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ECONOMIC GROWTH FOR TURKEY,
1880-2005**

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ABSTRACT

The Sources of Long-term Economic Growth for Turkey, 1880-2005*

This paper considers the sources of long-term economic growth for Turkey over the period 1880-2005. The period in question covers the decline and eventual dissolution of the former Ottoman Empire and the emergence of the new Turkish Republic in 1923. Hence, the paper provides a unique look at the growth experience of these two different political and economic regimes. The paper examines in detail the evolution of factors that led to growth in output across broad periods, including the post WWII period and the era of globalization beginning in the 1980's. It also considers output growth in the agricultural and non-agricultural sectors separately and allows for the effects of sectoral re-allocation. The lessons from this exercise have important implications for Turkey's future economic performance, for its ability to converge to per capita income levels of developed countries, and for the viability of its current bid for European Union membership.

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1 Introduction

The determinants of growth and of the distribution of income across countries have been the focus of much debate in the recent literature. The preferred method of analysis has been cross-country regressions which use information on individual countries over different time periods. See, for example, Barro (1991). However, cross-country growth regressions have come under criticism for failing to account for the diversity of experiences of the individual countries and also because there is considerably uncertainty regarding the appropriate specification or the set of variables that should be considered.¹ A different approach is to examine the record of specific countries over longer periods in the light of historical episodes, political events, different policy regimes, and the like. Lains (2003) and Prados de la Escosura and Roses (2005) conduct such studies that detail growth and catch-up for the case of Portugal and Spain, respectively. There also exist recent studies that seek to identify common causes behind the growth performance of a group of countries that share similar geographies, historical developments, and policy experiences. See, for example, Zettelmeyer (2006) or Cole *et al* (2004) on the Latin American countries.

In this paper, we examine the determinants of long-term economic growth for Turkey over the period 1880-2005. The growth experience of Turkey takes place against a backdrop of a wide-ranging set of historical and political events and encompasses different policy regimes. In contrast to the countries of the New World which were built by European settlers, the modern state of Turkey emerged from the ashes of the former Ottoman Empire. Up until its disintegration, this was a far-flung entity that had its own elites and a centralized system of government. The period culminating in the creation of the Turkish state was characterized by regional and international conflict, on the one hand, and attempts at reform, on the other. Yet after its creation, Turkey was much like many other developing countries during the post World War I and World War II periods. In many ways, Turkey's growth experience reflects the role of international factors that also governed growth in other

¹See the discussion in Levine and Renelt (1992) or Brock, Durlauf and West (2003).

developing countries. During the post World War II period, Turkey grew rapidly alongside other countries of its size and income and its adherence to state-led growth or import-substituting industrialization was not without precedent. Similarly, the era of globalization beginning in the 1980's was witness to recurring episodes of financial and macroeconomic instability and crises in a number of developing countries such as Mexico and Argentina in 1994-1995, the East Asian countries in 1998, Russia in 1999 – as they were in Turkey in 1994, 1999 and, more severely, during 2000-2001. Despite the influence of such phenomena, some countries were able to display very high rates of growth and to catch up to developed country levels while other were not. To date, Turkey has not featured among the “miracle economies” though this prognosis may change in the future. Our interest in studying the Turkish experience is first, to understand Turkey's absolute and relative position in the cross-country distribution of growth and convergence. Second, we seek to identify the role of factor accumulation, including human capital accumulation, versus a more broadly defined measure of technological progress in accounting for Turkey's growth experience across different historical periods and alternative policy regimes.

Our analysis proceeds as follows. In Section 2, we discuss Turkey's growth performance in absolute and comparative terms in the period from 1880 using purchasing-power adjusted per capita GDP data compiled by Maddison (2001, 2003). We consider Turkey's performance relative to developed countries and also developing countries, excluding China. Our results indicate that the income gap between Turkey and the present-day developed countries widened considerably during the nineteenth century, and that this gap has stayed roughly unchanged since World War I. In comparison to the developing countries as a whole, Turkey grew faster than the developing country averages from the nineteenth century until the 1970's. However, it has been lagging behind the developing country averages since the 1980's. Another way of describing this phenomenon is to note that the distribution of per capita GDP across countries has evolved towards a twin-peaked representation during this period, and Turkey has only managed to maintain its relative position in

these distributions irrespective of initial conditions.

Next, we employ a growth accounting approach to decompose output growth into growth in the factors of production versus total factor productivity (TFP). This discussion takes places in Section 3. There exist a number of studies that calculate TFP growth for the Turkish economy for the post 1960's period and examine its evolution for the aggregate economy and on a sectoral basis – see, for example, Filiztekin (2000), Saygılı , Cihan, and Yurtoğlu (2001, 2005), Altuğ and Filiztekin (2006), or Ismihan and Metin-Özcan (2006). In contrast to these papers, we also model the agricultural sector using a production function approach with inputs of land, labor and capital. Arguably one of the most important transformations that took place in the modern Turkish era was the increase in arable lands together with the mechanization of agriculture that began in the 1950's. (See Pamuk, 2007b.) To quantify this transformation and to examine its implications for Turkish productivity growth, we consider a two-sector model with an agricultural and non-agricultural sector that also allows for the impact of human capital. Another novel feature of our analysis is that we make use of a new capital stock series dating back to 1923. We are not aware of any studies that use such a long capital stock series or that allow for an explicit role for agriculture. Finally, we conduct a labor productivity decomposition, whereby we examine the impact on total productivity of increases in productivity within a sector and also the re-allocation of factors across sectors. These features are similar to the analysis in a recent paper by Bosworth, Collins and Virmani (2007) and Bosworth and Collins (2007), who examine the determinants of long-run growth for India and provide a comparison of China and India, respectively.

Several recent papers have argued that the growth experience of various Latin American countries or Turkey can be understood in the context of specific micro-founded explanations such as barriers to competition (Cole *et al*, 2004 in the case of the Latin Americans) or tax differences across sectors in an otherwise standard neo-classical framework (see Adamopoulos and Akyol, 2006 for the case of Turkey). By contrast, Zettelmeyer (2006) has examined the role of reforms that support positive

macroeconomic policy outcomes for Latin America. Taking a wider perspective, the growth literature in recent years has concentrated on such factors as the role of institutions (see Hall and Jones, 1999 or Acemoglu Johnson, and Robinson, 2001) or the impact of human capital (see Glaeser *et al*, 2004). Yet as Rajan and Zingales (2006) argue, there may be a third factor, which is the proximate cause of both. In their framework, the distribution of initial factor endowments leads to self-interested constituencies who perpetuate the *status quo*. Much of the debate surrounding the role of macro-policy-making has revolved around the notion that poor policy outcomes are a major source of instability and low growth for developing countries. Yet one could also argue that weak institutions (or self-interested constituencies) lead to political instability, which also leads to a poor macroeconomic outlook. However, even after controlling for the impact of institutions, Sirimaneetham and Temple (2006) have shown that macroeconomic policy-making may matter for the distribution of growth rates.

In this paper, we examine separately the role of institutions, human capital, and macroeconomic policy-making in determining Turkey's growth experience. The institutional environment matters for growth. If existing institutions favor diversionary activities, then individuals will not prefer to accumulate human capital and education and firms will not prefer to invest in productive capital. Both factors will deter growth. In the era of globalization, lower human capital will impede the diffusion of technology and hinder a society's ability to catch up to income levels in other rapidly developing parts of the world. The evolution of economic institutions in Turkey and their consequences for economic growth and distribution of income have not been closely studied. Nevertheless, one could argue that economic and political power have taken a long time to reach broad segments of the population. Too often during the last half century, Turkey's political system has produced fragile coalitions and weak governments which have sought to satisfy the short-term demands of various groups by resorting to budget deficits, borrowing and inflationary finance. There has been a weak democratic regime that has alternated with military

regimes in Turkey since 1960. These facts point to the importance of examining the institutional framework underlying Turkey's growth experience.

Human capital considerations also appear critical at key junctures of Turkey's growth experience. At the inception of the Turkish Republic in 1923, the percentage of the literate population was exceeding low. While official estimates are not available for adult literacy in the early years of the Republic, it can be safely assumed that the rate did not exceed 10% before World War I and in the 1920s. This fact itself may also help to explain why, despite a broad-reaching set of military, political and economic reforms, the Ottoman Empire was not able to transform itself into a modern state. Educational policies in Turkey in the last 80+ years have succeeded in bringing the literacy rate to less than 89% by 2005. We can also provide a comparative perspective on this issue. Since 1913 and 1950 education levels in Turkey as measured by literacy, years of schooling and school enrollment have been lagging significantly behind education levels in developing countries with similar levels of GDP. Turkey lags behind Latin America and well behind East Asia in the education variables, holding level of GDP constant. Along with other Muslim majority countries, Turkey also lags behind developing countries with comparable levels of per capita income in indices aiming to measure gender equality and socio-economic development of women.

The role of macroeconomic policy-making features in most analyses involving countries' growth experiences. In their sensitivity analysis, Levine and Renelt (1992) are unable to discern a statistical relationship between long-run growth and any single macroeconomic variable. Nevertheless they argue for the importance of national policies for determining countries' growth experiences. Turkey's recent macroeconomic history has been far from exemplary. Average inflation in the 1980's ranged around 50%, increasing to over 70% in the 1990's. Throughout much of this period, real interest rates in Turkey have traversed in the 20-25% range. Turkish GDP during the 1990's also shows a highly volatile path, declining by 6% in 1994 and by 5% again in 1999 as a result of the Marmara earthquake. Turkey's GDP registered one

of its largest declines in Republican history of 10% during the banking and financial crisis of 2000-2001 that erupted in the midst of an IMF-sponsored stabilization plan. Turkey has been experiencing a remarkable recovery in per capita GDP levels since the latest economic crisis in 2001. Per capita GDP levels have increased by about 20% during these five years. Nevertheless, among the developing countries, Turkey has the highest current account deficit to GDP ratio (7.5%) and the second highest inflation (around 7%). It suffers from the phenomenon of “jobless growth” and remains among the most vulnerable to changes in international capital market conditions.

With this introduction, we describe how the remainder of this paper is organized. In Section 2 below, we present an overview of Turkey’s growth record in both absolute and comparative terms. In Section 3, we conduct a growth accounting exercise over the period 1880-2005 including a discussion of the contribution of sectoral re-allocation from agriculture to the urban sector. Section 4 presents a set of puzzles regarding Turkey’s growth experience and seeks to resolve them before the conclusion in Section 5.

2 Turkey’s Economic Performance Since 1880

In this section we present an overview of Turkey’s growth record since the nineteenth century in both absolute and comparative terms. Population of the area within present day borders of Turkey increased from a little over 9 million in 1820 and 13 million in 1880 to 73 million in the year 2005. Per capita GDP increased from about 680 purchasing power parity adjusted 1990 international dollars in 1820 to 880 dollars in 1880 and to 7500 dollars in 2005, an 11 fold increase for 1820-2005 and a 8 fold increase since 1880.² Since per capita incomes increased in most if

²Per capita GDP in constant US dollars is the basic indicator for examining long term increases in average incomes. The GDP series that we use in this section are calculated with a purchasing power parity adjustment to take into account the fact that price levels tend to be lower and the same dollar income purchases more in lower income countries.

1880-1913:	Ottoman era to World War I
1913-1950:	interwar era
- 1913-1929:	post WWI recovery ends and a new policy era begins
- 1930-1950:	early Republic including the Great Depression and WWII
1950-1980:	post-WWII era under import substituting industrialization
1980-2005:	era of globalization since 1980

Table 1: Periodization

not all areas of the world during the last two centuries, it is necessary to examine Turkey's growth record relative to other countries. Thanks to the efforts of many economic historians, most notably the work of Angus Maddison in recent decades, we are able to compare below the growth record of Turkey with the population weighted averages for the high income countries of western Europe and the United States as well as the developing country averages as defined by Asia excluding Japan, Africa and Latin America. We will also compare Turkey's record with those of some of the individual countries whose case histories are better known. Following the established pattern in such long-term comparisons, we will divide this period into four sub-periods, nineteenth century until World War I, the interwar era until 1950, the post-World War II era until 1973 or 1980 and the current era of globalization since. (See Table 1.)

The first period covers Turkey during the Ottoman era. During the decades and the century before World War I, the areas comprising modern Turkey experienced positive but modest levels economic growth at less than 1% per annum. These increases in GDP per capita took place within the global context of open trade and financial regimes and were led by the agricultural sector, more specifically by export-oriented agriculture. Nonetheless, the gap in per capita incomes between Turkey and the Ottoman Empire, on the one hand, western Europe and the United States, on the other, widened considerably during the century before World War I, due to the rapid rates of industrialization in the latter. The GDP per capita series constructed

by Maddison (2001, 2003) make clear that the gap between the developing countries and the developed countries widened even more during the nineteenth century. GDP per capita in the area within present-day borders of Turkey as a percent of the GDP per capita in the high income countries of Western Europe and the United States, calculated on a population-weighted basis declined from about 55% in 1820 and about 41% in 1870 to 29% in 1913. (See Table 2.) GDP per capita in Turkey stood at approximately 1200 purchasing power parity adjusted 1990 US dollars in 1913. In the same year, GDP per capita of the areas comprising modern Turkey stood at 168% of the GDP per capita income in the developing countries of Asia, Africa and Latin America, calculated on a population-weighted basis. (Maddison, 2001, 2003 and Pamuk, 2006.)

Our second period covers the interwar era until the end of World War II. This period witnessed two world wars and a great depression. The Ottoman Empire disintegrated at the end of World War I and modern Turkey was established within a much smaller territory. In the areas covered by modern Turkey, World War I and the War of Independence in 1919-1922 led to large population losses, approximately 18%, and large declines in GDP per capita, as much as 40% or more, followed by a rapid recovery in the 1920s. To follow the large swings in per capita and total GDP during this difficult period, we have decided to divide the second sub-period into two, 1913 to 1929 and 1930 to 1950. We decided to choose 1929 for the end of this second period as this was the year when pre-War levels of per capita GDP was attained for the first time after WWI. By contrast 1930 marks the beginning of a new policy era as the Great Depression ushered in new economic policies in Turkey, protectionism and inward-oriented industrialization led by the state sector. Turkey experienced high rates of growth during the 1930's but the favorable trends were reversed by the outbreak of World War II. We chose 1950 to end this second sub-period and begin the next as this is the benchmark year in many studies and also because the Turkish post-World War II recovery was completed by this date.

The period after World War II was a period of high rates of growth around the

world. After a brief experiment with agriculture-led growth in the 1950s, Turkey settled once again on import-substituting industrialization (ISI), this time led by the private sector. Exports of manufactures remained low during this period and the reasonably high rates of economic growth, exceeding 3% per annum for GDP per capita, were led by domestic market-oriented industrialization during these decades (see Table 2). The era of globalization arrived in Turkey after a severe and prolonged foreign exchange crisis at the end of the 1970s and with the adoption of a new and liberal policy package in 1980. Rapid growth of exports of manufactures, on the one hand, and macroeconomic instability, on the other, have been the most important features of this fourth and last sub-period.

Per capita income in Turkey in 1950 had been at 1620 purchasing power parity adjusted, 1990 US dollars. This was equal to 24% of the per capita income of the high income countries and 188% of the per capita income in the developing countries. By 2005, GDP per capita in Turkey had reached 7500 dollars, an increase of more than five-fold since 1913. This figure corresponded to about 30% of the level of GDP per capita in the high income countries of Western Europe and the United States, and approximately 225% of the GDP per capita of the developing countries for the same year. In other words, average incomes in Turkey have increased at about the same rate as those in high income countries since 1913 and somewhat higher than the rates experienced by these countries since 1950. As a consequence, Turkey has not been able to close during the twentieth century the large gap that opened up between it and the developed countries during the nineteenth century.

In Figure 1 we provide per capita GDP series for Turkey and a number of other regions and countries as percentages of the average for Western Europe and the United States for the period since 1913. This figure allows further insights into Turkey's comparative economic record in the twentieth century. While Turkey's growth record is better than the averages for the developing countries as a whole (see Table 2), since 1950 Turkey has lagged well behind the countries with well-known episodes of "economic miracle" in Southern Europe and East Asia. This

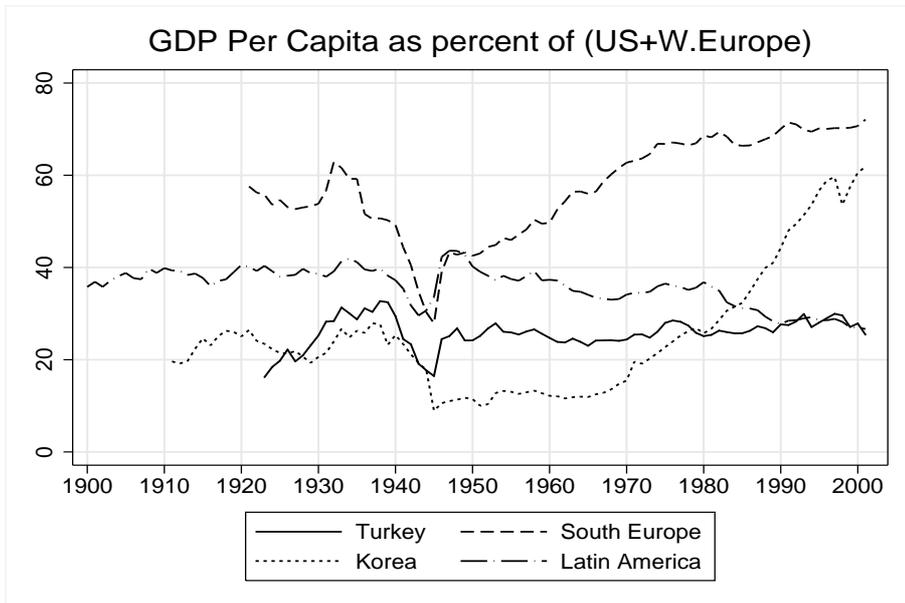


Figure 1: GDP Per Capita Relative to W. Europe and US

finding is also illustrated in Figure 2, which shows average annual per capita real GDP growth over the period 1960-2000 as a function of initial income per capita in 1960. Turkey's average GDP growth clearly is slower than the GDP growth of countries such as S. Korea, Thailand or Malaysia which had comparable per capita levels of income in 1960. A similar observation can be made for the "late-starters" in Europe. This phenomenon is also noted by Adamopoulos and Akyol (2006). We return to some of their findings at a later point.

In Figure 3, we summarize the information about convergence in terms of the distribution of per capita GDP levels for the developing countries for 1960 and 2000, respectively, using measures of chained weighted GDP per worker and GDP per capita obtained from the Penn World Tables. These distributions begin to display a marked twin-peaked character by 2000, a phenomenon which has been noted in the empirical growth literature.³ While there is a single distribution describing per capita GDP levels in 1960 (albeit one with a long upper tail), a large probability

³See, for example, Quah (1996).

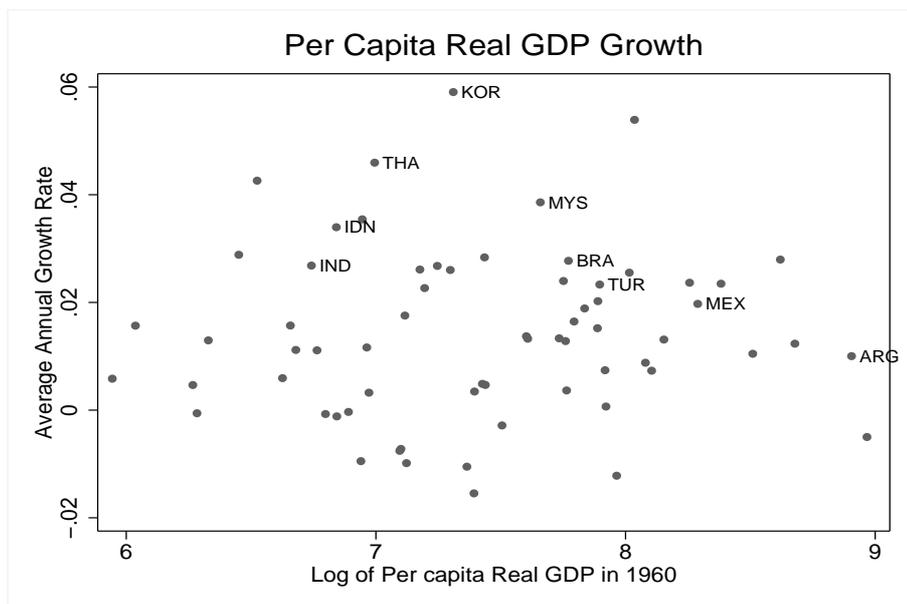


Figure 2: Average Annual Growth Rates as a Function of Per Capita Income in 1960

mass of this distribution has shifted to the right by 2000, corresponding to the group of countries who have managed to forge ahead in their growth experiences during the forty year period between 1960 and 2000. To get more insight into Turkey's relative performance, we note that Turkey has only managed to maintain its relative position in these distributions over time irrespective of its initial conditions.

It is also possible to discuss long-term trends in structural change and the shift of labor from agricultural to the urban sector. Urbanization and structural change did not gain momentum in Turkey until after World War II. Statistics in this area are not precise but it appears that share of urban in total population increased slowly during the nineteenth century and was about 28% on the eve of World War I. In 1950 the same share was lower at around 25% or even less. Share of agriculture in total employment was about 80% in 1880 and as late as in 1950.⁴ Even after

⁴The inclusion of women working in the family farm in the labor force but the exclusion of urban women working at home from the labor force tends to overstate the share of agriculture in Turkish employment statistics.

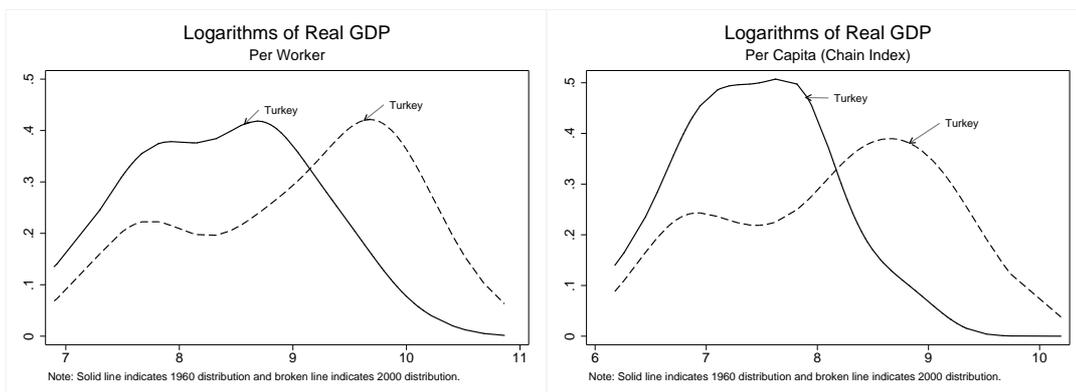


Figure 3: Distribution of Per Worker and Per Capita GDP, 1960 and 2000. Source: Penn World Tables

World War II, the shift to the urban sector was not very rapid. Numbers of people employed in the agricultural sector continued to increase, albeit gradually, until the 1980s and began to decline in absolute terms only in the 1990s. Share of agriculture in the labor force stood at 35% in the year 2000. Share of agriculture in GDP has declined faster, from about 64% in 1880 to 53% in 1950 to 13% in 2000. Share of industry has increased from about 13% in 1913 to 26% in 2005 while the share of services has increased from 34 to 64% during the same period.

In Table 3, we present further information on the growth rates of output and the factor inputs across the different periods in our study. One of the significant findings is the sharp break between the pre- and post-1950 periods. The growth rates of output and of the factor inputs such as labor, capital, land and human capital are all significantly greater in the post-1950 period. We can explain this pattern with two observations. First, rates of per capita growth accelerated sharply after World War II in all regions of the world. Second, in the Turkish case, there was a very large decline in population (approximately 20%) during and after World War I and even larger declines in GDP and GDP per capita (more than 40%) until the early 1920's. Even though by 1929 per capita GDP had returned to pre-World War I levels, growth rates for output, labor and most other variables were negative

for the period 1913-1929 as a whole. As a consequence, GDP per capita growth rates for Turkey for sub-periods until WWII or until 1950 were all below 1% per annum.

Rates of growth of labor and especially physical and human capital were significantly higher since 1950. Indeed one of the distinguishing features separating the pre- and post-1950 periods is the more than doubling of the growth rates of output and capital. There also appears to be a significant increase in the rate of human capital during the 1930-1950 periods. However, both the rates of physical and human capital accumulation show a marked decline after 1980. Considering the different sectors separately, we find that agricultural output increased most rapidly in the period 1950-1980. The reason is that the cultivation of arable lands expanded rapidly and reached its peak during this period. The land under cultivation starts to decline after 1980 as industry, tourism and residential housing begin to claim some of the agricultural land. Likewise, accumulation of physical capital in agriculture was the greatest during the 1950-1980 period. The non-agricultural sector also shows the greatest growth during the 1950-1980 period: output averages 6.15 % and capital accumulation proceeds at even a faster rate of 6.61%. As Turkey's economy is opened up to the rest of the world beginning in 1980, we see lower growth in non-agricultural activities as well as lower rates of capital accumulation.

These observations already provide important clues regarding the sources of growth for the Turkish economy since 1880. However, they do not isolate the impact of technological progress or total factor productivity from the remaining sources of growth. This is critical since most new growth theories, whether they be based on endogenous growth or emphasize the role of institutions, assign a key role to productivity or TFP growth. We now turn to this issue.

3 Growth Accounting

Growth accounting provides a convenient approach for analyzing the sources of output growth in an economy. It has featured widely in the growth literature as a way of examining the contribution to growth of the factor inputs versus total factor productivity. In Solow's (1958) original contribution, only the inputs of labor and capital were considered. Subsequently, the role of human capital accumulation on output growth was recognized by a variety of authors. (See, for example, Mankiw, Romer, and Weil, 1992 or Collins and Bosworth, 1996.) In this study, we consider a two-sector economy and allow for the impact of human capital growth on output growth.

Suppose that the economy has two sectors, an agricultural sector (sector a) and a non-agricultural sector (sector n). Let Y_{it} denote the output produced in sector $i = a, n$ at date t . We differentiate between the production technologies in the agricultural versus non-agricultural sectors by making the former depend on the factor of production land in addition to the factors of labor and physical and human capital. The production function in the agricultural sector and non-agricultural sectors are given by:

$$Y_{at} = A_{at} K_{at}^{\alpha_a} N_{at}^{\beta_a} L_{at}^{\gamma} H_{at}^{1-\alpha_a-\beta_a-\gamma}, \quad (1)$$

and

$$Y_{nt} = A_{nt} K_{nt}^{\alpha_n} N_{nt}^{\beta_n} H_{nt}^{1-\alpha_n-\beta_n}, \quad (2)$$

where $0 \leq \alpha_i \leq 1$, $0 \leq \beta_i \leq 1$ for $i = a, n$, $\alpha_a + \beta_a + \gamma < 1$ and $\alpha_n + \beta_n < 1$. In these expressions, K_{it} denotes services from physical capital, L_{at} denotes the services from land, N_{it} denotes the number of workers, H_{it} denotes human capital, and A_{it} denotes the possibly sector-specific technology shock. The form of the production for the non-agricultural sector is similar to the one assumed by Mankiw, Romer, and Weil (1992). For the agricultural sector, we allow for lands under cultivation to enter as another factor. We assume that both production functions display constant returns to scale.

Totally differentiating the production function and assuming that technological progress is Hicks neutral, the expression for the Solow residual or Total Factor Productivity (TFP) in each sector is given by

$$\frac{dA_{it}}{A_{it}} = \frac{dY_{it}}{Y_{it}} - \sum_{J=K,N,H(\text{and}L)} \xi^J \frac{dJ_{it}}{J_{it}}, \quad i = a, n, \quad (3)$$

where ξ^J denotes the output elasticities with respect to the relevant factors.⁵

One of the main issues has to do with determining the elasticities of output with respect to the factors in the relevant production functions. According to one approach, it is possible to estimate them from the data based on a simple Cobb-Douglas specification for the production function with multiple inputs. Ismihan and Metin-Özcan (2006) employ a cointegration approach to deriving such estimates in a model with human capital augmented-labor and capital as inputs for the period 1960-2004.⁶ They find that the capital share is estimated between 0.58-0.65. They also calculate the share of capital income from the national income accounts and report large variations in this quantity due to distributional shifts during the late 1970's and the late 1980's.

In contrast to this approach, we consider a much longer period and also include human capital explicitly as an additional factor in the production function. In such a long sample period, finding reliable instruments for the production function estimation is difficult.⁷ Hence, our choice of the input shares follows standard estimates.

⁵Alternatively, we can assume that the product and factor markets are perfectly competitive in each sector and derive an expression for the Solow residual as the difference between the rate of output growth and the share-weighted growth rates of the factors, where the shares are defined as revenue shares of the factors. It is well-known that the Solow residual overstates technical progress if there is imperfect competition or endogenous changes in efficiency due to increasing returns to scale. See, for example, Altug and Filiztekin (2002).

⁶Specifically, they define human capital-augmented labor as $H_t = h_t N_t$, where h_t is educational attainment per worker. A similar specification is adopted by Hall and Jones (1999).

⁷In the production function literature, standard instruments are oil shocks, the money supply, government spending, and the political party in power. See Hall (1988), for example. Finding the equivalent of these instruments for the Turkish case over our sample period is not easily accomplished.

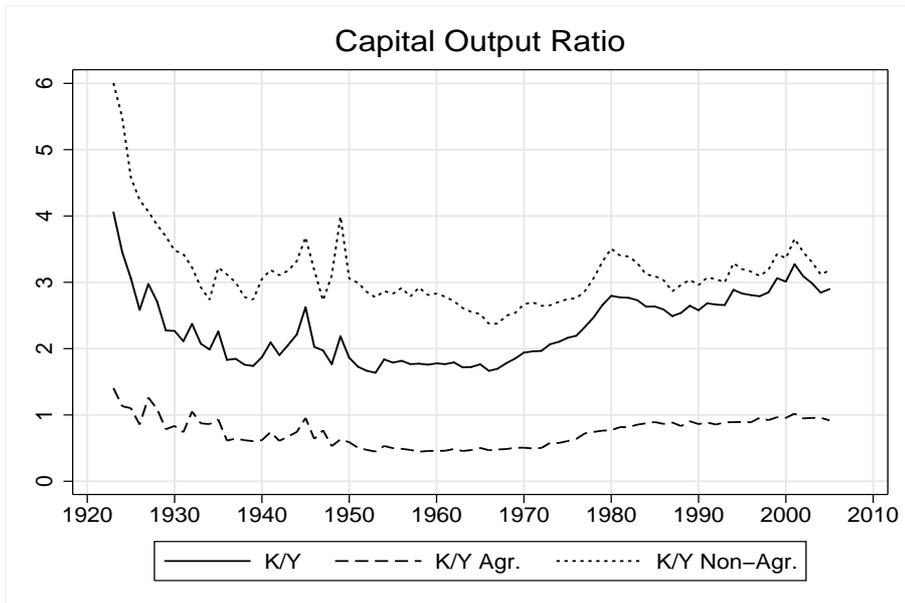


Figure 4: Capital-Output Ratio

(See also Lains, 2003.) The specifications that we adopt for the production functions in each sector are given in Tables 4 and 5. Thus, in the one-sector model without human capital, we take the share of capital to be 0.40. This is also the case for the non-agricultural sector in the two-sector model. For the agricultural sector, the share of capital is taken to be 0.25 for the period up to 1950 and 0.30 for 1950-2005, reflecting the mechanization of agriculture that began in the 1950's. In the models with human capital, we assign zero weight to human capital for the period 1880-1929 in the non-agricultural sector, reflecting the very low levels of literacy and educational attainment for this era. (For discussion on this point, see Section 4.1.) After 1929, we take the human capital share to be 0.15. For the agricultural sector, we assign even lower weights to human capital, assuming that the contribution of human capital to production in this sector was essentially zero until 1950 and 0.10 thereafter.

In Figures 4 and 5, we display the evolution of capital-output ratio and our education variable over the sample period. Beginning from 1950 onwards, we observe

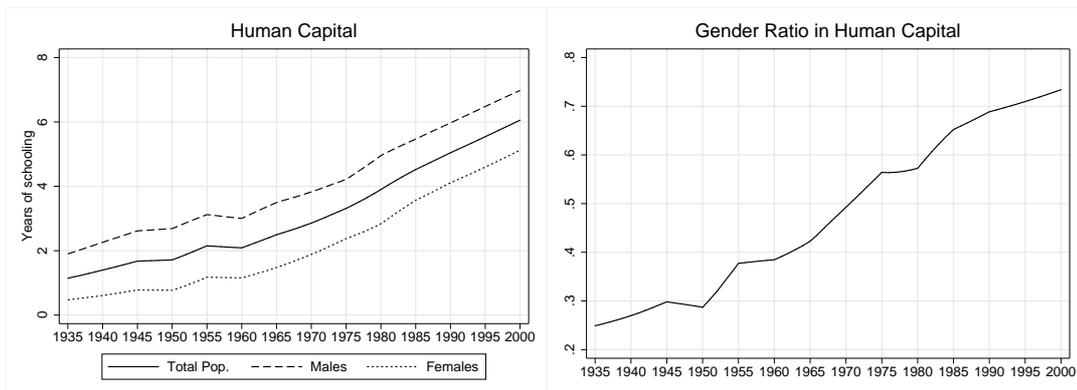


Figure 5: Human Capital and the Gender Ratio

that for the aggregate economy the capital stock has increased from a little less than twice the level of output to over three times. The capital-output ratio in the non-agricultural sector displays a similar pattern as the aggregate capital-output ratio. However, we observe that the growth rate of the capital-output ratio has fallen since 1980. In terms of the education variable, the period especially after 1960 sees an increase in the trend growth of this variable. de la Fuente and Domenech (2000) have observed that various data-related problems such as sharp breaks due to classification problems or the increase in the trend growth of educational or human capital variables (especially for developing countries) in periods when there has been decline in productivity may be a reason behind the negative effect of human capital variables in some cross-country regressions. The construction of our education variable is intended to minimize such problems.⁸ In Figure 5, we also graphed average female educational attainment as a fraction of the overall average attainment. This figure shows that there are differences between the educational attainments of females and males, although these differences appear to be leveling off over time.

The difference between the rate of growth of output and the contribution of input growth represents the rate of growth of TFP. That is, it represents the various

⁸See the Appendix.

types of increases in the productivity of the factors including technological and organizational change. How much output growth is attributed to improvements in TFP and how much to the growth of inputs also depends on the ways in which inputs are measured. Dale Jorgenson helped construct quality-adjusted input series. These improvements have substantially reduced the measured contribution of TFP to output growth. In our case, we were unable to use such quality-adjusted input series. On the other hand, if labor is measured in hours, unadjusted for education and experience, for example, increases in labor and total productivity will be higher. In our case, we measure labor in person years, admittedly a crude measure, due to the absence of other more detailed or disaggregated series. On the other hand, we are unable to take into account changes in hours worked per year. In the absence of the related data, more hours worked per person shows up as an increase in TFP in our calculations.⁹ By adding the human capital into equation, however, we attempt to account for at least part of the improvement in the quality of labor. Similarly, since our capital stock series does not take into account quality improvements, the contribution of increases in the quality of capital will be attributed to TFP growth.

In the developed countries TFP growth has been a major source of growth even in cases where inputs are adjusted for quality improvements. Studies show that anywhere from 20% to as much as 50% of the total increase in output is attributable to TFP in the developed countries. (See Denison, 1985.) Moreover, recent research has also shown that there are very large differences in total factor productivity levels and rates of growth of TFP between countries even after taking into account differences in education levels. In fact, variation in the productivity of inputs amongst countries is more important than the variation in the quantity of inputs as physical and human capital in explaining levels of output or output per worker. (Islam, 1995 and Helpman, 2004, pp. 28-31)

⁹Adamopoulos and Akyol (2004) make use of an hours worked series for Turkey from data from the Groningen Growth and Development Centre (GGRC). However, they admit that the GGRC approximates the hours for Turkey by those for Greece.

3.1 Main Findings

The results of the growth accounting exercise are displayed in Tables 6 and 7. These results are instructive in that they show strong evidence for the effects of alternative historical, institutional, and policy factors. Considering the Ottoman period, the contribution of TFP growth to GDP growth is negligible. While there is some evidence of higher TFP growth during the 1880-1913 period for the non-agricultural sector, TFP growth calculated under the different models for the aggregate economy is less than 0.5% for this period. Recall that the share of human capital has been set at zero over the 1880-1929 period, reflecting the low incidence of skills or formal education in the overall Ottoman populace. Hence, the models with or without human capital yield the same results regarding the contribution of TFP over this period. Undoubtedly the massive decline in output and the labor force in the period corresponding to WWI and the War of Independence play a role in this result. However, even if we were to look at the pre-WWI period between 1880-1913, TFP growth implied by some of the models is only slightly higher.

TFP growth essentially begins to emerge after 1930, beginning with the agricultural sector. This date corresponds to the adoption of protectionist measures and state-led industrialization following 1929 and the onset of autarkic policies worldwide. However, it also signals an era of new policies that were implemented in a variety of political and economic spheres as part of the creation of the new Republic. One of the reforms is undoubtedly the liberalization of laws and practices left over from the Ottoman era that governed peasant life such as the abolition of the tithe (or *öşür*) in 1925.¹⁰ Considering the 1930-1950 period, we see the effect of these changes in the tripling of TFP growth relative to the 1880-1929 period for the aggregate economy (from 0.25% to 0.92%). If we allow for human capital, this increase is smaller but still significant (from 0.25% to 0.63%.) An examination of the two-sector model shows that it is the increase in TFP growth in the agricultural

¹⁰For a further description of economic and social conditions in Ottoman society, see Inalcik and Quataert 1996).

sector that is responsible for the overall increase in TFP.¹¹ Whereas TFP growth is negative in the non-agricultural sector during 1930-1950 (see the columns marked 2-N and 2H-N in Table 6), there are significant increases in agricultural TFP growth for this period.

Table 6 shows that there is a trend increase in TFP growth for the Turkish economy. Comparing the broad periods 1930-2005 with 1950-2005, we observe that the contribution of TFP growth rises from around 1.3% to nearly 1.5% for the one-sector models across these two periods. Taken as a whole, the results for 1950-2005 are, in spirit, very similar to the results for 1930-2005, namely, that TFP improvements observed over the consecutive overlapping periods are mainly due to improvements in the agriculture sector, and that the contribution of non-agricultural TFP growth to aggregate TFP improvements is not important. However, this picture begins to change when we consider the post-1980 era. TFP growth begins to rise above 1.5% for the first time for the one-sector models. Furthermore, an examination of the results for the two-sector models shows that it is TFP increases in the non-agricultural sector that are at the source of TFP increases for the economy as a whole.

These results yield some noteworthy conclusions about the role of TFP growth in overall output growth for the Turkish economy. The contribution of TFP growth arising from the agricultural sector over the fifty-year period stretching from 1930 to 1980 reflects the agrarian basis for the Turkish economy which had its origins in the Ottoman era, and the role that liberalization and modernization of practices in agriculture had on improving agricultural productivity beginning from the early Republican era and onwards. Second, we observe a trend in TFP improvements over the period 1930 to 2005. Third, there is a qualitative change in the pattern of productivity growth after 1980, with TFP improvements originating from the non-agricultural sector including manufacturing and services becoming more important. As we discuss more fully later, the main factor underlying this change lies in the

¹¹The results for the two-sector model are obtained by weighting the results for the agricultural versus non-agricultural sectors with their weights in total output.

trade and financial liberalization measures that took place after 1980 and that had the effect of opening up the Turkish economy to the rest of the world. Despite these positive facts, however, an inescapable fact that arises from our analysis is that TFP growth is, in general, low for Turkey. During the entire 1950-2005 period, the two-sector model without human capital implies that TFP growth is 0.83%.

These findings are in line with the results of other studies that have conducted growth accounting exercises for Turkey. At the level of aggregate economy, Saygılı , Cihan, and Yurtoğlu (2001) find that TFP growth is equal to -0.29% for 1972-1979 and 0.44% for 1980-2000. Altuğ and Filiztekin (2006) examine the behavior of the manufacturing sector - the so-called “engine of growth” - for the period 1970-2000, and find that the contribution of TFP growth to output growth becomes positive only after 1980. The contribution of the current paper is to demonstrate that this result holds over much longer horizons and after taking into account the role of human capital and differences between the agricultural and non-agricultural sectors. In terms of the fraction of GDP growth explained by TFP growth, we find that TFP growth explains around 30% of output growth in all of the three main periods – 1880-1929, 1930-2005, and 1950-2005 – under study. Taken at face value, this finding seems to suggest that, in percentage terms, the contribution of TFP growth to output growth remained unchanged over the 125 years considered in our study. However, the results for the pre-World War I most likely reflect problems in overestimating output growth or underestimating the growth of some inputs. Likewise, the contribution of TFP growth to agricultural output (in percentage terms) appears high during the period 1980-2005 but this is due the declining share of the labor force employed in agriculture. (See Table 3.) Summarizing, we conclude that TFP growth becomes important as a source of Turkish long-term growth, reaching nearly 40% of total output growth in the absence of human capital or around 30% when human capital is accounted for, following the reforms aimed at trade and financial liberalization after 1980. Regardless of the ultimate causes of these results, whether they be a one-time increase in productivity, the diffusion of technol-

ogy and learning-by-doing effects, increased efficiency through greater competition, or a variety of other effects that have been named in the growth literature, they are consistent with the findings of Edwards (1998) who shows in a sample of 90-odd countries over the period 1960-1990 that greater openness leads to higher TFP growth.¹²

Our second main finding is that for the post-1930 era, the growth rate of output is essentially due to capital accumulation. In the earlier period 1880-1929, the role of capital accumulation is negligible. Considering some sub-periods, we observe that capital accumulation was the primary source of output growth for the “import-substituting” era corresponding to 1950-1980. During this period, the growth rate of physical capital is around 2.5%, with capital accumulation in both agricultural and non-agricultural sectors occurring at their highest observed historical values. The rate of capital accumulation is 2.14% between 1950-2005. By contrast, out of total output growth of 4.55% for this period, TFP growth is 1.41% and the growth of the labor input is 1.16%. Capital accumulation continues to remain as the primary source of growth even after allowing for human capital or different production technologies in the agricultural versus non-agricultural sectors. Indeed the main factor that distinguishes the pre- and post-1950 periods is the increased rate of physical capital accumulation in both agricultural and non-agricultural sectors. After 1980, we observe that the rate of physical capital accumulation is nearly on par with TFP growth.

Are these results surprising? In our opinion, no. Young (1995) was among the first to argue that TFP growth played little role in East Asian growth. Likewise, Collins and Bosworth (1996) find that TFP growth makes a surprisingly small contribution to East Asia’s growth performance. Instead, it has been the ability of these countries to achieve high rates of saving and investment that has led to rapid

¹²There are a number of papers that examine the impact of openness on TFP growth for Turkey directly. See Filiztekin (2000); see also Altuğ and Filiztekin (2006) for a further review and discussion of the impact of openness on growth.

growth in output. Lains (2003) also demonstrates that Portuguese growth during 1934-1947 was strikingly due to capital accumulation, which continued to remain as the most important source of growth for the periods 1947-1973 and 1973-1990. Kumar and Russell (2002) and Maudos, Pastor, and Serrano (2000) construct world production frontiers using output and inputs of labor and capital under the assumption of CRTS. Their results indicate that technical change is non-neutral, leading to productivity growth at higher capital-labor ratios, and that capital deepening is the primary cause of convergence in the distribution of labor productivity for the period 1960-1990. Thus, in common with many developing contrives including some high-performers such as the East Asian or South European countries, we find that output growth for Turkey derives primarily from capital growth. However, the rate of capital accumulation is typically lower for Turkey than it is for Portugal, for example. (Compare 5.35% for Turkey over the period 1950-2005 with 6.47% for Portugal over the period 1947-1990.) Furthermore, we find that the rate of capital accumulation slows after 1980, falling to 4.21%.

3.2 Labor Productivity Decomposition

Another way of examining a country's growth performance is in terms of the behavior of labor productivity. Total labor productivity can increase for two reasons. The first reason is due to productivity increases within each sector. The second has to do with factor re-allocation across sectors. In this section, we examine the impact of sectoral re-allocation out of agriculture as another source of overall growth for the Turkish economy.

Total labor productivity can be expressed as:

$$p_t = \sum_{i=a,n} w_{it} \frac{Y_{it}}{L_{it}}, \quad (4)$$

where w_{it} shows the weight of sector i in total employment at time t . Taking first

differences one reaches:

$$\Delta p_t = \underbrace{\sum_{i=a,n} w_{i,t-1} \Delta p_{it}}_{PGE} + \underbrace{\sum_{i=a,n} p_{i,t-1} \Delta w_{it}}_{SE}, \quad (5)$$

where p shows labor productivity, PGE denotes within sectoral productivity growth, and SE denotes the sectoral re-allocation effect.¹³

Table 8 shows the impact of sectoral re-allocation out of agriculture across the different periods for Turkey. We find that the contribution from sectoral allocation arises primarily during the 1950-1980 period. Indeed, for this period, 57% of overall growth is due to resources moving out of low productivity uses in agriculture into higher productivity uses elsewhere, primarily manufacturing. For the period 1980-2005, the contribution of this channel falls to 33%. Our results indicate that a major source of growth has involved shifting resources out of agriculture and into more high productivity uses elsewhere. However, the process of structural transformation has proceeded at a relatively slow pace in Turkey. Furthermore, productivity growth in the non-agricultural sector precisely during the period when this sectoral re-allocation was occurring has been either negative (-10.3% during 1930-1950) or low (13.4% during 1950-1980.) Adamopoulos and Akyol (2006) focus on a similar set of findings to explain Turkey’s relative performance or “relative stagnation”, in their parlance. They focus on the behavior of real GDP per working age person and conduct decompositions into labor productivity and labor force participation rates (or employment rates). They conclude that Turkey’s inability to catch up to developed country levels rests on the moderate growth rate of labor productivity and the *decline* in labor force participation (or employment) rates. They then seek to explain the decline in the labor market participation (or employment) rates in a neoclassical model with home production and differing rates of return to activities in the market versus the household sector. We return to the findings of this paper at a later point. Returning to Table 8, we note that it is only after 1980 when the

¹³It is also possible to illustrate the sectoral shift effect using TFP as a measure of productivity instead of labor productivity.

process of structural transformation had begun to slow do we see significant intra-sectoral productivity increases in non-agricultural activities. In this period, 67% of total labor productivity growth is due to the productivity growth component (PGE), with 52.6% growth being attributed to the non-agricultural sector.

The role of sectoral allocation in contributing to overall growth has been stressed by a number of authors. Broadberry (1998) argues that the US and Germany overtook the UK not by increasing productivity levels in manufacturing - as commonly supposed - but by shifting resources out of agriculture and by improving their relative productivity position in services. Using a shift-share analysis that accounts for the effect of changes in employment in each sector as in our analysis, he finds that structural change is sufficient to account for the bulk of the growth differential between Germany and the UK during the period 1871-1990 and to more than account for the US-UK growth differential over a comparable period. Peter Temin (2002) has described how Western Europe utilized sectoral re-allocation out of agriculture after WWII to achieve high rates of overall growth. Ventura (1997) has argued that the process of structural transformation may be also linked to capital deepening or capital accumulation when the interdependence between different economies is taken into account. In this vein, the East Asian countries achieved a rapid structural transformation through a conscious effort aimed at high saving and investment. The growth in the capital-output ratios for a variety of East Asian countries ranged around 3-3.5% during the period 1966-1990. By contrast, Turkey's investment performance has been peripatetic. Turkey's capital-output ratio grew at a rate of 1.2% during 1960-2005. For the period 1960-1980, this growth rate is 3.14%, which is comparable to some of the East Asian countries. However, the growth rate is only 0.4% over the period 1980-2005. Taken as a whole, these results suggest that the relatively slow process of structural transformation and the inability of the Turkish economy to achieve sustained increases in its growth rate may be inextricably linked to the low rates of saving and capital accumulation.

4 “Puzzles”

These main findings raise a number of questions or puzzles regarding the Turkish experience.

- Why is TFP growth so apparently low in Turkey? For example, average TFP growth is around 2% during 1966-1990 for the East Asian countries.
- Another puzzle is the low rate of capital accumulation itself - not why growth in Turkey is primarily due to capital accumulation.
- A third puzzle for Turkey has to do with relatively low rate of transition from agriculture to non-agricultural activities. As an indicator of this slow pace, we note that the share of population remaining in agriculture in Turkey by 2005 is nearly 34%, one of the highest in Europe.

4.1 Resolving the puzzles

In this section, we provide both a narrative discussion of the factors that we have identified and also seek to quantify the impact of these factors over a sample stretching back to 1880. Our goal is not to identify one out of a potentially competing number of explanations of growth but to examine the Turkish experience in the light of some existing theories. Our discussion is organized around three main factors.

- Institutions
- Human capital
- Macroeconomic policy-making

These factors typically figure among the co-variates of cross-country growth regressions. They have also been used in comparative exercises of growth experiences. As we discuss below, the recent literature has come to view the interrelationships among these factors as providing key insights into long-term growth.

Institutions

The idea that institutions are a key determinant of growth has witnessed a revival. One may define as an institution as a formal or informal set of rules in the sphere of economic, political or social interactions. This revival has taken place against a backdrop of scholarship that assigns a crucial role to institutions in economic development; see North (1981). Early studies that recognize the importance of institutions include Knack and Keefer (1995) and Mauro (1995). More recently, Hall and Jones (1999) argue that the disparity in observed income worker or in different words, productivity, may only be explained by differences in social infrastructure, by which they mean “the institutions and government policies that determine the economic environment within which individuals accumulate skills, and firms accumulate capital and produce output.”¹⁴ They identify the quality of institutions in terms of diversionary activities. Acemoglu, Johnson, and Robinson (2001) provide an ingenious test of the importance of institutions by arguing that the incidence of institutions that favor diversion or expropriation in place of investment or production in a set of developing countries with a former colonial past correlate with settler mortality. That is, locations that were favorable to settling by Europeans in the early stages of colonialism also feature, given the persistence of institutions, good institutions today. Both studies use a measure of expropriation risk developed by Political Risk Services to proxy for the quality of social infrastructure or institutions. While they find a significant effect from their measure of institutions to differences in incomes per capita, Acemoglu, Johnson and Robinson (2001) admit that their treatment of institutions can be likened to a “black box” in that institutional features such as expropriation risk, the enforcement of property rights, or even the rule of law are typically equilibrium outcomes.

A contrarian argument is put forward by Glaeser *al* (2004), who argue that countries that manage to accumulate sufficient levels of human capital are also able to develop sound institutions. Thus, their argument stresses the fact that there may be

¹⁴See also Rodrick, Subramanian, and Trebbi (2004).

reverse causality from growth to good institutions. In making their case for the primacy of human capital over institutions, they also take issue with various measures used in the literature to measure the quality of institutions. In their parlance, it is “constraints on government” which help to secure property rights that are a defining feature of institutions. (See also North, 1981.) Another characteristic of institutions is their “durability” or permanence. By both counts, they argue that measures such as expropriation risk, government effectiveness, and constraints on the executive are poor measures of institutions. The first two represent to a greater or lesser degree the outcomes from past choices made by governments while the third is typically very volatile in developing countries and reflects the results of the most recent elections. Following the second line of argument, Persson and Tabellini (2006) create an index of democracy in terms of a democratic capital variable by cumulating periods of democratic rule as in a simple capital accumulation equation. They argue that the influence of democracy must occur through investment decisions and expectations. In their framework, the level of TFP differs depending on whether the current regime is a democracy or an autocracy. In their empirical results, they assume that TFP is higher in the democratic regime. After controlling for the stability of the regime, they then find that democracies - on average - grow faster than autocracies. Rajan and Zingales (2006) present a third line of attack that suggests neither institutions nor the level of human capital may be sufficient to explain long-term growth experiences if one abstracts from political economy considerations. Their point is that economic institutions also determine the distribution of income and wealth. In other words, they determine not only the size of the aggregate pie, but also how it is divided amongst different groups in society. If those with the greatest income favor institutions that allow for rent-seeking or expropriation, then weak institutions may persist through time due to their self-fulfilling effect on the income distribution. For long-term growth, economic institutions should not offer incentives to narrow groups, but instead open up opportunities to broader sections of society.

As our previous arguments indicate, an institution is defined by its durability

as much as by characteristics such as constraints on rule. Following Persson and Tabellini (2006), we created a measure of *democratic capital* by cumulating periods of democratic rule as in a simple capital accumulation equation. If there is a change of regime, say, a military take-over, then the existing stock of political capital starts depreciating at some given rate. We use data on regime changes and transitions from the Polity IV database which are available for all countries with populations greater than 0.5 million since 1800. Specifically, this database provides separate information on quantitative indicators for the state of democracy and autocracy in a given country as well as on the nature of various interruptions such as foreign occupations or the general disruption of central authority. It also provides a measure denoted *polity2*, which considers the difference between the democracy and autocracy indicators. Following Persson and Tabellini (2006), we suppose that the current regime equals one if the *polity2* is strictly positive, and zero otherwise.¹⁵ This measure can be constructed for Turkey since the 1880's because there is potentially very rich information on the political regime since that period.

The process of political and social reform and transformation in Turkey has a long history, although this process was interrupted by such major events as World War I. Turkey's process of institutional change also reflects the impact of global factors. Turkey's democratic experience achieves an early and if imperfect start in 1876. This year corresponds to the announcement of the first Constitution in a Muslim country. In the Polity IV data this short-lived experiment registers as a small positive increase in their democracy variable. However, there is no *net* increase in democracy because the continuing autocratic practices during this period outweigh any positive effects of the constitution. Following the abolition of the First Constitutional Assembly, the thirty years that follow are characterized by the absolutist rule of Abdulhamit in an era when the Ottoman Empire is witness to large terri-

¹⁵Let s_t denote the current regime, where $s_t = 0, 1$, and d_t denote the index of democratic capital. Then $d_t = s_t + (1 - \delta)d_{t-1}$, where $0 < \delta < 1$. We chose a depreciation rate of $\delta = 5\%$. This is consistent with the approach in Persson and Tabellini (2006), who consider depreciation rates of 1% and 5%.

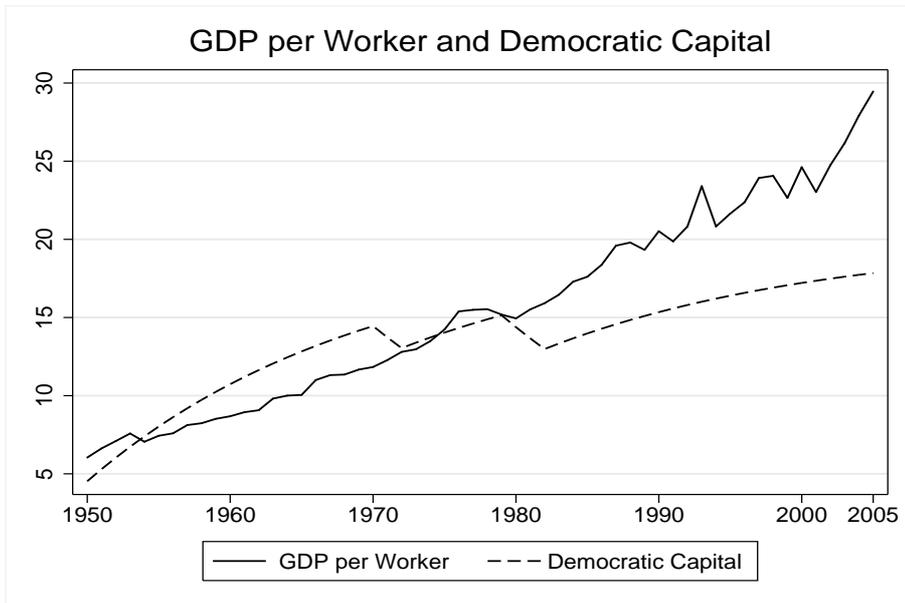


Figure 6: Democratic Capital versus GDP Per Worker. Source: Polity IV

torial losses. This period typically achieves the worst rating on the autocracy scale in Polity IV. The next experiment in representative rule is the Second Constitutional Assembly formed after the deposition of Abdulhamit by the emerging Young Turk movement in 1908. This registers as a positive event in the democracy indicator which is not quite high enough to outweigh the impact of remaining autocratic practices.¹⁶ The aftermath of World War I is an interregnum period, ending with a collapse of central authority in 1922. The period beginning with 1923 corresponding to the establishment and early years of the Turkish Republic does not attain a positive rating on the *polity2* scale because this period is characterized essentially by one-party rule led by a single leader, Mustafa Kemal Atatürk. Nevertheless the creation of a formal law-making body together with parliamentary elections sees a lightening of the autocracy index for this period. The period after 1934 and during World War II period constitute a slight worsening in these circumstances.

Turkey's process of accumulating democratic capital essentially obtains a start

¹⁶The *polity2* variable is -1 for the period 1909 to 1917.

in the post World War II era with multi-party elections in 1946. Figure 6 displays our measure of democratic capital together with a measure of GDP per worker. In 1950 a newly-formed party, the Democratic Party, ascends to power. The period after 1950 also deserves special mention. As we noted earlier, this corresponds to an era of rising incomes globally, as it does in Turkey. There is also a shift in power from the cadres who led the transition from Ottoman rule to a secular nation state. In the economic sphere, these cadres promoted the creation of national industrial bourgeoisie based on a state-led model of development. In contrast to the earlier period, the 1950's is witness to the rise in influence of landed interests and private sector industrialists. From Figure 6, we observe a steady increase in democratic capital during the 1950's.

For better or worse, however, this period is also witness to many of the populist policies that have shaped political life in Turkey for the past fifty years. In a society where the majority of the population has been agricultural but political and economic power has rested with a narrowly defined elite and its outgrowth, political parties in Turkey have seen a benefit to following gradualist and populist policies. On the one hand, in contrast to the rapid structural transformation and the growth in the utilization of labor and capital that has been observed in the East Asian countries, agricultural subsidies in Turkey prevented those employed in agriculture from moving to more high productivity sectors. Likewise, an open economy orientation to Turkish industry came only in 1980. Even after trade liberalization had taken place, Turkey failed to adopt policies that would promote greater international competitiveness by concentrating on exports of technology-intensive goods, for example. Instead, the distribution of export subsidies took a more prominent place.¹⁷

¹⁷In contrast to Turkey's experience, it appears that China is repeating the performance of the East Asian countries. In their comparison of China and India, Bosworth and Collins (2007) note that China moved more rapidly than India in lowering trade barriers and in attracting foreign direct investment. Furthermore, China has experienced "explosive growth" in its industrial sector whereas Indian growth has been driven by the services. Finally, both a high rate of capital accumulation and TFP growth appear important in China.

Indeed it is precisely to this type of scenario that Rajan and Zingales (2006) refer, in which self-interested constituencies determine the economic and political agenda. In their paper, they consider three types of constituencies, oligopolists, the educated (or the middle class), and the uneducated (or the poor), and two types of reforms, those promoting greater competitiveness and those leading to greater access to education (or human capital). They show that there is a wide array of circumstances in which no reforms will take place. If there is a small educated constituency that enjoys substantial rents, then this constituency may side with the oligopolists in opposing educational reforms. Likewise, the uneducated will oppose pro-market reforms unless these are accompanied by human-capital or endowment-enhancing measures. They also show that there exists a narrow set of circumstances in which reform will take, namely if there is a substantial middle-class and the oligopolist is relatively efficient.

It is also worth commenting on the approach followed by Adamopoulos and Akyol (2006) at this point. In their analysis, they link the relatively slow pace of structural transformation in Turkey to the high burden of taxation on market activities in the non-agricultural sector. It is our contention, however, that such policy variables as government spending and the tax rates needed to sustain them are determined as part of a political equilibrium which has been slow to change in Turkey. These authors also argue that Turkey's stagnation relative to the US, say, is not essentially attributable to physical or human capital accumulation because these variables have tended to display catch-up relative to the US. Our argument, by contrast, is that pro-market reforms or reforms aimed at increasing the human capital endowment were late in coming and when they did come, they were implemented in partial ways that did not lead to take-off as they did the East Asian countries or the late-starters in Southern Europe. In the absence of such reforms, investment in the non-agricultural sector needed to effect a rapid structural transformation did not take place, leading to an outcome of slowly rising productivity in that sector combined with low employment rates.

Returning to the historical record, the end of the 1950's and the beginning of the 1960's is witness to political and economic difficulties for Turkey. On the one hand, a foreign exchange crisis and serious foreign exchange shortages were causing economic difficulties. On the other hand, politically repressive measures were leading to widespread opposition, especially among the educated classes. These events culminate with the military coup of 1960. Surprisingly, the coup itself and the period after the coup rate relatively highly according to the *polity2* scale. One reason may reside in the new liberal Constitution, encompassing as it does a broad-reaching set of rights of expression, assembly, and organization. The 1960's and early 1970's see rapid growth in Turkey, with capital accumulation in heavy industries being undertaken by state enterprises and the private sector producing consumer goods under an import-substituting regime. The year 1971 corresponds to another military takeover, this time in response to growing student and worker demonstrations. The political and economic power of the workers, as well as their share in the total pie, had been on the rise after World War II, especially during the ISI era after 1960. Student and union militancy continued after the return to a civil government in 1974 but by this time, the first oil shock had occurred. Many have attributed the serious economic and political troubles that erupted after the mid-1970's to Turkey's inadequate policy response to the first oil shock.¹⁸ If we examine the course of democratic capital accumulation during this period, we will observe an increasingly erratic path. One way to view the military interventions that occurred in 1960 and 1971 are as interventions to curb the economic and political power of the various constituencies. Indeed the 1960 intervention had the hues of a "middle-class" revolution in so far as average incomes in Turkey were on the rise, and educational attainment kept pace with this growth. By the late-seventies, however, the Turkish economy was in serious difficulties, with a very severe foreign exchange crisis and the end of the import-substituting era in sight. The military coup of 1980 and its

¹⁸See Derviş, De Melo, and Robinson (1982) for an analysis of the various factors that contributed to the buildup of the crisis.

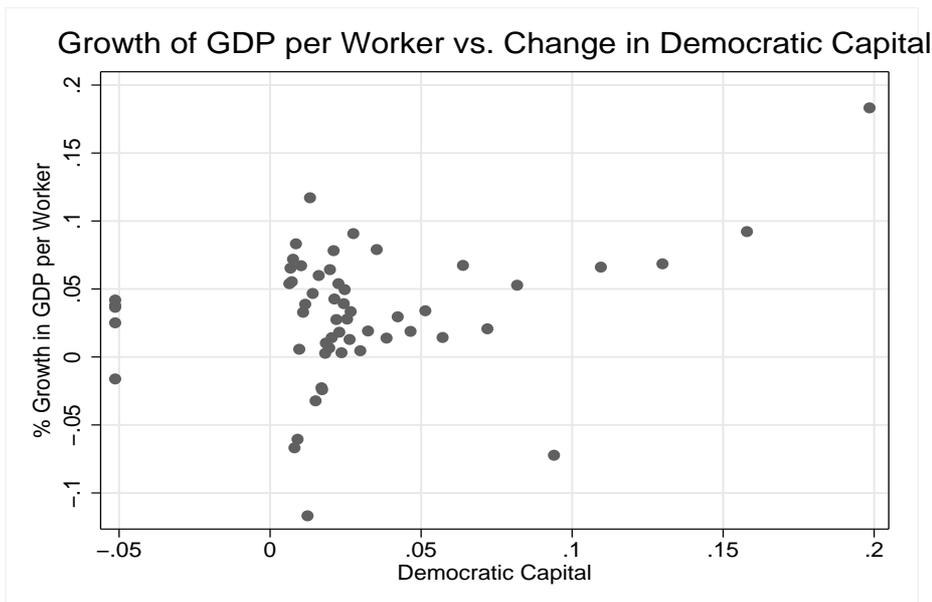


Figure 7: Growth of Per Worker GDP versus Changes in Democratic Capital

aftermath registers as the largest loss of democratic capital for Turkey in the post 1950's period. It is only by 1987 or thereabouts that the level of democratic capital is able to reach its former level in 1970. The immediate effect of the 1980 coup is to reduce the power of the workers and trade unions. A second outcome is the opening up of the Turkish economy to the rest of the world through a series of trade and financial liberalization measures, many advocated as part of the Washington Consensus. However, as we have argued above, these changes or reforms did not go the full measure as the existing constituencies who had gained in the import-substituting era now became principal beneficiaries of the new economic regime.

In Figure 7 we examine the relationship between changes in our measure of democratic capital and a measure of per worker GDP growth for Turkey. Interestingly, we find that there is a positive association between per capita GDP growth and increases in democratic capital for Turkey. This relationship essentially obtains for the post World War II era because prior to that, Turkey's democratic capital is zero. Persson and Tabellini (2006) present a fully-specified model in which it is

the probability of a regime shift or the likelihood of exiting from democracy that matters for growth.¹⁹ Thus, their argument hinges on the fact that the relationship between democracy and growth can be partly attributed to the *stability* of the current regime. If market participants attach a positive probability of a shift to a more unfavorable regime – as they also do in the analysis of Altuğ, Demers, and Demers (2007) – then they will refrain from undertaking productive investments, which will lead to lower growth. If the unfavorable regime such as a military intervention is actually realized, then there is also the impact through the transition to a state which features a lower level of TFP and the further loss of democratic capital.

These results indicate that the process of democratization has led to growth in Turkey. However, there are significant periods when there has been a loss of democratic capital. Furthermore, as we argued above, as in the case of other developing countries such as the Latin American countries, the *status quo* in Turkey has favored the pursuit of privileges from local and national governments for the producers rather than the pursuit of productivity improvements or competition in international markets. The political fragmentation induced after the 1980 military intervention has produced fragile coalitions and weak governments. Furthermore, Turkey's political system has features which appear conducive to large government and rent-seeking. Persson and Tabellini (2006) study the implications of political institutions such as presidential versus parliamentary regimes, majoritarian versus proportional voting systems, and accountability of politicians for public spending, rent extraction, and structural policy. They show that proportional voting systems (such as those in Turkey) lead to a larger size of government and higher government spending. Similarly, parliamentary regimes have larger government spending, though their economic performance rates better. In Turkey, these features have been accompanied by political and macroeconomic instability, which has also led to

¹⁹A similar argument is put forward by Altuğ, Demers, and Demers (2007), who consider a model with irreversible investment and regime shifts. In their case, the regime shift involves an unfavorable state, namely, the state of separation, that has never occurred in the data.

corruption and the deterioration in the rule of law.

Human capital

Does human capital matter? In our previous discussion, we uncovered various strands of the recent literature which state that human capital is as indispensable for the functioning of democratic societies as it is for increasing the overall productivity of the labor force. In his comparison, Zettelmeyer (2006) notes that the Latin American and Asian countries' performance on simple education and health indicators such as adult mortality track each other very well. Whereas Turkey's experience with democracy may not be any worse than that of these countries or even the countries in Southern Europe, its record of human development is significantly different than the one observed for these countries. In their microfounded account of Turkey's growth experience, Adamopoulos and Akyol (2006) have argued that Turkey's record of human accumulation is not necessarily a factor underlying its growth performance. They measure educational attainment by average years of schooling in the Barro-Lee (2000) data set and argue that whereas Turkey had the lowest level of educational attainment among Greece, Portugal, Spain and the US in 1950 (or 1960) and still has the lowest level today, it has exhibited the largest catch-up relative to the US. However, this view does not take into account that there may be threshold or distributional effects of education.²⁰

Examining the Turkish experience in this light unveils some interesting facts. As we argued earlier, the literacy rate at the inception of the Republic stood at no more than 10%. In 1935, the literacy rate for individuals over age 15 was 19%: 31% for men and only 8% for women. By 1950, the adult literacy rate had increased to 28%; 47% for men and 13% for women. Educational policies in Turkey in the last 80+ years have succeeded in bringing the literacy rate to less than 89% by 2005;

²⁰In our analysis, we assumed that the impact of human capital is captured through a constant returns to scale production function. Yet there also may exist externalities to human capital accumulation as in Lucas (1988).

95% for men and 82% for women. The average level of schooling for the workforce remains at 5.3 years. This is 2 or 3 years less than a country average based on the experience of 50 countries in 2000. (See Saygılı , Cihan, and Yavan, 2006). The role of educational attainment is also stressed by Bosworth and Collins (2007) and Bosworth, Collins and Virmani (2007) for Chinese and Indian growth.

In cross-country regressions, Barro (2001) examines the quantity and quality of education along different dimensions after controlling for a set of variables that are found to be significantly related to growth. As an example, his results indicate that scores on science tests have a particularly strong positive effect on growth. These results have important ramifications in the context of Turkey. The PISA study by the OECD shows that the performance of Turkish school children on examinations measuring mathematical and analytical ability is the lowest in the 27 countries in the OECD following Mexico. On the other hand, Turkish school children display the greatest (relative) success in terms of the percent who score in the top percentile on the examinations. Duygan and Güner (2006) argue that a growing inequality in access to education may be as worrying as observed consumption and income inequality. (See also Saygılı , Cihan, and Yavan, 2006).²¹ Are these worries allayed by current policies and practices? The share of government spending accruing to education is 3.82% of GDP in 2002 whereas the OECD average is 5.73%.

Thus, we find that there are significant differences in the levels of educational attainment between Turkey and countries with comparable income per capita. There are also distributional issues in educational outcomes across performance and income levels as well as large regional differences in Turkey's human development indicators between the mostly Kurdish southeast regions and the rest of the country. All of these factors may impede overall growth through a variety of mechanisms. In evaluating Turkey's growth performance in the light of political events and alterna-

²¹Similar worries are expressed for the Indian educational system, where the low quality of elementary schools is leading to a move from public to private schools. See Bosworth, Collins, and Virmani (2007).

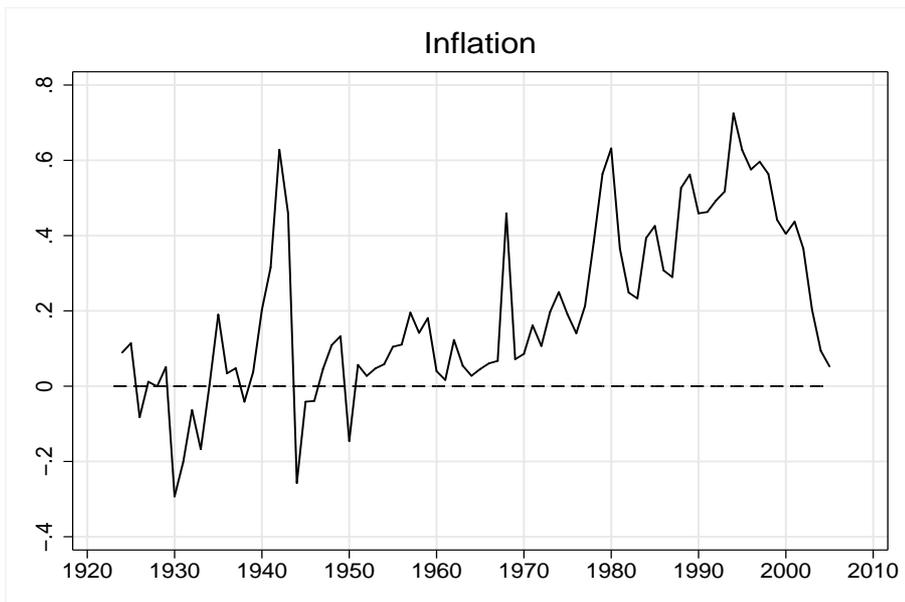


Figure 8: Inflation

tive policy regimes, we believe that a further focus on education and human capital remains important.

Macroeconomic policy-making

The role of prudent and effective *macroeconomic policy-making* obtains short shrift when one begins to contemplate the impact of such factors as institutions or human capital. Yet there is evidence that macroeconomic policy-making matters. Sirimaneetham and Temple (2006) show that bad policies can offset by other factors, but the best-performing countries are all characterized by high-quality macroeconomic management. This is also confirmed by Collins and Bosworth (1996) in their study of the determinants of long-growth for the East Asian countries. In Figures 8 and 9, we illustrate the behavior of two key macroeconomic series over a long horizon, inflation and government budget deficits.²² We note the persistently high inflation rates dating from the mid-1970's until the 2001 crisis. We also observe high and

²²See the Data Appendix for how these variables are measured.

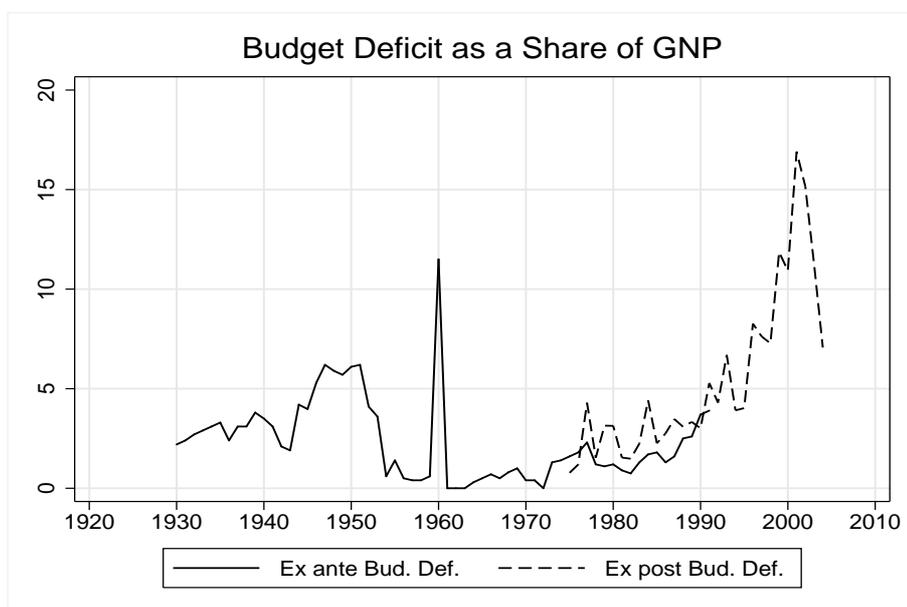


Figure 9: *Ex Ante* and *Ex Post* Measures of the Budget Deficit

growing fiscal deficits which date back to the mid-1970's. The government's lax fiscal stance was thus supported by various inflationary measures. In order to finance a growing fiscal deficit, public investment, including expenditures on education, declined sharply and continues to remain low. A concomitant result of high inflation and loose fiscal policy were the high real interest rates observed in Turkey during the 1980's and 1990's. Undoubtedly, these factors led to the low and volatile growth observed during this period, especially the 1990's.²³

The culmination of these factors was the 2000-2001 financial crisis. This crisis ushered in a new era. On the one hand, significant institutional changes were implemented such as central bank independence, the creation of new regulatory and supervisory bodies for the banking sector, the institution of fiscal discipline, to name a few. Interestingly these changes were implemented by new economic and political groups corresponding to the industrialists from the Anatolian region - as opposed

²³In a related analysis, Adroque, Cerisola, and Gelos (2006) use a dynamic panel regression analysis for Brazil to document the role of increasing government consumption and the real interest rate in reducing Brazil's per capita growth rate since the mid-1990's.

to the Istanbul-based industrial elites that flourished under the import-substituting regime and remained dominant in the 1980's and 1990's. The AKP (or the Justice and Welfare Party) government of the recent years has been supported by these emerging elites from the provinces.²⁴

5 Conclusions

In this paper, we have conducted a growth accounting exercise across broad historical periods and policy regimes for the Turkish economy. We have also studied the process of sectoral re-allocation for Turkey. Our results indicate that the Turkish economy underwent significant changes across broadly defined historical and policy regimes. It succeeded in changing its institutional environment, increasing the level of educational attainment in the population, and accumulating significant amounts of physical capital, all of which contributed to overall growth. Yet at various points it departed from the company of the high-performing countries. Its experience of democracy may be no worse than many other countries of its income level but its economic performance in the 1990's and even earlier has been disappointing.

In this paper, we have sought to understand the reasons behind this performance, and to relate it in a comparative way to the performance of countries with better known histories. We believe that the Turkish experience is interesting because it illustrates many of the recent debates in the literature on the determinants of growth. For one, Turkey's experience with democracy bears witness to the fact that it is the stability of the favorable regime that matters for growth. However, Turkey's experience also points to the relevance of various political economy arguments that have been forward to account for the persistence of poor outcomes observed in developing economy contexts. These factors appear to be compounded and to interact with problems arising from the relatively low level of human capital and, in the

²⁴In this paper, we have not provided a detailed examination of the period since the Justice and Welfare Party took power. Öniş (2005) provides a careful look at these new political players, and the transformation of Turkish politics that is occurring under their stewardship.

short-run, the lack of effective macroeconomic policy-making. We believe that none of these factors can, by themselves, account for the Turkish experience. We also believe that understanding the role of these factors is indispensable for predicting Turkey's performance in the future.

Appendix: Data and Sources

For most of the data employed in this study, we relied on the official population, GDP, land under cultivation series as published by the State Institute of Statistics for the period since 1923. For the labor force series we used the Bulutay (1995) study which was published jointly by the State Institute of Statistics and the International Labor Office at Ankara. For the capital stock series we began with the Saygılı , Cihan, and Yurtoğlu (2005) study which goes back to 1972. We extrapolated this series back to 1923 using the investment series as included in the national income accounts and the national income study for the period 1923-48 undertaken by Bulutay, Tezel and Yildirim (1974) and a depreciation rate of 4.2% per annum.

For the Ottoman era 1880-1913, we began with the data compiled and the national income estimates prepared by Vedat Eldem (1970) for the years before World War I. These are mostly based on the official Ottoman statistics. We extended these back to 1880 utilizing population growth rates, rural-urban breakdown of the population, Ottoman agricultural censuses and other relevant data. Estimates for the capital stock for 1880 are derived by assuming rates of investment for the decades before World War I as given by Eldem (1970).

Our education variable is defined as the average years of schooling of the labor force, ages 15-64. Educational attainment of the population by gender and age groups are available at 5-year intervals since 1935 through General Population Censuses. The data for years in between the censuses are imputed using number of diplomas awarded by gender and school level (primary, secondary - junior and senior levels -, vocational, and university degrees) in each year. The survival rates

by gender and five-year age groups are used to depreciate educational stock. The human capital series is then constructed by multiplying the number of persons that are alive and finished a particular school with the years of education required for that degree.

Inflation is measured based on the GDP deflator. Due to lack of data, we measured the budget deficit using both *ex ante* and *ex post* measures. The *ex ante* or planned budget deficit figures are taken from the official publication Maliye ve Gümrük Bakanlığı Yayın No: 1991/320. *Konsolide Bütçe Kaynak: Bütçe Başlangıç Ödenekleri ve Gelir Tahminleri (1930-1991)*, (Derleyenler: Iclal Demir ve Mukadder Öner). The *ex post* or realized budget deficit figures beginning from 1975 are based on the consolidated government budget figures obtained from the State Planning Organization.

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	1880	1913	1929	1950	1980	2005	
Population (mill.)	13	17	13	21	45	72	
Share of urban pop. (%)	26	28	24	25	44	68	
Share of agric. in labor force (%)	80	80	85	84	51	34	
Share of agric. in GDP (%)	54	55	42	54	26	11	
Share of industry in GDP (%)	?	13	11	13	21	26	
GDP per capita [†]	850	1200	710	1620	4020	7500	
- as % of W. Europe+US	37	29	16	24	25	30	
- as % of dev. countries	147	168	n.a.	188	219	225	
- as % of world	81	79	n.a.	77	89	117	
Annual Growth Rates (%)	1880-1913	1913-50	1929-50	1950-1980	1980-2005	1913-2005	1929-2005
Population	0.8	0.6	1.8	2.6	1.9	1.6	2.1
GDP per capita	0.8	0.8	3.1	3.1	2.5	2.0	2.9
Total agricultural output	1.3	1.0	2.7	2.9	1.2	1.7	2.3
Total industrial output	?	3.1	5.3	7.7	5.8	5.3	6.5

[†] PPP adj. in 1990 US dollars

Sources: For Turkish data except per capita GDP: State Institute of Statistics, Statistical Indicators, 1923-2002; for GDP per capita series: Maddison (2001, 2003); Eldem (1970), Özel and Pamuk (1998), and Pamuk (2006).

Table 2: Economic Indicators for Turkey

Annual Growth Rates (in %)					
Aggregate Economy					
	Output	Labor	Capital	Human Capital	
1880-1913	1.48	0.73	1.76	2.78	
1913-1929	-0.72	-1.31	-0.03	2.10	
1930-1950	2.80	1.93	1.82	3.81	
1950-1980	4.95	1.93	6.31	2.74	
1980-2005	4.07	1.35	4.21	2.44	
1880-1929	0.76	0.06	1.18	2.56	
1930-2005	4.08	1.74	4.41	2.93	
1950-2005	4.55	1.67	5.35	2.60	
Agricultural Sector					
	Output	Labor	Capital	Human Capital	Land
1880-1913	1.24	0.75	1.35	2.78	1.08
1913-1929	-0.87	-1.12	-1.31	2.10	-1.36
1930-1950	3.06	1.74	1.31	3.81	2.02
1950-1980	2.89	0.41	3.78	1.10	1.83
1980-2005	1.13	-0.96	1.83	-0.34	-0.34
1880-1929	0.55	0.14	0.48	2.56	0.28
1930-2005	2.35	0.31	2.47	1.34	1.16
1950-2005	2.09	-0.22	2.90	0.44	0.84
Non-Agricultural Sector					
	Output	Labor	Capital	Human Capital	
1880-1913	1.73	0.61	1.88	2.78	
1913-1929	-0.57	-2.47	0.26	2.10	
1930-1950	2.57	3.09	1.92	3.81	
1950-1980	6.15	5.56	6.61	3.73	
1980-2005	4.74	2.98	4.35	3.18	
1880-1929	1.53	0.62	1.52	3.07	
1930-2005	4.73	4.04	4.60	3.57	
1950-2005	5.51	4.39	5.58	3.48	

Table 3: Annual Growth Rates (in %)

	Factor Shares			
	1 Sector	2 Sector	2 Sector-Agric	2 Sector-Non-Agri.
Labor				
1880-1929	0.60		0.45	0.60
1930-1950	0.60		0.45	0.60
1950-1980-2005	0.60	M	0.40	0.60
Capital		i		
1880-1929	0.40	x	0.25	0.40
1930-1950	0.40	t	0.25	0.40
1950-1980-2005	0.40	u	0.30	0.40
Land		r		
1880-1929		e	0.30	
1930-1950			0.30	
1950-1980-2005			0.30	

Table 4: No Human Capital

	Factor Shares			
	1 Sector	2 Sector	2 Sector-Agric	2 Sector-Non-Agri.
Labor				
1880-1929	0.60		0.45	0.60
1930-1950	0.50		0.45	0.50
1950-1980-2005	0.50		0.30	0.50
Capital		M		
1880-1929	0.40	i	0.25	0.40
1930-1950	0.35	x	0.25	0.35
1950-1980-2005	0.35	t	0.30	0.35
Human Capital		u		
1880-1929	0.00	r	0.00	0.00
1930-1950	0.15	e	0.00	0.15
1950-1980-2005	0.15		0.10	0.15
Land				
1880-1929			0.30	
1930-1950			0.30	
1950-1980-2005			0.30	

Table 5: Models with Human Capital

Model	1	1-H	2	2-A	2-N	2-H	2H-A	2H-N
	Contribution of TFP - Annual Growth Rates (in %)							
1880-1913	0.33	0.33	0.42	0.25	0.61	0.42	0.25	0.61
1913-1929	0.08	0.08	0.59	0.37	0.81	0.59	0.37	0.81
1930-1950	0.92	0.63	0.86	1.17	-0.05	0.76	1.17	-0.21
1950-1980	1.27	1.37	0.58	1.04	0.17	0.78	0.97	0.50
1980-2005	1.57	1.55	1.14	1.07	1.21	1.20	1.00	1.25
1880-1929	0.25	0.25	0.48	0.29	0.68	0.48	0.29	0.68
1930-2005	1.28	1.23	0.84	1.08	0.46	0.91	1.08	0.56
1950-2005	1.41	1.45	0.83	1.05	0.64	0.97	0.99	0.84
	Contribution of TFP Growth to Growth (in %)							
1880-1913	22.7	22.7	28.5	19.7	35.4	28.5	19.7	35.4
1913-1929	-11.4	-11.4	-81.8	-42.5	-143.1	-81.8	-42.5	-143.1
1930-1950	32.7	22.4	30.5	38.1	-1.8	27.2	38.1	-8.3
1950-1980	25.6	27.6	11.6	36.0	2.7	15.8	33.6	8.1
1980-2005	38.7	38.2	28.0	94.5	25.6	29.4	89.0	26.4
1880-1929	33.1	33.1	62.4	51.7	69.0	62.4	51.7	69.0
1930-2005	31.2	30.2	20.5	46.1	9.7	22.4	46.1	11.8
1950-2005	30.9	31.9	18.3	50.4	11.7	21.3	47.2	15.2

Table 6: TFP

	Annual Growth Rates (in %)							
	Contribution of Capital							
Model	1	1-H	2	2-A	2-N	2-H	2H-A	2H-N
1880-1913	0.71	0.71	0.54	0.34	0.75	0.54	0.34	0.75
1913-1929	-0.01	-0.01	-0.11	-0.33	0.11	-0.11	-0.33	0.11
1930-1950	0.73	0.64	0.58	0.33	0.77	0.52	0.33	0.67
1950-1980	2.52	2.21	2.13	1.14	2.64	1.91	1.14	2.31
1980-2005	1.68	1.47	1.52	0.55	1.74	1.34	0.55	1.52
1880-1929	0.47	0.41	0.32	0.12	0.54	0.29	0.12	0.53
1930-2005	1.76	1.54	1.54	0.74	1.84	1.37	0.74	1.61
1950-2005	2.14	1.87	1.88	0.87	2.23	1.67	0.87	1.95
	Contribution of Labor							
1880-1913	0.44	0.44	0.35	0.34	0.36	0.35	0.34	0.36
1913-1929	-0.79	-0.79	-0.98	-0.51	-1.48	-0.98	-0.51	-1.48
1930-1950	1.16	0.97	1.39	0.78	1.85	1.21	0.78	1.54
1950-1980	1.16	0.97	2.26	0.16	3.34	1.88	0.12	2.78
1980-2005	0.81	0.68	1.39	-0.39	1.79	1.17	-0.29	1.49
1880-1929	0.37	0.31	0.33	0.28	0.37	0.30	0.28	-0.20
1930-2005	1.04	0.87	1.78	0.12	2.42	1.48	0.12	2.02
1950-2005	1.00	0.83	1.92	-0.09	2.63	1.61	-0.06	2.19
	Contribution of Human Capital							
1880-1913		0.00					0.00	0.00
1913-1929		0.00					0.00	0.00
1930-1950		0.57					0.00	0.57
1950-1980		0.41					0.11	0.56
1980-2005		0.37					-0.03	0.48
1880-1929		0.38					0.00	0.38
1930-2005		0.44					0.13	0.53
1950-2005		0.39					0.04	0.52
	Contribution of Land							
1880-1913				0.32			0.32	
1913-1929				-0.41			-0.41	
1930-1950				0.61			0.61	
1950-1980				0.55			0.55	
1980-2005				-0.10			-0.10	
1880-1929				0.09			0.09	
1930-2005				0.35			0.35	
1950-2005				0.25			0.25	

Table 7: Growth Accounting

	Productivity Growth Component (PGE)			Sectoral Shift Component (SE)		
	Agr	Non-Agr	Total	Agr.	Non-Agr.	Total
1880-1913	34.2	72.1	106.3	1.5	-7.9	-6.3
1913-1929	21.0	163.4	184.4	15.5	-99.9	-84.4
1930-1950	56.1	-10.3	45.8	-10.0	64.2	54.2
1950-1980	29.5	13.4	43.0	-18.7	75.7	57.0
1980-2005	14.4	52.6	67.0	-15.8	48.8	33.0

Table 8: Labor Productivity Decomposition