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Sources of long-term economic growth for Turkey, 1880–2005

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This article 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 article provides a unique look at the growth experience of these two different political and economic regimes. The article examines in detail the evolution of factors that led to growth in output across broad periods, including the post-World War II period and the era of globalization beginning in the 1980s. 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.

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 considerable uncertainty regarding the appropriate specification or the set of variables that should

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be considered.[2] 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 article, 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 many developing countries which were colonized by European settlers,[3] 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 behaved much like 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 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 1980s was witness to recurring episodes of financial and macroeconomic instability and crises in a number of developing countries such as Mexico and Argentina in 1994–95, the East Asian countries in 1997, Russia in 1998 – as they were in Turkey in 1994 and, more severely, in 2000–1. 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 others 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

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

[3] Much of the literature on the role of institutions in economic growth has concentrated on the identity of the European colonial settlers in determining a country's future growth performance; see Acemoglu, Johnson and Robinson (2001). For a recent application in the context of Brazil, see Naritomi, Soares and Assuncao (2007).

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 our own estimates for Turkey and 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 1970s. However, it has been lagging behind the developing country averages since the 1980s. 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 its initial condition.

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 1960s period and examine its evolution for the aggregate economy and on a sectoral basis – see, for example, Filiztekin (2000), Saygili, Cihan, and Yurtoglu (2001, 2005), Altug and Filiztekin (2006), or Ismihan and Metin-Ozcan (2006). Pamuk (2008a) has argued that the increase in arable lands together with the mechanization of agriculture that began in the 1950s is one of the most important transformations that took place in the modern Turkish era. To quantify this transformation and to examine its implications for Turkish productivity growth, we model the agricultural sector using a production function approach with inputs of land, labour and capital. Another novel feature of our analysis is that we make use of a new capital stock series dating back to 1923. Finally, we conduct a labour 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.[4]

Our results indicate that output growth in Turkey is primarily due to capital accumulation, not TFP growth. This is in contrast to the findings of Prados de la Escosura and Roses (2005), who report that innovation is the leading force in Spanish growth for the period 1850–2000. Various authors have identified the main factor behind East Asian growth or growth in late

[4] 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.

starters such as Portugal to be high rates of saving and investment (Young 1995; Collins and Bosworth 1996; Lains 2003). However, in contrast to these countries, Turkey has not witnessed sustained rates of capital growth, with this rate declining during the 1980s and especially during the period of political and macroeconomic instability in the 1990s. Our third finding refers to the rate of sectoral re-allocation in Turkey. As Ventura (1997) and others have demonstrated, the growth experience of the East Asian countries combines a rapid re-allocation of resources from agriculture to non-agricultural uses together with very high rates of capital accumulation. By contrast, the process of structural transformation in Turkey remains incomplete, with 34 per cent of the labour force still in agriculture as of 2005. These findings constitute a set of 'puzzles' regarding Turkish economic growth.

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 neoclassical 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 article, we also consider the role of institutions, macroeconomic policy-making and human capital in determining Turkey's growth experience. The institutional environment matters for growth. If existing institutions favour 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 the economic growth and power have taken a long time to reach large 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 with the process of human capital accumulation and macroeconomic policy-making underlying Turkey's growth experience.

The analysis of the factors that influence Turkey's growth doubtless has interest in itself. However, to the extent that the past growth experience of the Turkish economy is, in any way, a predictor of its future performance, this analysis also has ramifications for Turkey's relations with the European Union. These relations date back to the 1960s. However, they have gained impetus in recent years. In 1996, Turkey entered into the Customs Union Agreement with the European Union and, in 1999, Turkey's candidate status was confirmed at the European Union summit in Helsinki. Finally, on 3 October 2005 Turkey started accession negotiations with the European Union for full membership status. Hence, understanding the various economic, political and social factors that have shaped Turkey's past record of growth will provide important insights into its ability to converge to per capita income levels of developed countries and the viability of its current bid for European Union membership.

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. A historical perspective

In this section we present an overview of Turkey's growth record since the nineteenth century in both absolute and comparative terms. Per 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. Thanks to the efforts of many economic historians, most notably the work of Angus Maddison in recent decades, we are able to compare the growth record of Turkey with the population-weighted averages for the high income countries of western Europe and the

Table 1. *Periodization*

1880–1913	Ottoman era to World War I
1914–49	
1914–29	post-WWI recovery ends and a new policy era begins
1930–49	early Republic including the Great Depression and WWII
1950–79	post-WWII era under import substituting industrialization
1980–2005	era of globalization since 1980

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.

Population of the area within the present-day borders of Turkey increased from a little over 9 million in 1820 and 13 million in 1880 to 69 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 7,500 dollars in 2005, an eleven-fold increase for 1820–2005 and an eight-fold increase since 1880. Following the established pattern in such long-term comparisons, we will examine these 125 years in four periods, the nineteenth century until World War I, the period until 1950, the post-World War II era until 1973 or 1980, and the current era of globalization since; see Table 1.[5] 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 cent 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, and 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 the present-day borders of Turkey as a percentage 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 37 per cent in 1880 to 29 per cent in 1913. See Table 2. GDP per capita in Turkey stood at approximately 1,200 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 per cent of the GDP per capita income in the developing countries of

[5] We have chosen to use non-overlapping intervals in our analysis because, in our growth accounting, we will employ changing factor shares across the different subperiods.

Table 2. *Economic indicators of Turkey*

	1880	1913	1929	1950	1980	2005
Population (mill.)	13	17	14	21	45	69
Share of urban pop. (%)	26	28	24	25	44	68
Sh. of agr. in lab. force (%)	80	80	85	84	51	34
Share of agr. in GDP (%)	54	55	42	54	26	11
Share of ind. in GDP (%)	?	13	11	13	21	26
GDP per capita[a]	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
Life expectancy (years)	?	30?	n.a.	47	62	69
Adult lit., age 15+ (%)	?	10	n.a.	32	69	89
Annual growth rates (%)	1880–1913	1914–29	1930–49	1950–79	1980–2005	1930–2005
Population	0.8	−1.1	1.8	2.6	1.7	2.1
GDP per capita	0.8	0.0	3.1	3.1	2.5	2.9

[a]PPP adjusted in 1990 US dollars.

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

Asia, Africa and Latin America, calculated on a population-weighted basis (Maddison, 2001, 2003; Pamuk, 2006).

Our second period runs from 1914 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 1919–22 led to large population losses, approximately 18 per cent, and large declines in GDP per capita, as much as 40 per cent 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 subperiod into two, 1914 to 1929 and 1930 to 1949. We decided to choose 1929 for the end of the first part of this period as this was the year when pre-war levels of per capita GDP were attained for the first time after World War I. 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 1930s but the favourable trends were reversed by the outbreak of World War II. We chose 1949 to end the second subperiod because the Turkish post-World War II recovery was completed by this date, and to begin the next with 1950 as this is the benchmark year in many studies.

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 cent 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.

Per capita income in Turkey in 1950 had been at 1,620 purchasing-power-parity-adjusted 1990 US dollars. This was equal to 24 per cent of the per capita income of the high-income countries and 188 per cent of the per capita income in the developing countries. By 2005, GDP per capita in Turkey had reached 7,500 dollars, an increase of more than five-fold since 1913. This figure corresponded to about 30 per cent of the level of GDP per capita in the high-income countries of western Europe and the United States, and approximately 225 per cent 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

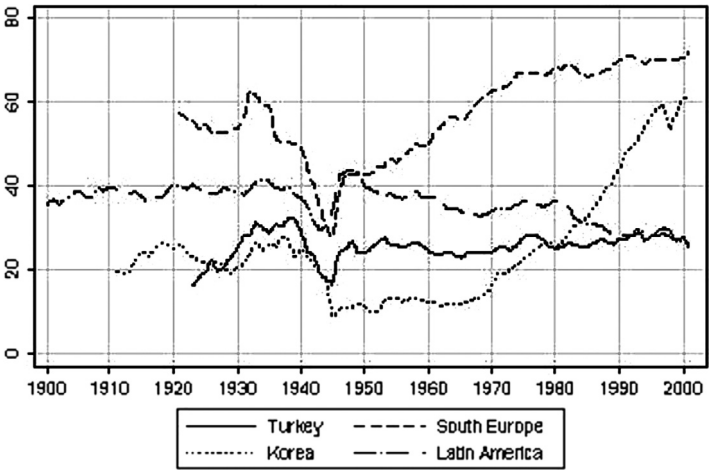

Figure 1. *GDP per capita relative to western Europe and USA*

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 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 rate clearly is slower than the GDP growth rates of countries such as South 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.

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.[6] While there is a single distribution describing per capita GDP levels in 1960 (albeit one with a long upper tail), a large probability mass of this distribution

[6] See, for example, Quah (1996).

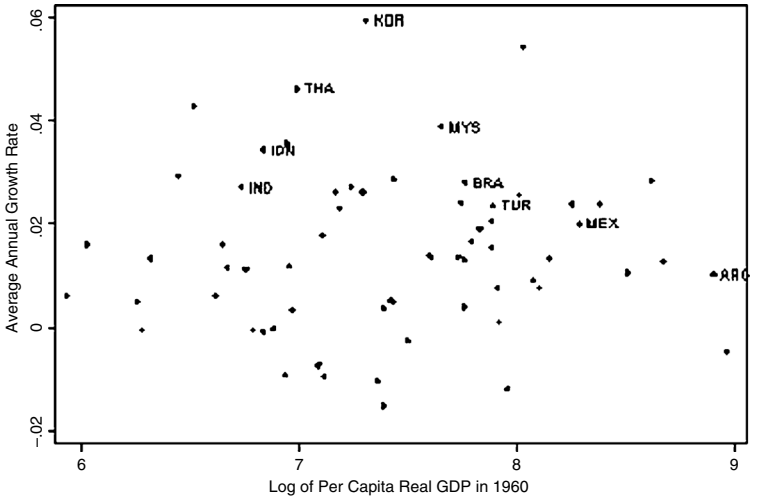

Figure 2. *Average annual growth rates as a function of per capita income in 1960*

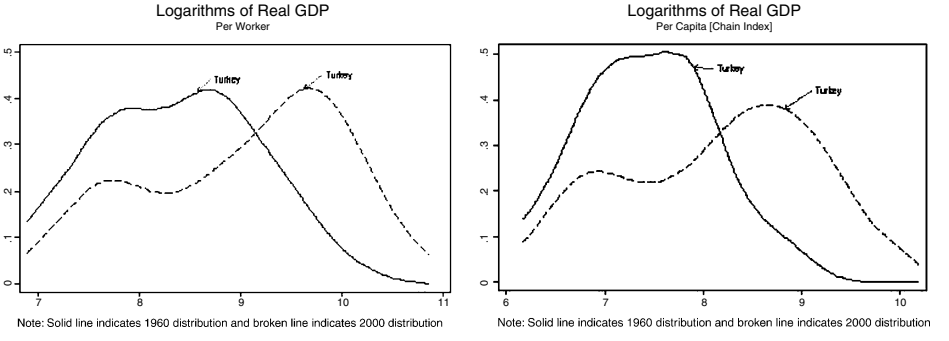

Figure 3. *Distribution of per worker and per capita GDP, 1960 and 2000*

Sources: Penn World Tables.

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 condition.

The above analysis helps to define Turkey's relative growth performance across broad historical periods. However, it does not directly describe the sources of growth for the Turkish economy. This is critical since most new growth theories, regardless of whether they are based on endogenous

growth or emphasize the role of institutions, assign a key role to total factor productivity (TFP) growth. We turn to this issue next.

3. Growth accounting

Growth accounting provides a convenient way to decompose output growth into growth of the factor inputs versus total factor productivity (TFP) growth. In Solow's (1958) original contribution, only the inputs of labour 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.) In this article, we consider a two-sector model with an agricultural and non-agricultural sector that also allows for the impact of human capital.

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. The production functions can both potentially depend on human capital. However, for the agricultural sector, we assign a zero weight to human capital across our entire sample period and similarly for the non-agricultural sector for 1880–1929. This reflects the very low levels of literacy and educational attainment for this era. The production technologies in the agricultural versus non-agricultural sectors are further differentiated by making the former depend on the factor of productive land. The production function in the agricultural sector and non-agricultural sectors are given by:

$$Y_{at} = A_{at} K_{at}^{\alpha} N_{at}^{\beta} L_{at}^{1-\alpha-\beta},$$

and

$$Y_{nt} = A_{nt} K_{nt}^{\gamma} N_{nt}^{\delta} H_{nt}^{1-\gamma-\delta},$$

where $0 < \alpha < 1, 0 < \beta < 1, 0 < \gamma < 1, 0 < \delta < 1, \alpha + \beta < 1$ and $\gamma + \delta < 1$. 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. We note that the production function for the non-agricultural sector is similar to the one assumed by Mankiw, Romer and Weil (1992).

Totally differentiating the production function and assuming that technological progress is Hicks neutral, the expression for the Solow residual or total factor productivity (TFP) growth in each sector is given by

$$dA_{it}/A_{it} = dY_{it}/Y_{it} - \Sigma_{\mathcal{J}} \chi^{\mathcal{J}} d\mathcal{J}_{it}/\mathcal{J}_{it}, \quad i = a, n,$$

where $\chi^{\mathcal{J}}$ *for* $\mathcal{J} = K, N, H, L$ denotes the output elasticity with respect to the relevant factors.

In Table 3, we present the growth rates of output and the factor inputs for the various subperiods in our study. This table shows that the growth rates of output and of the factor inputs such as labour, 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 per cent) during and after World War I and even larger declines in GDP and GDP per capita (more than 40 per cent) until the early 1920s. The period 1930–49 shows significant output growth in both the agricultural and non-agricultural sectors. The beginning of this period 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 noteworthy features of this period is the rapid increase in human capital. Arable lands also expand at the fastest rate during this period. Turkey witnesses the highest rates of overall growth during the period 1950–79. The cultivation of arable lands reaches its peak during this period and the accumulation of physical capital in agriculture is very high. The non-agricultural sector also shows the greatest growth during the period 1950–79. Output growth averages 6.15 per cent and capital accumulation proceeds at even a faster rate of 6.61 per cent. The land under cultivation starts to decline after 1980 as industrial uses, tourism and residential housing begin to claim some of the agricultural land. Finally, as Turkey's economy is opened up to the rest of the world beginning in 1980, there is lower output growth as well as lower rates of capital accumulation.

These observations show that there has been significant variation in the factor inputs across the various subperiods in our study. One of the main issues in a growth-accounting exercise has to do with determining the elasticity of output with respect to the different inputs in the relevant production functions. These can be determined using national income data based on factor shares. However, this approach typically tends to yield high values for the capital share as well as significant variation in this quantity due to distributional shifts during the late 1970s and the late 1980s. Alternatively, one can implement a production function estimation to estimate the output elasticity of the various inputs. Ismihan and Metin-Ozcan (2006) employ a cointegration approach to derive such estimates in a model with human-capital-augmented labour and capital as inputs for the period 1960–2004.[7] They find that the capital share is estimated between 0.58–0.65. These

[7] Specifically, they define human-capital-augmented labour 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).

Table 3. *Annual growth rates*

	Aggregate economy				Agricultural sector				Non-agricultural sector			
	Y	N	K	H	Y	N	K	H	Y	N	K	H
1880–1913	1.48	0.73	1.76	2.78	1.24	0.75	1.35	2.78	1.73	0.61	1.88	2.78
1914–29	−0.72	−1.31	−0.03	2.10	−0.87	−1.12	−1.31	2.10	−0.57	−2.47	0.26	2.10
1930–49	2.80	1.93	1.82	3.81	3.06	1.74	1.31	3.81	2.57	3.09	1.92	3.81
1950–79	4.95	1.93	6.31	2.74	2.89	0.41	3.78	1.10	6.15	5.56	6.61	3.73
1980–2005	4.07	1.35	4.21	2.44	1.13	−0.96	1.83	−0.34	4.74	2.98	4.35	3.18

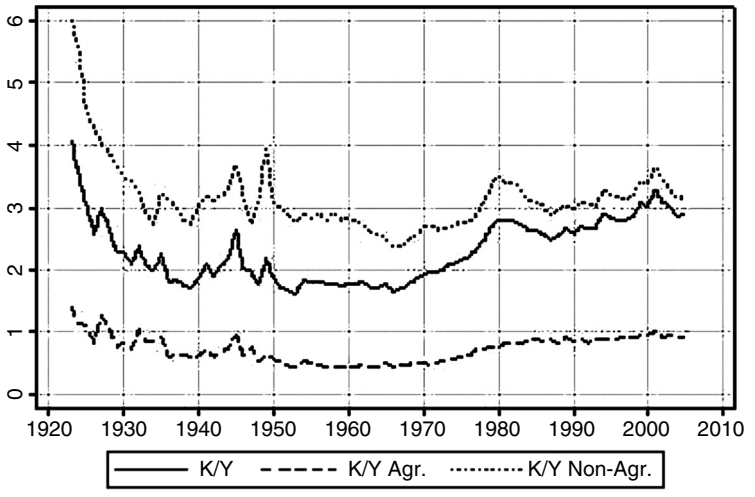

Figure 4. *Capital–output ratio*

values are typically much higher than the standard estimates used in studies for developed countries. In contrast to this approach, we consider a much longer period and also include human capital and land as additional factors in the production function. To control for the effects of the variation in the factor shares, we report growth-accounting results for three alternative sets of parameters.

The models we consider and their baseline parameterization are as follows:

- *Model 1*. The model without human capital has a capital share of 0.50.[8]
- *Model 1-H*. The model with human capital has a share of human capital equal to zero before 1930 and 0.15 afterwards. The share of capital is taken to be 0.50 for 1880–1929, and 0.35 for 1930–49 and 1950–2005.
- *Model 2*. The non-agricultural sector in the two-sector model (*Model 2-N*) has the same parameterization as Model 1. The agricultural sector in the two-sector model (*Model 2-A*) has a share of capital of 0.30 for the period up to 1950 and 0.40 for 1950–2005, reflecting the mechanization of agriculture that began in the 1950s. The share of land is 0.30 for the period up to 1950 and 0.20 for 1950–2005.

In Appendix 2, we conduct a sensitivity analysis based on alternative sets of factor shares.

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

[8] This is similar to the approach in Ismihan and Metin-Ozcan (2006).

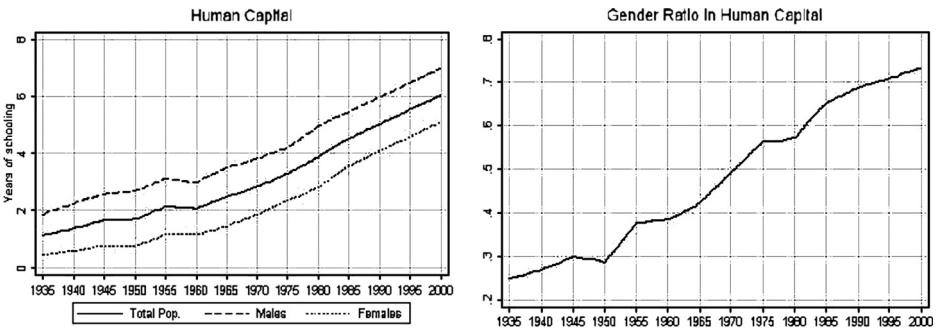

Figure 5. *Human capital and gender ratio*

observe 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 (2006) 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.[9] In Figure 5, we also graphed average female educational attainment as a fraction of the overall average attainment, both measured in years of schooling. This figure shows that there are differences between the educational attainments of females and males, although these differences appear to be levelling 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 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 labour is measured in hours, unadjusted for education and

[9] See Appendix A.

experience, for example, increases in labour and total productivity will be higher. In our case, we measure labour 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.[10] By adding the human capital into equation, however, we attempt to account for at least part of the improvement in the quality of labour. 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.[11]

3.1. Main findings

In the developed countries TFP growth has been a major source of growth even in cases where inputs are adjusted for quality improvements. A variety of studies shows that anywhere from 20 per cent to as much as 50 per cent of the total increase in output is attributable to TFP in the developed countries (see Denison 1985).[12]

Table 4 shows that there is significant variation in the contribution of TFP growth to output growth in Turkey across the subperiods in our study. In the Ottoman era excluding World War I, the fraction of output growth due to TFP growth is only 15.7 per cent. During the period 1913–29, this falls to 6.1 per cent due to the large declines in output arising from World War I and the War of Independence that followed. There is a significant contribution of TFP growth to output growth during the period 1930–49. However, an examination of the two-sector model shows that it is TFP growth in the agricultural sector that is driving overall TFP growth for this period.[13] Indeed the contribution of TFP in the newly emerging state-led, non-agricultural sector is nearly non-existent.

[10] Adamopoulos and Akyol (2006) 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.

[11] Another problem is 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).

[12] Moreover, recent research has 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. See Islam (1995) and Helpman (2004, pp. 28–31).

[13] The 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.

Table 4. *Growth accounting*

	Contribution of TFP									
	Annual growth rates (in %)					Contribution of TFP growth to growth (in %)				
Model	1	1-H	2	2-A	2-N	1	1-H	2	2-A	2-N
1880–1913	0.23	0.23	0.34	0.22	0.48	15.7	15.7	23.3	17.3	28.0
1914–29	−0.04	−0.04	0.43	0.36	0.50	6.1	6.1	−60.0	−41.0	−89.3
1930–49	0.66	0.36	0.65	1.06	−0.09	26.7	14.6	26.6	39.5	−3.8
1950–79	0.94	0.83	0.68	0.82	0.22	18.4	16.2	13.2	27.9	3.5
1980–2005	1.24	1.08	1.09	0.82	1.03	30.4	26.5	26.9	72.4	21.8
	Contribution of factor inputs									
	Annual growth rates (in %)					Annual growth rates (in %)				
	K					N				
1880–1913	0.88	0.88	0.66	0.40	0.94	0.36	0.36	0.30	0.30	0.30
1914–29	−0.01	−0.01	−0.13	−0.39	0.13	−0.65	−0.65	−0.83	−0.45	−1.23
1930–50	0.83	0.83	0.65	0.37	0.87	0.95	0.66	1.14	0.69	1.49
1950–79	3.18	3.18	2.72	1.54	3.33	0.98	0.68	1.92	0.17	2.83
1980–2005	2.11	2.11	1.91	0.73	2.17	0.68	0.47	1.15	−0.39	1.49
		H		L						
1880–1913		0.00		0.32						
1914–29		0.00		−0.41						
1930–49		0.60		0.52						
1950–79		0.41		0.39						
1980–2005		0.37		−0.07						

The period after 1950 deserves greater scrutiny because this era corresponds to the highest rates of growth for the Turkish economy; see Table 3. The period 1950–79 is the era of import-substituting industrialization. An examination of the two-sector model shows that it is the very low levels of TFP growth in the non-agricultural sector combined with declining TFP growth in the agricultural sector that is the source of the low TFP growth for the aggregate economy. However, this picture begins to change when we consider the post-1980 era. The contribution of TFP growth to output growth is around 30 per cent for the one-sector models. Furthermore, the results for the two-sector model show that it is TFP increases in the non-agricultural sector that are at the source of TFP growth for the economy as a whole.[14]

These results yield some noteworthy conclusions about the role of TFP growth in overall output growth for the Turkish economy. First, the role of TFP growth is minor for the late-Ottoman era. While TFP growth accounts for around 15 per cent of overall output growth, the growth rate of TFP is only 0.23 per cent for this period. Second, the contribution of TFP growth arising from the agricultural sector during the 1930–49 period reflects, in part, the effect that liberalization and the modernization of practices in agriculture had on improving overall productivity for the Turkish economy beginning from the early Republican era. The scarcity of population in relation to the extent of available land no doubt also contributes to this result. Third, the role of TFP growth in output is minor during the ISI era corresponding to the 1950–79 period.[15] Fourth, there is a qualitative change in the pattern of total factor 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 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.[16] It is worth emphasizing that the quality of our estimates is only as good as our data quality, especially for the earlier, pre-1950 period. Nevertheless, we stand behind the basic direction of our results, in particular, low but positive GDP per capita growth rates and the absence

[14] Here we are comparing the growth rates of TFP in the agricultural and non-agricultural sectors of 0.82% and 1.03%, respectively. The fraction of output growth attributed to TFP growth appears high in the non-agricultural sector because of the negative growth rates of labour and land in this sector for the period 1980–2005.

[15] This conclusion is somewhat tempered if we consider finer subperiods. Ismihan and Metin-Ozcan (2006) show that TFP growth was relatively high during the 1960s due to relatively stable political and macroeconomic environment.

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

of significant TFP growth for the late-Ottoman period as well as the results for the other subperiods.[17]

An overall conclusion that also emerges from Table 4 is that TFP growth is, in general, low for Turkey. During the entire 1950–2005 period, all of the models imply that TFP growth is only slightly above 1 per cent per annum. 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, Saygili, Cihan and Yurtoglu (2001) find that TFP growth is equal to -0.29 per cent for 1972–79 and 0.44 per cent for 1980–2000. Altug and Filiztekin (2006) examine the behaviour 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 article 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.

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. 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; see Table 3. Considering some subperiods, we observe that capital accumulation was the primary source of output growth for the 'import-substituting' era corresponding to 1950–79. 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. After 1980, the rate of TFP growth begins to approach the rate of physical capital accumulation.

Are these results surprising? In our opinion, no. 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 growth in output. Lains (2003) demonstrates that Portuguese growth during 1934–90 was due to capital deepening, a finding that is shared by many developing countries.[18] Thus, in common with many developing contries 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.

[17] See also Appendix 1.

[18] In this regard, Kumar and Russell (2002) and Maudos, Pastor, and Serrano (2000) construct world production frontiers using output and inputs of labour and capital under the assumption of CRTS. Their results indicate that technical change is non-neutral, leading to productivity growth at higher capital–labour ratios, and that capital deepening is the primary cause of convergence in the distribution of labour productivity for the period 1960–90.

Table 5. *Labour productivity decomposition*

	Productivity growth component (PGE)			Sectoral shift component (SE)		
	Agr	Non-Agr	Total	Agr	Non-Agr	Total
			Annualized change			
1880–1913	0.010	0.022	0.032	0.000	−0.002	−0.002
1914–29	0.006	0.047	0.053	0.004	−0.029	−0.024
1930–49	0.024	−0.021	0.004	−0.004	0.031	0.027
1950–79	0.089	0.050	0.139	−0.056	0.231	0.176
1980–2005	0.083	0.306	0.389	−0.092	0.284	0.192
			Contribution to annualized change (per cent)			
1880–1913	34.2	72.1	106.3	1.5	−7.9	−6.3
1914–29	21.0	163.4	184.4	15.5	−99.9	−84.4
1930–49	79.5	−67.0	12.5	−14.5	102.0	87.5
1950–79	28.2	16.0	44.2	−17.6	73.4	55.8
1980–2005	14.4	52.6	67.0	−15.8	48.8	33.0

However, the rate of capital accumulation is typically lower for Turkey.[19] Furthermore, we find that the rate of capital accumulation slows after 1980.

3.2. Labour productivity decomposition

Another way of examining a country's growth performance is in terms of the behavior of labour productivity. Total labour 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 labour productivity can be expressed as:

$$p_t = \Sigma_{i=a,n} w_i Y_{it}/L_{it},$$

where w_{it} shows the weight of sector i in total employment at time t and p_t shows labour productivity,. Taking first differences one reaches:

$$\Delta p_t = \Sigma_{i=a,n} w_{i,t-1} \Delta p_{it} + \Sigma_{i=a,n}\, p_{i,t-1}\, \Delta w_{it},$$

where the first term on the right denotes within sectoral productivity growth (PGE), and the second term denotes the sectoral re-allocation effect (SE).[20]

Table 5 shows the impact of sectoral re-allocation out of agriculture across the different periods for Turkey. In the Ottoman era 1880–1913, labour

[19] Compare, for example, a rate of capital accumulation of 5.26% for Turkey over the period 1950–2005 with 6.47% for Portugal over the period 1947–90.

[20] It is also possible to illustrate the sectoral shift effect using TFP as a measure of productivity instead of labour productivity.

productivity in the non-agricultural sector is increasing very rapidly but the fraction of the population in these industries remains roughly constant (or even falls slightly). During the 1913–29 period, we observe a dramatic reduction in the share of employment in the non-agricultural sector. This can be attributed to the fact that the urban population was disproportionately affected by the decade-long wars and their aftermath. Hence, for these periods, we observe a negative sectoral re-allocation effect.

There is a significant shift from agriculture into non-agricultural uses during the period 1930–49 but the increase in labour productivity during this period is due to increases in agricultural productivity. Nevertheless, we observe a positive effect of the sectoral shift effect on the change in overall labour productivity. The contribution from sectoral allocation is also important in the post-1950s period. For the 1950–79 period, 55.8 per cent of the change in overall labour productivity is due to resources moving out of low productivity uses in agriculture into higher productivity uses elsewhere, primarily manufacturing. By 1980–2005, the contribution of this channel falls to 33 per cent.

One reason for the large impact of sectoral allocation out of agriculture is the large differences in value added per worker in the two sectors as indicated by the official GDP series which has persisted to the present. The labour force and GDP series include women in the agricultural labour force when they work on the family farm but exclude them from the labour force if they stay at home after migrating to the urban areas. These definitions may have contributed to the size of sectoral allocation effect by raising the GDP per worker differences between the two sectors. Nevertheless, the magnitudes of the sectoral re-allocation effect for Turkey are not out of line for an economy which is undergoing a significant structural transformation.[21]

Summarizing, we conclude 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. Ventura (1997) has argued that the process of structural transformation may be also linked to capital deepening or capital

[21] In their study of the determinants of growth for India, Bosworth, Collins and Virmani (2007) report that for the period 1960–80, growth in per capita output is 1.3% per annum, of which 0.4% (or roughly 30%) is due to sectoral re-allocation effects. Likewise, for the period 1980–2004, they report a per capita income growth of 3.8%, of which 1% (or around 26%) is due to sectoral re-allocation effects. Broadberry (1998) has argued that the USA and Germany overtook the UK not by increasing productivity levels in manufacturing but by moving resources out of agriculture and by improving their relative productivity position in services. According to his calculations, out of aggregate labour productivity growth of 1.43% and 1.75% for the USA and Germany between the periods 1869–1990 and 1871–1990, respectively, 0.72% and 0.80% (which corresponds to nearly 50% of total productivity growth) are due to structural change. Likewise, Peter Temin (2002) has described how western Europe utilized sectoral re-allocation out of agriculture after World War II to achieve high rates of overall growth.

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 per cent during the period 1966–90.[22] By contrast, Turkey's investment performance has been peripatetic. Turkey's capital–output ratio grew at a rate of 1.09 per cent during the 1960–2005 period. For the period 1960–80, this growth rate is 2.27 per cent. However, the growth rate falls to 0.14 per cent over the period 1980–2005. If we look at the agricultural versus non-agricultural sectors separately, the growth rates are 1.54 per cent, 2.59 per cent and 0.70 per cent for agriculture, and 0.26 per cent, 1.07 per cent and −0.39 per cent for the non-agricultural sector over the periods 1960–2005, 1960–80 and 1980–2005, respectively. 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 apparently so low in Turkey? For example, average TFP growth is around 2 per cent during 1966–1990 for the East Asian countries.[23]
- 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 per cent, one of the highest in Europe.

4.1. Resolving the puzzles

In this section, we examine the role of institutions, human capital and macroeconomic policy-making in determining Turkey's absolute and comparative growth experience. 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. We focus on these factors because they typically figure among the co-variates of cross-country

[22] See Young (1995).
[23] See Hsieh (2002).

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.

The idea that institutions are a key determinant of growth has witnessed a revival (see North 1981). 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'.[24] A contrarian argument is put forward by Glaeser *et 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 reverse causality from growth to good institutions.[25] 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 favour 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.

In our growth-accounting exercise, we already allowed for the effect of education or human capital on output growth. Sianesi and Van Reenen (2003) provide an extensive survey of the direct and indirect effects of human capital on growth. The latter include stimulating the accumulation of physical capital, technology, or health, which induce growth, and discouraging factors such as population growth or infant mortality, which hamper it. Human capital may also have an effect on the quality of institutions. In other words, we would like to know the contribution of education – human capital – to economic growth. However, it may not be correct or realistic to assume that this contribution is fully captured by the human capital term in the Cobb–Douglas equation. Hence, we provide a more general discussion of the role of human capital at the same as we discuss changes in the institutional environment.

[24] See also Acemoglu, Johnson and Robinson (2001) or Rodrick, Subramanian and Trebbi (2004).

[25] 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).

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. Sirimaneetham and Temple (2006) show that bad policies can be 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.

Institutions. The institutional environment in Turkey features a transition from a multi-ethnic, multi-religious empire to a nation state. This was accompanied by a process of democratization and representative rule, which was frequently interrupted by such major events as World War I and a number of military coups after World War II. Turkey's process of institutional change also reflects the impact of global factors. Paralleling the major changes in the political sphere has been the gradual shift in economic power from the state elites to the private sector. Due to the political instabilities, however, Turkey has not been able to achieve macroeconomic stability and a marked improvement in economic institutions until recently.

Turkey's democratic experience achieves an early if imperfect start in 1876. This year corresponds to the announcement of the first constitution in a Muslim country. This short-lived experiment in representative rule is followed by thirty years of absolutist rule which ends with the declaration of the second constitutional parliament in 1908. The early years of the new nation state established in 1923 are characterized by one-party rule. The political cadres who led the transition from Ottoman rule to a secular nation state favour the creation of a national industrial bourgeoisie by the state but had to adjust to the realities of the Great Depression by accepting a state-led model of development.

The process of democratization resumes in the post World War II era with multi-party elections in 1946 and 1950. In 1950 the newly formed Democratic Party ascends to power. The period after 1950 corresponds to an era of economic growth and rising incomes in Turkey, as it does globally. There is also a shift in power from the political cadres who established the nation state to the newly emerging groups. As a result, the post-World War II era also witnesses the rise of the private sector, especially of industrialists. Democratic Party rule ends with the first military takeover in 1960. The period after the coup features a new and more liberal constitution, encompassing a broad-reaching set of rights of expression, assembly and organization. A new division of labour between the state and private sectors emerges, reflecting the changing political realities. Under the import-substituting regime, investments in heavy industries are undertaken

by state enterprises and the private sector produces the more profitable consumer goods.

The year 1971 corresponds to another military intervention, 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 civilian 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 1970s to Turkey's inadequate policy response to the first and second oil shocks.[26] The military interventions of 1960 and 1971 may be viewed as attempts to curb the economic and political power of new constituencies and a return to rule by the political and bureaucratic elites in Ankara. By the late 1970s, however, the Turkish economy was in serious difficulties, with a severe foreign exchange crisis. This period ends with the 1980 military takeover. 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.

As this brief description shows, the process of political and social transformation in Turkey has, at times, been turbulent. As in the case of some other developing countries, the *status quo* in Turkey has typically favoured the pursuit of privileges from local and national governments for the producers rather than the pursuit of productivity improvements or competition in international markets.[27] For better or worse, the period beginning with the 1950s has also witnessed the rise and frequent use of populist policies especially towards agriculture. 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 developed strong preferences for these policies. In contrast to the rapid structural transformation and the growth in the utilization of labour and capital that has been observed in the East Asian countries, however, 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.

[26] See Dervis, De Melo and Robinson (1982) for an analysis of the various factors that contributed to the build-up of the crisis.

[27] See Pamuk (2008b).

The period after the 1980 military intervention is characterized by political fragmentation, which has produced fragile coalitions and weak governments. The political and macroeconomic instability also led to the deterioration of the institutional environment. Rule of law and property rights suffered, and corruption increased. A variety of authors have studied the political and economic changes that took place during the 1980s and thereafter. In this regard, Öniş (2004) examines the legacy of Turgut Özal, the technocrat-turned-politician and statesman who was instrumental in implementing the so-called neo-liberal reforms initiated in the post-1980s period. On the one hand, he credits Özal with injecting optimism into the Turkish society and changing its inward-looking orientation. On the other, he argues that Özal's 'weak commitment to legal norms' and his reliance on economic decision-making units that had only weak support in acts of law laid the groundwork for corruption in the 1990s.

The strong economic recovery since the financial crisis of 2001 has been led by a new party of Islamist origins. It would be safe to say this government followed the most private-sector-friendly policies in Turkey's history. The twin IMF and EU anchors also helped bring about significant improvements in the political and economic institutional environment in these recent years. From a long-term perspective, however, political and macroeconomic stability has been a key missing ingredient in Turkey's experience with economic growth. The political and economic instabilities combined with slow improvement in the institutional environment emerge as a key reason why the rates of capital accumulation and economic growth have not been higher in Turkey since World War II.

Human capital. Human capital considerations 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 exceedingly 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 per cent before World War I and in the 1920s. By 1950, the adult literacy rate had increased to 28 per cent; 47 per cent for men and 13 per cent for women; see Table 2. Educational policies in Turkey in the last 80+ years have succeeded in bringing the literacy rate to less than 89 per cent by 2005; 95 per cent for men and 82 per cent for women. These literacy rates are typically lower than those for the Latin American and East Asian countries; see Zettelmeyer (2006). 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. 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.

In cross-country regressions, Barro (2001) also 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. Turkish children, by contrast, consistently perform among the lowest of the 27 countries in the OECD, following Mexico in terms of mathematical and analytical ability; see the PISA study by the OECD. On the other hand, Turkish school children display the greatest (relative) success in terms of the percentage that score in the top percentile in the examinations. Such inequality of outcomes is also mirrored in other dimensions. Duygan and Guner (2006) argue that a growing inequality in access to education may be as worrying as observed consumption and income inequality. (See also Saygili , Cihan and Yavan 2006.)[28] Finally, Turkey lags behind in the share of government spending in GNP accruing to education, with this value equalling 3.82 per cent in 2002 for Turkey compared to an OECD average of 5.73 per cent.

Guisan (2005) provides a comparison of GDP growth and per capita GDP growth for Mexico and Turkey over the period 1964–2004 by taking into account changes in population growth and human capital.[29] To the extent that higher levels of education lead to lower fertility rates, her results indicate that relatively high rates of growth of GDP combined with the failure of the GDP per capita to converge in countries such as Turkey and Mexico may be partly explained by the role of human capital accumulation. It is also worth commenting on the approach followed by Adamopoulos and Akyol (2006) at this point. These authors argue that Turkey's stagnation relative to the USA, say, is not essentially attributable to physical or human capital accumulation because these variables have tended to display catch-up relative to the USA. 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. 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 in the East Asian countries or the late starters in southern Europe.

[28] Similar worries are expressed for the Indian educational system. See Bosworth, Collins and Virmani (2007).

[29] Using the Barro-Lee (2000) measure of educational attainment defined as the average years of schooling of the population over 15, she shows that Turkey and Mexico have the lowest level of educational attainment when compared to Spain, Ireland, Korea and the UK. Korea, in particular, shows an outstanding increase in this dimension, surpassing the average education levels of all the afore-mentioned countries by the late 1980s.

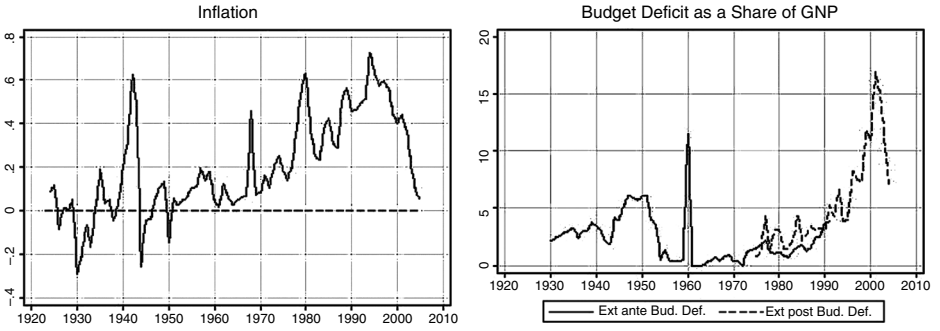

Figure 6. *Macroeconomic indicators*

Macroeconomic policy-making. In the early years of the Republic, Turkey adopted a prudent fiscal stance, and inflation remained low on average. There was some tendency for inflation to increase in the 1950s but it was brought under control during the 1960s. Turkey's macroeconomic performance started deteriorating following the first oil shock, and after this date attempts to control inflation and the government budget were short-lived at best.

Turkey's record of growth has undoubtedly been affected by its recent macroeconomic performance. Average inflation in the 1980s ranged around 50 per cent, increasing to over 70 per cent in the 1990s. Throughout much of this period, real interest rates in Turkey have traversed in the 20–25 per cent range. Turkish GDP during the 1990s also shows a highly volatile path, declining by 6 per cent in 1994 and by 5 per cent again in 1999 as a result of the Marmara earthquake. Turkey's GDP registered one of its largest declines in Republican history of 10 per cent during the banking and financial crisis of 2000–1 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 per cent during these five years. Nevertheless, among the developing countries, Turkey has the highest current account deficit to GDP ratio (7.5 per cent) and the second highest inflation (around 7 per cent). It suffers from the phenomenon of 'jobless growth' and remains among the most vulnerable to changes in international capital market conditions.

In Figure 6, we illustrate the behaviour of two key macroeconomic series over a long horizon, inflation and government budget deficits.[30] We note the persistently high inflation rates dating from the mid 1970s until the 2001 crisis. We also observe high and growing fiscal deficits which date back to the mid 1970s. The government's lax fiscal stance was thus supported by various inflationary measures. In order to finance a growing fiscal deficit,

[30] See Appendix A on data and sources for how these variables are measured.

public investment, including expenditures on education, declined sharply and continues to remain low. A concomitant result of high inflation and loose fiscal policy was the high real interest rates observed in Turkey during the 1980s and 1990s. The process of economic liberalization after 1980 has also been questioned from the viewpoint of sound macroeconomic policy-making principles. As Rodrik (1991) argues, the economic liberalization of the 1980s took place in a lax or lacking regulatory environment and often without too much regard to the rule of law. Undoubtedly, these factors led to the low and volatile growth observed during this period, especially the 1990s.[31]

The culmination of these factors was the 2000–1 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 to the Istanbul-based industrial elites that flourished under the import-substituting regime and remained dominant in the 1980s and 1990s. The AKP (or the Justice and Welfare Party) government of recent years has been supported by these emerging elites from the provinces.[32]

5. Conclusions

In this article, 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 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 at various junctures has been disappointing.

[31] In a related analysis, Adrogue, 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 1990s.

[32] In this article, 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.

In this article, 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 have tried to sketch the main features of this argument, first, by displaying the facts and then by showing how these facts could be interpreted along broad historical lines suggested by our story. 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 of growth points to the relevance of various political economy arguments that have been put forward to account for the persistence of poor outcomes observed in developing economy contexts. Similar arguments have been made for the Latin American countries. These factors appear to be compounded and to interact with problems arising from the relatively low level of human capital and, in the 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.

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Appendix 1. 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 (SIS) of Turkey for the period since 1923.

Output, aggregate and non-agricultural. 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 immediately 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. See Özel and Pamuk (1998) and Pamuk (2006). Needless to say, the quality and the reliability of the data we use decline as we go back in time. We have less confidence in the series for the Ottoman period than the series for the later periods. However, we stand behind the basic direction of our results, low but positive GDP per capita growth rates and the absence of significant TFP growth for this early period.

Data on nominal and real GDP for the period 1923–2005 are available from official sources such as the State Institute of Statistics. However, due to changes in the base year in 1948 and 1968, the official data show significant variation around these dates. Temel (1998) constructs real GDP data in 1987 prices for the entire 1923–2005 to minimize the effects of these changes. A similar real GDP series in 1990 prices is available from Saygili, Cihan and Yurtoglu (2005) for the period 1972–2003. We created a new GDP deflator with a base year of 1990 based on the deflators from these two studies, and adjusted the official nominal GDP series with this deflator.

Agricultural output. Estimates based on outward extrapolation of Ottoman data for 1880–1913; see Pamuk (2008b); State Institute of Statistics, Crop and Husbandry Output Series for 1923–61; FAO, Net Production Index for Turkey since 1961, production net of feed and seed.

Employment, aggregate and non-agricultural. This series is based on series in the Bulutay (1995) study, which was published jointly by SIS and the International Labour Office (ILO) at Ankara.

Agricultural employment. Estimates based on Ottoman population series and other data for 1880–1913; see Pamuk (2008a); Bulutay (1995) for 1923–1988; State Institute of Statistics since 1988.

Agricultural land. Estimates based on Ottoman population series and other data for 1880–1913; see Pamuk (2008b); State Institute of Statistics since 1925.

Capital stock. This is based on the capital stock series published in Saygili, Cihan and Yurtoglu (2005) for the period 1972–2005 in 1990 prices. This series was extrapolated 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) using a depreciation rate of 4.2 per cent per annum. 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).

Education. This variable is defined as the average years of schooling of the labour force, aged 15–64. Data on educational attainment of the population by gender and age groups are available at five-year intervals since 1935 through General Population Censuses. The data for years in between the censuses are imputed using the 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 the 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. Rate of change of the GDP deflator, State Institute of Statistics.

Budget deficit. 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 take from the official publication Maliye ve Gümrük Bakanliği Yayin No: 1991/320. *Konsolide Bütçe Kaynak: Bütçe Başlangiç Ödenekleri ve Gelir Tahminleri (1930–1991)*, ed. Iclal Demir and 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, Ankara.

Appendix 2. Sensitivity analysis

In Table A.1, we present some sensitivity results regarding the role of TFP versus the factor inputs by varying the share parameters. We consider two cases:

- Case I: the capital share is equal to 0.40 in the one-sector model (Model 1), and for the non-agricultural sector in the two-sector model (Model 2-N). In the model with human capital, we assign a weight of 0.15 to human capital after 1929. The share of capital is taken to be 0.40 for 1880–1929, and 0.35 for 1930–1950 and 1950–2005 (Model 1-H). 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, and the share of land 0.30 across the three subperiods (Model 2-A).
- Case II: the capital share is equal to 0.60 in the one-sector model (Model 1), and for the non-agricultural sector in the two-sector model (Model 2-N). In the model with human capital, we assign a weight of 0.15 to human capital after 1929. The share of capital is taken to be 0.60 for 1880–1929, and 0.50 for 1930–1949 and 1950–2005 (Model 1-H). For the agricultural sector, the share of capital and the share of land are both taken to be 0.30 across the three subperiods (Model 2-A).

The results in this table show that the magnitude of the capital share affects the fraction of growth attributed to TFP. In particular, higher values of the capital share imply that the contribution of TFP growth to overall growth falls significantly during periods of rapid capital accumulation and the converse for periods with capital decumulation. Thus, if we take the share of capital to be 0.40, as in Case I, TFP growth accounts for 23 per cent of output growth for the 1880–1913 period and nearly 27 per cent for 1950–79. By contrast, when we increase the capital share to 0.50, as in the text, the contribution of TFP for these periods falls to less than 20 per cent. With a capital share of 0.60, as in Case II, the contribution of TFP growth accounts for around 9 per cent and 10 per cent of output growth during the 1880–1913 and 1950–1979 periods, respectively. We view the results with a higher capital share to

Table A.1. *Sensitivity analysis*

	Case I									
	Contribution of TFP									
	Annual growth rates (in %)					Contribution of TFP growth to growth (in %)				
Model	1	1-H	2	2-A	2-N	1	1-H	2	2-A	2-N
1880–1913	0.33	0.33	0.42	0.25	0.61	22.7	22.7	28.5	19.7	35.4
1914–29	0.08	0.08	0.55	0.35	0.76	−10.7	−10.7	−77.0	−40.0	−134.7
1930–49	0.63	0.32	0.65	1.04	−0.21	25.7	13.2	26.6	38.6	−9.1
1950–79	1.37	1.47	0.68	1.01	0.32	26.7	28.6	13.2	34.1	5.0
1980–2005	1.51	1.49	1.09	1.03	1.17	37.2	36.7	26.9	90.9	24.6
	Contribution of factor inputs									
	Annual growth rates (in %)					Annual growth rates (in %)				
	K					N				
1880–1913	0.71	0.71	0.54	0.34	0.75	0.44	0.44	0.35	0.34	0.36
1914–29	−0.01	−0.01	−0.11	−0.33	0.11	−0.79	−0.79	−0.98	−0.51	−1.48
1930–50	0.66	0.58	0.52	0.31	0.69	1.14	0.95	1.35	0.77	1.79
1950–79	2.54	2.23	2.15	1.15	2.67	1.17	0.98	2.30	0.17	3.39
1980–2005	1.68	1.47	1.52	0.55	1.74	0.81	0.68	1.39	−0.39	1.79
		H		L						
1880–1913		0.00		0.32						
1914–29		0.00		−0.41						
1930–49		0.60		0.52						
1950–79		0.41		0.58						
1980–2005		0.37		−0.10						

Table A.1. *Continued.*

	Case II									
	Contribution of TFP									
	Annual growth rates (in %)					Contribution of TFP growth to growth (in %)				
Model	1	1-H	2	2-A	2-N	1	1-H	2	2-A	2-N
1880–1913	0.13	0.13	0.28	0.22	0.36	8.6	8.6	19.2	17.3	20.7
1914–29	−0.16	−0.16	0.30	0.36	0.36	22.9	22.9	−42.3	−41.0	−43.8
1930–49	0.68	0.36	0.65	1.06	0.03	27.6	14.6	26.6	39.5	1.4
1950–79	0.52	0.83	0.68	1.01	0.12	10.1	16.2	13.2	34.1	1.9
1980–2005	0.96	1.08	1.09	1.03	0.90	23.6	26.5	26.9	90.9	19.1
	Contribution of factor inputs									
	Annual growth rates (in %)					Annual growth rates (in %)				
	K					N				
1880–1913	1.06	1.06	0.75	0.40	1.13	0.29	0.29	0.27	0.30	0.24
1914–29	−0.02	−0.02	−0.12	−0.39	0.16	−0.52	−0.52	−0.71	−0.45	−0.99
1930–50	0.99	0.83	0.75	0.37	1.04	0.76	0.66	0.97	0.69	1.19
1950–79	3.82	3.18	3.03	1.15	4.00	0.78	0.68	1.55	0.17	2.26
1980–2005	2.53	2.11	2.23	0.55	2.61	0.54	0.47	0.90	−0.39	1.19
	H			L						
1880–1913		0.00		0.32						
1914–29		0.00		−0.41						
1930–49		0.60		0.52						
1950–79		0.41		0.58						
1980–2005		0.37		−0.10						

be more representative of the Turkish growth experience. These results are also consistent with the interpretation in other studies that have conducted growth-accounting exercises across broadly similar periods. Nevertheless, the findings that we emphasized in the text, namely, the importance of TFP growth in the agricultural and non-agricultural sectors for the 1930–49 and 1980–2005 periods, respectively, emerges in all three cases considered above.