et al. (2005) argue that Latin America is a "development outlier" since it is the only group of Western countries that have not gained significant ground on U.S. income levels in the last 50 years. Many observers have called the decade of the 1980s the lost decade of development for Latin America [see, for example, Krueger (1993, p. 1) and Rodrik (1995, p. 2927)]. The debt crisis was one of the key reasons for poor economic performance in Latin America. In August of 1982, Mexico announced that it was unable to meet its scheduled repayments, marking the beginning of the debt crisis. In addition, many Latin American countries have suffered from high and variable inflation rates. For example, Ortiz (2012, p. 17) states that the average inflation rate in Latin America was 136% per year in the

1980s and 240% per year in the first half of the 1990s. Brazil's inflation rate exceeded 1000% per year in some years during the early 1990s.[12]

Turkey had experienced a period with chronically high inflation rates. The average inflation rate in Turkey during 1974-2003 was 56%.[13] The Governor of the Turkish Central Bank, in his several speeches, labels the period from 1974 to 2003 as "the 30 lost years" [Başçı (2012b, d)].[14] The Governor's main point, based on Barro (1995), is that an inflation rate that is on average higher by 10 percentage points may cause, on average, a quarter point decrease in the long-term growth rates of the countries [Başçı (2012a, c)].[15] Başçı designs a counterfactual exercise and argues that, in 2011, GDP per capita in Turkey (at current US$) would have been around 31% of the U.S. per capita income (instead of the actual 22% of the U.S. level) if annual inflation rate had averaged 5% during 1974-2003 [Başçı (2012b, d)].[16]

Figure 5 provides some international comparisons using information for Brazil, Turkey and Korea, illustrating some notable similarities between Brazil and Turkey.[17] Panel (a) in Figure 5 shows relative human capital levels in Brazil, Korea, and Turkey.[18] Korea's human

---

[12] Since the mid-1990s, however, inflation rates in virtually all of Latin America have come down dramatically to the single digits in most cases. For example, in 2011, inflation was around 7% in Brazil and below 4% in Chile, Colombia, and Mexico [see, for example, Bernanke (2005) and Levy and Schady (2013)].

[13] Dibooglu and Kibritcioglu (2004) list five factors that could have been responsible for the high and persistent inflation rates in this period: (i) high public sector deficits; (ii) monetization of public sector deficits; (iii) increases in prices of major imported inputs (particularly, crude-oil prices); (iv) inflationary effects of rising exchange rates via increases in prices of imported goods; and (v) persistent inflationary expectations of economic agents.

[14] The argument of "the lost decades in Turkey" has also been stated by İmrohoroğlu et al. (2009) and Çiçek and Elgin (2011). Both studies, using the Kehoe and Prescott (2007) methodology, look at the historical growth experience of Turkey analyzing the evolution of the detrended output per working age person. Çiçek and Elgin (2011) argue that the Turkish economy experienced a depression from 1976 to 1984. İmrohoroğlu et al. (2009) state that the 1976-2001 period can be described as a period of significant stagnation in Turkey. Kehoe and Prescott (2007) argue that Argentina, Brazil, Chile, and Mexico had depressions in the 1980s that were comparable in magnitude to those in the U.S. in the interwar period.

[15] One of the main results in Barro (1995) is that if a number of country characteristics are held constant, then regression results indicate that the impact effects from an increase in average inflation by 10 percentage points per year are a reduction of the growth rate of real per capita GDP by 0.2-0.3 percentage points per year (Barro's data set covers over 100 countries from 1960 to 1990).

[16] Akat and Yazgan (2012) also discuss the possible harmful effects of inflation on growth in Turkey referring to the Central Bank for counterfactual calculations.

[17] There are some studies aimed to evaluate the economic development performances of Turkey and Korea in historical perspective [see, for example, Krueger (1987), Eşiyok (2011) and the references therein]. There also are some studies to explain the poor performance of Latin America relative to East Asia [see, among many others, Lin (1988), Comeau (2003), Grabowski (2008) and the references therein].

[18] Human capital is constructed using information on average years of schooling in the population over 15. Data on average years of schooling are from Barro and Lee (2010). These are converted into human capital, following Caselli (2005), using the formula $h = e^{\varphi(s)}$, where s is average years of schooling, and the function $\varphi(s)$ is piecewise linear with slope 0.134 for $s \le 4$, 0.101 for $4 < s \le 8$ and 0.068 for $s > 8$ [see Caselli (2005) for details]. Data in Barro and Lee (2010) are constructed at 5-year intervals from 1950 to 2010. We use a linear interpolation method, i.e., linear interpolation in between years ending in 0 and 5, to estimate missing observations. Similar results are obtained using information on average years of schooling in the population over 25. The results are available upon request. The Barro-Lee Dataset is available at the following address: http://www.barrolee.com/

capital increased from around 64% of the U.S. level in 1960 to 97.6% of the U.S. level in 2010. The starting points in 1960 and the time-paths observed in Brazil and Turkey have similarities. For example, Brazil's human capital increased from 47.6% of the U.S. level in 1960 to 71.7% in 2010. Similarly, Turkey's human capital increased from around 46% of the U.S. level in 1960 to 68% in 2010.

Panel (b) in Figure 5 shows the time series for gross domestic savings (% of GDP) in each country between 1960 and 2011 based on the World Bank Development Indicators. This ratio for Korea increased from around 2% in 1960 to 31.5% in 2011. Initially, both Brazil and Turkey had higher ratios than that of Korea. Brazil and Turkey have shown very similar patterns (as well as magnitudes) between 1990 and 2011. The average gross domestic savings (% of GDP) is around 18.6% in Brazil and around 18.4% in Turkey during 1990-2011. On the other hand, the average gross domestic savings (% of GDP) is more than 30% in Korea between 1990 and 2011.[19]

Panel (c) in Figure 5 depicts purchasing power parity (PPP) physical capital-output ratios in Brazil, Korea, and Turkey between 1960 and 2000.[20] The capital to output ratio in Turkey increased from 0.63 in 1960 to 1.56 in 2000. In 2000, the capital to output ratio in Brazil was 90% of the U.S. ratio. Similarly, the same ratio was 87% of the U.S. capital-output ratio in Turkey in 2000. Panel (d) in Figure 5 shows TFP levels in each country relative to the U.S. between 1960 and 2000.[21] Brazil and Turkey display very similar patterns of relative TFP levels. For example, in 1970, relative TFP level was 61% in Brazil and 62% in Turkey. The deterioration of TFP in Brazil (relative to the U.S.) is clear in the post-1980 period.[22] Panel (d) shows that Turkey had TFP reduction between 1970 and 2000.[23]

---

[19] In Turkey, saving and investment rates both have been following downward trends for more than a decade. Data from the Ministry of Development show that the ratio of gross fixed investments to GDP averaged less than 20% and the ratio of total domestic savings to GDP averaged around 17% between 1998 and 2010 (see Table 2.5 at the following address: http://www.mod.gov.tr/en/SitePages/mod_easi.aspx).
[20] Data are from Hsieh and Klenow (2010). They use a measure of the capital stock at common international prices (constructed using investment rates) based on Penn World Table 6.1.
[21] Data are from Hsieh and Klenow (2010). They use a standard growth accounting methodology. TFP is the residual after controlling for physical capital, human capital, and labor input.
[22] Cole et al. (2005) and Restuccia (2012) establish the importance of the TFP factor in divergence experience of Latin America. Similarly, Daude and Fernández-Arias (2010) calculate measures of TFP for a cross section of countries and argue that TFP is the principal driver of the slow development of Latin America. Levy and Schady (2013, Figure 2), based on the Daude and Fernández-Arias (2010) data set, compare TFP growth in East Asia, Latin America, and the U.S. during 1980-2007. They note that in East Asia, productivity growth has been faster than in the U.S., while in Latin America it was negative up to 2000. Since then, the region has continued to lose ground relative to East Asia. Üngör (2011) investigates the reasons behind the divergence of aggregate labor productivity in Latin America and East Asia within the framework of a multi-sector general equilibrium model.
[23] Productivity gap between private and non-private sectors could also be responsible for low TFP growth in Turkey. For example, Schmitz (2001), based on the data set of Krueger and Tuncer (1982), computes private TFP relative to government TFP for 1963 and 1976 for the industries of: chemicals, petroleum, nonmetallic mineral products, basic metal products, metal products, machinery, electrical machinery, and transport equipment

Figure 5. Some more comparisons for Brazil, Korea, and Turkey

(a): Human capital relative to the U.S. (%), 1960-2010
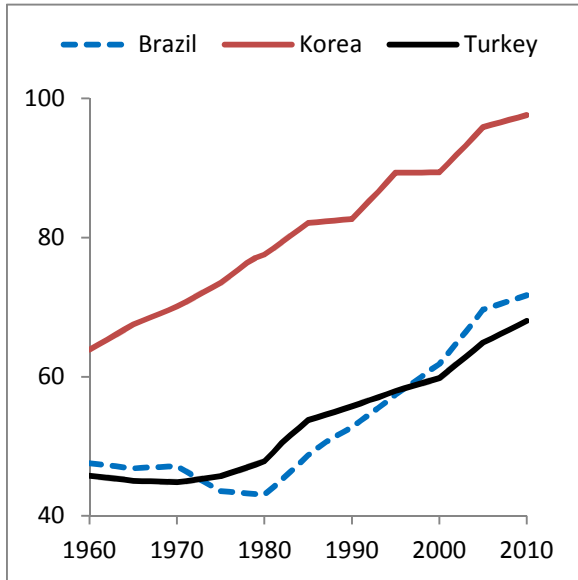
Source: Caselli (2005), Barro and Lee (2010).

(b): Gross domestic savings (% of GDP), 1960-2011
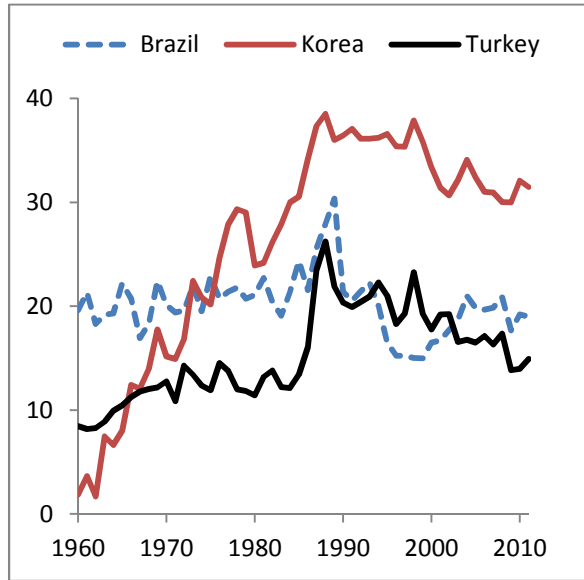
Source: World Bank, World Development Indicators.

(c): PPP capital-output ratio, 1960-2000
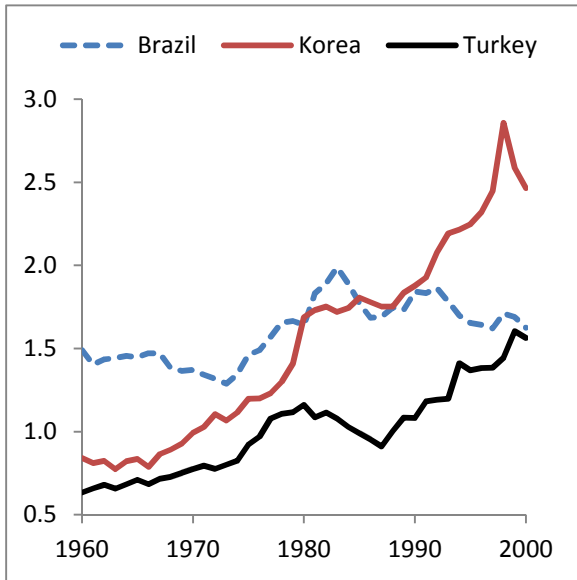
Source: Hsieh and Klenow (2010).

(d): TFP levels relative to the U.S. (%), 1960-2000
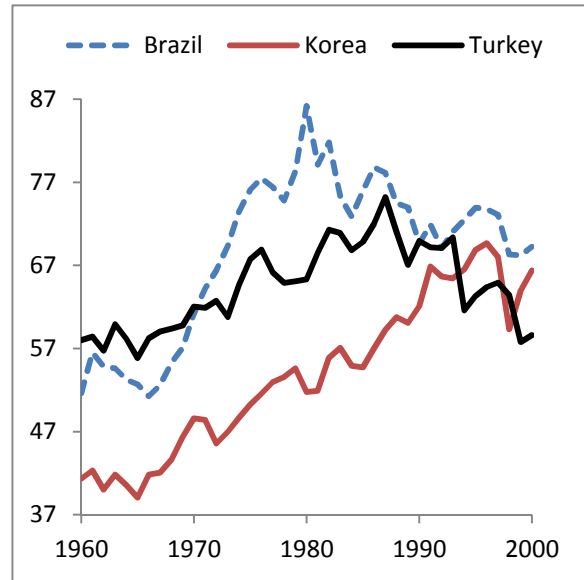
Source: Hsieh and Klenow (2010).

and finds that private TFP exceeded government TFP in most of the cases in Turkey. On average, private TFP in these industries was 1.9 times that of government TFP in 1963; in 1976, the multiple was 2.5.

4.   A Glimpse on the Sources of Growth

This section studies the recent economic performance of Turkey using a growth accounting framework that produces estimates of the contribution of capital, labor, education, and TFP for the aggregate economy, incorporating recent data revisions between 1998 and 2010.[24] It is worth to note that our purpose is to provide a perspective on the sources of economic growth in Turkey, in a relatively theory-free way.

We also note that there are too many factors at work influencing economic performance in any given country, or any pair of countries, for analysis to permit ironclad conclusions, since our representation of the production technology omits the direct information regarding the related supply-side factors such as capacity utilization, hours worked, labor force participation rate, technology adoption, regulation.

4.1.   Methodology and Data

A production function states a relationship between inputs (like labor and capital) and output (goods and services combined). Consider the following aggregate production function

$$Y = AK^{\alpha}(Lh)^{1-\alpha}, \tag{1}$$

where Y represents real gross domestic product (GDP), K is real physical capital and Lh is the "quality adjusted" workforce, namely the number of workers L multiplied by their average human capital h, while α and $(1-\alpha)$ are the elasticities of output with respect to capital and labor, respectively. The term A tells us how productively the economy uses all the factors of production. For this reason, A is called total factor productivity, or TFP. In per-worker terms the production function can be rewritten as

$$y = Ak^{\alpha}h^{1-\alpha}, \tag{2}$$

---

[24] The Turkish Statistical Institute released the revision to GDP data in 2008. The main reason for this revision was to account for the structural changes in the economy since 1987 and to harmonize Turkey's GDP estimates with the European System of Accounts (ESA 95). This revision updates the base year to 1998 from 1987, and includes both changes in methodology and coverage. With this revision, historical GDP series, both in real and nominal terms, as well as key macroeconomic ratios of Turkey such as shares of expenditure components in GDP have changed significantly (World Bank, 2008; Aldan and Üngör, 2012; Üngör, 2013a).

where y is the output per worker $y \equiv Y/L$, and k is the capital labor ratio $k \equiv K/L$. We take logarithms of this expression and decompose the average annual growth rate of output per worker over a number of years, *z*, (from time *t* to time *t+z*) as follows:

$$\frac{\log(y_{t+z}) - \log(y_t)}{z} = \frac{\log(A_{t+z}) - \log(A_t)}{z} + \alpha \frac{\log(k_{t+z}) - \log(k_t)}{z} + (1 - \alpha) \frac{\log(h_{t+z}) - \log(h_t)}{z}. \qquad (3)$$

The above expression decomposes changes in output per worker into changes in TFP component (the first term on the right hand side), changes in physical capital per worker (the second term on the right hand side), and changes in human capital per worker (the last term on the right hand side).[25]

GDP data are obtained from the Turkish Statistical Institute's "Expenditure on the Gross Domestic Product (at 1998 prices)" table. We use the capital services index calculated by Demiroğlu (2012) for the Turkish economy. That index properly weighs different types of capital in accordance with their marginal product, and thereby provides an appropriate measure of physical capital. Human capital is constructed using information on average years of schooling in the population over 15. Data on average years of schooling are from Barro and Lee (2010). These are converted into human capital following Caselli (2005) (see our Footnote 18). Data on employment are from the Ministry of Development of Turkey, Economic and Social Indicators (1950-2010), Table 8.7.[26] TFP is calculated as the residual and we set the capital income share, $\alpha = 0.5$.[27]

4.2.   Results

Table 1 presents the result of the decomposition presented in Equation (3) for Turkey between 1998 and 2010. The Turkish economy used to experience boom-and-bust cycles throughout the 1990s. The economic crisis in 2001 was the low point of this period, when real GDP contracted more than 5%. The economic crisis of 2000–2001 had a large negative

---

[25] Notice that we focus on output per worker since it provides an indicator of labor productivity and because scaling by number of workers brings it closer to a measure of income per capita, which is a typical indicator of living standards. We provide two different alternative decomposition strategies in Appendix A.4.1.
[26] http://www.mod.gov.tr/en/SitePages/mod_easi.aspx
[27] See Altuğ et al. (2008); Ismihan and Metin-Ozcan (2009); and Tiryaki (2011) for discussions on the values of factor income shares in Turkey. Chen et al. (2010), among many other studies, use 0.5 as the labor share for emerging and developing economies, because capital is relatively scarce in most of those remaining economies, and thus its return is high, while labor is cheap compared to advanced countries, leading to a lower labor share.

impact on economic activity and growth accounting indicates that most of this fall in GDP per worker was due to a large fall in TFP.

| | | Contribution to output per worker of | | |
Period	Output per worker	Physical capital per worker	Human capital per worker	Total factor Productivity
1998-1999	-4.7	1.0	0.6	-6.3
1999-2000	8.7	2.8	0.6	5.2
2000-2001	-5.6	0.9	0.4	-6.9
2001-2002	6.8	0.3	0.4	6.0
2002-2003	6.1	1.4	0.4	4.3
2003-2004	6.8	1.7	0.4	4.7
2004-2005	5.9	2.4	0.4	3.1
2005-2006	4.9	3.2	0.5	1.2
2006-2007	3.0	2.8	0.5	-0.3
2007-2008	-1.5	2.0	0.5	-4.0
2008-2009	-5.3	1.0	0.5	-6.9
2009-2010	2.8	-1.3	0.5	3.5
1998-2001	-0.5	1.6	0.6	-2.7
2002-2007	5.3	2.3	0.5	2.6

Table 1. Sources of growth in Turkey (average annual changes, %)

Source: Barro and Lee (2010), Demiroğlu (2012), TURKSTAT, Ministry of Economy, Author's calculations.

Since 2001, Turkey has put in place a structural reform agenda, coupled with sound monetary and fiscal policies, to establish macroeconomic and financial stability and to improve the business environment.[28] Central Bank independence that was granted by Law in 2001; the introduction of free-floating exchange rate regime in 2001; and inflation-targeting regime in 2002 are depicted as key steps (Yılmaz, 2008). In addition, economic reform program included attaining fiscal discipline, strengthening the banking system; improving the investment climate, speeding up the privatization, and maintaining a floating exchange rate regime.[29]

During 2002-2007, output per worker grew at 5.3% per year, and TFP growth accounts for around 50% of this growth.[30] Table 1 shows that TFP growth dominates capital

---

[28] Atiyas (2012) argues that until the crisis of 2000-2001, economic policy making was centralized and the discretionary powers of the government increased. In the post-crisis period, there has been a move towards a more rule-based form of governance. Aysan et al. (2013) present an account of Turkey's experience in dealing with various institutional and structural challenges during the last decade. See, also, McKinsey (2003); Saygılı et al. (2005); Taymaz and Suiçmez (2005); Saygılı and Cihan (2008); Ismihan and Metin-Özcan (2009); and Atiyas and Bakış (2011, 2013) for detailed studies regarding economic growth and aggregate productivity in Turkey.
[29] See OECD (2006, 2012), Gürsel (2011), and Aysan et al. (2013) for details.
[30] Our findings for significant growth in TFP in the post-2002 period are consistent with those of Atiyas and Bakış (2013). They find that, in the period 2002-2010, among the 98 countries for which complete data is available, Turkey ranks 7th in terms of TFP growth calculated through the Solow residual. In Appendix A.4.2, we compare

deepening in the periods of 2002–2003, 2003-2004, and 2004-2005. On the other hand, growth in capital per worker is higher than TFP growth during 2005-2006 and during 2006-2007. Ismihan and Metin-Özcan (2009) list four factors that could have been responsible for the speed-up in TFP: (i) successful reduction of the inflation rate, fiscal discipline, and the resultant stable macroeconomic environment; (ii) institutional reforms to the central bank and public-sector spending and structural reforms to the financial sector; (iii) the relatively stable political and external environment; and (iv) the prospect of possible EU membership.[31]

We should note that when examined in isolation, the 2002-2007 period in Turkey stands out as a high growth period. Real GDP grew at an average annual rate of nearly 7% between 2002 and 2007. However, the relative performance of Turkey in this period is much weaker compared to China, the fastest growing emerging giant. Between 2002 and 2007, real GDP per worker grew by 9.6% per year in China and that figure was 5.3% in Turkey (see Appendix A.4.3 for details).[32]

The global economic crisis of 2007-2009 had a negative impact on economic activity and growth accounting indicates that most of this fall in GDP per worker was due to a fall in TFP. The periods with negative GDP per worker growth are associated with large declines in TFP growth. Productivity growth is not only crucial for the sustainability of economic reform programs in the short term but also be a major factor for the Turkish economy to converge to per capita income levels in developed countries in the long-term.[33,34]

---

our calculated TFP growth rates with the TFP growth reported by the Conference Board Total Economy Database.

[31] OECD (2006) argues that Turkey's positive macroeconomic performance between 2002 and 2005 was also supported by a favorable international environment, characterized by strong world trade and – despite higher oil prices – relatively low inflation, low interest rates and a strong global appetite for emerging market assets. In addition, the increased role of foreign direct investment (FDI) in economic activity could be important. Sayek (2007) provides some observations regarding FDI flows to Turkey and notes the regulatory changes implemented with the FDI Act (Law No. 4875) that entered into force as of June 2003. With this legislative change, investment climate has been made more favorable for the entries of foreign firms. For example, until the regulatory changes in 2003 foreigners were not allowed to invest in real estate. As the new FDI Act allows foreigners to acquire property in Turkey, FDI inflows in real estate increased sharply. Sharp increase in FDI inflows is attributable to acquisitions by multinational companies of large stakes in major Turkish companies, especially in finance, telecommunications, and as a result of privatization and private sector takeovers. İnal and Akçabelen (2013) argue that technology transfer does have a major role in determining the level of GDP per worker in Turkey and suggest that Turkey could benefit more from FDI in terms of knowledge spillovers.

[32] Atiyas and Bakış (2013) discuss that, in the last decade, the highest TFP growth is observed in agriculture, followed by industry and then by services in Turkey. Üngör (2013b) states that the service sector in Turkey had the lowest labor productivity growth rate during 2002-2007 and argues that if the service sector in Turkey had had the same annual productivity growth rates as observed in China, then the average annual growth rate of the aggregate labor productivity would have been close to 8% during 2002-2007.

[33] There is also a close relationship between productivity and competitiveness. In Appendix A.5, we present the results of two recent reports by the World Economic Forum regarding some aspects of international comparisons on the competitiveness of nations.

5.   The Dynamics of GDP per Capita

5.1   Some Comparisons

This sub-section provides some figures based on the calculations with per capita income differences at current US dollars. Panel (a) in Figure 6 plots the behavior of GDP per capita in Turkey between 1960 and 2023. We choose 2023 as the last year of the sample, since Turkey has a tangible goal of bringing up the level of the nation's per capita income to $25,000 by 2023. It is the Government's stated intention that Turkey becomes one of the world's 10 largest economies by 2023, the 100th anniversary of the founding of the Turkish Republic, achieving per capita income of $25,000.[35] Recently, there has been a public discussion on this issue.[36] Panel (a) in Figure 6 assumes that Turkey reaches $25,000 per capita income in 2023. In other words, the average annual growth rate of nominal per capita income should roughly be 7.5% between 2011 and 2023 so that per capita income would be around $25,000 in 2023.[37] We provide a discussion for this issue in Section 5.3.

Panel (b) in Figure 6 displays a comparison of Brazil, Turkey and Korea. In current US$, GDP per capita in Turkey was around $497 in 1960. It increased from 17.2% of the U.S. level in 1960 to around 22% in 2011, and per capita income was $10,524 in 2011. Per capita income in Korea, in current US$, was lower than that of Turkey between 1960 and 1979. Specifically, per capita income in Korea was around $155 in 1960 and $1,747 in 1979. Starting with 1980, Korea's per capita income has shown an incredible pace and reached $22,424 in 2011. Turkey's per capita income in 2011 (that is $10,524) lies between Korea's 1994 and 1995 values. Per capita income in Korea was $9,525 in 1994 and $11,468 in 1995; and it doubled (from $11,235 in 1997 to $22,424 in 2011) during 1997-2011. This means that average annual growth rate of per capita income in Korea is 5.06% between 1997 and 2011.[38]

---

[34] The findings presented in this section are consistent with the studies that argue that differences in TFP play very important role in explaining income differences across countries. See, among many others, Parente and Prescott (2000), Hsieh and Klenow (2010), and Jones and Romer (2010).

[35] This is not the only target set by the policymakers for 2023. For example, "Turkish Exports Strategy for 2023" was initiated by the Ministry of Economy and Turkish Exporters Assembly in 2009. The main purpose of this strategy is to reach 500 billion dollars of exports volume in 2023 with an average of 12% increase in exports annually (see http://www.economy.gov.tr/upload/strategy/strategy2023.pdf).

[36] See, for example, Alkin (2012), Çağlar (2011, 2012), and Yeldan (2013).

[37] The annualized percentage growth rate of variable x over the period t to $t+T$ is computed as: $100 * [(x_{t+T}/x_t)^{1/T} - 1]$. Here, $100 * [(25000/10524)^{1/12} - 1] = 7.48\%$.

[38] South Korea became the first nation to go from being a recipient of aid from the OECD to being a member of its donor committee. South Korea has transformed itself into an innovative high-tech country with well-established

Figure 6. GDP per capita (current US$): Some comparisons

(a): GDP per capita, Turkey, 1960-2023

(b): GDP per capita, Brazil, Turkey, Korea, 1960-2011

(c): GDP per capita, China and India, 2000-2011

(d): Alternative scenarios for GDP per capita in Turkey
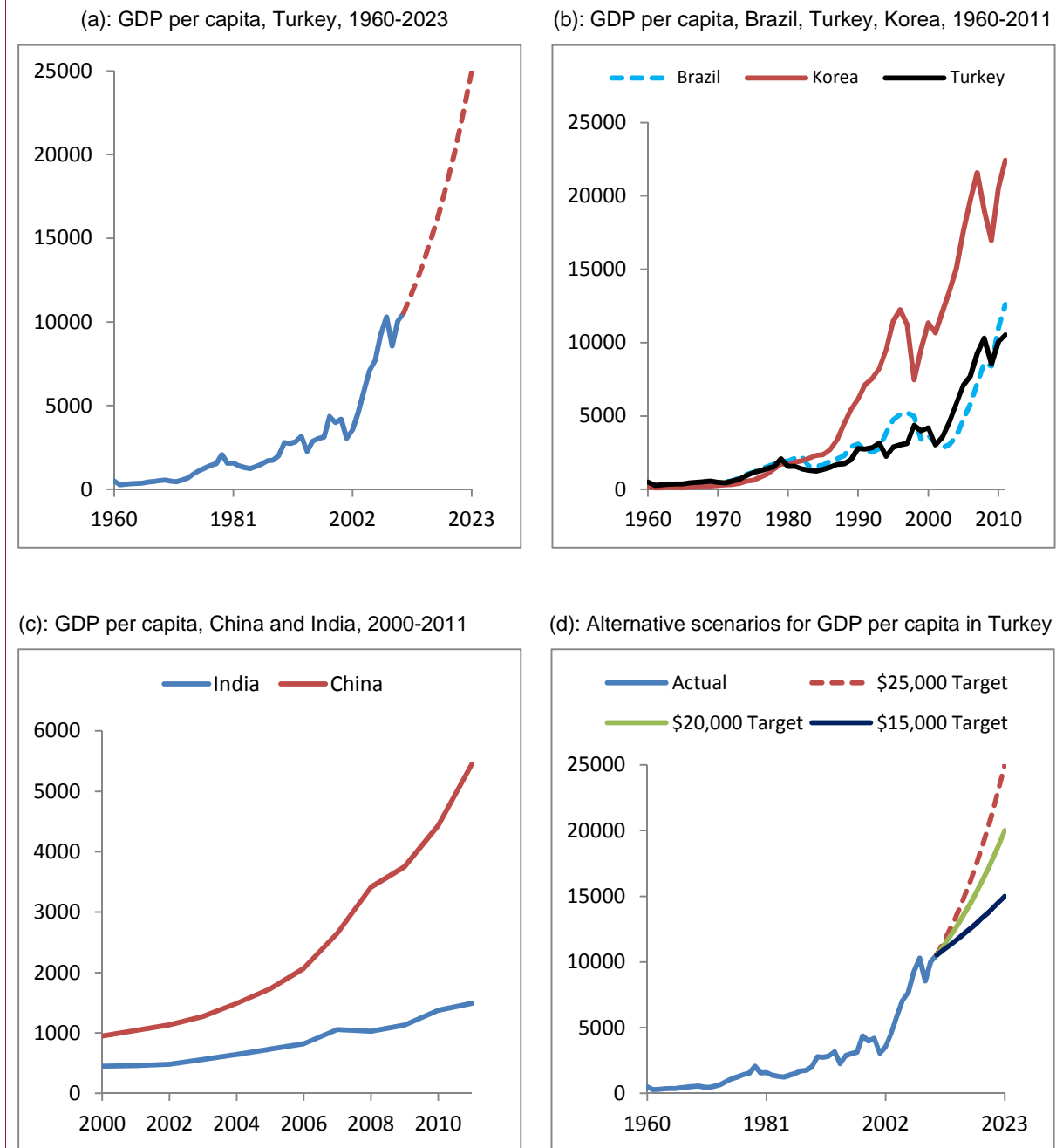
Source: World Bank, World Development Indicators.

Once again, Brazil and Turkey show similar paths. Per capita income in Brazil was around $208 in 1960 and $12,594 in 2011. Both Brazil and Turkey displayed significant increases in

---

global brands such as Hyundai and Samsung; and she is one of the leading suppliers of LCD screens, memory chips, and mobile phones (McKinsey, 2013).

the last decade. Brazil's per capita income increased more than four folds between 2002 and 2011 (from \$2,812 in 2002 to \$12,594 in 2011). It is worth to report data for China and India as well. Figure 6(c) depicts that India's per capita income doubled in just seven years (from \$450 in 2000 to \$1,055 in 2007). China's per capita income increased five folds in the first decade of the 21st century (from \$949 in 2000 to \$5,445 in 2011). Figure 6(d) shows three alternative scenarios for 2023: (i) \$25,000 target; (ii) \$20,000 target; and (iii) \$15,000 target. What should be the average annual growth rates for these three targets? The answers are as follows: (i) 7.5%; (ii) 5.5%; and (iii) 3.0%. Below we present an exercise for the time-path of per capita income till 2023.

5.2.   A Simple Decomposition Analysis

Panel (a) in Figure 6 motivates the following question: What is going to be the per capita income of Turkey in the near future? The following decomposition analysis provides a back-of-the-envelope calculation to sketch an answer to that question. Per capita income (with current US dollars) can be adjusted with the exchange rate so that we have the following expression:

$$y_t^{TR} = \frac{P_t^{TR} \times Y_t^{TR}}{N_t^{TR}} \times e_t^{US/TL}, \tag{4}$$

where y_t^{TR} is the nominal GDP per capita (measured in current U.S. dollars) in Turkey at time t; P_t^{TR} is the aggregate price level in Turkey; Y_t^{TR} denotes real GDP (in Turkish Lira) in Turkey; N_t^{TR} is the population in Turkey at time t. Finally, $e_t^{US/TL}$ is the nominal exchange rate between the U.S. dollar and the Turkish Lira, expressed as the number of dollars per lira so that $e_t^{US/TL}$ rises with an appreciation of the Turkish Lira. The real exchange rate between Turkey and the United States at time t is given by:

$$RER_t^{TR,US} = \frac{P_t^{TR}}{P_t^{US}} \times e_t^{US/TL}, \tag{5}$$

where P_t^{US} is the price level in the United States. Combining (4) and (5) yields the following:

$$y_t^{TR} = \frac{P_t^{TR} \times Y_t^{TR}}{N_t^{TR}} \times e_t^{US/TL} = \frac{P_t^{TR} \times Y_t^{TR}}{N_t^{TR}} \times \frac{P_t^{US}}{P_t^{TR}} \times RER_t^{TR,US} = \frac{Y_t^{TR}}{N_t^{TR}} \times P_t^{US} \times RER_t^{TR,US}. \tag{6}$$

We take logarithms of this expression and decompose the annual growth rate of output per capita (measured in current U.S. dollars) as follows:

$$\underbrace{\log(y_{t+1}^{TR}/y_t^{TR})}_{} = \underbrace{\log(Y_{t+1}^{TR}/Y_t^{TR})}_{} - \underbrace{\log(N_{t+1}^{TR}/N_t^{TR})}_{} + \underbrace{\log(P_{t+1}^{US}/P_t^{US})}_{} + \underbrace{\log(RER_{t+1}^{TR,US}/RER_t^{TR,US})}_{}. \quad (7)$$

| Growth in nominal per capita GDP | Growth in real GDP | Growth in population | Inflation in the U.S. | Appreciation of the Turkish Lira |

5.3. Some Back-of-the-Envelope Calculations

One can think of the following scenario so that average annual growth rate of per capita income would be 7.5% during 2011-2023:

$$\log(y_{t+1}^{TR}/y_t^{TR}) = \log(Y_{t+1}^{TR}/Y_t^{TR}) - \log(N_{t+1}^{TR}/N_t^{TR}) + \log(P_{t+1}^{US}/P_t^{US}) + \log(RER_{t+1}^{TR,US}/RER_t^{TR,US}).$$

| +7.5% | = | + 5% | -1% | +2.5% | +1% |

This scenario suggests that (real) output growth in Turkey would be around 5% and population growth would be around 1%. Therefore, real output per capita would grow by 4%. The U.S. inflation would add 2.5% and the appreciation of Turkish Lira would add 1%. These figures sum up to 7.5%, which yields $25,000 per capita income in 2023. Is this a reasonable scenario?

     According to the "Expenditure on the Gross Domestic Product (at 1998 prices)" table by TURKSTAT, average annual growth of real GDP between 2002 and 2012 is 4.97%. This supports the assumption of 5% real output growth rate. The Turkish Statistical Institute reports that the population of Turkey is expected to be 84,247,088 in 2023.[39] According to the "Mid-year population estimations and projections, 1986-2011" table by TURKSTAT,

---

[39] This figure is based on a basic scenario, in which total fertility rate decreases in its natural flow and reaches to its lowest value 1.65 in 2050, and then increases after this year and reaches the value of 1.85 in 2075. TURKSTAT also reports additional two scenarios: (i) total fertility rate increases to 2.11 in 2020 and to 2.50 in 2050 gradually, and then remains stable between the years 2050 and 2075; (ii) total fertility rate increases gradually to 3 in 2050, and then remains stable to 2075. The total population projections for alternative scenarios are (i) 85,153,647; and (ii) 85,598,777. Population projections are available at the following address: http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=15844

population in 2011 is 73,950,000.[40] Based on these two figures, the average annual growth rate in population between 2011 and 2023 could be calculated as 1.1%. This supports the assumption of 1% population growth rate. We assume that average (annual) inflation rate in the U.S. would be around 2.5% between 2011 and 2023. Our rationale for this assumption is that the average inflation rate in the U.S. during 2000-2012 is 2.51% (see Table A.5 in the Appendix).[41] Finally, we follow Derviş (2012) and assume a 1% real annual appreciation of the exchange rate.

Above, we have presented one specific scenario that would yield $25,000 per capita income by 2023 in Turkey. One of the assumptions we have is that real GDP growth would be around 5% during 2011-2023. In fact, the Turkish economy grew at an average annual rate of 6.9% between 2002 and 2007. There were contractions in 2008 and 2009 due to the global crisis.[42] After contracting by 4.8% in 2009, the Turkish economy rebounded quite rapidly and recorded a real growth of 9.2% in 2010 and 8.8% in 2011. Turkish economy grew lower than the expectations in 2012. According to the data revealed by the Turkish Statistical Institute, GDP increased by 1.4% at constant prices in the fourth quarter of 2012 and Turkey's rate of economic growth slowed to 2.2% in 2012.[43]

Some recent observations and projections suggest that achieving real GDP growth rate of 5% between 2011 and 2023 would be an ambitious goal.[44] For example, according to the IMF World Economic Outlook (April 2013, Table 2.1), real GDP growth in Turkey is projected to pick up to 3.4% in 2013 and 3.7% in 2014.[45] In this regard, we provide a set of alternative calculations for the average annual growth in nominal per capita income. We keep our assumptions for population growth, the U.S. inflation rate, and the appreciation of Turkish Lira. In other words, we only change the assumptions for real GDP growth.

We name the 7.5% target as our basic scenario. In *Alternative 1*, we assume that real GDP growth would be around 4% implying that the average annual growth in nominal per capita income would be around 6.5%. In *Alternative 2*, we assume that real GDP growth would be around 3% implying that the average annual growth in nominal per capita income would be around 5.5% between 2011 and 2023. In *Alternative 3*, we assume that real GDP

---

[40] http://www.turkstat.gov.tr/PreIstatistikTablo.do?istab_id=242
[41] Table A.5 in the Appendix provides the rates of inflation (based on the CPI data) between 1914 and 2012 in the United States. The U.S. inflation rate averaged 3.34% during 1914-2012.
[42] This is not surprising given the degree of Turkey's integration into the global economy and the severity of the global recession (although the severity and impact of the crisis varied widely from country to country). Many scholars argue that the recent U.S. Great Recession resembled the Great Depression far more closely than it did any of the postwar recessions (see, for example, Ohanian, 2011).
[43] http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=13471
[44] See Yeldan (2013) for several critics of the assumptions used for our calculations.
[45] http://www.imf.org/external/pubs/ft/weo/2013/01/pdf/text.pdf

growth would be around 2% implying that the average annual growth in nominal per capita income would be around 4.5% during 2011-2023. What is going to be the per capita income in Turkey by 2023 under each of these alternatives? The answers are as follows: $22,407 in *Alternative 1*; $20,008 in *Alternative 2*; and $17,847 in *Alternative 3*.[46]

In the light of these calculations, we argue that the real issue, in reaching $25,000 per capita income, is to achieve an average annual growth rate of 5% for real GDP (measured in Turkish Lira) in the next decade. The average of 2.2%, 3.4%, and 3.7% (the former is the actual growth rate for 2012 and the latter two are the IMF forecasts for 2013 and 2014) is 3.1%. This average suggests that, assuming that the growth rate of real GDP would be 3% during 2011-2023, *Alternative 2* looks like a more reasonable scenario. Therefore, our calculations suggest that the growth rates should be accelerated and Turkey needs to repeat the growth performance of the 2002-2012 period to reach per capita income of $25,000 by 2023.

It is important to emphasize that Equation (7), simply, decomposes the growth rate of nominal per capita income into the growth rates of real GDP and population in Turkey; the rate of inflation in the U.S.; and the appreciation of the Turkish Lira; and this exercise should not be considered as a primary method of convergence analysis. For example, considering the assumptions for population growth (1%), the U.S. inflation rate (2.5%) and the appreciation of Turkish Lira (1%); nominal per capita income would grow by 2.5% (annually) between 2011 and 2023 even if real GDP growth would be 0% (i.e., there is no growth in real GDP). This possibility provides evidence in favor of real per capita income as a true measure of economic convergence.

6.   Concluding Remarks

Average growth rates vary widely across countries and are uncorrelated with initial income levels. This paper has explored some aspects of the convergence process of Turkey providing some international comparisons. Specifically, we have reported some data for Turkey and Brazil, in comparison with Korea; and have emphasized that per capita income levels and growth rates are very similar for Turkey and Brazil. In 1960, Korea's GDP per capita (PPP adjusted) was around half of the GDP per capita in Turkey (or in Brazil). Korea started much poorer than Brazil and Turkey. From one of the world's poorest nations in the 1960s, Korea has grown to be the 15th largest economy in the world (see Table A.1). By

---

[46] It is worth to note that one can play around with other assumptions and come up with alternative calculations.

2011 the level of income per capita (at current US dollars) in South Korea was more than $22,000, while in Turkey it was less $11,000.

Turkey lost ground in the last two-three decades of the 20th century and the severity of the 2001 crisis made it a turning point. Turkey's per capita income (at current US dollars) declined from about 93% of Korean per capita income in 1980 to around 28.5% of Korean per capita income in 2001. After the lost decades, Turkey had high growth rates during 2002-2007. The Turkish economy (real GDP in Turkish Liras) grew at an average annual rate of nearly 7% between 2002 and 2007. In addition, between 2002 and 2011, Turkey's per capita income (at current US dollars) increased around three folds (from $3,553 in 2002 to $10,524 in 2011). Turkey's per capita income (at current US dollars) increased from about 29% of Korean per capita income in 2002 to around 47% of Korean per capita income in 2011. We have presented a growth accounting exercise and argued that the rate of productivity growth will be an important determinant of the ability of the Turkish economy to converge to per capita income levels in developed countries (see, also, Altuğ and Filiztekin, 2006).

We should note that this study has mainly focused on the differences in per capita income across countries. Per capita (real) income, although it is somehow the first measure in measuring the success of nations, is only a partial indicator of economic welfare because an evaluation regarding economic welfare also includes many other dimensions. One approach is to enhance GDP with other objective factors such as consumption; income inequality; improvements in the health and education of the population; leisure; life expectancy, etc.[47] There are many aspects of the growth process that we do not touch upon in this paper. Future studies, in an international comparison perspective, may focus on several issues in detail, such as the role of financial development in convergence; the importance of the structural transformation (i.e., a transfer of resources from the lower-productivity sectors to the higher productivity industries) observed in the economic activity; and the growth effects of the low level of saving/investment rates in Turkey.

Let us leave the last words to Edward F. Denison, known as one of the pioneers in the development of the U.S. National Income and Product Accounts, and as one of the originators of the growth accounting. Denison (1967, p. 4) states that "Governments in all countries make decisions directly affecting growth. They also adopt policies that influence individual decisions that affect growth. They must somehow compare the total advantages

---

[47] See Jones and Klenow (2011) for a recent careful investigation on these dimensions.

and disadvantages of their policies, including both effects on growth and all other effects, good and bad."[48]

Appendix A

A.1   Turkey is one of the 20 largest economies in the world

Table A.1 displays a list of countries in the world sorted by their GDP in 2010 and in 2011 (data are in current U.S. dollars). In 2011, the largest economies in the world with more than $2 trillion nominal GDP are the United States, China, Japan, Germany, France, Brazil, the United Kingdom, and Italy. Turkey was the 17th largest economy in the world in 2010 and the 18th largest economy in 2011.

Table A.1. The 20 largest economies in the World						
2011				**2010**		
Rank	Country	GDP (current trillion US$)		Rank	Country	GDP (current trillion US$)
1	United States	14.99		1	United States	14.42
2	China	7.32		2	China	5.93
3	Japan	5.87		3	Japan	5.49
4	Germany	3.60		4	Germany	3.28
5	France	2.77		5	France	2.55
6	Brazil	2.48		6	United Kingdom	2.26
7	United Kingdom	2.45		7	Brazil	2.14
8	Italy	2.19		8	Italy	2.04
9	Russian Federation	1.86		9	India	1.68
10	India	1.85		10	Canada	1.58
11	Canada	1.74		11	Russian Federation	1.49
12	Spain	1.48		12	Spain	1.38
13	Australia	1.38		13	Australia	1.14
14	Mexico	1.15		14	Mexico	1.04
15	Korea	1.12		15	Korea	1.01
16	Indonesia	0.85		16	Netherlands	0.77
17	Netherlands	0.84		**17**	**Turkey**	**0.73**
18	**Turkey**	**0.77**		18	Indonesia	0.71
19	Switzerland	0.66		19	Switzerland	0.55
20	Saudi Arabia	0.58		20	Poland	0.47

Source: World Bank, World Development Indicators.

---

[48] Denison (1967) provides one of the earlier detailed empirical studies for the postwar experience of productivity and economic growth. Denison attempts to measure the sources of growth in Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, the United Kingdom, and the United States between 1950 and 1962.

A.2 Turkey is an upper middle income country

The World Bank's income classification is the most widely used system to divide countries into income groups. The World Bank classifies countries into low income, lower middle income, upper middle income, and high income, based on the countries' gross national income (GNI) per capita in current prices. The World Bank classification with data for 2011 is as follows: Economies are divided according to 2011 GNI per capita, calculated using the World Bank Atlas method.[49] A country is low income if its GNI per capita is $1,025 or less; lower middle income if its GNI per capita lies between $1,026 and $4,035; upper middle income if its GNI per capita lies between $4,036 and $12,475; and high income of its GNI per capita is $12,476 or above.[50]

Table A.2 lists the World Bank's main criterion for classifying economies, GNI per capita, for selected countries in 2011. Norway, Qatar, Luxembourg, Switzerland, and Denmark are the highest income countries.[51] Turkey's GNI per capita in 2011 was $10,410. Turkey is below Brazil and above Argentina. According to the World Bank's classification, Turkey is an upper middle income country and GNI per capita in Turkey was 11.7% of that of Norway, 21.4% of that of the United States, and 49.9% of that of Korea in 2011.

Table A.2. GNI per capita for selected countries in 2011	
Country	GNI per capita, Atlas method (current US$)
Norway	88,890
Qatar	80,440
Luxembourg	77,580
Switzerland	76,400
Denmark	60,120
United States	48,620
Korea	20,870
Russian Federation	10,730
Brazil	10,720
Turkey	10,410
Argentina	9,740

Source: World Bank, World Development Indicators.

---

[49] In calculating gross national income (GNI—formerly referred to as GNP) and GNI per capita in U.S. dollars for certain operational purposes, the World Bank uses the Atlas conversion factor. The purpose of the Atlas conversion factor is to reduce the impact of exchange rate fluctuations in the cross-country comparison of national incomes. The Atlas conversion factor for any year is the average of a country's exchange rate (or alternative conversion factor) for that year and its exchange rates for the two preceding years, adjusted for the difference between the rate of inflation in the country: http://data.worldbank.org/about/country-classifications/world-bank-atlas-method
[50] http://data.worldbank.org/about/country-classifications
[51] Monaco and Liechtenstein are on the top of the list in 2009. There are no data reported for them in 2010 or in 2011.

A.3 Countries in Figure 1(a)

Albania, Algeria, Angola, Argentina, Australia, Austria, Bahrain, Bangladesh, Barbados, Belgium, Bolivia, Brazil, Bulgaria, Burkina Faso, Cambodia, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Côte d'Ivoire, Cyprus, Denmark, Dominican Republic, DR Congo, Ecuador, Egypt, Ethiopia, Finland, France, Ghana, Greece, Guatemala, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Luxembourg, Madagascar, Malawi, Malaysia, Mali, Malta, Mexico, Morocco, Mozambique, the Netherlands, New Zealand, Niger, Nigeria, Norway, Oman, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Saudi Arabia, Senegal, Singapore, South Africa, Spain, Sri Lanka, St. Lucia, Sudan, Sweden, Switzerland, Syria, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, the United Kingdom, the United States, Uruguay, Venezuela, Vietnam, Yemen, Zambia, and Zimbabwe. Countries in Figure 1(a) are selected such that there is no missing observation in the sample. Some countries such as former Soviet Union countries and some oil-rich Arab countries (Kuwait, Qatar, and the United Arab Emirates) are excluded.

A.4 Growth Accounting: Some Comparisons

A.4.1 Alternative Decompositions

Here, we present two alternative accounting frameworks following Hsieh and Klenow (2010). Now dividing Equation (1) by working-age population (N), and rearranging yields the following expression:

$$\frac{Y}{N} = A \left(\frac{K}{N}\right)^{\alpha} \left(\frac{Lh}{N}\right)^{1-\alpha}. \tag{A1}$$

An alternative accounting is based on the following rearrangement:

$$\frac{Y}{N} = A^{1/(1-\alpha)} \left(\frac{K}{Y}\right)^{\alpha/(1-\alpha)} \left(\frac{Lh}{N}\right). \tag{A2}$$

In (A2), the power $1/(1-\alpha)$ represents the magnification effect of TFP. An increase in TFP generates a proportionate increase in the capital stock, so the capital intensity factor,

$(K/Y)^{\alpha/(1-\alpha)}$, represents only the part of capital accumulation not induced by TFP growth. Hsieh and Klenow (2010) provide a discussion for both equations. We describe the results of accounting using equations (A1) and (A2). We use the same data as in Section 4. In addition, data for working-age person (*N*), (population 15 years old and over) are from the Ministry of Development of Turkey, Economic and Social Indicators (1950-2010), Table 8.7. Table A.3 presents the results for the 2002-2007 period.

The bigger exponents on TFP [$1/(1-\alpha)$ instead of 1] and on effective labor [1 rather than $(1-\alpha)$] in Equation (A2) reflect the impact these two variables on output both directly and indirectly through capital per worker. In our case, $\alpha = 0.5$. Therefore, the last figure in Table A.3 is 5.18 (=2*2.59). The exercise based on Equation (A2) implies that over the period 2002-2007, GDP per economically active person has grown at 4.85% per year, which is completely accounted for by a 5.18% growth rate in TFP factor $(A^{1/(1-\alpha)})$.

| Table A.3. Sources of growth in Turkey (average annual changes, %)				
Decomposition with Equation (A1)				
		Contribution to output per working-age person of		
Period	Y/N	K/N	Lh/N	A
2002-2007	4.85	2.05	0.21	2.59
Decomposition with Equation (A2)				
		Contribution to output per working-age person of		
Period	Y/N	K/Y	Lh/N	A
2002-2007	4.85	-0.75	0.42	5.18

Source: Barro and Lee (2010), Demiroğlu (2012), TURKSTAT, Ministry of Economy, Author's calculations.

A.4.2   A Comparison of TFP Growth Rates

We provide a comparison of TFP growth rates in this sub-section. Specifically, Figure A.1 compares the annual growth rates of our calculated TFP series with the TFP growth reported by the Conference Board Total Economy Database (TED) between 1999 and 2010 for Turkey.[52] We compute the annual growth rate in our calculated TFP series with the following formula: $g_t = 100 * [(\text{TFP}_t/\text{TFP}_{t-1}) - 1]$, where t denotes the year and g_t denotes the TFP growth rate for year *t*.

---

[52] Data and the methodological notes of the Conference Board Total Economy Database (TED) can be found the at the following address: http://www.conference-board.org/data/economydatabase/

We observe that our calculations are comparable with the calculations of the TED. For example, the simple correlation between these two series is 0.97, indicating similarities. We calculate that the TFP growth in 2010 is 3.52% and the corresponding figure reported by the TED is 3.57% for 2010. On the other hand, there are some differences between 2002 and 2007. For example, the average growth rate in TFP, during 2002-2007, reported in the TED is 2.17%, whereas our calculations suggest that the average TFP growth rate in the same period is 3.24%.

Figure A.1. TFP growth (%), 1999-2010

Source: Author's calculations and the Conference Board Total Economy Database, January 2013.
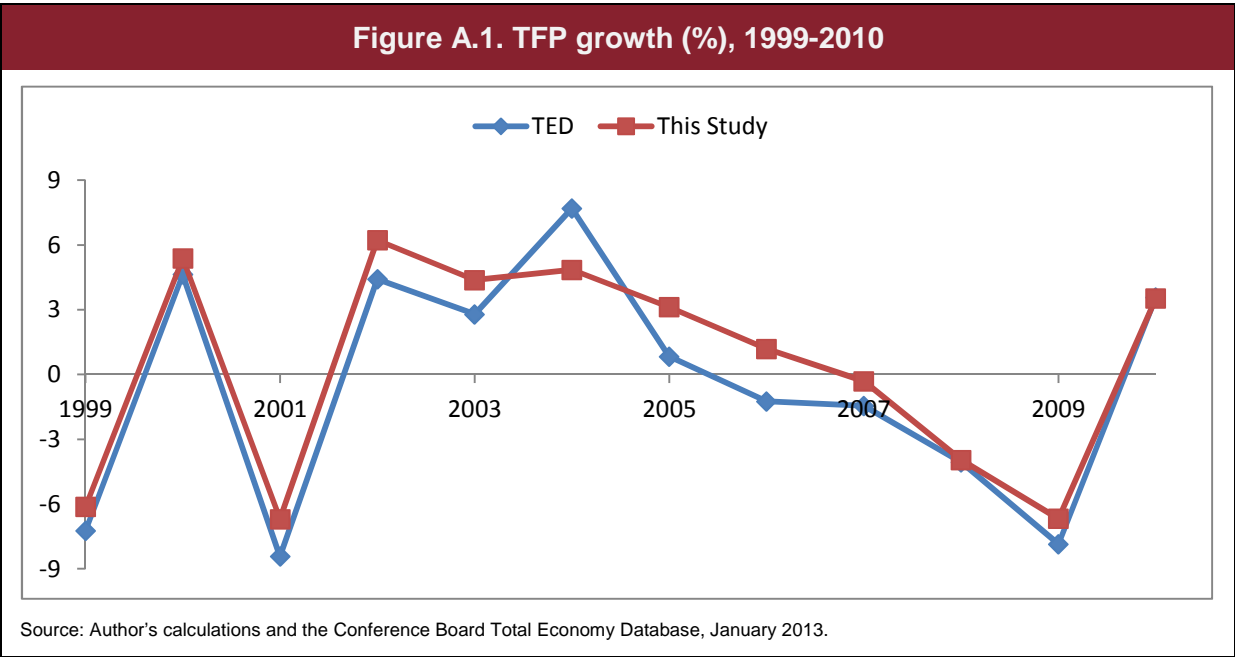
A.4.3   A Comparison with China

What is the relative performance of Turkey, in the high-growth era of 2002-2007, compared to China, the leading emerging economy? We replicate the growth accounting exercise for China. All data (except human capital) are from Kehoe and Ruhl (2010). Human capital is constructed following the procedure explained in Footnote 18 and $\alpha = 0.5$. Table A.4 shows the sources of growth in output per worker for China during 2002-2007. Note that the results presented in Table 1 and Table A.4 are based on the national currency of each country. Therefore, the results are not directly comparable. On the other hand, the figures presented are useful to see the growth performance of Turkey and China, since they provide information on average annual growth rates.

Table A.4. Sources of growth in China (average annual changes, %)				
		Contribution to output per worker of		
Period	Output per worker	Physical capital per worker	Human capital per worker	Total factor productivity
2002-2007	9.6	4.9	0.5	4.2

Source: Barro and Lee (2010); Kehoe and Ruhl (2010); Author's calculations.

A.5   Some International Comparisons on the Competitiveness of Nations

In addition to the academic research on productivity, competitiveness and cross-country comparisons, there are some world-wide reports that are available.[53] Here, we present two recent reports (with specific comments for Turkey) by the World Economic Forum. First, *the Global Competitiveness Report 2012–2013* presents information for competitiveness in the global world, where competitiveness is defined as the set of institutions, policies, and factors that determine the level of productivity of a country.[54] Turkey ranks at 43 out of 144 countries in 2012–2013 rankings. This is an improvement for Turkey, since she ranked at 59 out of 142 countries in 2011–2012 rankings.[55] *The Global Competitiveness Report 2012–2013* has the following comments for Turkey:

> "Turkey moves up by 16 places this year to attain the 43rd spot. The country's economy grew by 8.4% in 2011 and benefits from considerable progress in a number of areas covered by the GCI. Macroeconomic stability has improved and the financial sector is assessed as more trustworthy and finance as more easily accessible for businesses. Improvements to the institutional framework and greater competition in local markets have also been registered; these will further strengthen the country's competitive position. Turkey's vibrant business sector derives important efficiency gains from its large domestic market (ranked 15th), which is characterized by intense local competition (16th). Turkey also benefits from its reasonably developed infrastructure (51st), particularly roads and air transport, although ports and the electricity supply require additional upgrading. In order to further enhance its competitiveness, Turkey must focus on building up its human resources base through better primary education and healthcare (63rd) and higher education and training (74th), increasing the efficiency of its labor market (124th), and reinforcing the efficiency and transparency of its public institutions (67th)" (The Global Competitiveness Report 2012-2013, p. 27).

Second, *the Global Information Technology Report 2013* analyses the impact and influence of information and communication technologies (ICTs) on economic growth.[56] The Global Information Technology Report 2013, with coverage of 144 economies, provides an assessment of the impact of ICT on the competitiveness of nations. At the core of the

---

[53] Karaata (2012) reviews the reports of the EU, INSEAD and the Economist Intelligence Unit regarding the several innovation performance indices for Turkey and other countries.
[54] http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf
[55] http://www3.weforum.org/docs/WEF_GCR_Report_2011-12.pdf
[56] http://www3.weforum.org/docs/WEF_GITR_Report_2013.pdf

report, the Networked Readiness Index (NRI) measures the preparedness of an economy to use ICT to boost competitiveness and well-being.[57] This report has the following comments:

> "Turkey, in 45th place, ascends seven notches in the rankings, thanks to an overall improvement in its political and regulatory framework (54th) and in its business and innovation environment (43rd); a significant improvement in developing crucial ICT infrastructure, such as international Internet broadband capacity (42nd); and, above all, a drop in tariffs to access ICTs (4th), which have allowed for higher ICT penetration in terms of broadband subscriptions (56th) and Internet users (69th). Notwithstanding this progress, the country still suffers from an insufficiently developed skills pool (81st), the result of a low secondary education enrollment rate (88th) and a poor educational system (100th) that hamper the capacity of the country to fully leverage ICTs to boost innovation and raise national productivity levels. Addressing these weaknesses while improving government online tools to boost citizens' participation could help the country increase both its economic and social impacts going forward" (The Global Information Technology Report 2013, p. 20).

A.6   The Historical U.S. Inflation Rates

Table A.5. Rate of inflation (based on CPI) in the U.S., 1914-2012											
Year	Inflation	Year	Inflation	Year	Inflation	Year	Inflation	Year	Inflation
1913		1933	-5.20%	1953	0.80%	1973	6.20%	1993	3.00%
1914	1.30%	1934	3.50%	1954	0.30%	1974	11.10%	1994	2.60%
1915	0.90%	1935	2.60%	1955	-0.30%	1975	9.10%	1995	2.80%
1916	7.70%	1936	1.00%	1956	1.50%	1976	5.70%	1996	2.90%
1917	17.80%	1937	3.70%	1957	3.30%	1977	6.50%	1997	2.30%
1918	17.30%	1938	-2.00%	1958	2.70%	1978	7.60%	1998	1.60%
1919	15.20%	1939	-1.30%	1959	1.08%	1979	11.30%	1999	2.20%
1920	15.60%	1940	0.70%	1960	1.50%	1980	13.50%	2000	3.40%
1921	-10.90%	1941	5.10%	1961	1.10%	1981	10.30%	2001	2.80%
1922	-6.20%	1942	10.90%	1962	1.20%	1982	6.10%	2002	1.60%
1923	1.80%	1943	6.00%	1963	1.20%	1983	3.20%	2003	2.30%
1924	0.40%	1944	1.60%	1964	1.30%	1984	4.30%	2004	2.70%
1925	2.40%	1945	2.30%	1965	1.60%	1985	3.50%	2005	3.40%
1926	0.90%	1946	8.50%	1966	3.00%	1986	1.90%	2006	3.20%
1927	-1.90%	1947	14.40%	1967	2.80%	1987	3.70%	2007	2.90%
1928	-1.20%	1948	7.70%	1968	4.30%	1988	4.10%	2008	3.80%
1929	0.00%	1949	-1.00%	1969	5.50%	1989	4.80%	2009	-0.40%
1930	-2.70%	1950	1.10%	1970	5.80%	1990	5.40%	2010	1.60%
1931	-8.90%	1951	7.90%	1971	4.30%	1991	4.20%	2011	3.20%
1932	-10.30%	1952	2.30%	1972	3.30%	1992	3.00%	2012	2.10%

Source: http://www.minneapolisfed.org/community_education/teacher/calc/hist1913.cfm

---

[57] "The Networked Readiness Index, calculated by the World Economic Forum, and INSEAD, ranks 144 economies based on their capacity to exploit the opportunities offered by the digital age. This capacity is determined by the quality of the regulatory, business and innovation environments, the degree of preparedness, the actual usage of ICTs, as well as the societal and economic impacts of ICTs. The assessment is based on a broad range of indicators from Internet access and adult literacy to mobile phone subscriptions and the availability of venture capital. In addition, indicators such as patent applications and e-government services gauge the social and economic impact of digitization." http://www.weforum.org/reports/global-information-technology-report-2013

Figure A.2. GDP per capita relative to the U.S. (%), 1950-2012
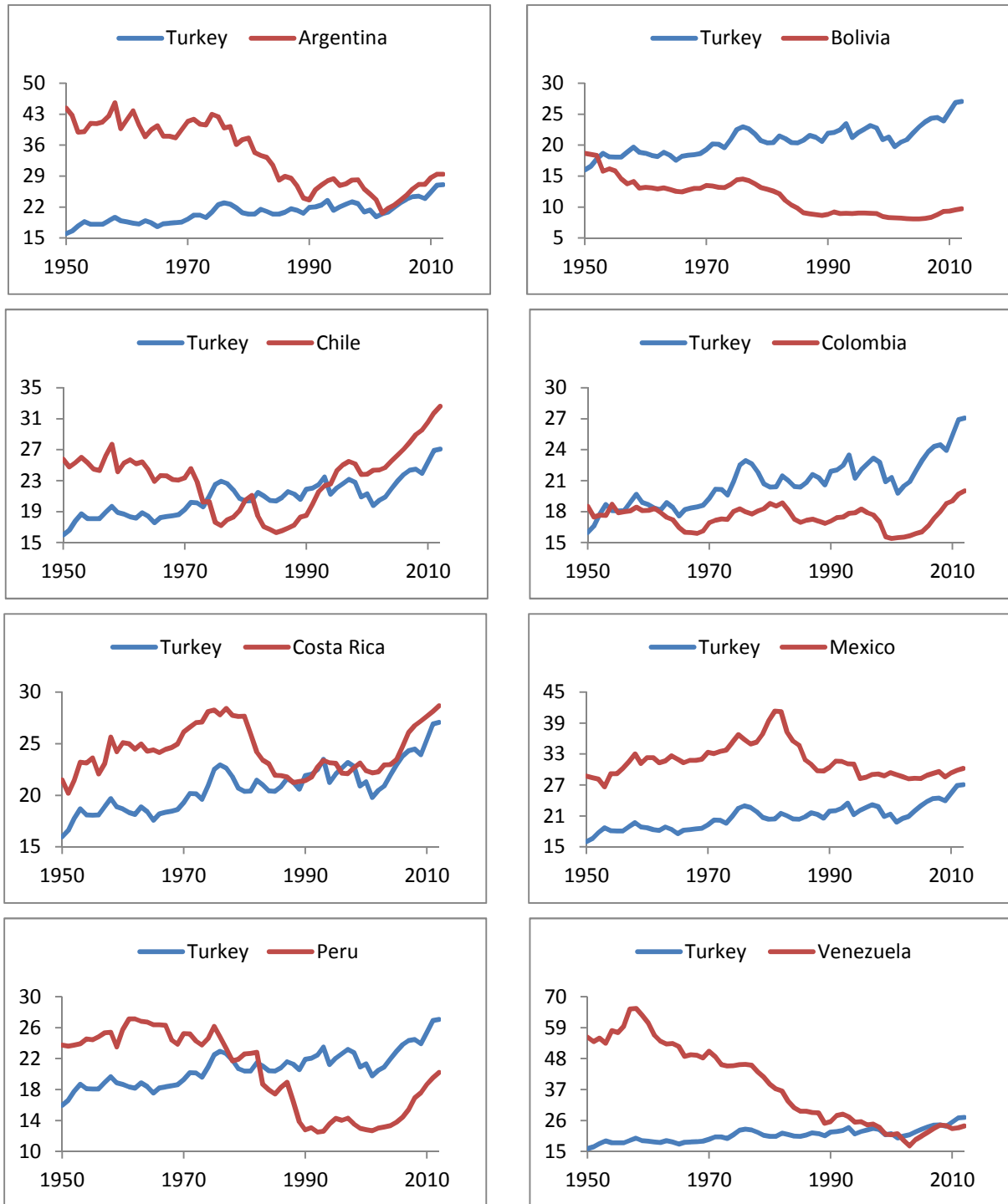
Source: The Conference Board Total Economy Database, January 2013.

References

Acemoglu, Daron. 2009. Introduction to Modern Economic Growth. Princeton: Princeton University Press.

Adamopoulos, Tasso, and Ahmet Akyol. 2009. "Relative Underperformance *Alla Turca.*" Review of Economic Dynamics, 12, 697-717.

Akat, Asaf S., and Ege Yazgan. 2012. "Observations on Turkey's Recent Economic Performance.*"* http://www.egeyazgan.com/uploads/akatyazgan_observations.pdf

Aldan, Altan, and Murat Üngör. 2012. "A Study on Real Income, GDP, and Terms of Trade." METU Studies in Development, 39, 179-196.

Alkin, Erdoğan. 2012. "Where Will We Reach by 2023?" Hürriyet Daily News (04/30/12) http://www.hurriyetdailynews.com/tum-yazilari.aspx?PageID=334&NewsCatID=426

Altuğ, Sumru, and Alpay Filiztekin. 2006. "Productivity and Growth, 1923-2003," in: S. Altuğ, A. Filiztekin (Eds.), The Turkish Economy: The Real Economy, Corporate Governance and Reform, New York, NY: Routledge, pp. 15-62.

Altuğ, Sumru, Alpay Filiztekin, and Şevket Pamuk. 2008. "Sources of Long-Term Economic Growth for Turkey, 1880-2005." European Review of Economic History, 12, 393-430.

Aricanli, Tosun, and Dani Rodrik (Eds.). 1990. The Political Economy of Turkey: Debt, Adjustment and Sustainability. London, Macmillan, and New York, St. Martin's.

Atiyas, İzak. 2012. "Economic Institutions and Institutional Change in Turkey during the Neoliberal Era."
https://research.sabanciuniv.edu/20470/1/economic_institutions_npt.pdf

Atiyas, İzak, and Ozan Bakış. 2011. "Türkiye'de Büyümenin Kısıtları: Bir Önceliklendirme Çalışması" (in Turkish).
http://www.tusiad.org.tr/__rsc/shared/file/Rapor-TRdeBuyumeninKisitlari.pdf

Atiyas, İzak, and Ozan Bakış. 2013. "Aggregate and Sectoral TFP Growth in Turkey: A Growth Accounting Exercise."
http://ref.sabanciuniv.edu/sites/ref.sabanciuniv.edu/files/tfp_tur_refwp.pdf

Aysan, Ahmet F., Mustafa H. Güler, and Cüneyt Orman. 2013. "The Road to Sustainable Growth in Emerging Markets: The Role of Structural and Monetary Policies in Turkey."
http://mpra.ub.uni-muenchen.de/44730/1/MPRA_paper_44730.pdf

Bakır, Naki. 2013. "Türkiye 2012'de Yeniden 17. Büyük Ekonomi Oldu." Dünya (04/19/13) http://www.dunya.com/turkiye-2012de-yeniden-17-buyuk-ekonomi-oldu-189138h.htm

Barro, Robert J. 1991. "Economic Growth in a Cross Section of Countries." Quarterly Journal of Economics, 106, 407-443.

Barro, Robert J. 1995. "Inflation and Economic Growth." NBER Working Paper 5326.

Barro, Robert J., and Jong-Wha Lee. 2010. "A New Data Set of Educational Attainment in the World, 1950-2010." NBER Working Paper 15902.

Başçı, Erdem. 2012a. "Speech at the 3rd Istanbul Finance Summit, İstanbul" (24/09/12) http://www.tcmb.gov.tr/yeni/announce/2012/Basci_IFS_Speech.php

Başçı, Erdem. 2012b. "Bakanlar Kurulu Sunumu, Ankara" (22/10/12) http://www.tcmb.gov.tr/yeni/duyuru/2012/Bakanlar_Kurulu_Ekim2012.php

Başçı, Erdem. 2012c. "Opening Remarks at the Payment Systems Conference, İstanbul" (05/12/12) http://www.tcmb.gov.tr/yeni/announce/2012/Basci_Payment_System.php

Başçı, Erdem. 2012d. "TCMB Plan ve Bütçe Komisyonunda Sunum, Ankara" (06/12/12) http://www.tcmb.gov.tr/yeni/duyuru/2012/Baskan_PlanButce_Aralik2012.php

Bernanke, Ben S. 2005. "Inflation in Latin America: A New Era?" (11/02/05) http://www.federalreserve.gov/boarddocs/speeches/2005/20050211/

Brandt, Loren, and Thomas G. Rawski (Eds.). 2008. China's Great Economic Transformation. Cambridge University Press.

Caselli, Francesco. 2005. "Accounting for Cross-Country Income Differences," in: P. Aghion, S.Durlauf (Eds.), Handbook of Economic Growth, Elsevier Press, pp. 679-741.

Chen, Vivian, Ahbay Gupta, Andre Therrien, Gad Levanon, and Bart van Ark. 2010. "Recent Productivity Developments in the World Economy: An Overview from the Conference Board Total Economy Database." International Productivity Monitor, 3, 3-19.

Cole, Harold L., Lee E. Ohanian, Alvaro Riascos, and James A. Schmitz. 2005. "Latin America in the Rearview Mirror." Journal of Monetary Economics, 52, 69-107.

Comeau, Ludovic, Jr. 2003. "The Political Economy of Growth in Latin America and East Asia: Some Empirical Evidence." Contemporary Economic Policy, 21, 476-489.

Çağlar, Esen. 2011. "Does the AKP's Plan for 2023 ensure 8.48% annual growth?" TEPAV Articles, (19/04/11) http://www.tepav.org.tr/en/kose-yazisi-tepav/s/2403

Çağlar, Esen. 2012. "$25,000 GDP per capita in 2023: Are we dreaming?" TEPAV Articles, (04/06/12) http://www.tepav.org.tr/en/kose-yazisi-tepav/s/3619

Çiçek, Deniz, and Ceyhun Elgin. 2011. "Not-Quite-Great Depressions of Turkey: A Quantitative Analysis of Economic Growth over 1968-2004." Economic Modelling, 28, 2691-2700.

Daude, Christian, and Eduardo Fernández-Arias. 2010. "On the Role of Productivity and Factor Accumulation in Economic Development in Latin America." Inter-American Development Bank Working Paper Series No. IDB-WP-155 http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=35077628

Demiroğlu, Ufuk. 2012. "The Capital Stock and an Index of Capital Services in Turkey." CBRT Research Notes in Economics, 12/26 (in Turkish). http://www.tcmb.gov.tr/research/ekonominotlari/2012/eng/EN1226eng.pdf

Denison, Edward F. 1967. Why Growth Rates Differ: Postwar Experience in Nine Western Countries. Washington, DC: The Brookings Institution.

Derviş, Kemal. 2012. "Turkey and Europe, a New Perspective." http://www.iai.it/pdf/GTE/GTE_PB_03.pdf

Dibooglu, Sel, and Aykut Kibritcioglu. 2004. "Inflation, Output Growth, and Stabilization in Turkey, 1980–2002." Journal of Economics and Business, 56, 43-61.

Eşiyok, Ali. 2011. "Development Performances of Turkey and South Korea: An Empirical Evaluation." Finans Politik & Ekonomik Yorumlar, 48, 67-83 (in Turkish).

Grabowski, Richard. 2008. "Modes of Long-Run Development: Latin America and East Asia." Journal of Institutional Economics, 4, 25-50.

Gürsel, Seyfettin. 2011. "Büyüme Sorunu ve Reform Ajandası" (in Turkish). http://betam.bahcesehir.edu.tr/tr/wp-content/uploads/2011/10/Buyume-Sorunu-ve-Reform-Ajandasi.pdf

Helpman, Elhanan. 2004. The Mystery of Economic Growth. Cambridge, MA: Harvard University Press.

Hsieh, Chang-Tai, and Peter J. Klenow. 2010. "Development Accounting." American Economic Journal: Macroeconomics, 2, 207-223.

IMF. 2013. World Economic Outlook, April 2013. http://www.imf.org/external/pubs/ft/weo/2013/01/pdf/text.pdf

Ismihan, Mustafa, and Kivilcim Metin-Özcan. 2009. "Productivity and Growth in an Unstable Emerging Market Economy: The Case of Turkey, 1960-2004." Emerging Markets Finance and Trade, 45, 4-18.

İmrohoroğlu, Ayşe, Selahattin İmrohoroğlu, and Murat Üngör. 2009. "Growth Facts in Turkey." Paper presented at the Society for Economic Dynamics Meeting, İstanbul.

İmrohoroğlu, Ayşe, Selahattin İmrohoroğlu, and Murat Üngör. 2013. "Agricultural Productivity and Growth in Turkey." Macroeconomic Dynamics, First View Article.

İnal, Vedit, and Ayşe Akçabelen. 2013. "Education, Technology and Economic Growth: The

Turkish Growth Experience from 1960 to 2009." İktisat İşletme ve Finans, 28(322), 91-118.

Jones, Charles I., and Paul M. Romer. 2010. "The New Kaldor Facts: Ideas, Institutions, Population, and Human Capital." American Economic Journal: Macroeconomics, 2, 224-245.

Jones, Charles I., and Peter J. Klenow. 2011. "Beyond GDP? Welfare across Countries and Time." http://www.stanford.edu/~chadj/

Karaata, Enver S. 2012. "Turkey's Position in Some of the Innovation and Knowledge Economy Performance Measurements" (in Turkish). http://ref.sabanciuniv.edu/sites/ref.sabanciuniv.edu/files/not_skaraata_inovasyon_ve_trnin_yeri.pdf

Kehoe, Timothy J., and Edward C. Prescott. 2007. "Great Depressions of the Twentieth Century," in: T. J. Kehoe, E. C. Prescott (Eds.), Great Depressions of the Twentieth Century, Minneapolis, Minnesota: Federal Reserve Bank of Minneapolis, pp. 1-20.

Kehoe, Timothy J., and Kim J. Ruhl. 2010. "Why Have Economic Reforms in Mexico Not Generated Growth?" Journal of Economic Literature, 48, 1005-1027.

Krueger, Anne O. 1987. "The Importance of Economic Policy in Development: Contrasts between Korea and Turkey." NBER Working Paper 2195.

Krueger, Anne O. 1993. Political Economy of Policy Reform in Developing Countries. Cambridge, MA: MIT Press.

Krueger, Anne O., and Baran Tuncer. 1982. "Growth of Factor Productivity in Turkish Manufacturing Industries." Journal of Development Economics, 11, 307-325.

Krugman, Paul. 1997. Development, Geography, and Economic Theory. Cambridge, MA: MIT Press.

Levy, Santiago, and Norbert Schady. 2013. "Latin America's Social Policy Challenge: Education, Social Insurance, Redistribution." Journal of Economic Perspectives, 27, 193-218.

Lin, Ching-yuan. 1988. "East Asia and Latin America as Contrasting Models." Economic Development and Cultural Change, 36, S153-S197.

Lucas, Robert E., Jr. 2002. Lectures on Economic Growth. Cambridge, MA: Harvard University Press.

OECD. 2006. OECD Economic Surveys: Turkey 2006. OECD Publishing.

OECD. 2012. OECD Economic Surveys: Turkey 2012. OECD Publishing.

Ohanian, Lee E. 2011. "Accounting for the Great Recession: Why and How Did the 2007-09 U.S. Recession Differ from All Others?" Federal Reserve Bank of Minneapolis Research Economic Policy Paper 11-1.

Ortiz, Guillermo. 2012. "Conventional Wisdom Challenged?," Monetary Policy after the Crisis, in: O. Blanchard, Romer, D., Spence, M., Stiglitz, J. (Eds.), In the Wake of the Crisis: Leading Economists Reassess Economic Policy, International Monetary Fund, pp. 15-23.

Pamuk, Şevket. 1981. "Political Economy of Industrialization in Turkey." Middle East Research and Information Project Reports, 93, 26-30+32.

Parente, Stephen L., and Edward C. Prescott. 2000. Barriers to Riches. Cambridge, MA: MIT Press.

Restuccia, Diego. 2012. "The Latin American Development Problem: An Interpretation." University of Toronto Working Paper 466.

Rodrik, Dani. 1995. "Trade and Industrial Policy Reform," in: J. Behrman, Srinivasan, T. N. (Eds.), Handbook of Development Economics Volume 3B, Elsevier Science B.V., pp. 2925-2982.

Rodrik, Dani. 2007. One Economics, Many Recipes: Globalization, Institutions, and Economic Growth. Princeton: Princeton University Press.

Rodrik, Dani. 2012. "Do We Need to Rethink Growth Policies?," in: O. Blanchard, Romer, D., Spence, M., Stiglitz, J. (Eds.), In the Wake of the Crisis: Leading Economists Reassess Economic Policy, International Monetary Fund, pp. 157-167.

Romer, Paul M. 1987. "Crazy Explanations for the Productivity Slowdown," in: S. Fischer (Eds.), NBER Macroeconomics Annual, Cambridge, MA: MIT Press, pp. 163-202.

Sayek, Selin. 2007. "FDI in Turkey: The Investment Climate and EU Effects." Journal of International Trade and Diplomacy, 1, 105-138.

Saygılı, Şeref, Cengiz Cihan, and Hasan Yurtoğlu. 2005. "Türkiye Ekonomisinde Sermaye Birikimi, Verimlilik ve Büyüme: 1972-2003." State Planning Organization Research Paper 2686 (in Turkish). http://ekutup.dpt.gov.tr/sermaye/saygilis/turkiye/2003.pdf

Saygılı, Şeref, and Cengiz Cihan. 2008. "Türkiye Ekonomisinin Büyüme Dinamikleri: 1987-2007 Döneminde Büyümenin Kaynakları, Temel Sorunlar ve Potansiyel Büyüme Oranı" (in Turkish).
http://www.tusiad.org/__rsc/shared/file/Buyumedinamikleriraporuno3.pdf

Schmitz, James A. 2001. "Government Production of Investment Goods and Aggregate Labor Productivity." Journal of Monetary Economics, 47, 163-187.

Şenses, Fikret (Eds.). 1994. Recent Industrialization Experience of Turkey in a Global Context. Westport, Connecticut: Greenwood Press.

Taymaz, Erol, and Halit Suiçmez. 2005. "Türkiye'de Verimlilik, Büyüme ve Kriz." The Turkish Economic Association Discussion Paper 2005/4 (in Turkish).
http://www.tek.org.tr/dosyalar/TAYMAZ-SUICMEZ.pdf

The Conference Board. 2013. Total Economy Database.
http://www.conference-board.org/data/economydatabase/

The McKinsey Global Institute. 2003. "Turkey: Making the Productivity and Growth Breakthrough."
http://www.mckinsey.com/insights/europe/turkey_making_the_productivity_and_growth_breakthrough

The McKinsey Global Institute. 2013. "Beyond Korean Style: Shaping a New Growth Formula." http://www.mckinsey.com/insights/asia-pacific/beyond_korean_style

The World Bank. 2008. "Turkey Country Economic Memorandum Titled Sustaining High Growth: Selected Issues." World Bank Report No: 39194.

The World Bank. 2013. World Development Indicators Database.
http://databank.worldbank.org/ddp/home.do

Tiryaki, Tolga. 2011. "Interest Rates and Real Business Cycles in Emerging Markets." The B.E. Journal of Macroeconomics, 11, Article 41.

Üngör, Murat. 2011. "Productivity Growth and Labor reallocation: Latin America versus East Asia."
http://www.muratungor.com/research.html

Üngör, Murat. 2013a. "Some Thought Experiments on the Changes in Labor Supply in Turkey." Central Bank of the Republic of Turkey Working Paper 13/14.

Üngör, Murat. 2013b. "Did the Rising Importance of Services Decelerate Overall Productivity Improvement of Turkey during 2002-2007?" Central Bank of the Republic of Turkey Working Paper 13/15.

Yeldan, Erinç. 2013. "Dersimiz Aritmetik, Konumuz Büyüme." Cumhuriyet (27/03/13)
http://eyeldan.yasar.edu.tr/Yeldan399_20Mar13.pdf

Yılmaz, Durmuş. 2008. "Governor Yılmaz's Speech in Conference on Turkey Beyond 2008, New York" (17/03/08) http://www.tcmb.gov.tr/yeni/duyuru/2008/DEIK08.php

Central Bank of the Republic of Turkey
Recent Working Papers
The complete list of Working Paper series can be found at Bank's website
(http://www.tcmb.gov.tr).

Reserve Option Mechanism as a Stabilizing Policy Tool: Evidence from Exchange Rate Expectations
(Ahmet Değerli, Salih Fendoğlu Working Paper No. 13/28, July 2013)

GDP Growth and Credit Data
(Ergun Ermişoğlu, Yasin Akçelik, Arif Oduncu Working Paper No. 13/27, July 2013)

Yield Curve Estimation for Corporate Bonds in Turkey
(Burak Kanlı, Doruk Küçüksaraç, Özgür Özel Working Paper No. 13/26, July 2013)

Inattentive Consumers and Exchange Rate Volatility
(Mehmet Fatih Ekinci Working Paper No. 13/25, July 2013)

Non-core Liabilities and Credit Growth
(Zübeyir Kılınç, Hatice Gökçe Karasoy, Eray Yücel Working Paper No. 13/24, May 2013)

Does Unemployment Insurance Crowd Out Home Production?
(Bülent Güler,Temel Taşkın Working Paper No. 13/23, May 2013)

Home Ownership and Job Satisfaction
(Semih Tümen, Tuğba Zeydanlı, Çalışma Tebliği No. 13/22, Mayıs 2013)

Türkiye İşgücü Piyasasında Mesleklerin Önemi: Hizmetler Sektörü İstihdamı, İşgücü ve Ücret Kutuplaşması
(Semih Akçomak, H. Burcu Gürcihan Çalışma Tebliği No. 13/21, Nisan 2013)

Gecelik Kur Takası Faizleri ve İMKB Gecelik Repo Faizleri
(Doruk Küçüksaraç, Özgür Özel Çalışma Tebliği No. 13/20, Nisan 2013)

Undocumented Workers' Employment Across US Business Cycles
(David Brown,Şerife Genç, Julie Hothckiss, Myriam Quispe-Agnoli Working Paper No. 13/19, March 2013)

Systemic Risk Contribution of Individual Banks
(Hüseyin Çağrı Akkoyun,Ramazan Karaşahin,Gürsu Keleş Working Paper No. 13/18, March 2013)

External Financial Stress and External Financing Vulnerability in Turkey:
Some Policy Implications for Financial Stability
(Etkin Özen, Cem Şahin, İbrahim Ünalmış Working Paper No. 13/17, March 2013)

End-Point Bias in Trend-Cyle Decompositions: An Application to the Real Exchange Rates of Turkey
(Fatih Ekinci, Gazi Kabaş, Enes Sunel Working Paper No. 13/16, March 2013)

Did the Rising Importance of Services Decelerate Overall Productivity Improvement of Turkey during 2002-2007?
(Murat Üngör Working Paper No. 13/15, March 2013)

Some Thought Experiments on the Changes in Labor Supply in Turkey
(Murat Üngör Working Paper No. 13/14, March 2013)

Financial Intermediaries, Credit Shocks and Business Cycles
(Yasin Mimir Working Paper No. 13/13, March 2013)

Role of Investment Shocks in Explaining Business Cycles in Turkey
(Canan Yüksel Working Paper No. 13/12, February 2013)

Systemic Risk Analysis of Turkish Financial Institutions with Systemic Expected Shortfall
(İrem Talaslı Working Paper No. 13/11, February 2013)