Reconsidering the Nexus between Knowledge and Economic Growth in An Unstable Economy:

The Case of Turkish Economy

Fatma Muazzez Utku-Ismihan
and Mustafa İsmihan

2024

RECONSIDERING THE NEXUS BETWEEN KNOWLEDGE AND ECONOMIC GROWTH IN AN UNSTABLE ECONOMY: THE CASE OF TURKISH ECONOMY

Fatma M. UTKU-İSMİHAN and Mustafa İSMİHAN

Abstract

This paper, inspired by the Turkish experience, investigates the role of macroeconomic instability and knowledge on total factor productivity over the 1960-2022 period, by using a production function approach. Within our simple model of total factor productivity we link short-run policy outcomes, with a proper measure of the quality of macroeconomic performance, to long-run productivity measures by considering political economy factors such as socio-political and institutional issues. In doing so, we attempt to measure the quality of macroeconomic performance with a composite macroeconomic stability indicator which acted as a moderating variable in our framework. This framework helps us to understand the dynamics behind the substantial volatility in productivity and hence output in Türkiye during the last six decades. The empirical results indicate that while knowledge accumulation in Türkiye is a critical driver of productivity and growth, the economy is also persistently and unfavorably affected by chronic macroeconomic instability fueled by the recurring unsound policies and weak institutions.

Keywords: *Knowledge, Total factor Productivity, Instability, Economic growth, Political economy, Institutions.*

JEL Codes: *E60, O40, O47, O50*

1. Introduction

Until recently one of the widely acknowledged facts in macroeconomics was that actual output fluctuates around a stable and rising level of trend output. However, following the pioneering study of Easterly et al. (1993) several studies on developing countries found that, in reality, output drops were persistent and volatile (see, for example, Hausmann et al., 2005, and Berg et al. 2012). Cerra and Saxena (2008), for example, have shown that output drops tend to be persistent in the aftermath of crises. Moreover, Aguiar and Gopinath (2007) argued that "the cycle is the trend" for emerging market economies and they claimed that the frequent policy regime shifts, such as dramatic changes in fiscal and monetary policies, are responsible for the substantial volatility in output trend in emerging market economies.

In another strand of literature, particularly within the domain of the endogenous growth models, the intensive empirical and theoretical research since the 1980s have indicated that various pillars of knowledge (such as, human capital, innovation, global linkages and information and communication technologies) have played key role in productivity and economic growth performance of countries (see e.g. Lucas, 1988, Romer, 1994 and Romer, 2019). The increasing automation in the production process of goods and services has increased the importance of "knowledge" which has been increasing at an accelerating pace compared to capital and labor. Thus, in this new era the importance of knowledge and building a strong knowledge base for sustainable long-run economic growth performance has become a priority for majority of the countries all over the world. However, this is a very difficult task since it requires not only a solid base for building the necessary foundations for knowledge accumulation (such as human capital, information communication technologies and so on) but also necessitates stable macroeconomic environment, especially in emerging and developing countries.

In the Turkish economy endemic instability, recurrent crises and associated low and volatile productivity and growth rates have been the dominant macroeconomic themes since its transition to the multi-party democracy in 1950. Many economists blamed the weaknesses in democracy and the prevalence of inequalities, particularly in the distribution of wealth and income, for the persistence of macroeconomic instabilities and the associated disappointments in growth and productivity performance in Türkiye over the long-term (see, e.g. Öniş, 1997 and İsmihan, 2009, 2012).

In this paper, inspired by the Turkish experience, we investigate the relationship and the role of macroeconomic instability and knowledge on total factor productivity over the 1960-2022 period, by using a production function approach. By developing an augmented production function model with knowledge accumulation, we also attempt to link short-run policy outcomes to long-run productivity measure by incorporating political economy factors such as socio-political and institutional issues.[1] This framework helps to explain the substantial volatility in productivity and output trend in Türkiye during the period under consideration.

This paper is organized as follows. The following section provides a brief literature review. Section 3 provides information on the common threads in the Turkish economy and the typical instability episodes. Section 4, initially, introduces the model and then provides the empirical results. Finally, Section 5 provides the concluding remarks.

2. A Brief Literature Review

As has been mentioned before, this study investigates the role of macroeconomic instability and knowledge on the total factor productivity and the growth performance of Türkiye over the 1960-2022 period. In our model, as we shall explained in Section 4, in addition to the role of knowledge accumulation, we attempt to incorporate short-run policy outcomes, with a proper measure of the quality of macroeconomic performance, to long-run productivity (Total Factor Productivity) measure by considering political economy factors. Thus, our model has its foundation on two different strands of literature; that is, the economic growth theories (Section 2.1) and political economy (Section 2.2).

2.1. Economic Growth Theories: A Condensed Overview

After the publication of the seminal study by Solow (1956) one of the widely held belief in macroeconomics was that actual output fluctuates around a stable and rising level of trend output which is exogenously determined by technological progress. However, this belief in exogenous technological development was challenged during the 1980s with the emergence of the endogenous growth models, led by Romer (1986) and Lucas (1988). For example,

---

[1] See İsmihan (2012) for several theoretical arguments on relevant political economy factors.

Romer (1990) argued that human capital was the most important factor of production in developed countries because it was the main input in R&D which accelerated the technological progress. Therefore, technological progress is available to countries who could afford to invest in human capital and R&D.[2] Later, other factors such as trade and public spending on infrastructure (e.g. on ICT) have been incorporated into the endogenous growth models.[3]

With the increasing use of advanced technologies during the production process, economists have tried to analyze the impact of knowledge factors (or pillars) on economic growth performances of economies.[4] For example, Chen and Dahlman (2004) identified economic and institutional regime, educated and skilled population, dynamic information infrastructure and efficient innovation system as the four pillars of knowledge that transformed "knowledge" into *an effective engine of growth*. They argue that when these four pillars are strengthened this would increase the level of knowledge used in production and this, in turn, increase economic growth through its impact on total factor productivity (TFP).

2.2. The Impact of Instability on Economic Growth: Reconsidering the Political Economy Factors

Researchers following the seminal study of Easterly et al. (1993) investigated the reasons behind the distinct patterns of growth rates in developing countries and challenged the general view that output fluctuates around a stable and rising level of trend output.[5] The new political economy literature suggests the policy environment as the reason behind the persistent productivity and output drops in emerging market economies or developing countries.[6] More specifically, the main policy-related issues are strategic debt accumulation, inefficient budget deficits and the war of attritions.[7] Moreover, in related literature, it is argued that the persistence of unsound policies –i.e. myopic and populist macroeconomic policies– and associated macroeconomic instability in developing countries are result of deeper socio-political instabilities and institutional weaknesses.

---

[2] See Romer (2019) for a recent review of the endogenous growth models and related empirical evidence.
[3] See, for example, Barro (1990) and Grossman and Helpman (1989).
[4] See for example, Chen and Dahlman (2004) and Poorfaraj et al. (2011) which provide comprehensive review of empirical evidence on the role of knowledge on economic growth at international level.
[5] See, for example, Hausmann et al. (2005) and Berg et al. (2011).
[6] See İsmihan (2012) for a review.
[7] See, for example, Drazen (2000) Persson and Tabellini (2000), İsmihan (2009) and Romer (2019) for a review.

Some studies have shown that the demand for redistributive public spending, such as public wage and social transfer increases, is higher with higher income and wealth inequality.[8] In countries with significant income disparities, governments are more motivated to implement populist policies that include redistributing public expenditure (Dornbusch and Edwards (1990, 1991)). Polarization in politics also influences public spending decisions since weaker governments often prioritize reducing public investment rather than current expenditure.[9] Furthermore, Rodrik (1999) argues that social conflicts and weak political institutions are the main causes of growth collapses.

The presence of electoral uncertainty results in myopic or short-sighted policymakers who prioritize immediate gains above long-term benefits. High levels of political instability and polarization may lead to strategic political behavior and myopic policies, such as excessive debt accumulation, inefficiently high budget deficits, and low public investment (see, Roubini and Sachs (1989b) and Persson and Tabellini (2000)). There is some evidence about the impact of political issues on budget deficits and inflation in developing countries (See İsmihan (2009) for a review).

A related area of research in the new political economics literature examines the persistent nature of high budget deficits that occur as a result of disputes over how the cost of fiscal adjustment should be shared among powerful interest groups or political parties in a coalition. Alesina and Drazen's (1991) "war of attrition" model emphasizes the significance of political fragmentation, which frequently results in higher levels of political instability and polarization, that lead to a delay in fiscal adjustment or stabilization (Veiga (2000) provides empirical evidence).

Considering all this, the prevalance of unsound policies and resultant macroeconomic instability may act like a "moderating" variable which may affect the strength of the relationship between knowledge (as well as physical) capital and growth of output. Macroeconomic instability may effect this relationship through different channels. That is, it could adversely affet the rate of productivity and investment with uncertainty about current

---

[8] For more detail see Alesina and Rodrik (1994) and Benabou (1996).
[9] See, for example, Roubini and Sachs (1989a) for empirical evidence.

and future macroeconomic environment. For example, an increase in inflation and its variability, by leading to a rise in the level of macroeconomic uncertainty and distorting information, would adversely affect economic growth through various mechanisms (Fischer (1993) [See İsmihan (2009) for more details]. Nevertheless, we should note that "distortionary macroeconomic policies are more likely to be symptoms of underlying institutional problems rather than the main causes of economic volatility" (Acemoglu et al. 2003: 49-50).

3. A Typical Instability Episode and the Common Threads in the Turkish experience

The economic history of Türkiye has been shaped by policy makers who opted for the easy way out by implementing myopic and populist policies, over extended periods of time. As underlined in the new political economy literature these unsound policies are frequently emanating from trying to avoid deep socio-political instabilities rather than technical or mistakes of policy makers and the experience of Türkiye seems to be in line with the main predictions of this literature.[10] Consequently, the chronic instability, economic and/or political crises seem to be the endemic feature in the Turkish economy.

The recurring populist policies in Türkiye started in the 1950s with the Menderes era that marks the switch to the multi-party democracy regime. Even though in its essence a multi-party system is a system that is supposedly prevent a single party from controlling the system without a challenge, the ineffective management of the severe distributional conflicts had led the political parties when in power to be more interested in obtaining greater share of the easily accessible state resources. Populist and myopic policies mainly arise from the short-term aim of sustaining political power (via electoral support) and the lack of powerful institutional system to regulate the actions of the leading parties. This has been the weakness of the Turkish democratic system from then on.

Even though the knowledge accumulation in Türkiye is a critical driver of productivity and growth, the economy is also persistently and unfavorably affected by chronic macroeconomic instability fueled by the recurring unsound policies and weak institutions. As is evident in the upward tendency in the enhancement of knowledge in Figure 1, the advancement of knowledge helped to promote economic growth in Türkiye. However, the endemic economic

---

[10] See Öniş (2003) and İsmihan (2009) for a summary of the Turkish experience from the 1950s to early 2000s.

instability (see Figure 2) caused a substantial volatility in productivity and output in Türkiye during the last six decades (see Figure 3).

Especially from 1970s onwards, the recurrent financial and economic crises, mainly arising from these unsound populist policies, have prevented Türkiye from achieving higher potential economic growth rates and thus has become an important setback for the Turkish economy.

Figure 1. The Time Plot of Knowledge Accumulation in Türkiye, 1960-2022

Kn
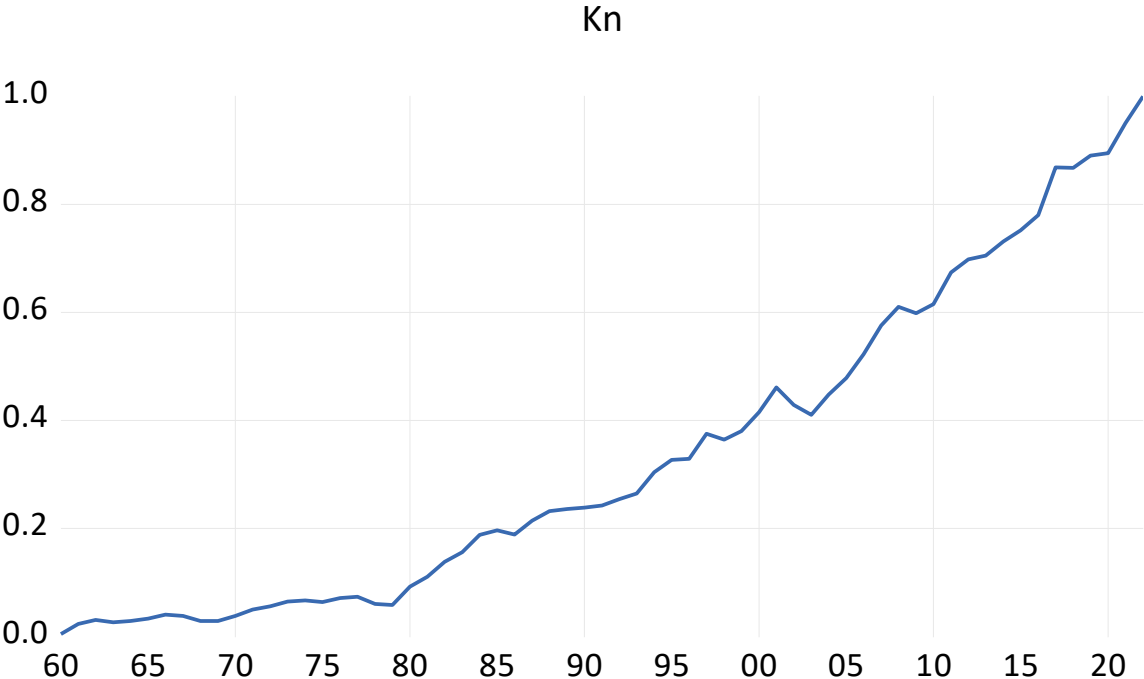
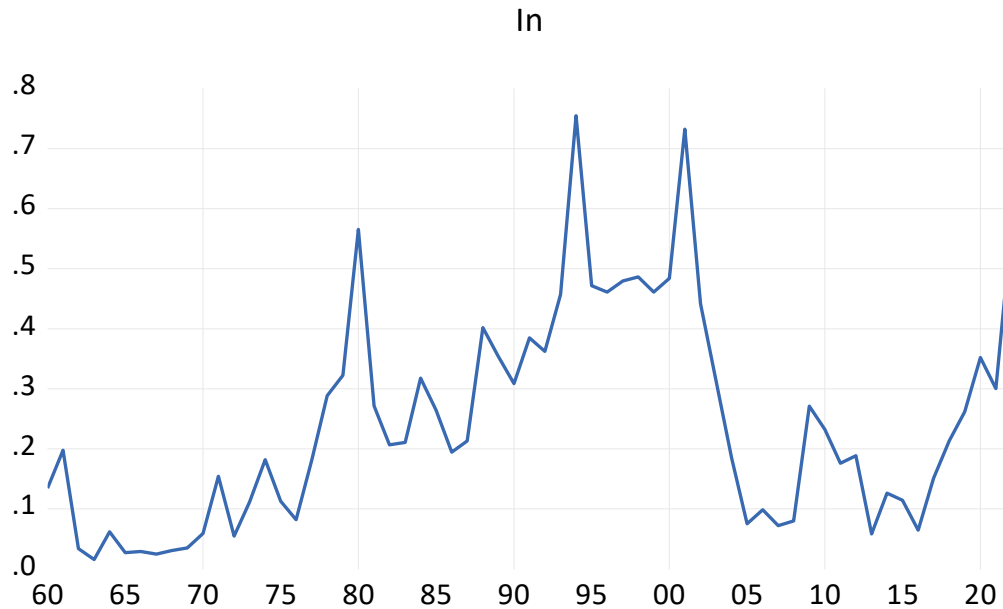Note: See Section 4.1 for the definition and measurement of Knowledge Index (Kn)

The fiscally irresponsible actions under myopic and populist macroeconomic policies have led to political instability, polarization, and chronic fiscal imbalances and high inflation, which, in turn, led to volatile and frequently falling trend rates of productivity and economic growth (See Figure 3).

Following the major crises several stabilization programs were entered into force with the aim of restoring stability in the economy. In general, except for few, these programs were abandoned or delayed after achieving temporary relief in the economy. This, in turn, lead to a highly volatile, low and frequently falling total factor productivity in Türkiye (İsmihan, 2012).
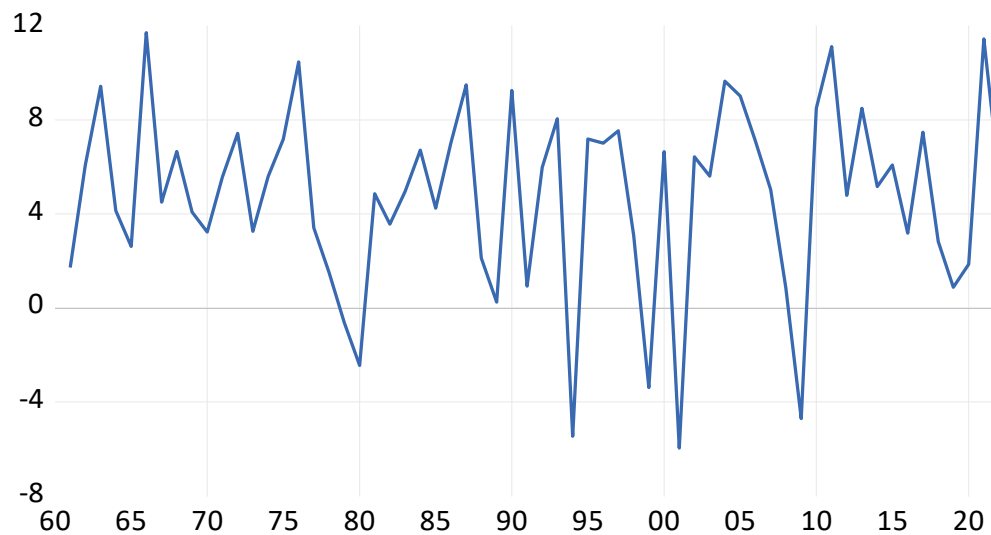
Figure 4 provides the visual presentation of a typical instability episode in Türkiye, caused by political economy factors mentioned in Section 2.2.

Figure 2. The Time Plot of Macroeconomic Instability in Türkiye, 1960-2022
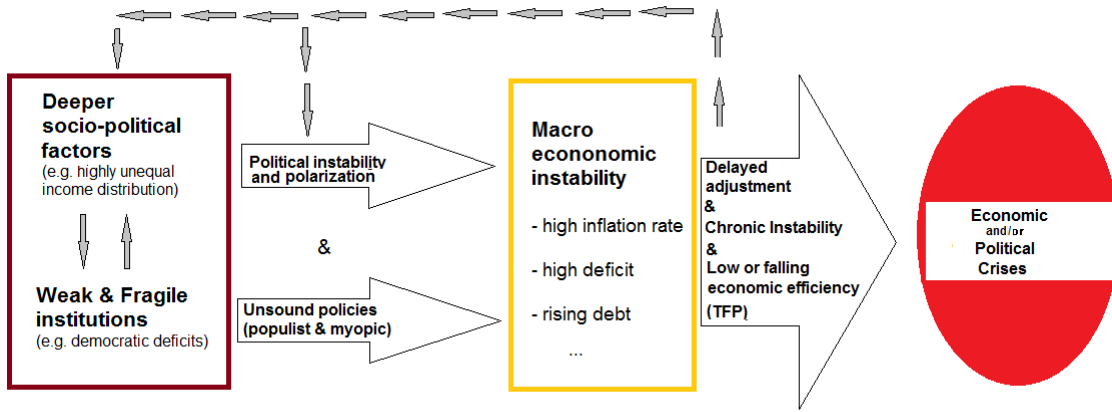

Note: See Section 4.1 for the definition and measurement of macroeconomic instability index (In)

Figure 3. The Time Plot of Growth Rate in Türkiye, 1960-2022

Figure 4. Visual Presentation of a Typical Instability Episode

Source: İsmihan (2012)

However, it is important to note that especially as the post-2001 (esp. 2002-2006) period has demonstrated Turkish economy is as responsive to committed stabilization periods[11] as it is to myopic and populist policies.

4. The Model and Empirical Results

4.1. The Model and the Data

As noted earlier, in this study we attempt to investigate the impact of macro instability and knowledge on total factor productivity and economic growth over the 1960-2022 period in Türkiye, by using a production function approach. Therefore, by following the related literature, we initially consider the following standard Cobb-Douglas production function

$$Y_t = A_t \ K_t^{\alpha} \ L_t^{1-\alpha} \tag{1}$$

where Y is the level of aggregate output, K is the level of the capital stock, L is the level of employment, A is total factor productivity (TFP) and t is time. In line with the literature constant returns to scale is imposed on equation (1).

---

[11] After committed implementation of the 2001 stabilization program -based on fiscal adjustment- growth rates of productivity and output in Türkiye (see Figure 3) quickly rebounded via efficiency gains obtained from the fall in macro instability (see Figure 2).

In our model, we specify the total factor productivity as

$$A_t = \varphi \; Kn_t^{\theta} \; In^{\gamma} \tag{2}$$

where *Kn* represents the level of knowledge and *In* represents the level of macroeconomic instability (both can be measured as a composite variable or index as explained below).

In case of industrial countries incorporating a composite knowledge indicator into equation (2) by itself would be enough to analyze the impact of knowledge on economic growth performances. However, when we are considering countries with recurring and endemic macroeconomic instability, such as Türkiye, we will also need to include another important factor, which is *in*efficiency, that affects *the strength* of the relationship between knowledge (as well as capital) accumulation and economic growth. For instance, as noted earlier, macroeconomic instability may adversely affect the rate of productivity by creating uncertainty about current and future macroeconomic environment. Therefore, it is not an exaggeration to say that the persistent macroeconomic instability continues to be a main contributor to efficiency losses (as a result low TFP) and output in many emerging countries.[12] Considering all this, we have also included the macroeconomic instability index (In) in the formulation of TFP. In doing so, within our simple model of TFP we link short-run policy outcomes, with a measure of the quality of macroeconomic performance (In), to long-run productivity measure (TFP) by considering political economy factors such as socio-political and institutional issues, as noted above. In doing so, we attempted to measure the quality of macroeconomic performance with a composite macroeconomic instability indicator which acted as a moderating variable, which influences the strength of the relationship between economic growth and knowledge and capital accumulation in our framework, as we shall explain below. This framework, in turn, helps us to understand the dynamics behind the substantial volatility in productivity and hence output in Türkiye during the last six decades.

It should be noted here that there are basically two reasons for using indices, e.g. the Knowledge Index (Utku-İsmihan, 2016), for measuring the impact of the variables contained

---

[12] According to leading economists such as Hulten (2001) and Bosworth and Collins (2003), it is important to note that TFP should not be confused with technological development. Instead, TFP "provides a measure of gains [or losses] in economic efficiency … which can be thought of as shifts in the production function. But such shifts reflect myriad determinants, in addition to technological innovation, that influence growth but that the measured increases in measured inputs do not account for. Examples include the implications of sustained political turmoil, external shocks, changes in government policy, institutional changes or measurement errors" (Bosworth and Collins, 2003:115).

in Equation (2). The first and most important one is to prevent the potential problem of multi-collinearity in the empirical analyses since the indicators of knowledge (as well as the indicators of macro instability) are highly correlated. Secondly, construction of an index provides a single and a comprehensive measure –in our case– on the "level" knowledge in the economy, which incorporates multi-dimensional facets as we explained earlier.

The knowledge index (Kn) is composed of four important indicators of knowledge, i.e. human capital, R&D, ICTs and trade (see Utku-İsmihan, 2016 for more detail) and the macroeconomic instability index (In) is based on four macroeconomic instability indicators; namely public deficit to GDP ratio, inflation rate, change in the current account balance to GDP ratio and change in exchange rate.[13]

When we insert equation (2) into equation (1) and take the natural log (ln) after re-arrangement, we obtain

$$\ln\left(\frac{Y}{L}\right)_t = \phi^* + \theta \, lnKn_t \;+\; \gamma \, lnIn_t \;+ \alpha \ln\left(\frac{K}{L}\right)_t \tag{3}$$

where Y/L is the output per labor, K/L is the physical capital per labor and the remaining variables are defined as earlier [$\varphi^* = \ln \varphi$].

Thus, the following empirical (stochastic) log-linear model is used in empirical applications.

$$\ln\left(\frac{Y}{L}\right)_t = \phi^* + \theta \, lnKn_t \;+\; \gamma \, lnIn_t \;+ \alpha \ln\left(\frac{K}{L}\right)_t + \varepsilon_t \tag{4}$$

ε is the disturbance term and all other variables are as defined earlier.

In sum, the two main variables of interest are *LnKn* and *LnIn*. In line with the above-mentioned theoretical arguments, a positive sign for *LnKn* ($\theta>0$) is expected since an increase in the level of knowledge induces growth in TFP. Similarly, considering the detrimental effect of macroeconomic instability (via creating uncertainty) on TFP and economic growth we expect a negative sign for *LnIn* ($\gamma<0$).

---

[13] The macroeconomic instability index (In) has been developed by İsmihan (2009, 2012). This index (and Kn) is calculated by using human development index (HDI) methodology and is based on four macroeconomic instability indicators; namely, public deficit to GDP ratio, inflation rate, change in the current account balance to GDP ratio and change in exchange rate. For more detail see İsmihan (2012).

In the following sub-section, we have used cointegration analysis for investigating the long-run dynamic empirical relationship between knowledge, macroeconomic instability and output per worker. Considering the possibility of the mix of I(0) and I(1) variables, we estimated our model (equation (4)) with ARDL technique.

Finally, it should be noted that the data availability determined the source of data used in the analysis[14] and we updated the series of Y (output or real GDP in constant TL), K (physical capital in constant TL) and L (employment) from İsmihan (2012) by using recent data from TurkStat. Similarly, we updated In and Kn by using the relevant data from WDI and TurkStat.[15]

4.2. The Empirical Results

Before proceeding with estimation of our model with the yearly time series data from 1960 to 2022 it is essential to check for the presence of a unit root. Figure 5 provides the time plots of Lny [**Lny**=ln(Y/L)] and Lnk [**Lnk**=ln(K/L)] (see Figure 1 and 3 for the time plots of Kn and In) and there is some visual evidence of nonstationarity in each series. Nevertheless, the formal results of the ADF tests indicate a mix case: some variables (Lnk and LnIn) contain a unit root [I(1)] and others (Lny and LnKn) are I(0) (see Table 1).

---

[14] That is initially we planned to use PWT data in our analysis but since the latest version of PWT ended in 2019 we used other data sources to have a more comprehensive data set.

[15] Please see İsmihan (2012) and Utku-İsmihan (2016) and the references and procedures cited therein for more detail.

Figure 5. The Time plot of Lny and Lnk, 1960-2022

Lny

Lnk
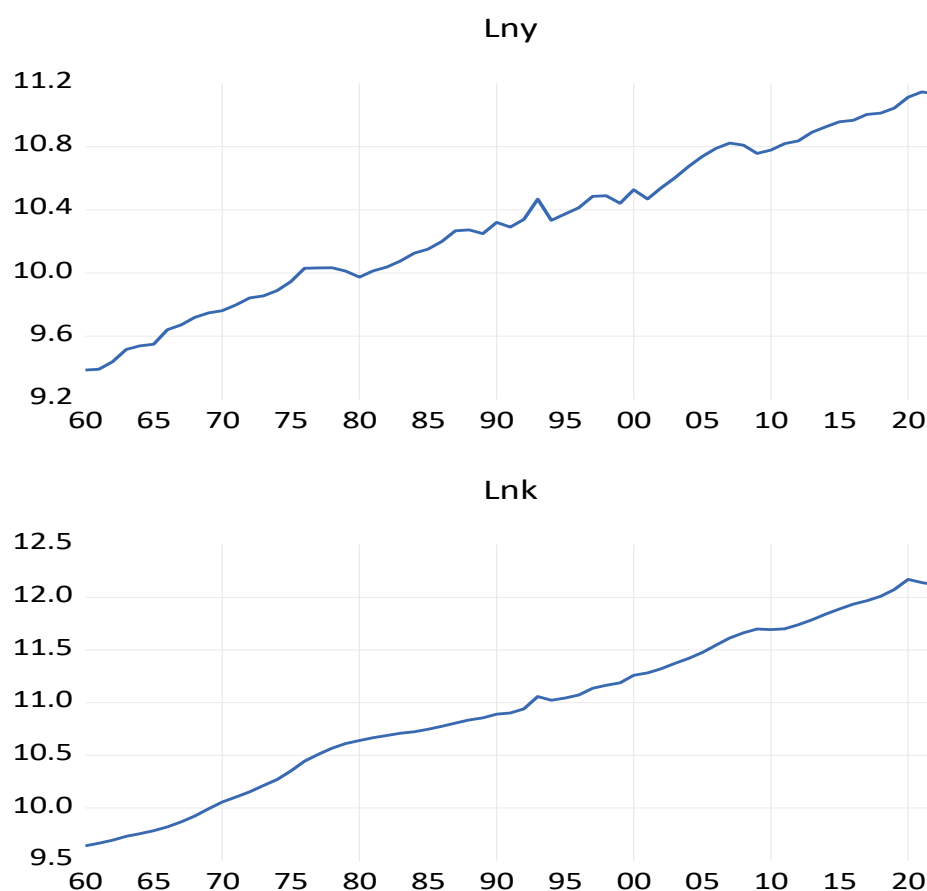
Table 1. ADF Tests

Variables	ADF Tests		First Difference
	Level		First Difference
	Without Trend	With Trend	Without Trend
Lny	-0.880544 (0)[a] [0.7881][b]	-3.809060 (0) [0.0225]	-9.242929 (0) [0.0000]
Lnk	-1.006189 (0) [0.7460]	-1.481732 (0) [0.8254]	-5.819385 (0) [0.0000]
LnKn	-3.509883 (0) [0.0109]	-7.207693 (0) [0.0000]	-13.92258 (0) [0.0000]
LnIn	-2.307071 (0) [0.1730]	--------[c]	-9.209108 (1) [0.0000]

Note: [a] The optimal lag chosen by SBC (Schwarz Bayesian Criterion) are given in parentheses.
           [b] p-values are provided in square brackets.
           [c] Since Ln(In) does not have apparent trend we did not include the trend term in ADF tests.

We used cointegration analysis for investigating the long-run dynamic empirical relationship between knowledge, macroeconomic instability and output per worker. However, considering the possibility of the mix of I(0) and I(1) variables noted above, we estimated our model (equation (4)) with ARDL technique (ARDL Bounds test confirms the existence of

cointegration relation).[16] The following equation provides the long-run estimates for the specified model:

$$Lny_t = 6.239 + 0.391\, Lnk_t - 0.061\, LnIn_t + 0.182\, LnKn_t \qquad (5)$$
$$\quad\quad\quad\quad [0.001] \qquad [0.005] \qquad [0.015]$$

Note: *p*-values are provided in square brackets.

Equation (5) demonstrates that the increase in knowledge has a positive and considerable impact on output per worker in Türkiye during the 1960-2022 period. However, it also indicates that during the same period macroeconomic instability has a negative effect on output per worker. These results are consistent with the theoretical expectations and the observed patterns in the Turkish economy during the analyzed time period. Hence, as mentioned before when formulating TFP we linked short-run policy outcomes (proxied with the macroeconomic instability index) to long-run productivity measure (TFP), and these results in turn help us to explain the substantial volatility in productivity and output trend in Türkiye during this period, by considering the aforementioned political economy factors. Our findings are consistent with the view that unsound or distortionary macroeconomic policies should be considered as "the symptoms of underlying institutional problems" (see Acemoglu et al. 2003).

5. Conclusion and Policy Implications

Inspired by the Turkish experience, in this paper we analyzed the impact of macroeconomic instability and knowledge on total factor productivity and economic growth over the 1960-2022 period. In our analysis we used a production function approach. We have also utilized a knowledge index to assess the influence of different aspects of knowledge on the productivity and overall growth of the economy. Furthermore, since macroeconomic instability may

---

[16] The ARDL Bounds test verifies the existence of a cointegration between the variables of interest at a significance level of 1%. The selected model is ARDL(1, 2, 0) based on the Schwarz Information Criterion (SIC). Additionally, it is important to mention that we incorporated a dummy variable to account for the Covid19 pandemic. The diagnostic tests conducted indicate no significant statistical issues. However, when the dummy variable is removed, some diagnostic tests, such as the White and JB tests, indicate the presence of heteroscedasticity and non-normality issues, respectively. The ARDL Bounds test verified the presence of a cointegration relation when the Covid19 (dummy) variable was excluded, and the parameter estimates closely related to those previously reported. The ARDL Bounds test confirmed the presence of a cointegration relation between the variables of interest for the period from 1960 to 2019. Additionally, the diagnostic tests conducted during the re-estimation of the model for the period 1960-2019 showed no statistical problems.

adversely affect the rate of productivity, by creating efficiency losses via uncertainty about macroeconomic environment, we have also incorporated a macroeconomic instability index into the TFP specification.

Moreover, we used co-integration analysis to examine the long-run dynamic empirical relationship between the variables of interest in Türkiye over the 1960-2022 period. The empirical findings indicate that the higher level of knowledge had a positive impact on the growth rate of Turkish economy over the sample period. Nevertheless, the persistent instability, populist cycles, and resultant crises and regime changes have caused unfavorable effects on economic growth in Türkiye. Thus, it is necessary to establish an economic environment that fosters the advancement of knowledge and consequently promotes economic growth in Türkiye.

The primary empirical finding of our study is that the government can hinge (i.e. through the negative impact of macroeconomic instability) and at the same time support (i.e. through the positive impact of knowledge accumulation) economic growth efforts. Thus, it can be said that our study is a counter example against the widely disputed argument of "government as *the problem*" vs "government as *the solution*" dichotomy in our profession. In other words, the government can be both the source and the remedy of the slow or negative productivity growth and with carefully designed policies and institutions *solution-creating* factors could overcome *the problem-creating* factors in the long-run.

REFERENCES

Acemoglu, A., Johnson, S., Robinson, J. and Thaicharoen, Y. (2003). "Institutional causes, macroeconomic symptoms: volatility, crises and growth", Journal of Monetary Economics, 50(1), 49-123.

Aguiar, M. and Gopinath G. (2007). "Emerging Market Business Cycles: The Cycle is the Trend", Journal of Political Economy, 115(1), pp. 69-102.

Alesina, A. and Drazen, A. (1991). "Why are Stabilizations Delayed?", American Economic Review, 81(5), pp. 1170-1188.

Alesina, A. and Rodrik, D. (1994). "Distributive Politics and Economic Growth", Quarterly Journal of Economics, 109, pp. 465-90.

Barro, R. J. (1990). "Government Spending in a Simple Model of Endogenous Growth", Journal of Political Economy, October, Part II, 98 (5), pp. 103-125.

Benabou, R. (1996). "Inequality and Growth", NBER Macroeconomics Annual 1996, pp. 11-92, NBER, London: MIT Press.

Berg, A., Ostry, J. D. and Zettelmeyer, J. (2012) "What Makes Growth Sustained?" Journal of development Economics, 98(2), pp.149-166.

Bosworth B. and Collins, S. M. (2003) "The Empirics of Growth: An Update", Brookings Papers on Economic Analysis, 2, pp.113-206.

Cerra, V. and Saxena, S. C. (2008). "Growth Dynamics: the Myth of Economic Recovery", American Economic Review, 98(1), pp. 439-57.

Chen, D. H. C. and Dahlman C. J. (2004). "Knowledge and Development: A Cross-Section Approach", World Bank Research Working Paper 3366, August 2004.

Dornbusch, R. and Edwards, S. (1990). "Macroeconomic Populism", Journal of Development Economics, 32, pp. 242-278.

Dornbusch, R. and Edwards, S. (Ed.) (1991). The Macroeconomic Populism in Latin America, Chicago: The University of Chicago.

Drazen, A. (2000). Political Economy in Macroeconomics, N.J.: Princeton University Press.

Easterly, W., Kremer, M., Pritchett, L., Summers, L. H. (1993). "Good Policy or Good Luck? Country Growth Performance and Temporary Shocks." Journal of Monetary Economics, 32, 459–483.

Fischer, S. (1993). "The Role of Macroeconomic Factors in Growth", Journal of Monetary Economics, 32(3), pp. 485-512.

Grossman, G.M. and Helpman, E. (1989). "Product development and International Trade", Journal of Political Economy, 97, pp.1261-1283.

Hausmann, R., Prichett, L., Rodrik, D. (2005). "Growth Accelerations". Journal of Economic Growth, 10, 303–329.

Hulten, R. C. (2001). "Total Factor Productivity: A Short Biography", in Hulten C. R., Dean, E. R., and Harper, M. J., New Developments in Productivity Analysis, University of Chicago Press.

İsmihan, M. (2009). The Role of Politics and Instability in Macroeconomic Performance: Theory and Lessons from the Turkish Experience. VDM Verlag Dr. Muller, Saarbrucken, Germany.

İsmihan, M., (2012). "The Political Economy of Productivity Collapses and Accelerations: The Turkish Experience, 1950-2010", Presented in *International Conference on Economics* organized by Turkish Economic Association [ICE-TEA 2012], 1-3 November 2012, İzmir, Türkiye.

Lucas, R. E. Jr. (1988). "On the Mechanics of Economic Development." Journal of Monetary Economics, 22, 3-42.

Öniş, Z. (1997). "Democracy, Populism and Chronic Inflation in Turkey: The Post Liberalization Experience", Yapi Kredi Economic Review, 8(1), pp. 33-50.

Öniş, Z. (2003). "Domestic Politics versus Global Dynamics: Towards a Political Economy of the 2000 and 2001 Financial Crises in Turkey", Turkish Studies, 4 (2), pp. 1-30.

Persson, T. and Tabellini G. (2000). Political Economics: Explaining Economic Policy, The MIT Press.

Poorfaraj, A., Samimi, A. J. and Keshavarz, H. (2011). "Knowledge and Economic Growth: Evidence from Some Developing Countries", Journal of Education and Vocational Research, 1(1), pp. 21-25.

Rodrik, D. (1999). "Where Did All the Growth Go? External Shocks, Social Conflict, and Growth Collapses", Journal of Economic Growth, 4, pp. 385-412.

Romer, D. (2019). Advanced Macroeconomics, 5th ed., New York: McGraw Hill Publishers.

Romer, P. M. (1994). "The Origins of Endogenous Growth" The Journal of Economic Perspectives, Winter, 8(1), 3-22.

Romer, P. M. (1986). "Increasing Returns and Long-Run Growth." Journal of Political Economy, 94, 1002-1037.

Roubini, N. and Sachs, J. (1989a). "Government Spending and Budget Deficits in the Industrial Countries", Economic Policy, 8, pp. 99-132.

Roubini, N. and Sachs, J. (1989b). "Political and Economic Determinants of Budget Deficits in the Industrial Democracies", European Economic Review, 33, pp. 903-933.

Solow, R. (1956). "A Contribution to the Theory of Economic Growth." Quarterly Journal of Economics, 50, 65-94.

Utku-İsmihan, F. M. (2016). Essays on the impact of Knowledge on Economic Growth, Ph.D. Dissertation, Science and Technology Policy Studies, Middle East Technical University.

Veiga, F. J. (2000). "Delays of Inflation Stabilizations", Economics and Politics, 12(3), pp.275-295.