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Ibrahim Bakirtas
Corresponding author

Aksaray University,
Faculty of Economics and
Administrative Sciences,
Department of Economics,
Aksaray,
Turkey

ibakirtas@aksaray.edu.tr

Ramazan Sari

Technical University of Denmark,
Department of Technology,
Management and Economics,
Kgs. Lyngby,
Denmark

ramsa@dtu.dk

Suleyman Koc

Aksaray University,
Faculty of Economics and
Administrative Sciences,
Department of Economics,
Aksaray,
Turkey

suleymankoc@aksaray.edu.tr

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Coup D'état and Economic Growth in Turkey: Evidence from ARDL Bounds Testing Procedure

Summary: In seven decades of the multiparty democracy period, Turkey has experienced four military coups. Even though the coups are thought to be a cold war phenomenon in the literature, they are still relevant. The failed coup attempt in 2016 reminds us that the military coup is still a critical issue in Turkish democracy and the economy. Interestingly, there is not an adequate amount of empirical research on the political economy of Turkey's military coup experience. This study's motivation is to provide empirical evidence for the economic growth-coup nexus literature with a core focus on Turkey, which is a remarkable case in many aspects. For this purpose, we extend an open-economy Cobb-Douglas production function with coups and use the autoregressive distributed lags (ARDL) method for the period 1950 to 2014. According to the study's empirical findings, coup d'états negatively affect real GDP in Turkey. Through structural reforms, Turkey should strengthen its democratic institutions to prevent such antidemocratic attempts.

Keywords: Coup d'état, Economic growth, Turkish economy, ARDL.

JEL: C22, F50, O40.

Turkish democracy has been faced periodic military interventions almost every 10 years, particularly in the second half of the 20th century. This historical background of Turkey makes it a good case for examining the relationship between economic growth and military coups. As Alper H. Yagci (2018) states, the possible adverse effects of the Turkish military coups on economic growth have not been empirically studied yet. This paper aims to empirically fill this gap by using advanced methodologies and applying a production function framework to Turkey's coup d'états.

Although there is no consensus on the impact of democracy on economic growth (Houssem Rachdi and Hichem Saidi 2015), the most common finding of the empirical research is that the causal relationship goes from democracy to economic growth (as in Jonathan M. Powell and Mwita Chacha 2016; Michael K. Miller, Michael Joseph, and Dorothy Ohl 2018; Daron Acemoglu et al. 2019, among all). Democracy has features, such as freedom, equality, progress, etc., that contribute to establishing channels that positively influence economic growth. Political stability is considered as a major channel (Wafa Ghardallou and Dorsaf Sridi 2020) in a

democratic society. However, coup d'état is a political event that reduces political stability, thus hindering economic growth.

The structure of this paper is organized as follows. First section of this study briefly reviews related literature on democracy, political stability, coup d'état, and economic growth to introduce a conceptual framework for our empirical analysis and also summarizes coup d'état experience of Turkey. The second section provides a brief overview of the relevant literature. The third section presents the data and the basic concept of econometric tools utilized throughout the study. The fourth section explains our model and reports the main empirical findings. In the last section, we discuss the results and present concluding remarks, as well as suggestions for further studies.

1. Background: Democracy, Political Stability, Coup D'état, Economic Growth and Turkey's Coup D'état History

Democracy causes economic growth (Acemoglu et al. 2019). Political stability is a major channel that contribute to economic growth (Ghardallou and Sridi 2020) in a democratic society. Coup d'état is a political event that reduce political stability in general. It is essential to review that for a background for our empirical analysis of the economic consequences of the coup d'états in Turkish democracy. In this section, we briefly review related literature on democracy, political stability, coup d'état, and economic growth to introduce a conceptual framework for our empirical study.

1.1 Democracy and Economic Growth

The effects of democracy on economic growth are generally analyzed through the channels of transition from democracy to economic growth. The typical finding is a J-shaped effect similar to Ian Bremmer (2006) observation. In other words, when a permanent transition toward democracy is achieved in a less democratic society, the initial economic performance is poor; however, economy quickly recovers and surpasses the poor performance in the long-run. After the empirical economic growth literature in the early 1990s (Robert J. Barro 1991), researchers have developed new models through augmenting cross-country growth regressions with various measures of democracy (Elias Papaioannou and Gregorios Siourounis 2008). One major highlight of this literature is that democracy has a few positive economic effects, although not statistically significant (see Adam Przeworski and Fernando Limogni 1993; Ghardallou and Sridi 2020). In their massive review, Steven N. Durlauf, Paul A. Johnson, and Jonathan R. W. Temple (2005) reports the main findings and important limitations of the empirical economic growth framework. Ghardallou and Sridi (2020) review the democracy and economic growth literature and determine four channels through which both are associated. The first one is *property rights.* The democratic order provides stronger protection of property rights, which promotes economic growth. A well-functioning property rights mechanism supports economic development (Douglass C. North 1990; Acemoglu and Simon Johnson 2005) because effective protection of rights is closely related to the quality of political institutions (Philip Keefer 2008). Ghardallou and Sridi (2020) argue that democratic institutions can better protect property rights than others.

The second channel is *political stability*. A more stable government has beneficial effects on economic growth. Uncertainty arises in the absence of political stability, which hinders economic growth performance (Alberto Alesina et al. 1996). Enhanced political stability supports economic growth by stimulating investment (Jose Tavares and Romain Wacziarg 2001).

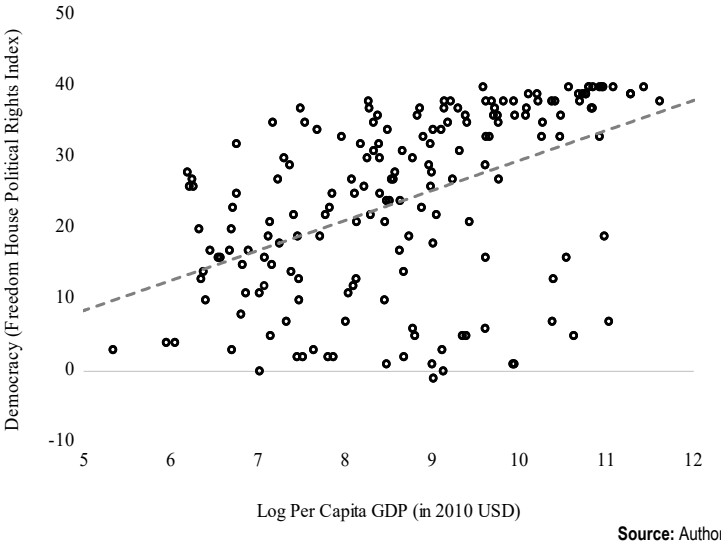
The third channel is *human capital accumulation*. Human capital accumulation is also one of the main determinants of economic growth as stated in Gilles Saint-Paul and Thierry Verdier (1993). Institutional patterns of alternative political regimes appear in different socioeconomic preferences. For example, higher taxes in democracies allow higher health and education expenditures and support human capital accumulation (Acemoglu et al. 2019; Ghardallou and Sridi 2020).

Technological innovations are the fourth channel of the transition from democracy to economic growth. The democratic order provides important leverage for technical and technological progress. These progresses trigger a transmission for positive economic results. Endogenous growth theories pioneered by Paul M. Romer (1990) show that technical progress is an important determinant of economic growth. Ghardallou and Sridi (2020) indicates that democracy supports the adoption of new technologies. Democratic institutions are better at accepting new ideas and projects, as they are in a decentralized structure in which absolute authority is distributed (Raaj Kumar Sah and Joseph E. Stiglitz 1986). Morton H. Halperin, Joseph T. Siegle, and Michael M. Weinstein (2005) argue that democratic organizations are learning bodies that encourage individuals to revise existing knowledge, which make the adoption of new technologies smoother in democratic regimes. Philippe Aghion and Peter Howitt (2009) state that democracy promotes the entry and exit of innovative firms to the market. The promotion of entry and exit means that democracy limits the power of politicians to block innovative firms from entering the market.

The scatter plot of countries between GDP and democracy is presented in Figure 1. There seems to be a positive relationship between democracy and *per capita* GDP in the majority of the countries. The more affluent countries tend to be more democratic than lower ones. We use the freedom house democracy index for 2020 and *per capita* gross domestic product (GDP) for 2019 (fixed 2010 USD) obtained from the latest update of World Development Indicators (WDI) (Political Rights Index Online Dataset 2020[1] and World Bank 2020a[2]). This empirical finding is line with Seymour Martin Lipset (1959), Jakob B. Madsen, Paul A. Raschky, and Ahmed Skali (2015), Klaus Gründler and Tommy Krieger (2016), Mehmet Ozan Saray (2018), Acemoglu et al. (2019) and Marco Colagrossi, Domenico Rossignoli, and Mario A. Maggioni (2020).

[1] **Political Rights Index Online Dataset.** 2020. Freedom House. https://freedomhouse.org/countries/freedom-world/scores (accessed October 01, 2020).

[2] **World Bank.** 2020a. World Development Indicators. https://datacatalog.worldbank.org/dataset/world-development-indicators (accessed October 01, 2020).



Source: Authors' calculations.

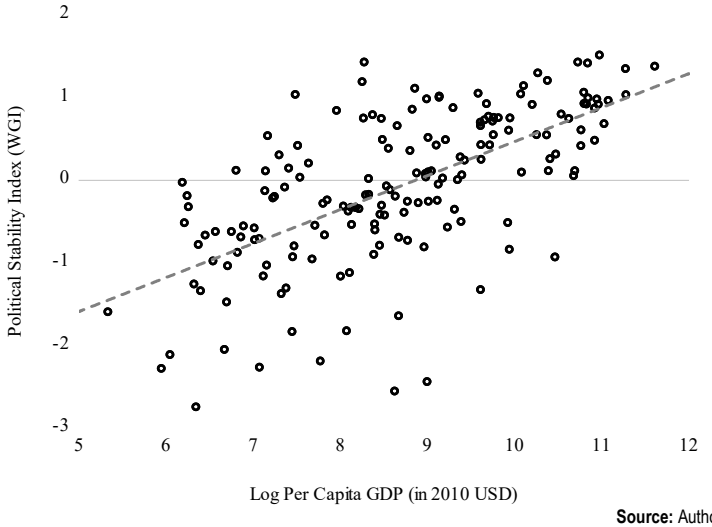
Figure 1 Democracy and per capita GDP in the World

1.2 Political Stability and Economic Growth

As a transmission channel of democracy, we have already stated that political stability supports economic growth. Alesina et al. (1996) provide evidence for remarkable relative economic growth differences in Argentina and Japan in the 20th century. There has a remarkable economic growth performance in Argentina, which was the scene of many coups and political violence, on the one hand, and Japan, which can be seen as a monument of political stability. Obviously, the differences in important issues, such as capital accumulation, technological progress, and human capital accumulation, also played a role in this situation. This remarkable relative economic growth observation has fueled research questions on economic consequences of the political (in)stability.

The definition of political instability is a major issue in the studies in this empirical side of the literature. Alesina et al. (1996) calculated political (in)stability using government change densities. On the other hand, composite measurement techniques, such as Worldwide Governance Indicators (WGI) (World Bank 2020b)[3], transform information, such as conflict, violence, protests, terrorism, into a single political instability index (Daniel Kaufman, Aart Kraay, and Massimo Mastruzzi 2011). Although providing evidence for such variables is difficult, it is beneficial to visualize the overall picture. In Figure 2, the relationships between *per capita* GDP and political instability are illustrated in a scatter diagram. The relationship between variables is negative as expected. We use the latest WGI and WDI data for this figure.

[3] **World Bank.** 2020b. Worldwide Governance Indicators. https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators (accessed October 01, 2020).



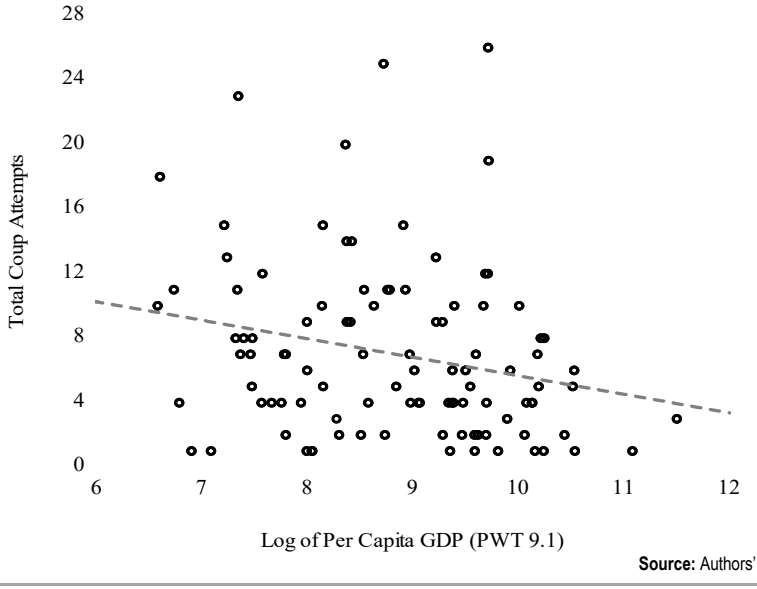
Source: Authors' calculations.

Figure 2 Political Stability and per capita GDP in the World

Democracy, when combined with a politically stable environment, can contribute to economic growth (Nedra Baklouti and Younes Boujelbene 2020). Political in stability shortens the policymakers' decision horizons and pushes them suboptimal economic policies. Moreover, political instability also leads to more frequent changes in economic policies, which creates volatility and negatively affects economic growth (Ari Aisen and Francisco José Veiga 2013; Johannes Blum and Gründler 2020). Finally, an important issue about the economic consequences of political instability is the problem of endogeneity. In other words, violence, coups, and other political events are treated as political instability that may also occur due to poor economic growth.

1.3 Coup D'états and Economic Growth

Coups are defined as illegal attempts by military or other elites to unseat the sitting executive (Powell and Clayton L. Thyne 2011). According to Nikolay Marinov and Hein Goemans (2014), coups are the single most crucial factor for unseating incumbent democratic governments. Martin Gassebner, Jerg Gutmann, and Stefan Voigt (2016), Erik Meyersson (2016), Yabin Wang (2017) and Blum and Gründler (2020) among all, provide evidence for the negative effect of coups on economic growth, particularly in democratic regimes. Coup d'états can also be defined as a political instability measure directly and/or a major source that causes political instability. Figure 3 illustrates the association between total coup attempts and *per capita* GDP worldwide. We used a data set covering 101 countries that experienced at least one coup attempt. The national income series was compiled from PWT 9.1 (Robert C. Feenstra, Robert Inklaar, and Marcel P. Timmer 2015). The negative relationship between the number of coup d'état attempts and *per capita* GDP is quite striking.



Source: Authors' calculations.

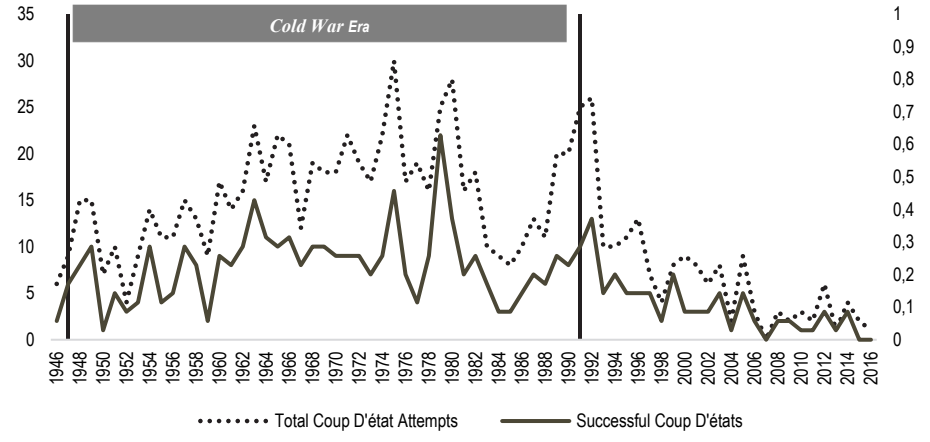
Figure 3 Coup Attempts and per capita GDP in the World

This empirical finding is in line with claims in Scott Ross Baker and Nicholas Bloom (2013), indicating that economic uncertainty hinders economic growth because political shocks (i.e., coups, revolutions) raise overall uncertainty, and high uncertainty destroys productivity, weakening economic growth. Coups deteriorate the channels that democracy supports economic growth like human capital accumulation, physical capital accumulation, and political stability (Meyersson 2016).

1.4 Coup D'états Attempts Worldwide

Figure 4 depicts the course of coup attempts from 1946 to the present and their success rates. When the occurrences of coup attempts are examined, the coups' intensity, especially during the cold war period, is evident. With the end of the cold war period, there was a significant decrease in coup attempts worldwide.

Contrary to this trend in the world, after the end of the cold war, Turkey has experienced two more coup attempts, a remarkable number in this regard. The recent failed coup attempt of July 15, 2016, shows that the coups are still a critical issue for Turkish democracy and the economy. The following section summarizes a brief history and economic developments of military coups in the Turkish democracy.



Source: Authors' calculations.

Figure 4 Developments in the Total Coup Attempts in Worldwide

1.5 A Brief Overview of Turkish Economic Growth and Coup D'état History

Institutions matter for economic growth (North 1990, 1991; Acemoglu and Johnson 2005). Institutions are also channels through which democracy affects economic growth (Tavares and Wacziarg 2001; Acemoglu et al. 2019). Turkey's institutional structure transformed from an empire consisting of various ethnic and religious forms to a nation-state democracy. This transition to democracy was interrupted by the Second World War and a series of military coups. Because of political instability, Turkey has not achieved macroeconomic stability and remarkable institutional improvements for a long time (Sumru Altug, Alpay Filiztekin, and Şevket Pamuk 2008).

Turkey has made the transition under a subcritical level of GDP (see Przeworski et al. 2000) necessary for the sustainability of democracy. However, Yagci (2018) argues that Turkey's coup experience might show a more frequent occurrence without this early transition because of democratic regimes as less exposed to military coups. Turkey has a higher coup incidence rate than world standards and is very close to the Latin American and African average, the world's most coup-prone regions. Turkey is a remarkable case for coup studies with high coup incidence frequency.

By the 2000s, it was a common belief that the coup era for Turkish democracy had ended (Ersel Aydinli 2009). However, E-memorandum in 2007 and the coup attempt on July 15, 2016, remind us that military interventions are still a critical issue in Turkish democracy. Turkey has experienced military coups overthrowing elected governments almost every ten years since 1960. In 1960, 1971, 1980, and 1997, four coups occurred, respectively (Table 1). These coups resulted in a replacement of the elected government. On the other hand, Turkey experienced three failed coup attempts in 1962, 1963, and 2016. Furthermore, Turkey experienced an e-memorandum in 2007, which represents arising concerns about statements released on the website of the General Staff of the Turkish Armed Forces in April 2007. In Table 1, the economic growth performance is calculated for the duration of the incumbent government before the

coup attempt. For some governments, the pre-coup period was very long; thus, we used an annual average growth rate for these cases, i.e., for Adnan Mednederes period between 1951 and 1959. For some others, the period was less than a year for which we used the related annual growth rate. For instance, the 1996 growth rate was used for the period of Necmettin Erbakan, the leader of the Welfare Party, who was the target of the 1997 military intervention that resulted in the government's resignation in its first year.

Table 1 History of Coup D'état in Turkey

Year	Result	Political orientation of the incumbent government	Growth rate	Growth rate (per capita)	Prime minister	President
1960, May 27	*Successful*	*Right-Wing*	*8.66[a]*	*5.59[a]*	*Menderes*	*Bayar*
1962, Febr. 22	Failed	Left-Wing	1.87[b]	−0.99[b]	Inonu	Gursel
1963, May 20	Failed	Left-Wing	6.11[c]	3.40[c]	Inonu	Gursel
1971, Mar. 12	*Successful*	*Right-Wing*	*6.58[d]*	*4.20[d]*	*Demirel*	*Sunay*
1980, Sep. 12	*Successful*	*Right-Wing*	*−0.66[e]*	*−2.86[e]*	*Demirel*	*Caglayangil*
1997, Febr. 28	*Successful*	*Right-Wing*	*11.01[f]*	*9.26[f]*	*Erbakan*	*Demirel*
2007, Apr. 27	Failed	Right-Wing	6.79[g]	5.34[g]	Erdogan	Sezer
2016, July 15	Failed	Right-Wing	7.58[h]	6.06[h]	Yildirim	Erdogan

Notes: a: 1951-1959 average annual growth rate, b: 1961 annual growth rate, c: 1962 annual growth rate, d: 1965-1970 average annual growth rate, e: 1979 annual growth rate, f: 1996 annual growth rate, g: 2002-2006 average annual growth rate, h: 2002-2015 average annual growth rate.

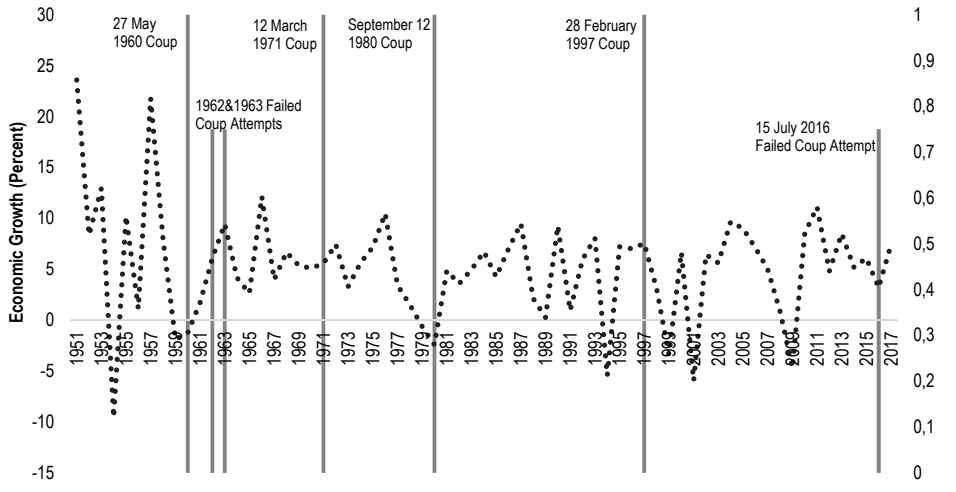
Source: Data obtained from Penn World Tables (Groningen Growth and Development Centre 2020)[4].

We can briefly mention the features of the successful coup attempts in Turkey as follows: (i) The 27th of May 1960 coup was the first coup in the Republic era. The president, prime minister, and some ministers were arrested and tried for treason; (ii) The 12th of March 1971 Memorandum was a military intervention that aimed to restore order against the widespread unrest and triggered an economic recession. The army's recommendations caused a change in government; (iii) The 12th of September 1980 coup was centered around an army intervention that aimed to restore order amidst clashes between left and right-wing groups. During the military intervention, hundreds of thousands of people were arrested; (iv) On the 28th of February 1997, the army offered some "recommendations" to the right-wing "welfare party". The government accepted these recommendations, and the prime minister subsequently resigned.

The periodical occurrences of four successful coup attempts and the relationship with economic growth are briefly illustrated in Figure 5. The left axis of the figure represents the economic growth of Turkey, which is calculated by an annual percentage change in real GDP. The vertical line represents all coups and failed attempts. The 1960 and 1980 coups occurred after the contraction of economic growth. Gradual increases in economic growth rates can be observed after these two military coups, partly due to the base effect. Also, the 1971 coup occurred at the end of a 5-year period that

[4] **Groningen Growth and Development Centre.** 2020. Penn World Tables. https://www.rug.nl/ggdc/productivity/pwt/?lang=en (accessed October 02, 2020).

could have a negative impact on average. Only the 1997 post-modern coup happened in the least problematic economic growth period compared with the others.

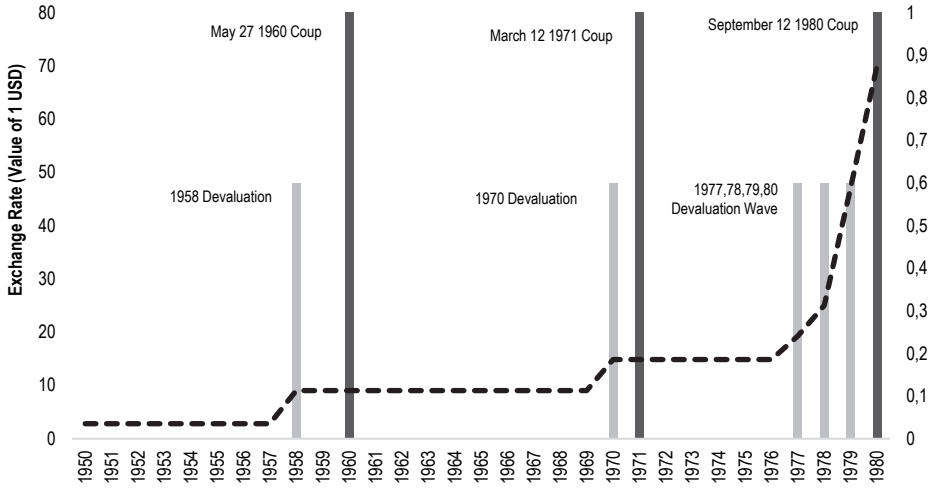


Source: Authors' calculations.

Figure 5 Coup Attempts and Economic Growth in Turkey

This typical pattern can be summarized as follows. Historically, the Turkish economy has used foreign sources due to insufficient domestic savings to finance investments to achieve high economic growth targets. These developments increased financial dependencies on foreign sources. Because of the (un)balance of payments problem caused by the increase in foreign debt and the failure of macroeconomic policy management, some major devaluations had to be made in 1958 and 1970, and, on irregular bases, between 1977 and 1980. During these crises, the policies promised to be implemented in return for loans from institutions, such as the International Monetary Fund (IMF), including prescriptions that civilian governments could not easily use. For instance, freezing wages or limiting public spending were among the prescriptions. The authoritarian regime based on the army was able to implement these policies, which would be difficult for civilian governments to implement. This interpretation is named "local theory" by Yagci (2018). Major devaluations and military coups in the cold war era are illustrated in Figure 6.

The financial dependence approach to the cold-war political economy of the Turkish military coups gives valuable insights. However, this approach must be carefully evaluated due to its limitations. Financial dependence does not require a role for foreign lenders directly in making the military coups. Financial dependence is a consequence of domestic policymakers' choices and high growth targets determined beyond the Turkish economy's structural limits.



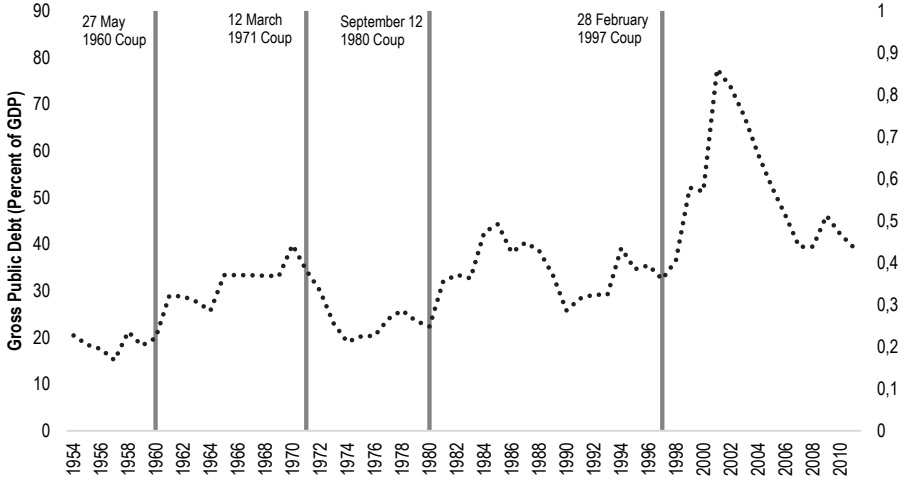
Source: Authors' calculations.

Figure 6 Cold War Era Coups and Major Devaluations in the Fixed Exchange Rates in Turkey

While international organizations such as the IMF help economies in crisis, they are essentially lending institutions. In other words, when lending funds to countries in crisis, it is natural to provide prescriptions to guarantee its repayment. Already successful macroeconomic management is the one that can be carried out without borrowing by means of such stabilization programs while trying to reach the basic macroeconomic targets. Economic evaluations of the military coups in Turkey, especially during the cold war, provide insight but a partial explanation. Political shocks, such as coups, are multidimensional events that should be handled carefully (Yagci 2018).

Providing another basic indicator for evaluating the financial dependency pattern in the political economy of the Turkish coups can be helpful. We plot gross public debt in Figure 7. This illustration also backs the dependency-based *local theory* of Turkish coups. Before all the cold war era coups, public debt had performed an upward trend. We also must note that the public debt series of Turkey has been in an upward trend in the full-time span. However, particularly after the 1971 coup, there is a downward local trend until 1974. One must highlight that the peak of public debt to GDP ratio has achieved short after the 1997 coup, which occurred in a downward trend in the public debt.

The latest bloody putsch on July 15, 2016, triggered the depreciation of the Turkish lira against the dollar by 5% in 1 day. This depreciation is remarkable from the global perspective, similar to Mexico 1994, Argentina 2002, and Turkey 2001. Stable exchange rates are essential to maintain macroeconomic stability (Hippolyte Weneyam Balima 2020).



Source: Authors' calculations.

Figure 7 Coups and Gross Public Debt in Turkey

2. Literature Review

Coups are rare events and have unpredictable nature that can temporarily delay the democratic regime and cause severe societal damage (Augustin Kwasi Fosu 2002). They are severe shocks to the established system with economic, political, and social consequences. Coups involve law enforcement agencies, judiciary members, or organized groups that target the government or its institutions or directly target the head of executive power through undemocratic means or methods. These methods can involve assassination, violence, and physical force. Powell and Thyne (2011) gives an insightful overview of the definition of coup d'état, and Leiv Marsteintredet and Andrés Malamud (2020) clarifies the proliferation of the use of the term "coup" in academia, in the media, and in the practice of politics.

The causal direction of coups and their relationships to economic fluctuations has been a matter of curiosity in the literature (John B. Londregan and Keith T. Poole 1990). Two approaches define causal relationships. The first approach defines a coup as a dependent variable and investigates the determinants of the probability of a coup. The second approach uses coups as an explanatory variable and investigates whether coups affect economic growth.

Table 2 provides a brief overview of the empirical studies on the relationship between economic fluctuations and coups. It contains descriptive information and the main findings of the studies. A group of researchers, such as Thomas H. Johnson, Robert O. Slater, and Pat McGowan (1984), Taeko Hiroi and Sawa Omori (2013), Powell and Chacha (2016) and Miller, Joseph, and Ohl (2018) analyze the effect of economic growth on coup incidence rate. The others explore the impact of coup incidence on economic growth (Londregan and Poole 1990; Barro 1991; Ross Levine and David Renelt 1992; Alesina et al. 1996; Xavier X. Sala-i-Martin 1997; Meyersson 2016).

Table 2 Empirical Literature on the Relationship between Economic Growth and Coups

Researcher(s)	Sample (period)	Method(s)	Finding(s)
Johnson, Slater, and McGowan (1984)	35 African countries (1960-1982)	Ordinary least squares	Deteriorating economic performance increases the tendency of a coup d'état and this relationship is statistically significant.
Londregan and Poole (1990)	121 countries (1950-1982)	Correlation simultaneous equations	There is a negative correlation between income and coups. The likelihood that the government will withdraw from power with a coup is significantly affected by the rate of economic growth.
Barro (1991)	118 countries 1960-1985	Panel data analysis	Political instability (coups and revolutions) negatively affects economic growth.
Levine and Renelt (1992)	119 countries 1960-1989	Extreme bounds analysis	Political instability (coups and revolutions) negatively affects economic growth.
Alesina et al. (1996)	113 countries (1950-1982)	Simultaneous equations	The impact of coups on the economy is negative and statistically significant.
Alexander Galetovic and Ricardo Sanhueza (2000)	89 non-communist and developing countries (1950-1982)	Logit	Coups are more likely in recessions. Increasing per capita GDP has an ambiguous effect on the probability of a coup.
Paresh Kumar Narayan and Russell Smyth (2005)	Fiji (1962-2000)	ARDL	The impact of the coups on the economy is negative and statistically significant.
Narayan and Biman Chand Prasad (2007)	Fiji (2000)	Computable general equilibrium	In the long term, the impact of the coups on economic growth is essential.
Powell (2012)	143 countries (1961-2000)	Heckman selection probit	No relationship was found between the economic fluctuations and the coups.
Arif Özsağır (2013)	Turkey (1923-2012)	Ordinary least squares	The impact of the coups on the economy is negative and statistically significant.
Hiroi and Omori (2013)	152 countries (1962-2007)	History event analysis	Economic development reduces the coup risk. The result is statistically significant.
Hiroi and Omori (2015)	190 countries (1946-2009)	Cox regression	As the per capita GDP increases, the likelihood of a coup attempt decreases. The relationship is statistically significant.
Bahar Berberoğlu (2016)	Turkey (1950-1984)	Hybrid spline regression	The coups affect the economy, but this effect is not significant.
Nam Kyu Kim (2016)	148 countries (1960-2005)	Two-stage least squares	The effect of economic expansion on coup risk is negative and statistically significant.
Meyersson (2016)	182 countries (1955-2001)	Panel data analysis	Coups have substantial negative effects across several standard growth-related outcomes, including health, education, and investment.
Gassebner, Gutmann, and Voigt (2016)	164 countries (1952-2011)	Extreme bounds analysis	Coup risk is higher in economies with low per capita income.
Powell and Chacha (2016)	152 countries (1952-2007)	Logistic regression	As the per capita RGDP increases, the probability of a coup decreases.
Cristina Bodea, Ibrahim Elbadawi, and Christian Houle (2017)	149 countries (1950-2007)	Multinomial logit	The possibility of the government leaving power with a coup is significantly affected by the economic growth rate.
Wang (2017)	35 countries (1970-2013)	Dynamic panel distributed lag model	Coups have negative effects on output.
Miller, Joseph, and Ohl (2018)	174 countries (1950-2010)	Logistic regression	The empirical study validates that more mass-driven political events robustly spread cross-nationally.
Blum and Gründler (2020)	180 countries (1950-2017)	Panel DID dynamic panel data analysis	Political instability deteriorates economic growth. Periods of instability reduce growth by 2-3 percentage points, increase unemployment, and impair health and life satisfaction

Source: Authors' calculations.

The former group of researchers identifies the causes of coups as; complaints of the official institution's employees, complaints of the army, the popularity of the

army, national political crises, contagion effect of other coups in the different areas, external threats, the nation's national security doctrine, the size of the army, the colonial past of the civil society, and coups in the past (Aaron Belkin and Evan Schofer 2003). Besides these factors, economic growth and development are also counted as causal factors for coups.

Barro (1991) takes coups and revolutions to measure *political instability*. Levine and Renelt (1992) provide a sensitivity analysis for Barro's cross-country growth regressions. Similarly, they bring both revolutions and coups into the analysis and confirm the negative effects of coups on economic growth. Alesina et al. (1996) state that although coups reduce economic growth, low economic growth rates increase the risk of coup d'état as an indicator of political instability. Sala-i-Martin (1997) validates Barro (1991) and Levine and Renelt (1992)'s findings of the negative effect of revolutions and coups on economic growth with *two million regressions* in the context of extreme bounds analysis.

Some researchers report mixed findings for the effect of coups. In a similar framework, unlike Alesina et al. (1996), Londregan and Poole (1990) find no evidence of coups on economic growth. On the other hand, Gabriel Leon (2014) empirically denotes that successful coups increase military spending by more than failed coup attempts, and lower military spending increases coup attempt risk. He concludes that the army may plot coups to prompt its funding. Vincenzo Bove and Roberto Nistico (2014) reached similar results in their synthetic control approach. Meyersson (2016) demonstrates that the effect of coups on economic growth could vary depending on the country's democracy level. He stated that while coups reduce economic growth in democracies, they may induce economic growth in autocracies.

A close examination of Table 2 provides the following findings: (i) In the current literature, the researchers who report the negative effect of coups on economic growth are more than the others; (ii) Most researchers preferred to work on a group of countries, usually through panel data sets. Country-specific studies with quantitative techniques and large time series are scarce; (iii) There are relatively few studies that analyze the impact of coups on the economic growth in Turkey; (iv) There is little attempt to distinguish the long-term and short-term effects of coups on economic growth; (v) Based on the literature survey, there is not a sufficient number of studies using the production function form to explore the coups and economic growth nexus.

3. Data and Methodology

This study analyzes the effect of four military coups, which took place in 1960, 1971, 1980, and 1997 in Turkey, on the economic growth of the Turkish economy. We estimate an open economy Cobb-Douglas production function by using the ARDL Bounds Testing approach developed in M. Hashem Pesaran and Bahran Pesaran (1997) and Pesaran, Yongcheol Shin, and Richard J. Smith (2001). This method can be applied to time-series data, whether they are I(0) or I(1), or mutually cointegrated. The ARDL method allows us to estimate both long-term and short-term effects. Models with nonstationary data may cause spurious regression problems (Clive W. J. Granger and Paul Newbold 1974).

It has been noted by Charles Nelson and Charles Plosser (1982) that most of the macroeconomic time series data are I(1). This makes empirical macroeconomic

research open to criticism because of spurious and potentially artificial results. The primary solution to this problem in applied econometrics is a cointegration analysis. Robert F. Engle and Granger (1987) provide groundbreaking work in this field. Their approach requires all variables to be integrated of order one. This method consists of a process with two steps. In the first step a co-integration test is applied. If the residuals of a regression - which is estimated with level values of nonstationary variables - are stationary, then it means that two nonstationary variables have a linear stable relationship. According to the Engle-Granger Representation Theorem, if variables have a cointegration relationship, then there is an error correction representation. The second step involves estimating the error correction model, which shows both short-run and long-run dynamics. The Engle-Granger two-step approach is best for two-variable cases; however, it becomes inefficient in multivariate systems and/or analyses. For multivariate cases, there is a more efficient alternative approach which is developed by Søren Johansen (1988, 1991) and Johansen and Katarina Juselius (1990). This approach also requires all the variables to be I(1).

The ARDL Bounds Testing approach to co-integration does not strictly adhere to the requirement that all variables must be I(1). Furthermore, In ARDL bounds testing approach, none of the series taken into the analysis can be I(2). In the empirical design of this study, we planned human capital as an explanatory variable, but we could not include it in the analysis as the results of the unit root tests indicated that this series was I(2). In addition, it works more efficiently at detecting co-integration relationships in relatively small samples (Subrata Ghatak and Jalal U. Siddiki 2001).

We use annual time series data obtained from Penn-World Tables version 9 (Feenstra, Inklaar, and Timmer 2015). This data set covers the 1950 to 2014 period. In the analyses, Coups are represented by dummies variables.

4. Analyses and Empirical Findings

The ARDL approach consists of three steps (Pesaran, Shin, and Smith 2001). The first step is to test the cointegration among the variables by employing a bounds testing method. This procedure can identify the long-run relationship with a *dependent* variable followed by its forcing variables. We construct the following regressions for the bounds testing procedure. Equation (1) is a coup expanded open economy Cobb-Douglas production function. Other equations are constructed without any prior information.

$$\Delta Y_t = a_{0y} + \sum_{i=1}^{n} b_{iy}\,\Delta Y_{t-i} + \sum_{i=0}^{n} c_{iy}\,\Delta K_{t-i} + \sum_{i=0}^{n} d_{iy}\,\Delta L_{t-i} + \sum_{i=0}^{n} e_{iy}\,\Delta OP_{t-i} + \lambda_{1y}Y_{t-1} + \lambda_{2y}K_{t-1} + \lambda_{3y}L_{t-1} + \lambda_{4y}OP_{t-1} + a_{1y}T + a_{2y}CP + \varepsilon_{1t}; \quad (1)$$

$$\Delta K_t = a_{0k} + \sum_{i=1}^{n} b_{ik}\,\Delta Y_{t-i} + \sum_{i=0}^{n} c_{ik}\,\Delta K_{t-i} + \sum_{i=0}^{n} d_{ik}\,\Delta L_{t-i} + \sum_{i=0}^{n} e_{ik}\,\Delta OP_{t-i} + \lambda_{1k}Y_{t-1} + \lambda_{2k}K_{t-1} + \lambda_{3k}L_{t-1} + \lambda_{4k}OP_{t-1} + a_{1k}T + a_{2k}CP + \varepsilon_{2t}; \quad (2)$$

$$\Delta L_t = a_{0l} + \sum_{i=1}^{n} b_{il}\,\Delta Y_{t-i} + \sum_{i=0}^{n} c_{il}\,\Delta K_{t-i} + \sum_{i=0}^{n} d_{il}\,\Delta L_{t-i} + \sum_{i=0}^{n} e_{il}\,\Delta OP_{t-i} + \lambda_{1l}Y_{t-1} + \lambda_{2l}K_{t-1} + \lambda_{3l}L_{t-1} + \lambda_{4l}OP_{t-1} + a_{1l}T + a_{2l}CP + \varepsilon_{3t}; \quad (3)$$

$$\Delta OP_t = a_{0op} + \sum_{i=1}^{n} b_{iop}\,\Delta Y_{t-i} + \sum_{i=0}^{n} c_{iop}\,\Delta K_{t-i} + \sum_{i=0}^{n} d_{iop}\,\Delta L_{t-i} + \sum_{i=0}^{n} e_{iop}\,\Delta OP_{t-i} + \lambda_{1op}Y_{t-1} + \lambda_{2op}K_{t-1} + \lambda_{3op}L_{t-1} + \lambda_{4op}OP_{t-1} + a_{1op}T + a_{2op}CP + \varepsilon_{4t}. \quad (4)$$

In Equations (1-4) Y is GDP, *K* is capital stock, *L* is labor, *OP* is trade openness, *CP* is coup period dummy variables. We expand the Cobb-Douglass production function with the trade openness because we require additional information on the structural transformation of Turkey's economy for the model. Trade openness is simply calculated by dividing the sum of exports and imports by GDP. Obviously, there is a considerable difference between Turkey of the 1960s and Turkey of the 1990s, which cannot be explained only by trade openness. To consider additional information about structural transformation into the model, we expand Cobb-Douglas production function with trade openness. The parameters *b*, *c*, *d*, and *e* are the short-run coefficients and λ's are the long-run coefficients of the ARDL models. The null hypothesis of "no cointegration" in Equations (1-4) is $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$. The null hypotheses are tested by computing the general F-statistics and comparing them with critical values in Pesaran, Shin, and Smith (2001) and Narayan (2005).

Previous empirical studies suggest that the recessions increase the likelihood of coups, and, given this finding, a more comprehensive framework would be provided. However, this study primarily focuses on how successful coups in Turkey affect long-run real GDP based on a Cobb-Douglas production function within the cointegration framework. Therefore, we do not build an empirical framework that considers the joint determination of coup incidence and GDP together. Also different from the production function for further research, it can be helpful to take into account income inequality and political instability. Furthermore, Alesina et al. (1996) recommend studying Turkey's 1980 coup in the framework of political instability. Although its contagious effect is controversial, global coup trends and frequency may affect a specific country's coup experiences.

Before we start applying the ARDL methodology, its essential to determine the integration order of the series because it is not important whether the series are I(1) or I(0); however, they should not be I(2) or higher. For the linear unit root testing, we used augmented Dickey-Fuller (David A. Dickey and Wayne A. Fuller 1979, 1981), Dickey-Fuller GLS de-trended (Graham Elliot, Thomas J. Rothenberg, and James H. Stock 1996), Phillips-Perron (Peter C. B. Phillips and Pierre Perron 1988), KPSS (Denis Kwiatowski et al. 1992), Elliot-Rothenberg-Stock Point-Optimal (Elliot, Rothenberg, and Stock 1996) and Ng and Perron's NP-Zα (Serena Ng and Perron 2001) (for detailed information about these tests see Gangadharrao Soundalyarao Maddala and In-Moo Kim 1998; Ng and Perron 2001; In Choi 2015). Results of the unit root tests are presented in Table 3.

The results indicate a mixed order of integration for the series. According to the conventional linear unit root test results, almost all series are I(1); however, KPSS, ERS-PO, and NP-Z_α indicate that capital stock is I(0). The mixed order of integration result suggests that the more proper method is an ARDL Bounds testing approach (Pesaran, Shin, and Smith 2001), thanks to its flexibility for a mixed order of integration in a multivariate cointegration analysis.

Table 3 Results of Unit Root Tests for the Production Function Data

		Levels									
		ADF		DF-GLS		PP	KPSS	ERS-PO		NP-Z_α	
		Statistics	Lag	Statistics	Lag	Statistics	Statistics	Statistics	Lag	Statistics	Lag
Y	Intercept	-1.513978	0	2.931161	0	−1.714878	1.033714	702.4058	0	1.83602	0
K		1.033161	2	1.633809	1	1.025288	1.019764	278.5393	2	2.11604	1
L		2.019354	0	4.077321	0	1.906263	1.034304	419.5488	0	2.70738	0
OP		0.022620	0	-0.018769	0	−0.006760	0.857017	26.32025	0	−0.01744	0
Y	Trend and intercept	-3.361676[c]	0	−1.864225	0	−3.383130[c]	0.218752	26.33300	0	−5.17809	0
K		-2.727711	6	−2.736257	6	−1.532537	0.080902[a]	0.593843[a]	6	−8218824[a]	6
L		-1.657603	0	−1.063062	0	−1.902748	0.118390[a]	30.72429	0	−2.91148	0
OP		-2.819817	0	−1.435704	0	−2.904929	0.229622	42.84287	0	-2.98617	0
		First differences									
		ADF		DF-GLS		PP	KPSS	ERS-PO		NP-Z_α	
		Statistics	Lag	Statistics	Lag	Statistics	Statistics	Statistics	Lag	Statistics	Lag
Y	Intercept	−8.312232[a]	0	−1.978072[b]	1	−8.705388[a]	0.260908[a]	4.233683	0	−7.29655[c]	1
K		−4.799409[a]	1	−4.289686[a]	0	−4.260711[a]	0.193019[a]	0.803494[a]	1	−22.7809[a]	0
L		−6.819746[a]	0	−6.606896[a]	0	−6.864526[a]	0.364136[a]	0.892828[a]	0	−30.5459[a]	0
OP		−7.531472[a]	0	−6.617480[a]	0	−7.527751[a]	0.356685[a]	0.973740[a]	0	−30.5179[a]	0
Y	Trend and intercept	−8.267030[a]	0	-5.847289[a]	0	−8.695838[a]	0.129034[a]	5.581973[b]	0	−28.2596[a]	0
K		−4.991935[a]	1	-5.057249[a]	1	−4.380530[a]	0.094625[a]	2.191547[a]	1	−42.1631[a]	1
L		−7.270966[a]	0	-7.390020[a]	0	−7.271642[a]	0.081817[a]	2.815824[a]	0	−31.3737[a]	0
OP		−7.730993[a]	0	-7.747485[a]	0	−7.737517[a]	0.113447[a]	3.014650[a]	0	−31.4690[a]	0

Notes: Superscripts a, b and c represent significance at %1, %5, and %10 respectively. ADF, DF-GLS, PP, KPSS, ERS-PO, NP-Zα refer to Augmented Dickey-Fuller, Dickey-Fuller GLS de-trended, Phillips-Perron, Kwiatkowski-Phillips-Schmidt-Shin, Elliot-Rothenberg-Stock point-optimal, Ng-Perron Zα respectively. Lag lengths are determined by Schwarz Information Criterion (SIC). Y, K, L, OP refer to GDP, capital stock, labor, and trade openness, respectively.

Source: Authors' calculations.

Calculated F-statistics of the ARDL Bounds testing approach are reported in Table 4. According to the results, we found cointegration relationships in Equation (1) and (4). In Equations (1) and (4) the F-statistics value is greater than the upper bound critical values from tables of Pesaran, Shin, and Smith (2001) and Narayan (2005) at 5% and 10% levels of significances, respectively.

Table 4 Bounds-Testing Procedure Results

Cointegration hypotheses	***F-statistics***
(1) $F(Y_t \mid K_t, L_t, OP_t, CP_t)$	5.29**
(2) $F(K_t \mid Y_t, L_t, OP_t, CP_t)$	1.41
(3) $F(L_t \mid Y_t, K_t, OP_t, CP_t)$	2.63
(4) $F(OP_t \mid Y_t, K_t, L_t, CP_t)$	4.34*

Notes: * represents significance at 10%, ** at 5% and *** at 1%. The critical values from Pesaran, Shin, and Smith (2001) are 3.03-4.06, 3.47-4.57, 4.40-5.72 for 10%, 5% and 1% significance level, respectively. Similarly, from Narayan (2005) we have critical values 3.196-4.262, 3.732-4.920, 4.974-6.378 for 10%, 5% and 1% significance level respectively. Results and table critical values represents "Case V: unrestricted intercept and unrestricted trend".

Source: Authors' calculations.

The second step in the ARDL procedure is to estimate the long-run coefficients of the models identified in the first step. For this purpose, the following ARDL (h, z, r, q) (Equations (5)-(6)) models are estimated. The lag lengths of the models are determined by Schwartz Information Criteria (SIC). We use SIC for our limited number of observations following the Pesaran and Pesaran (1997) recommendation.

$$Y_t = a_{0y} + \sum_{i=1}^{h} \alpha_i Y_{t-i} + \sum_{i=0}^{z} \beta_i K_{t-i} + \sum_{i=0}^{r} \gamma_i L_{t-i} + \sum_{i=0}^{q} e_i OP_{t-i} + a_{1y}T + a_{2y}CP + \varepsilon_{yt}\ ; \quad (5)$$

$$OP_t = a_{0y} + \sum_{i=1}^{h} \alpha_i Y_{t-i} + \sum_{i=0}^{z} \beta_i K_{t-i} + \sum_{i=0}^{r} \gamma_i L_{t-i} + \sum_{i=0}^{q} e_i OP_{t-i} + a_{1op}T + a_{2op}CP + \varepsilon_{opt}. \quad (6)$$

The long-run estimation results of the coup expanded open economy Cobb-Douglas production function, Equation (1), can be seen in Table 5, Panel A. Coefficient of the coup periods dummy (CP) is negative (−0.06) and statistically significant. This evidence implies that military coup periods in Turkey affected the Real GDP negatively in the long-run. Table 4. Panel B presents short-run coefficients of the selected ARDL model. The coefficient of the error correction term ECT(-1), which indicates the short-term speed of adjustment to the long-term equilibrium point, is negative and statistically significant. We can use this coefficient as a kind of confirmation tool for cointegration relationships among the model's variables.

Table 5 Estimated Autoregressive Distributed Lag Models, Long-Run Coefficients, and Short-Run Error Correction Model (Y, K, L, OP, CP), ARDL(1,1,0,1,0)

Regressor	Coefficient	Standard error	T-ratio [Prob]
Panel A. Estimated long-run coefficients			
K	0.321708	0.092789	3.467101 [0.0010]
L	-0.185296	0.413136	-0.448510 [0.6555]
OP	-0.154111	0.041808	-3.686141 [0.0005]
CP	-0.063119	0.034849	-1.811225 [0.0756]
Panel B. Error correction representation for the selected ARDL			
ΔK	0.357766	0.083994	4.259411 [0.0001]
ΔL	0.011236	0.038314	0.293256 [0.7704]
Intercept	4.080222	0.714305	5.712155 [0.0000]
Trend	0.017183	0.003194	5.380369 [0.0000]
ECT(-1)	-0.493978	0.087669	-5.634576 [0.0000]

Diagnostic test results	Test stat. [Prob]
Normality (JB)	2.879938 [0.24]
Serial corr. LM	0.199858 [0.90]
Heteroskedasticity (White)	6.270894 [0.62]
Ramsey RESET	1.630294 [0.21]

Source: Authors' calculations.

Long-run estimation results of Equation (4) are summarized in Table 6. A one-unit change in coup dummies corresponds to an expected decrease in real GDP of approximately 6 percent. In, Panel A, we see that the effects of military coups on trade openness in Turkey seem to be positive, but this coefficient is statistically insignificant.

Short-run estimation results of Equation (4) can be seen in Table 5. As seen in Panel B., the ECT is negative and statistically significant, signifying the validity of a long-term relationship amongst the variables. This result also implies that an error correction mechanism works against the shocks in the short-term.

Table 6 Estimated Autoregressive Distributed Lag Models, Long-Run Coefficients, and Short-Run Error Correction Model (OP, Y, K, L, CP), ARDL(1,1,0,0,0)

Regressor	Coefficient	Standard error	T-ratio [Prob]
Panel A. Estimated long-run coefficients			
Y	-2.670166	0.715583	-3.731457 [0.0004]
K	0.133989	0.504781	0.265439 [0.7916]
L	1.488467	1.762287	0.844622 [0.4019]
CP	0.255440	0.186836	1.367191 [0.1770]
Panel B. Error correction representation for the selected ARDL			
ΔY	0.157455	0.274041	0.574568 [0.5679]
Intercept	7.894343	1.541081	5.122602 [0.0000]
Trend	0.039235	0.007323	5.357926 [0.0000]
ECT(-1)	-0.299106	0.058017	-5.155512 [0.0000]

Diagnostic test results	Test stat. [Prob]
Normality (JB)	1.910678 [0.38]
Serial corr. LM	2.855533 [0.24]
Heteroskedasticity (White)	11.67465 [0.11]
Ramsey RESET	0.001952 [0.96]

Source: Authors' calculations.

The main empirical evidence generated in this study shows the negative impact of coup period dummies in Equation (1). This result is consistent with the existing narrow empirical time series literature on Turkey's coup experience (Özsağır 2013; Berberoğlu 2016).

According to political economy literature, economic recessions trigger coups (Kim 2016). However, this study is not seeking to validate this view. This study mainly aims to answer the question: *how much do coups affect the economy*? Turkey is an appropriate case to answer this question in an empirical setting. The results indicate that coups have a significant negative effect on real GDP. We estimate this effect in both the long-term and in the short-term. They are both significant. This means that in the short-term, a coups direct effects causes a slowdown in economic growth, in the long-term, indirect costs harm the foundations of the economy through, for instance, negative structural reform. Nevertheless, not all the economic fluctuations in Turkey have been triggered by coups. However, we can assert that coups are the one of the main factors that has a role in the long-run instability of the Turkish economy.

5. Conclusion

Coups can cause several economic problems, such as financial instability, especially in democratic countries. The effect of failed coup attempts on the economic growth of a country is limited and temporary. After short-term volatility, the economy returns to

its previous trend. However, the effect of successful coup attempts on economic growth is large and powerful. Turkey has experienced military coups overthrowing elected governments almost every ten years since the 1960s. If the average growth rate of the Turkish economy between 1950 and 2017 were equal to the average growth rate of the first period of the single-party governments, the realized value of real GDP *per capita* in 2017 would be 3.75 times greater.

In this study, the coup-GDP nexus has been analyzed by a coup extended production function by employing ARDL methodology. According to the results, 1960, 1971, 1980, and 1997 coups have a statistically significant negative effect on the real GDP in Turkey. These findings are consistent with the current literature.

This research is carried out under some significant constraints. These constraints should be taken into account when evaluating the result. First, modeling of coups by dummy variables is complex due to their infrequent nature. This constraint poses an obstacle to achieving general results that are accurate or valid. Second, coups may coincide with periods of recession in economies. This makes it difficult to separate the impacts of the coups from a downturn, making the research results and the overall validity of the results controversial. These two constraints provide researchers with clues about modeling the coup-income nexus with large data (e.g., panel) sets. When choosing new generation dynamic heterogeneous panel data analysis techniques (pooled mean group, common correlated effects, etc.), researchers should consider the heterogeneity of countries. Depending on the second limitation, future research may contribute to the literature by determining alternative control variables that take deviations into account. Moreover, depending on regional data availability, future research directions can include whether a military rule arising from a coup impacts taxes. How do coup-originated autocratic regimes affect the regional distribution of GDP? Is there any relationship between the type of regime and regional GDP? Finally, for future research, it can be recommended to investigate whether coups have an external dimension in democratic countries, like the Republic of Turkey, in which foreign policy dimensions need to be analyzed.

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