TEDUTRC
TRADE RESEARCH CENTER

International Conference of TRC Emerging Markets: Recent Challenge

E-Proceedings: Voluntary Contributions

June 13&14, 2019
TED University, Ankara, Turkey

TÜRKİYE CUMHURİYET MERKEZ BANKASI

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Cross-Country Growth and Income Differences in Autocratic Regimes*

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Abstract

Studies investigating the effects of political regimes on economic outcomes generally consider autocracies as homogenous regimes. Given the internal heterogeneity in political institutions and economies of autocracies, the dichotomous classification of political regimes as democracy and autocracy yields inconclusive results. This paper asks whether autocratic regime types explain economic growth and income level differences across countries and over time by exploiting the distinctions among autocracies. To offer comprehensive answers, we construct several static and dynamic panel models for growth rates and income levels. Short- and long-run causal relationships are estimated, using both balanced and unbalanced data and across three autocratic regime classifications, and over 37 years from 1972 to 2008. While autocratic regime types seem to be significant drivers of both growth rate and income level differences in restricted models, they lose much of the explanatory power once time effects are introduced, implying that growth rate and income level differences are mainly explained by other factors that are time-variant and common to all regime types. We argue that the null effect of regime types can be attributed to possible arbitrariness in the way regimes are classified. Besides, political institutionalization within regimes is too diverse, possibly causing regime types to demonstrate non-uniform effects on growth rates and income levels.

Keywords: autocracies, democracy, growth, institutions, GMM

JEL Classification: P16, O43, C23

*This paper has been derived from the Ph.D. dissertation of Abdurezack Hussein Ahmed that has been completed under the supervision of M. Aykut Attar. The dissertation has been submitted to Hacettepe University Graduate School of Social Sciences and successfully defended in Summer 2018. The authors are grateful to the dissertation committee members Hasan Cömert, Burcu Fazlıoğlu, Muammer Kaymak, and Hüseyin Özel for their helpful comments and suggestions on an earlier version of this paper. Any remaining errors are the authors' own.

1. Introduction

The comparative political economy literature has come a long way from its common identification of autocracies as a residual category and neglecting their heterogeneity and diversity. These differences among autocratic regime types are used to answer major pending research questions in the field. Different studies try to understand the links between autocratic regime types and conflict behaviour, political survival and democratization (Chiebub et al. 2010). Some others investigate issues such as government quality, regime stability and duration within autocratic regimes (Wahman et al., 2013). Since the recognition of the importance of heterogeneities across autocracies is a recent phenomenon, the expansion of this literature has been slow and limited. In this regard, Wahman et al. (2013: 32) rightly complain that "[t]he field has hitherto been somewhat preoccupied with the issue of 'regime stability,' but there are many understudied aspects of authoritarian regime types concerning their nature, origin and consequences." Acemoglu et al. (2017:28) also identifies the need to disentangle the "complex interactions between political regimes and economic outcomes" through incorporating "multiple regime types and richer heterogeneous effects" as future areas of research.

Understanding the consequences of autocratic regime types on economic outcomes is among these largely neglected topics. There exist a few works on this subject, and the repeated citations of a study by Wright (2008) confirm that the literature is particularly narrow. Most studies on political regimes and economic outcomes adopt dichotomous classification of regime types as democracies and non-democracies. The results of these studies consequentially compare a relatively highly homogenous polity, democracies, with an extremely heterogeneous one, autocracies. Given the political and economic differences within autocracies, such comparisons do not allow fora deeper understanding of the causal relationship between political regimes and economic outcomes. In this respect, Wright (2008: 342) suggests that the "answers to many of the enduring questions in comparative political economy" conceivably depend on "careful study of distinctions between different types of authoritarian polities."

In this paper, we try to exploit the distinctions among autocracies by studying the effects of political regime types on economic outcomes. This paper specifically addresses the question

of whether autocratic regime types explain differences in economic growth and income levels for a large sample of countries. It approaches the question in such a way that plausible reflections will be made on how each autocratic regime type is compared to democracies and how each autocratic regime's performance is compared to another regime in terms of the level of income and rate of economic growth.

We look at two different outcome variables that proxy economic performance; these are real GDP per capita level and its growth rate. We use three different autocratic regime type classifications to construct our regime dummies. The multiplicity of estimation techniques, the diversity of datasets and types, and the number of independent variables used in the analysis bring the total number of econometric estimations implemented in this research to reach close to three hundred.

Few papers that measure the effect of autocratic regime types on economic growth mainly pursue an *institutionalist* approach. The approach has put overriding emphasis on how political institutions are distinct in autocracies and how they affect economic and political outcomes (Wright, 2008). The essence of their argument lies in the conviction that well institutionalized autocratic regimes perform better than those that run a poorly institutionalized state. Implicit in their argument is the presumption that the more the political institutions in a regime resemble those in democratic politics, the higher the level of income and economic growth will become. This line of argument is, therefore, an extension of the larger argument suggesting that the superiority of democracies over autocracies in economic performance originates from differences in political institutions between the two regime types. As Acemoglu and Robinson (2012) demonstrate, nations with participatory politics produce inclusive institutions and economically perform better than those that are characterized by extractive institutions. Although institutions in autocracies are assumed to be more extractive than those in democracies, different regime types in autocracy can also be roughly ranked depending on the extractive-ness of their institutions.

An earlier line of thought that distinguishes dictatorial regimes in terms of their level of institutionalization can be traced back to Przeworski and Limongi (1993). They differentiate between autocracies and bureaucratic dictatorships based on the level of citizens' "property right to fiscal residuum" (Przeworski and Limongi, 1993: 58). In a bureaucratic dictatorship,

the state has no legal rights against citizens to appropriate fiscal residuum. On the other hand, citizens are deprived of such legal privileges in autocratic regimes. Jamali et al. (2007) further generalize this distinction in terms of the presence of codified and announced laws and empirically show that bureaucracies perform better in their economic growth than autocracies.

Another institutional approach is followed by Gandhi (2008; 2010). She distinguishes between broadly institutionalized autocracies that have political institutions such as multiple political parties and legislatures from narrowly institutionalized autocracies. Econometric estimations reveal that autocracies with broad institutions recorded higher growth compared to narrowly institutionalized autocracies. Wright (2008) also focuses on the legislature as a political institution to examine its effects on economic outcomes in autocracies. Beyond the mere presence of legislatures, Wright (2008) argues, differences in constraints they impose on the state leadership explain growth rate differences among autocratic regime types. Those with binding legislatures perform economically better than autocracies with nonbinding legislatures. At regime level, he shows that, compared to personalist regimes where institutions are less binding, single party and military regimes with binding legislations record higher economic growth rates. Another earlier work by Durham (1999) emphasizes the binding-ness of institutions and their effect on economic growth. He argues that, within authoritarian polities, single-party regimes that keep a limit on their rulers' discretionary powers perform economically better than party-less autocratic regimes.

The contribution of Gandhi (2008; 2010) and Wright (2008) on theoretical foundations of the link between political regimes and economic growth helps in constructing hypotheses for our estimations. The first hypothesis that can be drawn from their *institutionalist* analysis is related to the distinction between democracies and autocracies in promoting economic growth. As democracies have broadened institutions and binding legislators to constrain leaders, they economically outperform autocracies. The second hypothesis is associated with the presence and level of these institutions within autocracies. In the CGV(Cheibub, Gandhi and Vreeland [as in Cheibub et al. (2010)]) classification of autocracies that include monarchic, military and civilian autocracies, it can be hypothesized that regimes that have a more personalist behaviour such as monarchic regimes will show poorer economic performance than expectedly more institutionalized civilian and military regimes. Under the GWF (Geddes, Wright and Frantz [as in Geddes et al. (2014)]) classification, dominant party-

based and military regimes are expected to have higher economic growth rates than personalist and monarchic regimes. Finally, in the HTW (Hadenius, Teorell and Wahman [as in Wahman et al. (2013)]) classification, electoral regimes have more broadened legislatures and are therefore expected to perform better than monarchic and military regimes.

On the other side of the spectrum, however, there are contending theoretical perspectives that challenge the argument that the presence of constraints on the sovereign action is conducive to good economic performance. The *state autonomy perspective*, for example, suggests that leaders with fewer and milder constraints on their actions favour growth more than other types of regimes. According to Przeworski and Limongi (1993), the "capacity" to follow "developmentalist" economic policies and the "insulation" from interest group pressures are the two building blocks of the “state autonomy” argument. Such an autonomy is available only under authoritarianism, and it helps them avoid distribution-related pressures and support faster economic growth. The autonomy of a state also increases the government's capability to "extract resources, provide public goods, and impose the short-term costs associated with efficient economic adjustment" (Haggard, 1990: 262). The miraculous economic success stories of developmental states and benevolent dictators are good examples in this regard. Leaders of these states capitalized on their autonomy to craft state-led development policies that successfully bring growth and prosperity to their citizens.[1] This perspective brings to attention the possibility of getting results that are contrary to the hypothesis stated above. Yet another hypothesis regarding the relationship between regime types and economic growth can be deduced from what Sirowy and Inkeles (1990) categorize as *sceptical perspectives*. These suggest that economic performance is indifferent to political regimes and good or bad performance can happen in any form of regime type. The inconclusiveness of the theoretical discussions, therefore, makes the attempt to empirically identify the relationships between autocratic regime types and economic performances an interesting research avenue.

Our study shows that the effect of autocratic regime types on economic performance depends on the type of economic outcome variable, the data type (balanced vs unbalanced), the time frame (short-run vs long run), the autocratic regime classification, and the model

[1] See White and Wade (1988) and World Bank (1993) on East Asian countries in general; specific state-led industrialization policies in Japan in Johnson (1982); Amsden (1989) on South Korea; Rodrik (1994) on South Korea and Taiwan; and Gilson and Milhaupt (2011) on benevolent autocrats.

specifications we use in our analysis. Accordingly, the superiority of the *institutionalist* over the *state autonomy* explanation or over *sceptical perspective*, or otherwise, also depends on these factors. The multiplicity of the models we estimated provides us with more details on when and how autocratic regime types do and when and how they do not explain the differences in economic growth and income levels.

Our results generally suggest that democracies grow faster than any type of autocratic regimes. In the balanced data of 70 countries for 37 years from 1972 to 2008, our findings show that civilian autocracies perform better than military autocracies in CGVclassification and monarchs have higher annual growth rates than personalist autocracies in GWF classification. In the unbalanced data with 99 countries, we find that personalists have a lower annual growth rate than military autocratic regimes under GWF regime classification. In the transformed data with five-year moving average growth rates, we once again find that monarchic regimes grow faster than personalist regimes in the long run. This data transformation has an effect on the number and strength of statistically significant regime type dummies in CGV and HTWclassifications. The introduction of exogenous covariates such as latitude, the colonial heritage, the percentages of specific religions' followers, resource rents, and South American and East Asian dummies affect the magnitude and significance of the estimates. However, the major revision we could identify is due to the inclusion of time effects into the model. Once time effects are included, autocratic regime types cease to explain cross-country growth differences.

We build on the work of Acemoglu et al. (2017) to investigate the role of autocratic regime types on cross-country income level differences. Results exhibit some variation with the data types, time spans, regime classifications, estimation methods, and model specifications used. Estimations of our dynamic panel model using within, difference and Forward Orthogonal Deviation (FOD) GMM estimators yield comparably more statistically significant regime dummies than estimations obtained through the system GMM estimator. In the CGV autocratic regime classification, we find that, compared to democracies, being a monarchic autocracy entails smaller short-run and long-run percentage income declines than civilian and military forms of autocracies. In the GWF and HTW classifications, however, the relatively more institutionalized dominant party and electoral autocratic regime types outperform other autocratic regime types in their category. The use of the system GMM estimator reduces the

number of significant autocratic regime types and makes the comparison of income levels among autocracies more difficult. Nonetheless, it is once again the inclusion of time effects that significantly diminish the explanatory power of autocratic regime types. Similar to the growth differences, once time effect dummies are included in our models, the capacity of autocratic regime types to explain income level differences goes to nil. These results strongly suggest that patterns in real income per capita are mainly determined not by heterogeneities within autocracies but by other omitted factors common to all regime types.

The outline of the paper is as follows: We present a brief review of the related literature at the end of this section. Sections 2 and 3 then present the results of our econometric estimations on growth rate and income level differences, respectively. In both of these sections, we also discuss the sensitivity of the results to the inclusion of control variables and different sets of estimation techniques. In Section 4, we present a brief discussion of the role of time effects. We conclude the paper in Section 5.

1.1 Related Literature

The comparative theoretical and empirical political economy literature on the interaction between political regimes and economic growth is full of ambiguities. The inconclusiveness in the superiority of democracy vis-à-vis autocracy in promoting economic growth is one area of disagreement. Comparison of the two political regimes in promotion of growth can be made in four major areas: property rights, long-term growth, wealth distribution, and the level of development.

Secure, well-defined and effectively enforced property rights encourage innovation and investment and raise productivity. These are the bases and the driving forces for what Schumpeter (1942) calls “creative destruction.” In their extended analysis of global prosperity and inequality, Acemoglu and Robinson (2012) forcefully argue that protection of property rights has been a major factor in explaining world poverty and prosperity. Credible commitment in the enforcement of property rights is crucial, and its absence decreases the effective expected returns from an investment (North and Weingast, 1989).

Which types of political regimes better promote and sustain property rights is a source of controversy in the literature. Kuzman et al. (2002) argue that the safeguarding of property

rights is one of the critical features of democratic regimes that help promote economic growth. In terms of commitment to safeguarding property rights, (Durham, 1999) suggests that democracies solve the “credible commitment problem” through limits kept on sovereign discretion, thereby labelling the ground for better economic opportunities. Olson (1991: 572) makes a strong generalization and asserts that “[h]istory provides not even a single example of a long and uninterrupted sequence of absolute rulers who continuously respected the property and contract-enforcement rights of their subjects.” On the other hand, Przeworski and Limongi (1993) point to some features of democracy such as the freedom to form unions and universal suffrage as possible democratic privileges that pose threats to the protection of property rights. They conclude that "democracy may promote growth but not via this particular mechanism."(Przeworski and Limongi, 1993:54).

Ambiguity in the relationship between growth and democracy fades away in the long run. The consolidation of democracy encourages long-run growth through promoting investment in key factors of production (Gerring et al., 2005; Baum and Lake, 2003; Acemoglu et al., 2001),pushing far-reaching institutional reforms (Stiglitz, 2002),and maintaining policy stability (Quinn and Woolley, 2001; Nooruddin, 2011; Chandra and Rudra, 2015). In autocracies, depending on whether the leaders are “developmentalist” or “thieves,” the performance of their economy varies dramatically (Sah, 1991). If there is any consensus in the decade-long debate, Chandra and Rudra (2015) suggests that it is the prevalence of growth volatility in autocracies and an increasing tendency towards a stable economic performance in democracies. Easterly (2011) also mentions the same consensus as one of the two stylized facts in the growth literature. Almeida and Ferreira (2002) statistically shows that both within-country and cross-country growth volatility are high in less-democratic countries than democratic ones. Other studies such as those of Weede (1996) and Acemoglu et al. (2003) also estimate that being an autocracy has a robust effect on the variability of growth rates.

Democracy has a distinct role to play in wealth redistribution as well. Existing theoretical and empirical works postulate that an extended practice of democracy leads to more egalitarian wealth distributions (Gerring et al., 2005). The limit on sovereign discretion in democracies forces policymakers to distribute wealth from the elite to their subjects (Olson, 1993). Acemoglu et al. (2013) also argue that expanding decision making power to the unprivileged, poorer section of the population facilitates wealth redistribution and decreases

inequality. Against these expectations, however, Piketty and Goldhammer's(2014) study of wealth distributions in advanced economies of the world, where democracy has a long history, shows that wealth inequality, despite its decline after World War I, has started rising since the late 1970s.

Another interesting dimension in the relationship between political regimes and economic growth is its association with the level of development. There exists a vast literature that prescribes the autocratic form of government for countries at early stages of development. At the heart of their argument lies the notion of "state autonomy". As mentioned above, this notion builds on the notion of developmental states and the insulation from interest group pressures (Przeworski and Limongi, 1993). Sirowy and Inkeles (1990) present the arguments of those who prescribe authoritarian forms of government for rapid economic growth in poor nations. As early stages of economic take-off require huge capital accumulation, it calls in the need to have a type of government that has little institutional constraints to suppress consumption and to promote saving. Coupled with already fragile and weak political institutions in the developing countries, such potentially unpopular economic measures would augment political pressures and force the government to "become preoccupied with the maintenance of internal order" had the form of government been a democratic one. Sirowy and Inkeles (1990: 1313) further note the bold conviction that "in the world facing developing nations after World War II, those with a more authoritarian form of government will experience more rapid economic growth than will democratic regimes." Relatedly, Antić's (2004) findings show that, in most of the post-World War II period, dictatorships performed comparably equivalently with democracies while democracies were more successful than autocracies between 1820 and 1950. More specifically, at least 30% of autocracies show comparable economic performance with democracies (Chandra and Rudra, 2015). Historically speaking, Gerring et al. (2005) argue that rich countries of today grew rich under authoritarian auspices. Poser (2010) further contends that the absence of cultural and institutional prerequisites for democracy would often make dictatorship optimal in poor countries with primitive economies. In support of the theory, Schiffbauer and Shen (2010:59) confirm that, among economically comparable democratic and authoritarian countries, "poor but large and stable dictatorships" perform better in achieving higher rates of long-run economic growth. The developmental state and benevolent autocrat literature abundantly document these exceptional performers among autocracies.

In addition to the limitations of econometric models used in the empirical literature, one major shortcoming in the field is the ignorance of heterogeneities across autocracies. Autocrats' political institutions are even more diversified than those of democracies. They, for instance, occupy at least 16 points in the 21-point Polity IV index that characterize political regimes mainly based on their patterns of authority. Moreover, autocracies differ among themselves in their political organizations (Gandhi, 2008) and economic systems (Wintrobe, 2002), and these variations are as important as the distinctions we make between autocracies and democracies (Wright, 2008). These differences within autocracies possibly entail different economic and political outcomes. The distinctions among them reflect themselves in the observed variations in democratization (Linz and Stepan, 1996; Geddes et al., 2014), democratic consolidation (Svolik 2008), regime stability (Geddes, 1999; Hadenius and Teorell 2007), conflict behavior (Peceny et al., 2002), government quality (Charron and Lapuente, 2011), and economic growth (Gandhi, 2008; Wright 2008). Studying autocracies at the regime level, Wright (2008: 342) suggests, may provide "answers to many of the enduring questions in comparative political economy."

2. Growth Rate Differences

2.1. Data and Methodology

The present analysis of the effects of regime types on growth and income differences is conducted in a very conscientious manner. Existing studies on political regimes and economic outcomes have given different answers to the same question. The differences in empirical research emanate from several reasons. Data used, variables selected, statistical methods adopted, sample sizes and other issues are some of the factors causing these discrepancies in conclusions. In our attempt, precautions are followed to make sure that the findings of this research are as reliable and robust as possible.

First, we carefully organize the type of data used in this research. We compiled the autocratic regime list based on three datasets on political regimes: CGV, GWF, and HTW. We then formed our own balanced and unbalanced datasets of autocracies within the study period

from 1972 to 2008.[2] In compiling both datasets, any country that had an autocratic experience within the study period is first identified as a potential candidate. From these countries, those that have data for the entire period are included in the balanced dataset, and those that failed to appear in all regime classifications for some reason in any particular time are included in the unbalanced dataset. Newly independent countries in Africa, newly established nation-states in Eastern Europe and countries that ceased to exist any time within the study period like Eastern Germany, USSR, and North and South Yemen are among countries that we exclude. In addition to these, some countries like Somalia have encountered state failure and some others like Afghanistan and Iraq have faced foreign occupation and exited the dataset in the later years of the study.

In the balanced dataset, we have got 2,672 observations and 71 countries for 37 years from 1972 to 2008.[3] The summary statistics for the growth rate of GDP per capita are presented in Table 1. Not surprisingly, democratic regimes in all of the three autocracy classifications have higher average growth rates. Besides, military regimes in CGV and HTW and personalist autocracies in GWF classification constitute regime types with the lowest mean GDP per capita growth rates. In terms of growth volatility, approximated by the standard deviation of the pooled data in Table 1, democracies have the least average volatility in their growth rates and monarchic regimes across all classifications display the highest volatility.

The total number of observations in the unbalanced panel is 3,272, with 99 countries included. The summary of GDP per capita growth rates is presented in Table 2, and the two tables significantly overlap with each other.

[2] We discuss how we have organized our dataset and present the list of autocrat countries across the three regime classifications in Appendix A.
[3] The sources of data used in this study are presented in Appendix 2.

Table 1: GDP per capita growth rates across regime types (balanced dataset)

Regime types	Mean	St. Dev	Max	Min	N
Democracy CGV	3.09	6.93	52.38	-36.64	871
Civilian CGV	2.06	7.64	38.9	-37.36	684
Military CGV	1.35	8.54	48.26	-69.73	824
Monarchic CGV	2.36	11.36	46.35	-44.41	248
Democracy GWF	3.08	6.80	52.38	-36.64	802
Dominant Party GWF	2.77	8.06	48.26	-33.5	811
Personalist GWF	-0.18	7.66	27.31	-37.36	407
Monarchic GWF	2.35	11.34	46.35	-44.41	249
Military GWF	1.60	8.56	30.98	-69.73	358
Democracy HTW	2.95	5.88	28.69	-36.64	729
Electoral HTW	2.41	7.74	52.38	-33.5	982
Military HTW	1.05	9.30	48.26	-69.73	670
Monarchic HTW	2.34	11.41	46.35	-44.41	246

Our panel growth model builds on Wright (2008) who has estimated the interaction between autocratic regime types and per capita income growth rates in 80 authoritarian countries. We extend his methodology in two respects. First, we make democracy our reference category; compared to his use of personalist autocratic regime in the study. Making democracy as the reference category helps us learn two important lessons in the political regimes-cum-growth analysis. First, while previous studies compare democracy and autocracies at the aggregate level, here we are able to learn how specific autocratic regime types are compared to democracy in their performance in promoting economic growth. This by itself is an important contribution to the existing political economy literature. Second, the sign and magnitude of the estimated coefficient help us identify good and bad performers among autocracies.

Our second extension is concerned with data estimation method. Wright (2008: 340) has pooled the data and estimated the model using "OLS with panel specific AR (1) correlation and panel corrected standard errors." His model fails to account for country-fixed effects. This is a major issue in terms of model misspecification as we expect countries differ in ways unobserved by the econometrician.

Table 2: GDP per capita growth rates across regime types (unbalanced dataset)

2	Mean	St. Dev	Max	Min	N
Democracy CGV	3.04	6.99	52.38	-36.64	914
Civilian CGV	1.67	9.57	45.03	-67.20	1101
Military CGV	1.58	8.84	48.26	-69.73	991
Monarchic CGV	2.27	13.03	96.10	-44.41	266
Democracy GWF	3.03	6.90	52.38	-36.64	863
Dominant Party GWF	2.44	8.32	48.26	-37.20	1093
Personalist GWF	0.54	10.82	47.00	-67.20	660
Monarchic GWF	2.26	13.01	96.10	-44.41	267
Military GWF	1.40	8.43	30.98	-69.73	389
Democracy HTW	2.92	5.90	28.69	-36.64	767
Electoral HTW	2.13	9.02	52.38	-54.00	1430
Military HTW	1.12	9.92	48.26	-69.73	811
Monarchic HTW	2.25	13.08	96.10	-44.41	264

The empirical static panel data model we estimate is specified as in

$$g_{it} = \beta_1 D_{1,it} + \beta_2 D_{2,it} + \beta_3 D_{3,it} + \beta_4 D_{4,it} + \sum_{j=1}^{p} \gamma_j x_{it} + \alpha_i + \theta_t + \varepsilon_{it}, \quad (1)$$

where g_{it} is the growth rate of GDP per capita in purchasing power parity corrected terms in the country i at time t. D_1 to D_4 are binary dummy variables representing autocratic regime types. The democratic regime type, as mentioned above, is omitted and taken as the reference category. More specifically, for GWF classification, $D_{1,it} = 1$ if regime type is personalist, and 0 otherwise; $D_{2,it} = 1$ if regime type is dominant party autocracy, and 0 otherwise; $D_{3,it} = 1$ if regime type is military, and 0 otherwise; $D_{4,it} = 1$ if regime type is monarchic, and 0 otherwise. For CGV classification $D_{1,it} = 1$ if regime type is civilian, and 0 otherwise; $D_{2,it} = 1$ if regime type is monarchic, and 0 otherwise; $D_{3,it} = 1$ if regime type is military, and 0 otherwise; and $D_{3,it} = 1$ if regime type is monarchic, and 0 otherwise. Finally, for HTW classification, $D_{1,it} = 1$ if regime type is electoral, and 0 otherwise; $D_{2,it} = 1$ if regime type is monarchic, and 0 otherwise, $D_{3,it} = 1$ if regime type is military, and 0 otherwise.

The panel model in (1) has a standard interpretation; α_i represents the time invariant country effects, θ_t denotes the time effects, and x_{it}'s are control variables. The idiosyncratic

error term is assumed to be $\varepsilon_{it} \sim N(0, \sigma^2)$.

Regarding the methodology employed to analyze these data, our purpose is to give a comprehensive answer to autocratic regimes-cum-economic outcomes relationship. Therefore, we use different forms of growth of real GDP per capita in purchasing power parity corrected terms as our dependent variable. Here, we implement the analysis on growth rate differences both with annual growth rates and with five-year moving averages to differentiate regime effects on short-term fluctuations from those on the long-run secular component of growth rates.

2.2. Results[4]

Estimation results in our balanced panel under CGV classification are presented in Table 3. In line with the theoretical expectations, democratic regimes are superior over autocracies in having higher average GDP per capit2a growth rates. Despite the mixed results in the level of statistical significance of most regime types, estimations produce negative signs for all coefficient parameters of autocratic regime dummies. Under the baseline estimation in column 1, the military regime coefficient is statistically significant, and civilian regimes are weakly significant at 10% significance level whereas the coefficient for the monarchic regime was found to be statistically insignificant. It suggests that, compared to democracies, growth is lower in both military and civilian autocracies, and, among autocracies, the growth in civilian regimes is higher than that of military regimes.

In the remaining columns from 2 to 4, three exogenous variables are included. The first of these three is religion. Religion and the different rules and values it promotes affect peoples' behaviour and the nature of institutions. In line with this, Weber (1930), for example, stressed the role of Protestant ethics in flourishing capitalism in Europe. There are also studies that underline the key role of Confucianism in the miraculous economic success of Eastern Asian countries (Castells, 1992). On the other side, Kuran (2004) argues that some Islamic religious laws caused the formation of "Middle East institutions" that contributed to the underdevelopment of the region. We, therefore, added percentages of followers of the four

[4]A supplementary appendix that is not intended for publication includes all of the estimation results and can be accessed at http://yunus.hacettepe.edu.tr/~maattar/Autocracy.pdf

major religions of the world (Christianity, Islam, Buddhism and Hinduism) as control variables to check the robustness of our results and to test the role of religion in explaining cross-country growth rate differences in our data.

Table 3: Effects of CGV autocratic regime types on GDP per capita growth, balanced panel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Monarchic CGV	–0.701	–0.782	–0.754	–0.847	–1.453	–0.234	–0.514
	(1.000)	(1.066)	(1.022)	(1.178)	(1.482)	(1.027)	(1.290)
Military CGV	–1.660**	–1.654**	–1.442*	–1.539*	–1.687*	–0.840	–0.831
	(0.761)	(0.753)	(0.767)	(0.787)	(0.866)	(0.791)	(0.854)
Civilian CGV	–1.067*	–1.096*	–0.828	–0.869	–1.71***	–0.124	–0.708
	(0.575)	(0.571)	(0.603)	(0.623)	(0.549)	(0.660)	(0.602)
Latitude		0.0270**	0.0114	0.00529	0.0272		0.0267
		(0.0105)	(0.0167)	(0.0151)	(0.0194)		(0.0177)
UK colony			–1.625*	–1.899**	–0.308		–0.548
			(0.886)	(0.796)	(1.051)		(0.970)
French colony			–2.22***	–2.69***	–1.142		–1.427*
			(0.774)	(0.712)	(0.889)		(0.864)
Spanish colony			–0.825	–0.116	0.517		0.540
			(0.971)	(1.023)	(1.049)		(0.990)
Christian %				–2.059	0.485		–0.189
				(1.513)	(1.871)		(1.626)
Islam %				–0.493	0.894		0.345
				(1.305)	(1.404)		(1.218)
Buddhism %				1.249	2.044		1.219
				(1.554)	(1.653)		(1.354)
Hinduism %				–2.720	1.093		–0.271
				(1.969)	(2.219)		(1.785)
Resource rent					0.119***		0.0794*
					(0.0452)		(0.0423)
East Asia					3.291***		3.05***
					(0.767)		(0.670)
South America					1.317		1.414*
					(0.820)		(0.781)
Constant	3.072***	2.660***	3.732***	4.947***	1.018	3.278***	2.367
	(0.431)	(0.484)	(0.843)	(1.292)	(1.852)	(1.075)	(1.989)
Observations	2,627	2,590	2,590	2,590	2,401	2,627	2,401
R–squared	0.05	0.13	0.276	0.366	0.373	0.041	0.470
Countries	71	70	70	70	69	71	69

Note: Robust standard errors in parentheses. *** indicates p <0.01, ** p <0.05, * p < 0.10. The Hausman test statistics is 0.22 (p-value=0.9747) therefore selects a random effect model as the preferred modelling. The results are presented in seven columns. In column 1 the baseline model is estimated without any control variable and without time effect variables. Control variables are introduced to the model in the remaining columns except in column 6. In column 2, the latitude of country centroid (Latitude), in column 3 dummies for the three large colonial rulers (British colony=1 if a country was a British colony, 0 otherwise; French colony=1 if a country was French colony, 0 otherwise and Spanish=1 if a country is was Spaniard colony, 0 otherwise) and in column 3, the percentage of followers of the four largest religions Christianity (Christian %), Islam (Islam %t), Buddhism (Buddhism %) and Hinduism (Hinduism %) are included as control variables . The 5th column further added the percentage share of rent collected from the natural resource (Resource rent), East Asian dummy (East Asia=1 if a country is from East Asian, 0 otherwise) and South American dummy (South American=1 if a country is from South America, 0 otherwise). The 6th and 7th columns present the results of models in 1st and 5th with time effects respectively.

Our second exogenous covariate is geography, measured as the latitude of the country centroid. The central argument that links geography to economic development is based on the observation that many rich countries are located in temperate areas and large numbers of poor countries in the tropics. Acemoglu and Robinson (2012) suggested that the geography hypothesis is related to the prevalence of deadly diseases, soil productivity, and endowments of plant and animal species. It is argued that people at higher latitudes less frequently encounter diseases, have more productive soil and more species that can be domesticated and used for increasing agricultural productivity.

The third exogenous covariate represents historical colonial effects. The variable measures whether being ruled by a specific colonial ruler have an effect on current economic growth rates. In this regard, Acemoglu et al. (2001) argue for the relevance of differentiating among the different European colonization policies and their impact on the nature of institutions—consequently on current development—in colonized countries. We have, for example, North et al. (2000), that suggest the development superiority of British colonies over other European powers, and Kohli (1994) who applauses the role of Japanese colonization in the impressive growth of South Korea in the 1970s. In this paper, we study the interaction between the three largest colonial rulers in our data, namely British, French and Spanish colonial legacies, with income growth rates.

The latitude of country centroid does not create any change in the results obtained in the baseline estimation of column 1. However, when colonial legacy dummies are included in column 3, the monarchic regime in CGV becomes weakly significant at 10% significance level. British and French colonial legacies are associated with negative annual economic growth rates while the Spanish colonial legacy produces a statistically insignificant coefficient parameter. Religion covariates do not create major changes in the significance of estimated parameters.

Next, we investigate if results are driven by characteristics that are generally associated with specific groups of countries. For this purpose, we introduce

- resource rents as a control variable to capture the effect of the rent collected from natural resources in autocracies,
- a dummy variable for East Asia, i.e., the region where economies exhibited miraculous growth, and
- a dummy for South America, i.e., a region with large collections of military autocracies.

The results presented in column 5 show that higher resource revenue and being an East Asian economy is associated with higher economic growth rates while South American dummy is found to be insignificant to determine growth rate variations in the sample. The inclusion of these specific controls alters the results. Civilian autocratic regimes become the only statistically significant regime that explains growth, and military regimes completely lose their significance. These controls also alter the statistical significance of colonial legacy dummies. The last two columns display the results of the specifications that include the time effects. These time effects absorb the explanatory power of autocratic regime types on growth rates. None of the autocratic regimes types statistically significantly affect economic growth, regardless of the presence of control variables. The only strongly significant variable in column 7 is the East Asian dummy while resource rent and South American dummy are weakly significant at 10% significance level.

The model in (1) is estimated with GWF and HTW classifications as well, with results being presented in Tables 1A and 1B of the appendix. The overall message is that, even though some explanatory variables are significant and some not in different specifications, all autocratic regime types become insignificant in explaining growth rate differences if time effects are included.

The above estimations and discussions focus on the short-run interaction between annual GDP per capita growth rates and autocratic regime types. Since annual growth rates are prone to large year-to-year fluctuations, we have also computed five-year moving averages of growth rates. When growth rates are smoothened in this way, some interesting changes occur. While there is a decline in the number and level of statistically significant coefficients in CGV and HTW regime classifications, GWF classification has emerged stronger in explaining long-term per capita income growth differences among regimes.

In CGV classification results presented in Table 4, the weakly significant coefficients of civilian regime type completely lose significance and military regimes become weakly significant. It is only in the model with a full set of controls in column 5 that we find a statistically significant civilian regime. In comparison to democracies, being under the rule of a civilian autocratic regime is associated with a 1.49 percent decline in long-run rate of economic growth. Nonetheless, the inclusion of time effects once again erases any sign of

CGV autocratic regime types affecting growth rates. Among the control variables, latitude and British and French colonial dummies are found to affect long-run growth at different specifications. Irrespective of the inclusion of time effects, the East Asian dummy continues to positively affect long-run growth.

Table 4: Effects of CGV autocratic regime types on long-run GDP per capita growth, balanced panel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Monarchic CGV	–1.088	–1.119	–1.168	–1.221	–1.251	–0.952	–0.719
	(0.906)	(0.969)	(0.964)	(1.114)	(1.162)	(0.922)	(1.041)
Military CGV	–1.577*	–1.600*	–1.512	–1.557	–1.594	–1.032	–1.031
	(0.924)	(0.921)	(0.930)	(0.954)	(1.041)	(0.990)	(1.106)
Civilian CGV	–0.794	–0.778	–0.677	–0.719	–1.49**	–0.134	–0.822
	(0.632)	(0.633)	(0.653)	(0.669)	(0.607)	(0.759)	(0.719)
Latitude		0.0228**	0.00653	0.00138	0.0147		0.0199
		(0.0113)	(0.0171)	(0.0160)	(0.0208)		(0.0188)
UK colony			–1.509*	–1.73**	–0.327		–0.622
			(0.860)	(0.772)	(0.932)		(0.854)
French colony			–2.07***	–2.44***	–0.917		–1.226
			(0.777)	(0.719)	(0.897)		(0.899)
Spanish colony			–0.981	–0.245	0.116		0.290
			(0.970)	(1.004)	(0.984)		(0.920)
Christian %				–2.248	0.422		–1.276
				(1.917)	(2.345)		(2.570)
Islam %				–0.901	0.682		–0.695
				(1.676)	(1.818)		(2.051)
Buddhism %				1.049	1.687		0.140
				(2.103)	(2.014)		(2.081)
Hinduism %				–1.429	1.737		–0.700
				(3.288)	(3.329)		(3.200)
Resource rent					0.0510		0.0155
					(0.0479)		(0.0531)
East Asia					3.53***		3.043***
					(0.885)		(0.888)
South America					0.997		1.202
					(0.777)		(0.736)
Constant	2.806***	2.44***	3.583***	4.94***	1.503	6.06***	6.305**
	(0.466)	(0.516)	(0.874)	(1.738)	(2.484)	(0.779)	(2.934)
Observations	2,415	2,381	2,381	2,381	2,228	2,415	2,228
R–squared	0.05	0.107	0.229	0.315	0.3895	0.041	0.4822
Countries	71	70	70	70	69	71	69

Note: Robust standard errors in parentheses. *** indicates p <0.01, ** p <0.05, * p < 0.10. The Hausman test statistics is 0.45 (p-value=0.930) therefore selects a random effect model as the preferred modelling. The results are presented in seven columns. In column 1 the baseline model is estimated without any control variable and without time effect variables. Control variables are introduced to the model in the remaining columns except in column 6. In column 2, the latitude of country centroid (Latitude), in column 3 dummies for the three large colonial rulers (British colony=1 if a country was a British colony, 0 otherwise; French colony=1 if a country was French colony, 0 otherwise and Spanish=1 if a country is was Spaniard colony, 0 otherwise) and in column 3, the percentage of followers of the four largest religions Christianity (Christian %), Islam (Islam %t), Buddhism (Buddhism %) and Hinduism (Hinduism %) are included as control variables . The 5th column further added the percentage share of rent collected from the natural resource (Resource rent), East Asian dummy (East Asia=1 if a country is from East Asian, 0 otherwise) and South American dummy (South American=1 if a country is from South America, 0 otherwise). The 6th and 7th columns present the results of models in 1st and 5th with time effects respectively.

As in the case of annual data, the appendix collects estimation results that use GWF and HTW classifications as well, and results are presented in Tables 1C and 1D on the appendix. While there are a few significant regime dummies in various specifications, the negative result appears once again if time effects are included: Growth differences are explained with unobserved factors that change in time and commonly affect all regimes.

In an attempt to strengthen and secure the robustness of a conclusion drawn from the above analysis, the effects of regime types on annual and long-run GDP per capita growth rates are re-estimated using a larger data size. The re-estimation of our model using unbalanced panel data is presented from Table 1E to Table 1J of the appendix. The analyses yield a few changes in terms of regime dummies. The most noticeable change that comes with the change in the type and size of the data is seen on control variables. The inclusion of time effects, on the other hand, alter the picture completely for both annual and long-run growth differences. Except for civilian regime types in both annual and long-run growth rates under CGV classification and personalist autocracies in annual growth rates under in GWF classification, none of the regime types produces a statistically significant coefficient. In other words, similar to the balanced dataset, autocratic regime types cease to explain both annual and long-run economic growth differences in the data once time effects are present.

2.3. Discussion

The analysis of the effects of autocratic regime types on growth rates has substantiated the importance of understanding this relationship using different data types, time frames, regime classifications, and model specifications. With the change in our data size from balanced to unbalanced data, for example, we have seen changes in statistical significance for some regime dummies in CGV and GWF classifications. The change from short-run to long-run growth rates has also affected the role of regime types in explaining growth rate differences in the CGV classification. The effects of these changes, moreover, vary across different classifications. While regime types under HTW classification largely maintain their signs and significance, regime types in CGV show a larger degree of sensitivity to these changes.

A common result in all regime classifications is the distinction between autocratic and democratic regime types. Regime types with significant growth effects confirm that

democracies economically perform better than autocracies. Our study further gives some details of the relationship within a given autocracy classification. Monarchic regimes are found to be the closest to democracies in their economic performance than personalist regimes in GWF classification, and military regimes perform better than civilian autocracies in CGV classification under unbalanced data. The lack of more than one statistically significant regime type in the final model specification with full control variables and time effects, however, make these comparisons among autocracies conditional. The same problem also delimits the possibility of evaluating institutionalist versus state autonomy hypothesis within autocracies.

These estimations lead to a stark conclusion: Existing autocratic regime classifications do not explain economic growth differences in a robust manner. The inclusion of time effects strongly affects the statistical significance of the regime dummies. The presence of time effects absorbs the effects of few statistically significant regimes type dummies. This signals the fact that economic growth in autocracies is explained by some common factor or by factors that affect growth patterns in many autocratic countries. Our results are not in line with those of Wright (2008) who used an earlier version of GWF classification. He finds that, among autocracies, single party and monarchic regimes have higher income growth rates compared to personalist autocracies. His findings, however, originate from a methodology that is significantly different from our approach. For one, Wright (2008) has avoided democratic regimes and used personalist autocracy as the reference category. For another, he has pooled all countries together and,thus, failed to take into country-specific effects into consideration.

3. Income Level Differences

3.1. Data and Methodology

To study the effects of autocratic regime types on real GDP per capita *levels*, we once again use balanced and unbalanced panels under the three regime classifications. The summary statistics in Table 5 show that, in contrast with growth rate averages, pooled averages of income figures make monarchic autocracies represent the richest of all regime types in both balanced and unbalanced datasets. Democracies on average are the second prosperous regimes in all three classifications. Conversely, militarist autocracies once again

emerge as the poorest in CGV and HTW classifications while they only surpass personalist autocracies in GWF. A similar trend is present in the unbalanced panel. 645 additional observations from 28 new countries in this dataset do not change income level rankings in neither of the regime classifications; see Table 1K of the appendix.

Our econometric estimations in this section closely follow recent work by Acemoglu et al. (2017) in formulating the main estimating equation. These authors identify several problems in the existing literature regarding the modeling of income and its dynamics. It proposes dynamic panel data models as appropriate. In this research, we adopt the model designed for dichotomous regime type classifications and harmonize it with our regime types which have three or more classifications. Furthermore, four variants of dynamic panel data estimation techniques are employed in order to safeguard the robustness of results (see below). Additionally, the robustness of our results is further investigated using Roodman's (2009b) guidelines for dynamic panel data models.

Table 5: GDP per capita in PPP across regime types (balanced dataset)

Regime types	Mean	St. Dev	Max	Min	N
Democracy CGV	7,840	7,331	38,696	507.92	871
Civilian CGV	5,641	5,867	42,341	337.26	684
Military CGV	3,231	4,985	63,690	408.02	824
Monarchic CGV	28,418	48,587	227,761	600.32	248
Democracy GWF	8,167	7,259	38,696	552.25	802
Dominant Party GWF	5,906	7,115	63,690	482.33	811
Personalist GWF	1,871	1,735	13,619	337.26	407
Monarchic GWF	28,304	48,523	227,761	571.82	249
Military GWF	3,486	2,715	12,987	408.02	358
Democracy HTW	8,871	7,685	38,696	552.25	729
Electoral HTW	5,047	6,318	63,690	482.33	982
Military HTW	2,879	2,603	12,987	337.26	670
Monarchic HTW	28,638	48,723	227,761	600.32	246

Our baseline dynamic model for GDP per capita level is formulated as in

$$y_{it} = \beta_1 D_{1,it} + \beta_2 D_{2,it} + \beta_3 D_{3,it} + \beta_4 D_{4,it} + \sum_{j=1}^{p} \delta_j \, y_{it-j} + \alpha_i + \theta_t + \varepsilon_{it} \qquad (2)$$

where $_{it}$ is log of GDP per capita in the country i at year t. The dummies $D_{1,it}\ to\ D_{4,it}$ and the country and year effects α_i and θ_t are as described under equation (1). In order to introduce the dynamics in GDP per capita, p lags of the dependent covariate y_{it} are included in the right-hand side of the model.

As in Acemoglu et al. (2017), the model in (3) is estimated under the standard sequential exogeneity assumption:

$$E\left(\varepsilon_{it}\middle|y_{it-1},.,y_{it_0},D_{1,it},\dots,D_{1,it_0},\ D_{2,it},\dots,D_{2,it_0},D_{3,it},\dots,D_{3,it_0},D_{4,it},\dots,D_{4,it_0},\alpha_i,\theta_t\right)=0$$

given $y_{it-1},.,y_{it_0},D_{1,it},,D_{1,it_0},\ D_{2,it},,D_{2,it_0},D_{3,it},\dots,D_{3,it_0},D_{4,it},\dots,D_{4,it_0},\alpha_i\ and\ \theta_t$ and for all i and $t \geq t_0$.

This assumption implies that regime types and past GDP per capita levels are orthogonal to current and future shocks to GDP per capita. The analysis also assumes that there is no serial correlation in the error term ε_{it}. In order for this last assumption to hold, sufficient numbers of lags of the dependent variable need to be included in the model.

Following Acemoglu et al. (2017), we start our estimations using the standard within estimator, followed by Arellano-Bond's difference GMM estimator in the second stage of our analysis. In addition to serving as further proof to the robustness of our results in the first estimation, the use of difference GMM is motivated by the intention to avoid the possibility of "Nickell's bias" associated with the use of the within estimator for a dynamic model.[5] Nickell (1981) demonstrates that using OLS estimator for a dynamic model with fixed effects produces inconsistent and biased parameter estimates. Moreover, the persistence in GDP dynamics necessitates the need to model them using autoregressive forms. Such models, therefore, are more suitably estimated using GMM estimators.[6]

Contrary to Acemogluet al. (2014; 2017), we also employ forward orthogonal deviation (FOD) transformation and the system GMM estimation techniques that correct some of the

[5] Since we have moderately high T, 37 for the balanced panel, the $1/T$ order of bias for the within estimator remains small.

[6] The use of GMM models requires small T and large N. Since we have larger N (77 in balanced and 99 in unbalanced) compared to our T, we follow Acemoglu et al. (2017) and usedynamic GMM estimators.

drawbacks in the difference GMM estimators. The forward orthogonal deviation (FOD) transformation and the difference GMM differ in how the variables are differenced in order to drop time-invariant components in the model. While difference GMM transforms a model by differencing $t-1$ from t, the forward orthogonal deviation estimator proposed by Arellano and Bover (1995) transforms the data by subtracting the average of all future values from current observations. This method is especially helpful to retain more data points in the unbalanced data with gaps (Roodman, 2009b).

The system GMM, on the other hand, is distinguished from the difference GMM in the type of internally generated instrumental variables it uses. As a version of an instrumental variable estimation technique, the difference GMM uses lagged levels as instruments to differenced variables. By using differenced instruments for lagged level variables, the system GMM estimator effectively augments the difference GMM estimator and produces a more appropriate result especially for series that have a higher degree of persistence (Roodman, 2009b).

All the three GMM estimators we employ use instrumental variables generated from within the model itself. The use of instrumental variable techniques is mainly to control for possible endogeneity of explanatory variables, and they provide instruments that are otherwise difficult to find for our regime dummies. While the level or differenced instruments of regime dummies help us capture the effect of the persistence of political institutions, instruments for our lagged dependent variable captures the effects of the persistence of the economic structure in the model.

In our study of the relationship between regime types and income levels, we, therefore, employ the within, the difference GMM, the system GMM and the FOD estimators. The estimations are made using both balanced and unbalanced data. Similar to what we have done in our previous estimations of GDP per capita growth rates, we first drop the time effects in our primary estimation of equation (3) in order to disentangle the role it plays in the robustness of results of our dynamic model.

3.2. Results

We start with CGV classification of regime types using our balanced dataset of 71 countries and 37 years covered in our sample. In the balanced panel data without time effects shown in Table 6, the within estimator both at the baseline and with controls produce significant coefficients for all regime types. In the CGV classification, all autocratic regimes have negative estimated signs implying that all autocratic regimes economically perform weaker than democratic regimes. Among autocratic regime types, monarchic regimes perform better than military and civilian regimes. A transition to the autocratic regime from democracy or failing to make the transition to democracy annually levies a cost of 1.44% decline in income in monarchic, 1.95% in the military, and 2.11% in civilian regimes. Following Acemoglu et al. (2014; 2017), iterating this annual percentage value using the formula given in (4), these costs rise, respectively, to 26.25%, 35.52% and 38.49% after twenty years and to 37.59%, 50.87% and 55.11% in the long run.

$$\frac{\hat{\beta}_n}{1-\sum_{j=1}^{p}\hat{\delta}_j} \tag{3}$$

where "$\widehat{\ }$" denotes parameter estimates and n takes values from 1 to 3 in CGV and HTW, and 1 to 4 in GWF regime classification.

Regime types continue to produce statistically significant parameters with the inclusion of control covariates to the baseline model. A noticeable change is in the ranking of autocracies. When religion and resource rent controls are included, civilian regimes start outperforming military regimes. Militarist autocracies entail 2.9% decline in annual income and 55.02% in the long-run income, compared to democracies, whereas civilian autocracies are associated with declines of 1.99% and 36.78% in income in short-run and long-run, respectively. In all specifications using the within estimator, monarchic regimes continue to perform better than military and civilian regimes if judged by the parameter magnitudes.

The statistically significant relationship between monarchic regimes and income level dissipates once estimations are conducted using GMM estimators. Military and civilian regime types, however, continue to show a statistically significant difference with democracies in both difference and FOD GMM estimators. For the balanced panel, estimation from FOD transformation presented gives comparably similar results with the difference

GMM in the baseline regression in column (1). In these two estimators, the magnitude of the difference increases for both regime types compared to the within estimator. Being military and civilian autocracies are associated with a long term decline of income, relative to democracy, by at least 60.75% and 43.92%, respectively.

Our third GMM estimator is the system GMM. The use of this estimator is motivated by two reasons. The first is associated with the autoregressive structure of our dependent variable. Tests for all estimations in Table 6 convincingly show a high degree of persistence of GDP per capita levels. This makes the use of the system GMM more appropriate than difference GMM. In contrast to difference GMM that uses level lagged values as instruments, the system GMM uses differences of lagged values for the same purpose. These instruments in the system GMM capture future changes better than the instruments used in the difference GMM (Blundell and Bond, 1998). The second motivation to use the system GMM is related to the freedom it gives in using time-invariant control variables in the analysis. Despite being a fixed-effect model, the system GMM accommodates and does not drop out time-invariant covariates (Levine et al., 2000).

Table 6: The effect of CGV autocratic regime types on GDP per capita, balanced panel without year fixed effect

		Within			Difference GMM			FOD GMM		
		1	2	3	1	2	3	1	2	3
Monarchic	**Short-run effect %**	–1.440***	–1.526***	–1.644***	1.654	0.415	1.660	1.654	0.208	–1.447
		(0.192)	(0.338)	(0.539)	(2.838)	(2.809)	(2.601)	(2.838)	(2.018)	(1.253)
	Effect after 20 yrs %	–26.25***	–27.06***	–28.61***	29.77	7.414	28.91	29.77	3.762	–25.90
		(1.177)	(4.819)	(8.064)	(51.23)	(50.30)	(45.37)	(51.23)	(36.51)	(21.02)
	Long-run effect %	–37.59***	–37.29***	–30.36***	43.45	10.60	31.05	43.45	5.456	–28.26
		(6.480)	(8.377)	(7.863)	(75.50)	(72.29)	(49.71)	(75.50)	(53.06)	(20.85)
Military	**Short-run effect %**	–1.948**	–1.972**	–2.979***	–2.755**	–2.973**	–3.266**	–2.755**	–3.035**	–3.109**
		(0.848)	(0.901)	(1.068)	(1.222)	(1.412)	(1.485)	(1.222)	(1.345)	(1.419)
	Effect after 20 yrs %	–35.52**	–34.98**	–51.85***	–49.61***	–53.13**	–56.87***	–49.61***	–54.85***	–55.68***
		(14.27)	(14.60)	(14.70)	(19.05)	(21.32)	(20.02)	(19.05)	(20.58)	(19.73)
	Long-run effect %	–50.87***	–48.20***	–55.02***	–72.40***	–75.97***	–61.07***	–72.40***	–79.55***	–60.75***
		(14.80)	(14.79)	(12.04)	(18.63)	(20.08)	(15.11)	(18.63)	(19.96)	(15.26)
Civilian	**Short-run effect %**	–2.111***	–1.884**	–1.992**	–3.038***	–2.935**	–2.349**	–3.038***	–3.116***	–2.329**
		(0.732)	(0.761)	(0.867)	(1.068)	(1.239)	(1.163)	(1.068)	(1.131)	(1.051)
	Effect after 20 yrs %	–38.49***	–33.43***	–34.67**	–54.69***	–52.45***	–40.90**	–54.69***	–56.32***	–41.71**
		(12.33)	(12.63)	(14.15)	(16.48)	(19.29)	(18.27)	(16.48)	(17.48)	(16.86)
	Long-run effect %	–55.11***	–46.06***	–36.78**	–79.82***	–75.00***	–43.92**	–79.82***	–81.69***	–45.51***
		(16.11)	(15.54)	(14.73)	(21.22)	(23.50)	(18.33)	(21.22)	(22.58)	(17.35)
	GDP persistence	0.962***	0.959***	0.946***	0.962***	0.961***	0.947***	0.962***	0.962***	0.949***
		(0.0100)	(0.0106)	(0.0162)	(0.0123)	(0.0134)	(0.0182)	(0.0123)	(0.0130)	(0.0182)
	AR(1)				0.000	0.000	0.000	0.000	0.000	0.000
	AR(2)				0.614	0.431	0.248	0.614	0.41	0.784
	Hansen p				1.000	1.000	1.000	1.000	1.000	1.000
	Lags in Instrument				Full	Full	Full	Full	Full	Full
	No of instruments				1644	1645	1557	1644	1645	1557
	R–squared	0.945	0.946	0.941						
	Observations	2,343	2,343	2,019	2,272	2,201	1,879	2,272	2,201	1,879
	Countries	71	71	70	71	71	70	71	71	70

Note: Robust standard errors in parentheses. *** indicates p <0.01, ** p <0.05, * p < 0.10. The table presents estimates of the effect of regime types on income level under CGV. Regimes coefficients are multiplied by 100 and up to 4th lags are included in the estimation except in column (3) for each estimation where up to 6th lags are used to elevate AR2 test to an acceptable level. The GMM estimates are one-step. Under each estimator, column (1) presents results without any control variable. Religion is included in column (2) and Resource rent in column (4). GDP persistence tests whether the sum of coefficients of dependent variable lags is less than 1. The test of serial correlation in the residual is reported under AR2 test. The full regression output behind this table is reported in Table 2A of the appendix.

Table 7: The effect of CGV autocratic regime types on GDP per capita, balanced panel without year fixed effect (system GMM)

		System GMM				
		1	2	3	4	5
Monarchic	Short-run effect %	–0.726	–0.870	–0.556	–0.507	0.282
		(0.669)	(0.632)	(0.625)	(0.637)	(0.553)
	Effect after 20 yrs %	–22.14	–26.50	–16.51	–14.45	8.921
		(19.89)	(18.87)	(18.38)	(18.02)	(17.47)
	Long-run effect %	–712.6	–2,089	–241.5	–118.8	41.64
		(1,801)	(13,656)	(394.7)	(169.9)	(82.23)
Military	Short-run effect %	–1.383**	–1.641***	–1.678***	–1.665***	–1.815***
		(0.571)	(0.626)	(0.634)	(0.631)	(0.680)
	Effect after 20 yrs %	–42.16**	–50.02**	–49.80**	–47.43**	–57.02**
		(17.67)	(19.62)	(19.39)	(18.81)	(22.46)
	Long-run effect %	–1,357	–3,943	–728.5	–390.1**	–257.6***
		(3,115)	(24,946)	(732.0)	(194.6)	(89.83)
Civilian	Short-run effect %	–0.868**	–1.165***	–1.180***	–0.897**	–0.550
		(0.420)	(0.414)	(0.432)	(0.438)	(0.408)
	Effect after 20 yrs %	–26.46**	–35.50***	–35.01***	–25.56**	–17.28
		(12.69)	(12.65)	(12.95)	(12.63)	(12.80)
	Long-run effect %	–851.7	–2,799	–512.2	–210.2	–78.05
		(2,058)	(18,058)	(587.3)	(141.1)	(69.53)
	GDP persistence	0.999***	1.000***	0.998***	0.996***	0.993***
		(0.00264)	(0.00274)	(0.00284)	(0.00284)	(0.00366)
	AR(1)	0.000	0.000	0.000	0.000	0.000
	AR(2)	0.348	0.507	0.416	0.384	0.234
	Hansen p	1.000	1.000	1.000	1.000	1.000
	Lags in Instrument	Full	Full	Full	Full	Full
	No of instruments	1716	1717	1708	1711	1622
	Observations	2,343	2,272	2,240	2,240	1,919
	Countries	71	71	70	70	69

Note: Robust standard errors in parentheses. *** indicates p <0.01, ** p <0.05, * p < 0.10. The table presents estimates of the effect of regime types on income level under CGV using system GMM estimator. Regimes coefficients are multiplied by 100 and up to 4th lags are included in the estimation except in column (5) where up to 6th lags are used to elevate AR2 test to an acceptable level. The GMM estimates are one-step. Under each estimator, column (1) presents results without any control variable. Religion is included in column (2), Latitude in column (3), colonial legacy dummies in column (4) and resource rent, Eastern Asian and South American dummies altogether in column (5). GDP persistence tests whether the sum of coefficients of dependent variable lags is less than 1. The test of serial correlation in the residual is reported under AR2 test. The full regression output behind this table is reported in Table 2Y of the appendix.

When the model is re-estimated using the system GMM estimator (see Table 7), military and civilian regimes continue to explain growth differences in a statistically significant manner. A rather remarkable departure from the previous estimation is seen in the magnitudes of the two regime types coefficients; here, civilian autocracies perform better than military autocracies. In the baseline estimation, while not being a democracy reduces income by 1.38% in the short run and by 42.16% after twenty years in military regimes, it depresses income by 0.87% annually and by 26.46% after two decades in civilian regimes. With the exception of the civilian regime under the full battery of controls in column (5), these results are robust to the inclusion of control covariates. The long-run effects, however, are found to be statistically insignificant for most model specifications and for both regime types.

The above exercises show how sensitive results are to the changes in estimator types, and there is a need to take precautions while drawing conclusions. Results for the CGV classification are further scrutinized for robustness to changes in data type and inclusion of more observations. As unbalanced panel estimations show in Table 1L of the appendix, the results are largely closed to our balanced panel estimations. All autocracy coefficients are statistically significant for the within estimator (column 1), and only military and civilian autocracies produce parameter estimates showing statistical significance. In the system GMM estimator presented in Table 1M of the appendix, however, only military regimes are found to have statistically significant effects in the short run and in a twenty-year span. Here, the failure to make a shift to democracy imposes at least 1.30% annual decline and a total of 38.86% after twenty years when regimes are led by the military or someone with a military background.

As a final step in our robustness checks, we introduce year fixed effects to our models. Recall that the inclusion of time effects on the growth model has seriously affected the outcomes. The results presented from Table 1N to 1Q of the appendix clearly show that regime types in CGV classification cease to explain differences in income levels once year fixed effects are included in the estimations. The introduction of year fixed effects has visible effects on determining the capacity of CGV autocratic regimes to explain income differences.

Our next autocratic regime type classification is the GWF. Once again, we try to figure out the effect of autocratic regime type in GWF classification. The results from the estimations on the baseline model and with control covariates included are shown in Table 1R of the

appendix. The within estimator on the baseline model on GWF classification shows that irrespective of regime types and compared to democracies, being an autocracy is associated with a lower level of income. Within autocratic regime types, military regimes are found to be the poorest performers, and it is associated with an annual decline of 2.83% in income compared to democracies. This difference in income rise to 50.58% after twenty years and to 71.72% in the long run. Monarchic autocracies, on the other hand, are the best performers among autocratic regime types. In comparison to democracies, their annual income declines every year by 1.25% and the difference reaches as high as 31.60% in the long run. Similarly, being a dominant party-based and personalist autocracy creates 41.73% and 40.40% declines in income in the long run, respectively.

The inclusion of religion as a control variable in column (2) for the within estimation does not create much change in our results. When resource rent is included in column (3), however, dominant party regime ceases to have significance and the magnitude of parameters increases in other regime types.

When the same model is estimated using the difference GMM, two of the four-parameter estimates for the within estimation lose their statistical significance. The baseline estimator under the difference GMM column (1) shows that income is depressed annually by 2.21% in dominant party autocracies and by 3.11% in military autocracies, relative to democracy. In the long run, this annual difference accumulates to create 56.38% and 79.44% declines in a dominant party and military autocracies, respectively. The inclusion of religion covariates to the difference GMM estimator still does not affect the statistical significance of results from the baseline estimation. The resource rent, once again, makes dominant party regime dummy statistically insignificant. When religion and resource rent controls are included, statistically significant regime types are largely similar to the difference GMM estimates.

The re-estimation of the model with system GMM (see Table 1S of the appendix) continues to reaffirm that democracies, in general, perform better than any autocratic regime type in being conducive to higher incomes. Nonetheless, in comparison to previous GMM estimators, these estimators produce different results in the magnitude and statistical significance of autocratic regime types in our dataset. In sharp contrast to difference and FOD GMM estimators, personalist autocracies have become statistically significant together with military autocracies all across the five models. In all the models, military autocracies are

found to perform better than personalist autocracies.

In Tables 1T and 1U of the appendix, we re-estimate the model with an unbalanced panel. This leads to slight changes in estimates for the dominant party and personalist autocracies. Dominant party autocracies become less significant in the within estimator whereas personalist autocracies emerge statistically more significant than they do in the balanced dataset. Nevertheless, in all our estimations including the system GMM, the further expansion of our dataset does not create major changes either in the relationship between autocracies and democracies or the intra-autocratic regime types performance.

The final check for robustness of results of both balanced and unbalanced datasets and across the four estimators is done by including year fixed effects to our models. Here again, year fixed effects display a significant role in absorbing the effects of autocratic regimes on income. After the inclusion of the year fixed effects in our balanced panel data, the only statistically significant coefficient is that of personalist regime under the system GMM estimator (see Tables 1V and 1W of the appendix). Income in personalist autocracies is lower than democracies by 2.05% annually and the amount reaches as high as 58.21% after 20 years. These results are robust to the inclusion of religion and geography controls, and statistical significance would be lost only with the inclusion of dummies of past colonial legacies into the model. In the unbalanced data with time effects (see Table 1X and 1Y of the appendix), monarchic regimes emerge as regimes with the only statistically significant difference with democracies under the within estimator. The regime exhibits an annual decline in income by 0.92% and a 16.74% decline in the long run, relative to democracy. However, these statistically significant relationships are lost across all the three versions of GMM estimators used in our analysis.

In our third and final stage, we use the HTW classification of autocratic regimes. The results of the estimations shown in Table 1Z of the appendix for the balanced panel without year fixed effects demonstrate an interesting shift in the explanatory power of regime types. When the within estimator is employed, military and monarchic regimes produce statistically significant effects, but the electoral regime type is found to have a minor effect on income levels. In contrary to the within estimator, in the difference and FOD GMMs, electoral and military autocracies are statistically significant. Despite the fact that electoral regimes are closest to democracies in their institutional settings, the difference and FOD GMM estimators

suggest that being an electoral autocracy costs 1.40% in annual income and up to 35.85% in the long run. Within autocratic regimes, nonetheless, electoral regimes perform better than military regimes and monarchic regimes. Electoral autocracies display better performance than that of military regimes. This result is robust to the inclusion of religion covariates but becomes insignificant when resource rents are included in the analysis. In the system GMM results ofTable 1AA of the appendix, the parameter estimates of military regimes maintain their statistical significance.

When the unbalanced panel is used (see Table 1AB of the appendix), the within estimator shows that electoral regimes are superior to all other regimes and military regimes perform better than monarchic regimes. In the long run, not being a democracy results in 28%, 47.04% and 78.8% declines in incomes in the electoral, military, and monarchic regimes, respectively. With a slight decline in the magnitude of estimates, the results still hold under the inclusion of control covariates.

When year fixed effects are introduced, most regime types cease to be a major factor in explaining income levels. As tables from Tables 3AD to 3AGD of the appendix shows, only monarchic regimes under the within estimator and military regimes under the system GMM estimator produce statistically significant parameter estimates. The introduction of year fixed effects to the model once again absorbs the role of regime types in affecting GDP per capita in HTW classification.

3.3 Some Robustness Checks

The conclusiveness of results we obtain above using GMM estimators needs to be checked for robustness to the reduction of the instrument count. Roodman (2009a) shows that, if not constrained, the difference and system GMM estimators are prone to instrument proliferation, and this is more prevalent when T increases. This proliferation of instruments seriously compromises the power of the over-identification test, and it also affects the values of parameter estimates. Thus, Roodman (2009a: 140) strongly recommends the importance "for researchers to test GMM results for robustness to reductions in the instrument set." Moreover, he also shows that Windmeijer-corrected two-step GMM estimator is the preferable specification for efficiency (Roodman, 2009b). When we look at the modelling approach

pursued by Acemoglu et al. (2017), we notice that the GMM estimator used is one-step and no modifications are employed to limit the instrument proliferation.

Each GMM estimator in the results discussed above produces more than one thousand instruments. This hugely disproportional number of instruments compared to 71 countries in the balanced and 99 countries in the unbalanced dataset produced a perfect Hansen J test statistic with p-values equal to unity. This, Roodman (2009b) argues, is a typical problem of low power, and robustness of the results has to be checked with a reduction in the number of instruments in the model. Next, we follow Roodman's (2009s) guidelines and re-estimate the model in (2).

We start with two-step Windmeijer-corrected difference and FOD GMM estimators with time effects for CGV regime classifications and present the results in Table 8. In contrast to one-step difference, GMM discussed previously, our preferred two-step estimator includes fewer lags of the dependent variable. Although there are alterations form the sign and magnitudes of coefficient estimates, our preferred model once again shows that, in all the three regime classifications, autocratic regimes do not explain income differences both in balanced and unbalanced data. In these estimations, the shift to two-step estimator and the reduction of the instrument count to the ideal level of fewer than the number of countries decreases the problematically low power Hansen J statistic p-value. Both limiting and collapsing the lags used as instruments are employed to this end. For most of our specifications, we manage to bring the p-value for Hansen J over-identification within the 0.1 and 0.25 range Roodman (2009b) recommends. These results are obtained after multiple attempts to bring Hansen J statistic within the recommended range while maintaining the instrument count below 71 and, AR (1) and AR (2) p-values within the acceptable ranges.

As Table 8 shows, parameter estimates exhibit major changes in the magnitude and statistical significance. The only statistically significant regime type is now a monarchic regime under FOD GMM with religion controls in the short-run. It shows that, in comparison to democracies, monarchic autocracy annually reduces income by 9.34%. These considerable changes in magnitude, statistical significance and sometimes in signs of the relationship between regime types and income levels pose a serious concern on the robustness of results obtained using GMM estimators. The same inconsistency in results is also observed in the unbalanced data under CGV classification (see Table 1AH of the appendix).

Major changes are also observed for GWF and HTW classifications. In GWF, the statistically significant military regime type in the unbalanced data under FOD GMM (see Table 1X of the appendix) becomes insignificant when instrument count is reduced (see Table 1AJ of the appendix). On the contrary, the same regime type has become significant in the short-run under the balanced dataset (see Table 1AJ of the appendix). In HTW classification, monarchic regime type that is significant both in the balanced and unbalanced data ceases to be significant (see Table 1AK and 1AL of the appendix). The effect of restricting instrument count is even more pronounced in the use of system GMM estimators. Although Hansen p-values can be comfortably placed between the acceptable ranges, these changes reduce the persistence in GDP series and imply non-stationarity. This loss of stationarity makes the use of system GMM in the restricted model unnecessary and inappropriate. The results we obtain after employing Roodman's (2009a) suggestion for GMM estimators, therefore, compromise the reliability of results for the difference, FOD and the system GMM estimators.

Table 8: The effect of CGV autocratic regime type on GDP per capita, the balanced panel with year fixed effect (two-step GMM)

		Difference GMM			FOD GMM		
		1	2	3	1	2	3
	Log GDP 1st lag	0.704***	0.977***	0.986***	1.357***	1.086***	1.020***
		(0.162)	(0.140)	(0.167)	(0.164)	(0.135)	(0.121)
	Log GDP 2nd lag	–0.0794	–0.165**	–0.169***	–0.253***	–0.152**	–0.117*
		(0.0567)	(0.0688)	(0.0648)	(0.0931)	(0.0664)	(0.0648)
	Log GDP 3rd lag	0.0889**	0.0816*	0.0605			
		(0.0349)	(0.0447)	(0.0477)			
Monarchic	**Short-run effect %**	–17.42	–19.68*	–6.169	–16.84	–9.341***	–4.608
		(30.68)	(11.64)	(12.03)	(14.62)	(2.349)	(4.340)
	Effect after 20 years %	–60.63	–164.7	–47.20	–1,758	–114.1	–43.01
		(113.8)	(149.0)	(83.89)	(3,143)	(81.26)	(35.54)
	Long-run effect %	–60.84	–183.9	–50.45	162.7	–142.1	–47.56
		(114.3)	(202.5)	(90.01)	(161.2)	(167.4)	(40.59)
Military	**Short-run effect %**	–0.176	–0.641	–1.156	–2.772	–0.134	–0.276
		(2.406)	(1.837)	(3.096)	(2.025)	(1.972)	(2.028)
	Effect after 20 years %	–0.614	–5.367	–8.848	–289.5	–1.633	–2.579
		(8.444)	(18.09)	(27.52)	(553.6)	(24.97)	(19.77)
	Long-run effect %	–0.616	–5.994	–9.456	26.79*	–2.035	–2.851
		(8.474)	(21.40)	(30.43)	(15.02)	(31.86)	(22.16)
Civilian	**Short-run effect %**	–1.554	0.490	–3.566	0.105	–0.0178	0.0580
		(4.505)	(3.323)	(7.164)	(2.234)	(3.415)	(3.507)
	Effect after 20 years %	–5.408	4.099	–27.28	10.93	–0.217	0.541
		(15.15)	(27.68)	(60.93)	(233.4)	(41.82)	(32.57)
	Long-run effect %	–5.426	4.579	–29.16	–1.012	–0.271	0.598
		(15.19)	(31.01)	(67.09)	(21.63)	(52.23)	(35.96)
	GDP persistence	0.714***	0.893***	0.878***	1.103***	0.934***	0.903***
		(0.107)	(0.0972)	(0.109)	(0.0796)	(0.0790)	(0.0660)

AR1 test p–value	0.022	0.001	0.002	0.000	0.000	0.000
AR2 test p–value	0.926	0.643	0.607	0.626	0.369	0.435
Hansen p	0.218	0.236	0.114	0.162	0.194	0.280
No of lags in Instr.	9	5	4	9	3	3
No of instruments	69	65	64	70	54	56
Observations	2,343	2,343	2,159	2,414	2,414	2,229
Countries	71	71	70	71	71	70

Note: Robust standard errors in parentheses. *** indicates p <0.01, ** p <0.05, * p < 0.10. The table presents estimates of the effect of regime types on income level under the CGV autocratic classifications using two-step difference and FOD GMMs. Regimes' coefficients are multiplied by 100. Both limiting and collapsing instruments are employed to contain instrument proliferation. For each estimator, column (1) presents results without any control variable. Religion and resource rent are included as control covariate in column (2) and column (3) respectively. The p-values of the test of serial correlation in the residual and over-identification test results are reported under AR2 and Hansen p test respectively. The full regression output behind this table is reported in Table 2Y of the appendix.

3.4. Discussion

The results of the effect of regime types on income levels can be presented within the perspective of the findings presented by Acemoglu et al. (2017). Using exactly the same modelling procedure, our study further disaggregated the statistically significant and robust results they find into specific regime types. Under the within and difference GMM estimators, the negative sign in all regime parameters entails that the poor performance of autocracies compared to democracies also hold across all autocratic regime types. When we look at the statistically significant regime types found in our results, it implies that these relationships are mainly guided by some regime types, and they vary across different specifications of the model. The strength of these relationships fades away when year fixed effects are introduced and the system GMM estimators are employed in the analysis. In other words, the power of autocratic regime types to explain cross-country income differences, as in the case of growth rates, largely depends on the methodology we adopt and, more importantly, the presence of time fixed effects in the model.

The change in the dependent variable from growth rates to levels results in changes in the ranking of the performance of autocratic regime types. The fact that we have got more statistically significant regime types in most estimations using the within estimator provides us with the chance to compare economic performance among autocracies. In CGV classification, both in the balanced and unbalanced data, monarchic regime types, which, by definition, are the least expected to own broader and binding institutions than civilian and military regimes, are the closest in economic performance to democracies. This adds another major restrictiveness of institutionalist explanations of cross-country economic performance

differences. On the other hand, the institutionalist hypothesis is supported in GWF and HTW classifications. For instance, in the balanced data under the within estimation and GWF classification, we find that economic performance is higher in dominant party autocracies followed by the military, personalist, and monarchic regimes. In HTW classification, too, the most institutionalized regime type—electoral autocracy—outperforms military and monarchic regimes. These standings in both classifications largely hold in most specifications with statistically significant coefficient estimates.

The ability of the institutionalist explanation to shed light on economic performance differences, among other things, depends on the type of a dependent variable and regime classification used in the analysis. Given the results we obtain in the previous section, the results we obtain in this section suggest that the institutionalist explanation of differences in economic performance works better when economic performance is measured as growth rates than at levels. What is common, nonetheless, is the role of time effects, regardless of the dependent variable or the autocracy classification. Once they are included, regime types cease to explain cross-country income differences in both balanced and unbalanced datasets.

These results, once again, reaffirm the need to take precautions in the estimation methodologies adopted and the conclusions drawn from data. This perhaps extends to the political economy literature in general on the search for a causal relationship between economic outcomes and political factors. The fact that we fail to find significant and robust effects of autocratic regime types on income levels even in a carefully executed estimation procedure consolidates the results we acquire earlier that regime types per se do not explain income and growth differences. The patterns in real income per capita are therefore determined not by heterogeneity within autocracies but by other omitted factors.

4. Explaining the Time Effects

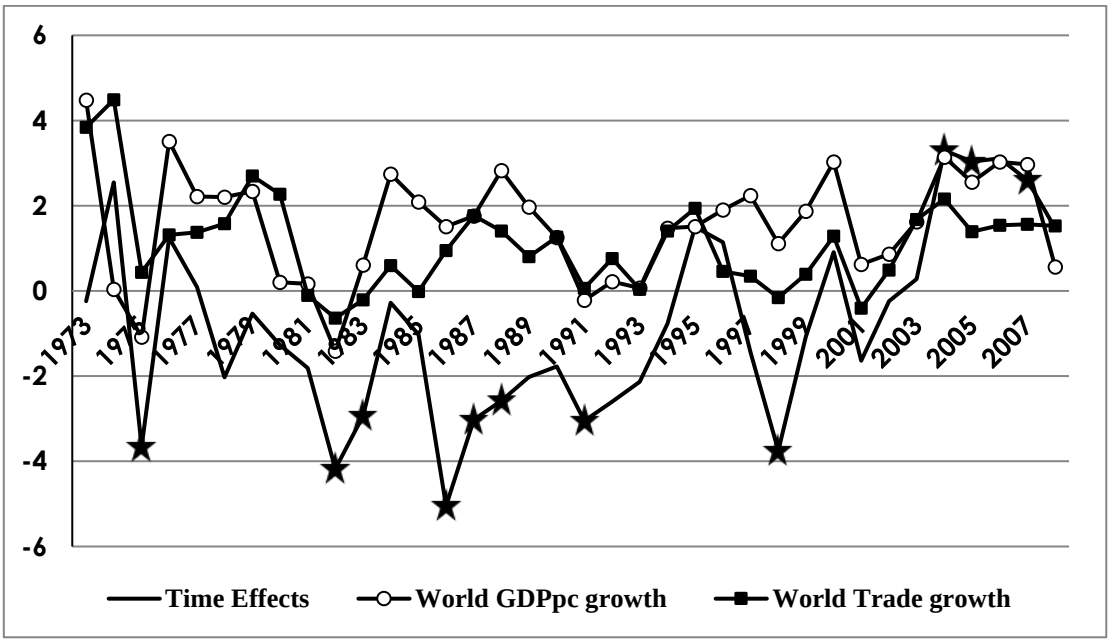
Our preferred specifications are the ones with year fixed effects; the inclusion of which absorbs autocratic regime types' role in explaining growth and income differences. Three possible explanations can be given to the results we obtain in this paper.

First, if we assume that there are no considerable subjectivity and arbitrariness in autocratic

regime classifications we use in our study, then our research findings suggest that autocratic regime types fail to explain growth and income differences when time effects are included in the models. In other words, the causes of differences in growth rates and income levels in authoritarian regimes are unobserved time factors that affect all regime types at a given year and not autocratic regime types per se.

To further investigate our first explanation, we depict estimated year fixed effects along with world income growth and world trade growth patterns in Figure 1.1. The time effects produce statistically significant dummies in 1975, 1982-83, 1986-88, 1991, 1998, 2004-05 and 2007, and weakly significant dummies for the years 1974, 1992 and 2006. Most of these years are associated with periods of major economic and political events in the world.

Figure 1: Time effects and the growth of world income and world trade



Note: Stars (★) represent years with statistically significant time effects. Growth rates of world merchandise export are divided by 10 to facilitate graph comprehension. Time effects are from the estimation of the growth model in 4.1 under CGV classification.

Figure 1 clearly shows that the fluctuations in the world economy and trade are reflected in year fixed effects. World income growth and year fixed effects have a Spearman's correlation of 0.537 with a p-value of 0.0007, implying a positive and moderate correlation between the two. A closer look at the statistically significant year dummies further strengths the notion that some common factors explain growth rate differences across autocracies. Within the

study period, the years in which world average per capita income contracted (1975, 1982 and 1991) are reflected in autocracies by producing statistically significant time effect dummies. We also observe some boom years for the world economy where year fixed effects are positive and significant; these are the years from 2004 to 2007 that eventually ended up with the Global Financial Crisis.

The correlation between time effects and world income growth rates entails the presence of linkage and common factors that affect both series. The literature on economic crises identifies trade and financial links as major economic crisis transmission mechanisms (Desai, 2003). With the development of the global financial sector, the number of different financial linkages that transmit crises from one place to other increases. Financial markets in developing countries, however, lack strong connections with developed markets, thereby reducing contagion via the financial channel (Abdel-Latif, 2009). There is also a limitation on data availability to effectively study the role of financial links (Glick and Rose, 1999). More importantly, Masson (1998) and Glick and Rose (1999) find that trade linkages have higher explanatory power of crisis transmission than financial channels. Bernanke (2009) also suggest that this channel was critical in transmitting the effects of the recent economic crisis on Asian economies.

In line with this, picturing the growth rates of world merchandise exports alongside year fixed effects produces an interesting relationship between the two. They have a moderate and positive Spearman's correlation of 0.548 with a p-value of 0.0005, and the statistically significant year fixed effects match major changes in international trade flows. These years coincide with global trade contraction of 1982-83 and 1998, the largest decline of the past four decades in 1975 (by 40.56%), and the recovery in global trade between 1986-1988 and after 2004.

It should also be noted that some economic and political shocks that were largely confined to autocracies produce statistically significant year fixed effects. The Latin American debt crisis in 1982, the second half of the 1980s (1986 to 1988) where numerous exits from autocracy were witnessed in Eastern Europe and South Americas, and the height of the Asian financial crisis in 1998 are found to be statistically significant to explain the pattern of economic growth for the countries in the dataset.

The second alternative explanation is in relation to questioning the validity of regime classifications. Cheibub et al. (2010) caution that the arbitrariness involved in determining cutting points in distinguishing regimes types between democracy and autocracy may have the potential to mislead the results in either way. It may give seemingly significant results when there is no such relationship, or it may produce the opposite. The fact that the dichotomous democracy-autocracy categorization is further sliced into different autocratic regime types increases the risk associated with arbitrariness and aggravates the possibility of producing misleading results. Some evidence on these grounds can be found in Acemoglu et al. (2014). They associate the inconsistency in some of their results in different estimations with the possibility of high measurement errors in democracy indices. They deem these indices to have missed "important de facto elements of democracy" in their classifications (Acemoglu et al., 2014: 35). The wide variation of results we obtain across different estimations could thus potentially suggest possible measurement errors in these autocratic regime type classifications.

The third explanation is related to the internal heterogeneity within regime types themselves. The theoretical mapping of relationships between regime types and economic growth runs mainly through the level and quality of institutionalization in a polity. When we look at regime classifications, however, different levels of institutionalization within specific regime categories co-exist. If we look at monarchic regimes, which perhaps consists one of the most politically homogenous polities, for example, we have on one hand Saudi Arabia with the most restrictive institutions for the free market and on the other hand countries such as the United Arab Emirates and Qatar with institutions that facilitated the establishment of free markets. Similar contrasts can also be established within other regimes types as well.

5. Concluding remarks

This paper attempts to give a comprehensive answer to one of the most intensely debated questions in political economy. Using static and dynamic panel data models, we examined whether different autocracies create causal effects on economic growth rates and income levels. The main result is that, while some regime types have a statistically significant effect on growth rate or income level, such effects are extremely sensitive to the addition of time effects. Put differently, different autocratic regime types have statistically significant

economic effects only when estimations ignore time effects that commonly hit all regime types at any given year.

The multiplicity of estimation techniques applied, the different data and autocratic regime type classifications employed, and the diversity of economic outcome variables used to imply that *our negative result is robust*. Our findings clarify when and how heterogeneity among autocracies creates a meaningful effect and when and how it does not. Results also show when and where the institutional explanation overpower the state autonomy paradigm, when and where the opposite happens, and, perhaps most importantly, when and where both fail to have a meaningful story to tell.

Bearing in mind the second and third explanations that question the validity of the autocratic classification themselves, we can conclude that the three prominent autocratic regime classifications used in our research do not reliably explain income level and growth rate differences across autocracies. This indicates the need for refining the existing classifications and developing new ways of classifying autocracies in order to discern their effects on economic growth and income. It is thus important to reiterate Prezeworski and Limongi's (1993: 66) conclusion that "[c]learly, the impact of political regimes on growth is [still] wide open for reflection and research."

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APPENDIX 1: AUTOCRATIC COUNTRIES LIST (1972-2008)

In this study, efforts have been made to avoid a wrong classification of a regime as an autocracy. For this purpose, three of the latest and most commonly used datasets of autocracies are used. These datasets are: CGV by Cheibub et al., 2010, GWF by Geddes et al. (2014), and HTW by Wahmana et al. (2013). The datasets utilize different criteria to identify political regimes and to distinguish between democracies and autocracies. In our study a country is identified as having an autocratic regime only when all the three datasets name that specific country on that specific year as an autocracy. Considering the disparities both in the definition of autocratic regimes and in the observations in these datasets, we prefer to be precautious in identifying a regime as an autocracy. Selecting only the country-year pairs that appear as autocracies in all of the three datasets at the same time, we increase reliability, representativeness, and the strength of conclusions that will be made in the following parts of this work.

Based on the criteria mentioned above, the following table presents the list of autocratic countries used in our study. Autocratic stay refers to the number of years a country stayed under autocratic rule. The table also shows the type of autocratic regime types these countries had been through within our study period from 1972 to 2008.

		CGV			GWF				HTW		
Countries	**Autocratic stay**	**Military**	**Monarchic**	**Civilian**	**Dominant Party**	**Personalist**	**Military**	**Monarchic**	**Monarchic**	**Military**	**Electoral**
Afghanistan	26		X	x	x	x		x	x	x	
Albania	19	x		x	x						x
Algeria	37	x		x	x		x			x	
Angola	33			x	x					x	x
Argentina	7	x					x			x	
Azerbaijan	16			x		x					x
Bangladesh	13	x		x	x	x	x			x	x
Belarus	16			x	x						x
Benin	18	x				x				x	x
Bolivia	8	x					x			x	
Brazil	13	x					x			x	
Bulgaria	18			x	x						x

Burkina Faso	35	x				x	x				x	x
Burundi	28	x		x	x		x				x	x
Cambodia	37	x		x	x	x						x
Cameroon	37			x	x	x						x
Central African Republic	26	x		x		x	x				x	
Chad	34	x		x	x	x	x				x	x
Chile	15	x					x				x	
China	37			x	x							x
Congo (Brazzaville)	31	x			x	x					x	
Congo (Kinshasa)	37	x		x		x					x	
Cote d'Ivoire	37	x		x	x	x					x	x
Cuba	37	x		x	x							x
Czechoslovakia	17			x	x							x
East Germany	18			x	x							x
Ecuador	7	x				x	x				x	
Egypt	37	x			x							x
El Salvador	12	x		x	x		x				x	x
Eritrea	15			x	x						x	
Ethiopia	37	x	X	x	x		x	x	x		x	x
Gabon	37			x	x							x
Gambia	16	x				x					x	x
Georgia	12			x		x						x
Ghana	17	x				x	x				x	x
Greece	2	x					x				x	
Guatemala	4	x					x				x	x
Guinea	37	x		x	x	x					x	x
Guinea Bissau	26	x		x	x	x					x	x
Haiti	27	x		x		x	x				x	x
Honduras	9	x					x				x	
Hungary	18			x	x							x
Indonesia	27	x			x						x	x
Iran	37		x	x	x			x	x			x
Iraq	32	x		x	x	x					x	
Jordan	37		x					x			x	
Kazakhstan	17			x		x						x

Kenya	26			x	x						x
Kuwait	37		x					x	x		
Kyrgyzstan	13			x		x					x
Laos	33	x		x	x						x
Lesotho	21	x		x	x		x			x	
Liberia	25	x		x	x	x				x	x
Libya	37	x				x				x	
Madagascar	20	x			x	x	x			x	x
Malawi	22			x		x				x	x
Malaysia	35			x	x						x
Mali	20	x				x				x	
Mauritania	35	x		x		x	x			x	x
Mexico	28			x	x						x
Mongolia	18			x	x						x
Morocco	37		x					x	x		
Mozambique	31			x	x					x	x
Myanmar	36			x			x			x	
Nepal	22		x					x	x		
Nicaragua	12	x		x	x	x				x	x
Niger	23	x		x		x	x			x	x
Nigeria	22	x					x			x	
North Korea	37	x		x	x						x
North Vietnam	4				x						x
North Yemen	17	x		x		x	x			x	x
Oman	37		x					x	x		
Pakistan	19	x					x			x	
Panama	17	x					x			x	
Paraguay	17	x			x						x
Peru	15	x		x		x	x			x	x
Philippines	13			x		x					x
Poland	17	x		x	x						x
Portugal	3	x		x		x				x	x
Romania	18			x	x						x
Russia	15			x		x					x
Rwanda	37	x		x	x		x			x	x
Saudi Arabia	37		x					x	x		
Senegal	28			x	x						x
Serbia	8			x	x						x
Sierra Leone	24	x		x	x		x			x	x
Singapore	37			x	x						x

Somalia	20	x		x		x				x	
South Africa	22			x	x						x
South Korea	15	x					x			x	
South Vietnam	3						x			x	
South Yemen	17			x	x						x
Spain	5	x		x		x					x
Sri Lanka	8			x	x						x
Sudan	33	x				x				x	
Swaziland	37		x					x	x		
Syria	37	x			x					x	
Taiwan	21	x		x	x					x	x
Tajikistan	17			x		x					x
Tanzania	37	x		x	x						x
Thailand	8	x		x			x			x	
Togo	36	x		x		x				x	
Tunisia	37	x		x	x						x
Turkey	2	x					x			x	
Turkmenistan	17			x	x						x
USSR	19			x	x						
Uganda	31	x		x		x				x	
UAE	37		x					x	x		
Uruguay	11	x					x			x	x
Uzbekistan	17			x	x						x
Vietnam	33	x		x	x						x
Yemen	19	x				x					x
Yugoslavia	19			x	x						x
Zambia	31			x	x						x
Zimbabwe	28			x	x						x

APPENDIX 2: SOURCES OF DATA

Variables	Source of data
Growth rate of GDP per capita in PPP	Computed from Penn World Tables, version 9.0 " Expenditure–side real GDP at chained PPPs (in mil. 2011US$)" by Feenstra et al. (2015)
Latitude	Latitude of country centroid by Gallup et al. (1998)
Religion	The percentage of a certain religion follower in a country taken from Zeev and Errol (2013). The raw data provides data every 5 years. By using the same level of percentage of year t for t_1 to t_4 the data is made annual.
Colonial legacy	Primary Colonial Ruler data by Paul (2014)
Resource rent	Total natural resources rents (% of GDP) data in World Development Indicators by World Bank (2017)
World Real GDP per capita growth rate	Computed from "GDP per capita (constant 2010 US$)" data in World Development Indicators by World Bank (2017)
Region classification	United Nations, 2014, "Country Classification", Annex in " World Economic Situation and Prospects", UN, New York
World trade growth	Computed from WTO data on World Merchandise Trade (Export): http://stat.wto.org/StatisticalProgram/WsdbExport.aspx

The Effects of Energy Prices on Trade in Turkey: Analysis in a Data-Rich Environment

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Abstract

Energy price increases can have strong adverse effects on the economies of developing countries. The magnitude of the effects depends on the import dependencies of the countries. Turkey is a typical developing country and, also is an oil importer. This study is the first attempt to addressing the effects of the oil price shocks on trade for Turkey in detail. The FAVAR approach allows us to analyze energy-trade nexus in a data-rich environment. This paper uses the large monthly dataset that covering the period of 2005 to 2018 and consisting of 135 series. The results can be summarized as i) Oil have a reducing effect on the unobserved factor of trade, but natural gas has no significant impact. ii) The fact that the derivations of the energy prices have not changed the results greatly. These results show us that difference the effects of the positive or negative innovations of energy prices are negligible. iii) In detail, price increases in oil reduce intermediate goods imports and rise manufacture goods exports. The cost effect of oil works. iv) factor analysis reveals the underestimation of the effects of oil shocks on trade.

Jel Classification: C38, C55, E23, E31

1. Introduction

Energy price increases can have strong adverse effects on the economies of developing countries. The magnitude of the effects depends on the import dependencies of the countries. Turkey is a typical developing country and also is an oil importer. While the bill of the energy import of Turkey is about 43 billion dollars, the import dependency of oil in Turkey is about 94.4% in 2015 that is highly critical level (Ediger and Berk, 2011). However, natural gas that is the main fuel type of energy in Turkey was neglected mostly. However, natural gas accounting for 30.2% of net energy imports and gas net imports have grown by about 80% in the last decade (International Energy Agency, 2016).

Mounting studies are analyzing the relation between oil price changes and macroeconomic variables in the literature, starting from Hamilton (1983,1996) and Mork et al. (1994). Two of the earlier and essential papers of Hamilton (1983, 1996) reveal that most of the recessions of the US economy after World War II are caused by oil price increases. This adverse effect on macroeconomic stability supported by many other studies (e.g., Burbidge and Harrison (1984), Mork et al. (1994), Hamilton (2009), Cavalcanti and Jalles, (2013)). Although how oil prices impact economies is still arguably a bit, consensus held in the literature is that oil prices contribute to macroeconomic fluctuations (e.g. Hamilton, 2011; Lee et al., 1995; Rahman and Serletis, 2011; Farzanegan and Markwardt, (2009) and have inflationary effects (Barsky and Kilian, 2004; LeBlanc and Chinn, 2004; Meyler, 2009). Herrera et al. (2011) and Kilian and Vigfusson (2012) also claim that this relationship has asymmetric behavior.

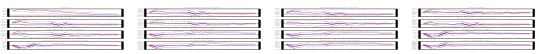
So, the new strand in the related literature is using the advantage of rich data environments. FAVAR approach is used by some studies to estimate the effects of oil shocks. Styrin (2009), which emphasizes that keeping the rates constant have deepened the oil crisis of the 1970s can be considered as the first attempt. Lescaroux (2009) and An et al. (2014) concluded that oil prices have inflationary effects, and it is greater in positive oil price shocks rather than price decreases. Some other studies support these results (such as Herrera et al., 2017; Ratti and Vespignani, 2016). Moreover, the literature suggests the oil price innovations are the significant drive of the financial markets (Zazaglia (2010); Juvenal and Petrella (2015); Nasher and Rashid (2018); Aastveit et al. (2018))

However, any studies that use the FAVAR approach give importance to foreign trade. This study is the first attempt to addressing the effects of the oil price shocks on trade for Turkey in detail as far as we know. Moreover, the studies about Turkey restricted with standard tools of VAR or VECM. These methods struggle with overparameterization in case of a high number of variables. For this reason, most of them cannot exceed the four or five variables. Though, few variables cannot represent truly the whole macroeconomics. The contribution of this study can be that it uses the large data set to analyze the oil shocks. Secondly, it focuses on the estimate the effects of energy prices on trade for the first time. It uses the variations of the energy prices to handle it.

2. Data and Methodology

The dataset used in this paper consists of 135 macroeconomic variables of the Turkish economy and covered between the years of 2005 and 2018 as a monthly basis[7]. All variables of the Turkish economy obtained from Turkish Central Bank Electronic Data Delivery System (EVDS). Variables of the energy prices are international crude oil price and natural gas price. The source of the oil price is the US Energy Information Administration and measures as a dollar per barrel. Natural gas represented by Russian natural gas border price in Germany and measures as a dollar per million metric British Thermal Units. The natural gas price obtained from the IMF database. Exception energy prices, all other series transformed to induce stationary. We did not report the results of unit root tests because of space.

However, some derivations of the energy prices were used in the literature such as Mork, SOPI, and NOPI. The choice of energy price variables is very difficult and decisive. Although there is a debate about how should be deflated energy prices, we focus on the shock type and nonlinear behavior. In this view, we use four alternative derivations of both oil and natural gas prices. Firstly, the standard way is interannual changes in the prices:

 (1)

[7] Descriptions of all the series and transformation information can be found in Appendix.

Secondly, Mork (1989) suggest taking into consideration only positive innovations. According to it, the second derivative of the energy prices in this paper is calculated by:

$$\Delta energy_t^+ = \max(0, \Delta energy_t) \quad (2)$$

The third derivatives called as net oil price increases (NOPI) proposed by Hamilton (1996). NOPI extended the Lee et al. (1996) measure with logarithmic differences of levels from the last four years. This variable aims to measure the greatest positive innovations in the last years. It takes the logarithmic difference from the past four years if it is positive or zeroes otherwise:

$$NOPI_t = max\ [0, ln(energy_t) - ln(max(energy_{t-4}, energy_{t-8}, energy_{t-12}, energy_{t-16}, energy_{t-20}, energy_{t-24}) \quad (3)$$

The fourth and last derivatives of the energy prices are scaled oil price increases (SOPI) which proposed by Lee et al. (1995). It argues that oil shock has more significant effects on stable regimes. SOPI focus on the volatility of energy shocks. It is used the GARCH framework to modeling the volatility and measured by:

$$\Delta energy_t = \alpha + \sum_{j=1}^{k} \beta_j \Delta energy_{t-j} + \varepsilon_t \quad (4)$$

$$h_t = \gamma_0 + \gamma_1 \varepsilon_{t-1}^2 + \gamma_2 h_{t-1} \quad (5)$$

$$SOPI_t = \max(0, \frac{\hat{\varepsilon}_t}{\sqrt{\hat{h}_t}}) \quad (6)$$

The four derivatives of the energy prices, which are oil price and natural gas price are represented in Figure 1. and Figure 2. respectively. It can be concluded from the figures that energy prices have major nonlinearities. Finally, correlations of derivatives for each energy price can be found in Table 1.

Figure 1. Oil Prices and It's Derivatives

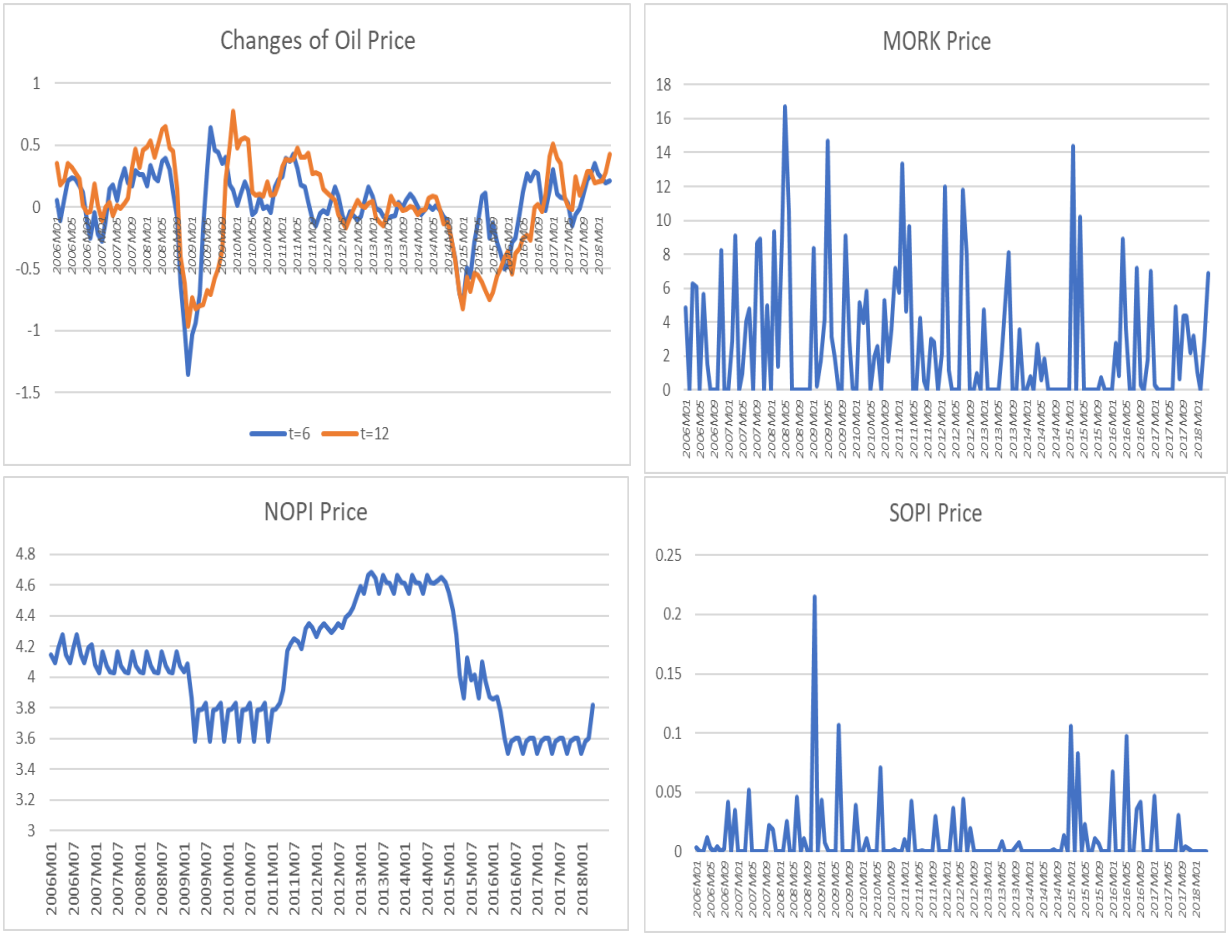
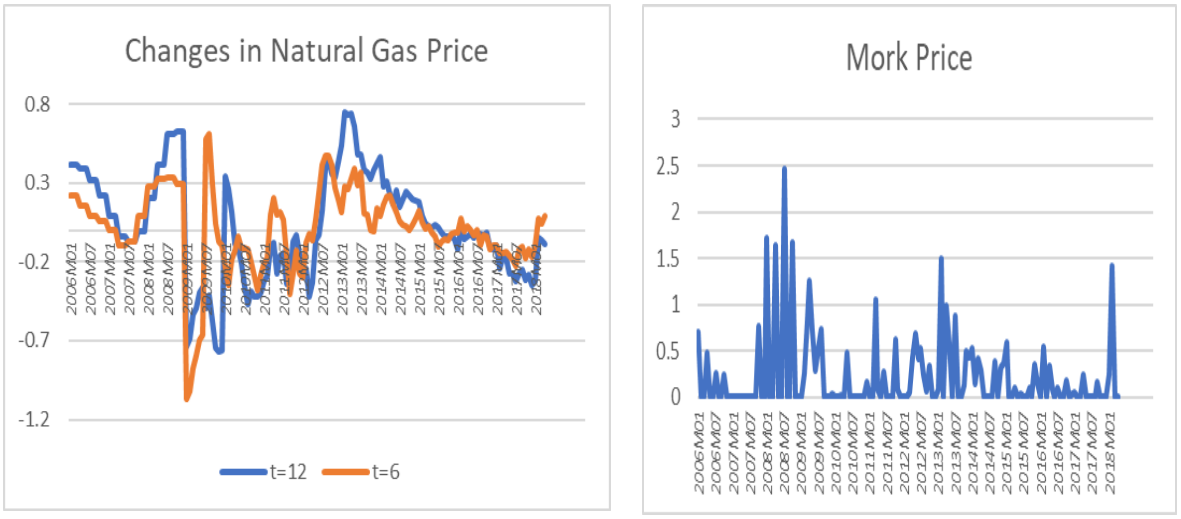
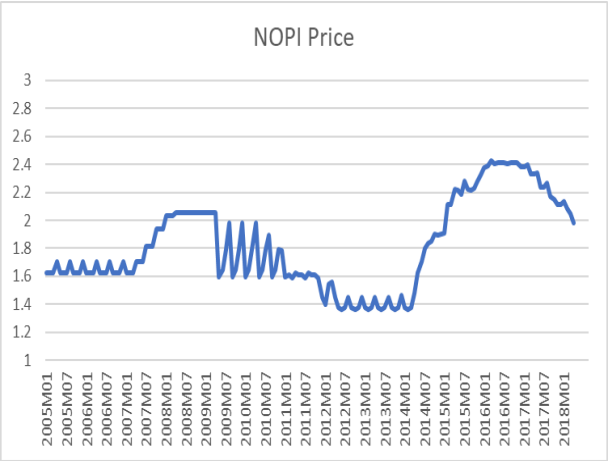


Figure 2. Natural Gas Prices and It's Derivatives





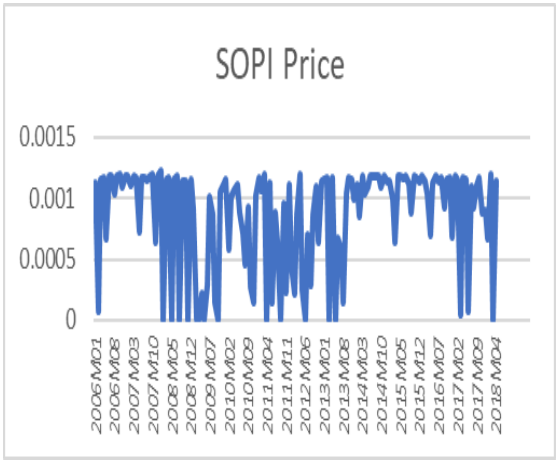


Table 1. Correlations of the Price Derivatives

	Changes of Oil Prices	SOPI Price	NOPI Price	MORK Price
Changes of Oil Prices	1.000	-0.227	-0.12	0.206
SOPI Price	-0.227	1.000	-0.056	-0.079
NOPI Price	-0.12	-0.056	1.000	-0.109
MORK Price	0.206	-0.079	-0.109	1.000

	Changes in Natural Gas Prices	SOPI Price	NOPI Price	MORK Price
Changes of Natural Gas Prices	1.000	0.130	-0.229	0.165
SOPI Price	0.130	1.000	-0.176	0.083
NOPI Price	-0.229	-0.176	1.000	-0.064
MORK Price	0.165	0.083	-0.064	1.000

3. Results

There are two estimation procedures in the literature to estimate the FAVAR models: two-step principal component approach and the Bayesian likelihood approach. This paper uses the two-step principal component procedure because of its simplicity. So, Bernanke et al. (2005) state that it is not clear which method is superior. Two-step principal approach can be summarized as:

1. Determining the number of factors.
2. Derivating the unobserved common factors and determines which variables have a fast response

3. FAVAR model estimation using unobserved common factors and observables.

Table 2. includes some diagnostics before the FAVAR estimation. Panel A. shows the results of the principal component analysis. Eigenvalues and proportions of variances of all factors help us to specify the optimal number of factors. Contribution of each new factor to cumulative variance proportions reduces after the fourth factor. So, four factors can explain 42.4% of the total variance, and after that, additional factors can not significantly increase the explained share of variance. This result support with the Bai and Ng (2008) test, which indicates the model has four common factors.

Also, Panel B. of Table 2. Shows that four-factor has enough explanatory power on foreign trade. Key trade variables can be explained at least % 50 with these four factors.

Table 2. Factorization Results

Panel A.

Factors	Eigenvalues	Cumulative Variance Proportions
1	23.8	17.9
2	15.7	29.7
3	9.4	36.7
4	7.6	42.4
5	6.7	47.6
6	4.1	50.7
7	4	53.7

Panel B.

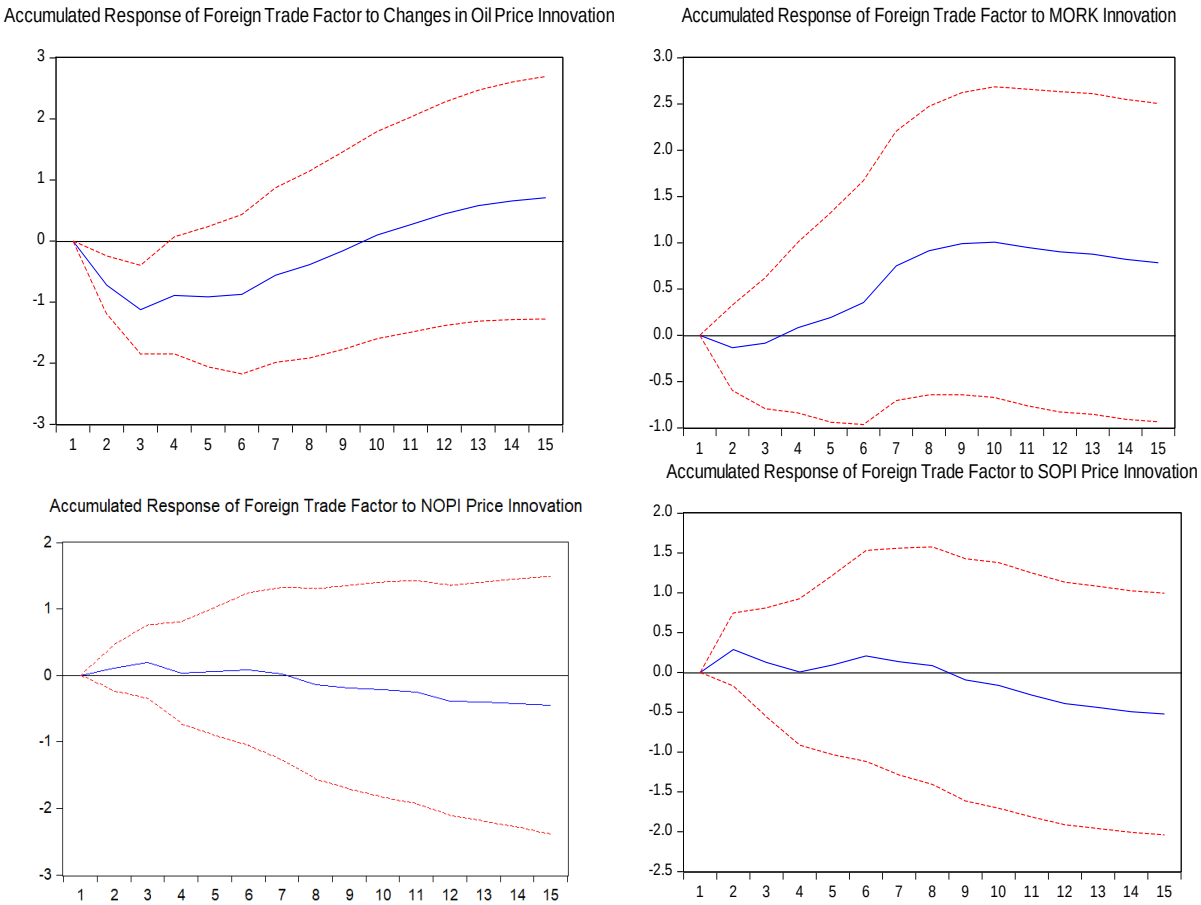
Variables	Variance Explained by all factors
Total Exports	0.57
Total Imports	0.60
Export Unit Index	0.51
Export Volume Index	0.50
Import Unit Index	0.56
Import Volume Index	0.52

We derivated the four unobserved common factors from the variables using by principal component analysis. The first factor indicates the broad concept of production, and the second is exchange rates. The third one represents the money market. The fourth factor is related to

foreign trade. Because this paper tries to analyze the effects of energy prices on foreign trade, we focus on the fourth factor rather than all on the rest of the paper.

Figure 3. and Figure 4. show the responses of the common factor of foreign trade to shocks on all derivatives of oil and natural gas. The interannual changes in oil prices have a significant and negative effect on foreign trade. One standard deviation increases in the oil prices reduce foreign trade. On the other hand, there are controversial results on the effects of other derivatives. International trade does not a response to shocks of Mork prices and SOPI prices as can be seen from the confidence bands. However, NOPI prices, which indicate the greatest increase of the last year, have reducing effects on trade as similar to interannual change. The results emphasize the importance of comparing the current price of oil with where it has been over the previous moths rather than the previous year alone. It can be argued that it should be considered maximum increase of the last longer term for the price increases.

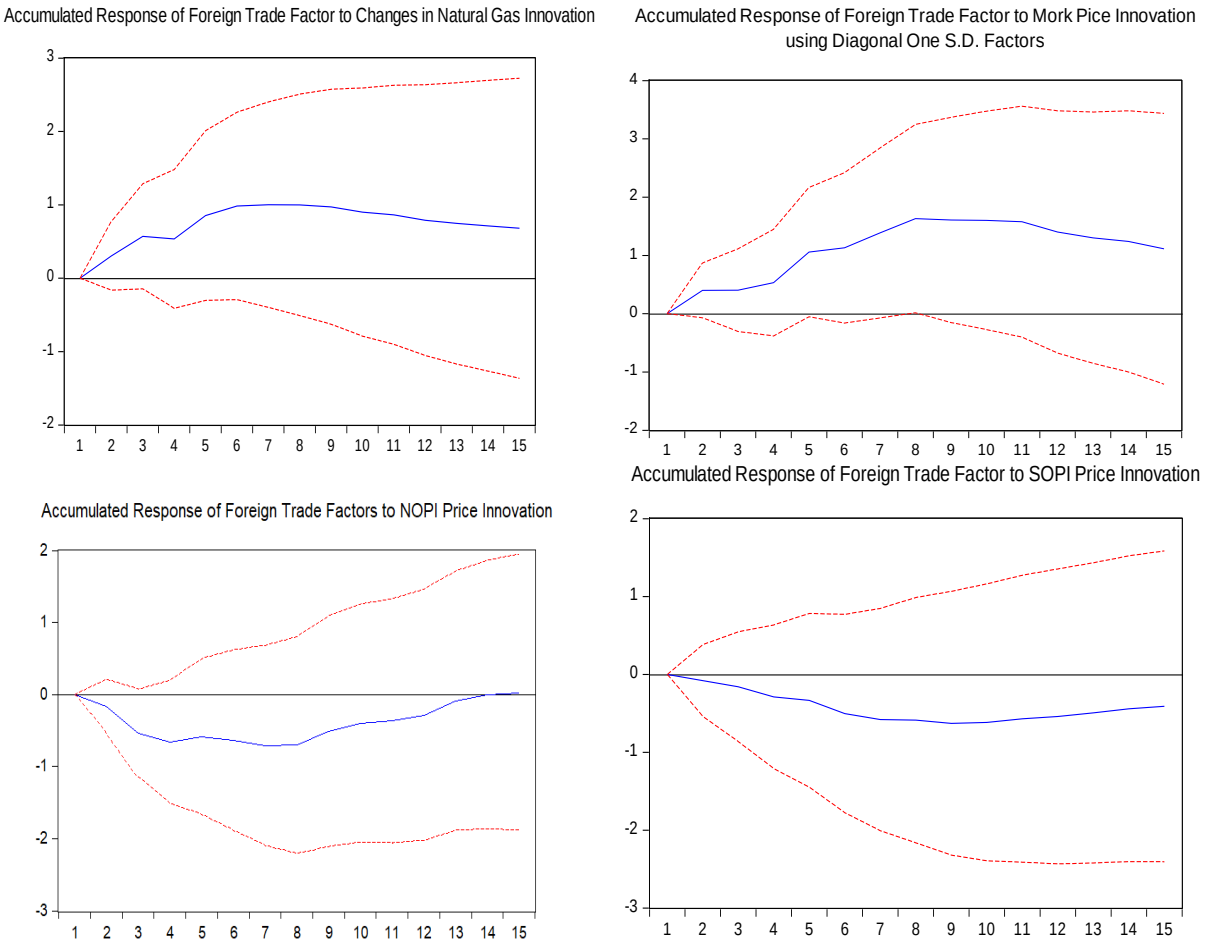
Figure 3. Responses of the Unobserved Trade Factor to Oil Price and It is Derivatives



Note: Responses are accumulated. Shocks are one standard deviation, and vertical axes represent percentage change.

However, the impulse responses of the natural gas price and its derivatives indicate clear results. Although the share of the natural gas in energy consumption gradually increases in the last decade in Turkey, any of the natural gas variations have a significant impact on trade, according to Figure 4. Two main reasons can be found. First of those is the longer-term contract structure of natural gas between countries. Price terms of the assignments allow importing prices of the natural gas more stable. It can be suggested that low volatility of the gas prices is the second reason for the responsiveness of trade.

Figure 4. Responses of the Unobserved Trade Factor to Natural Gas Price and It is Derivatives

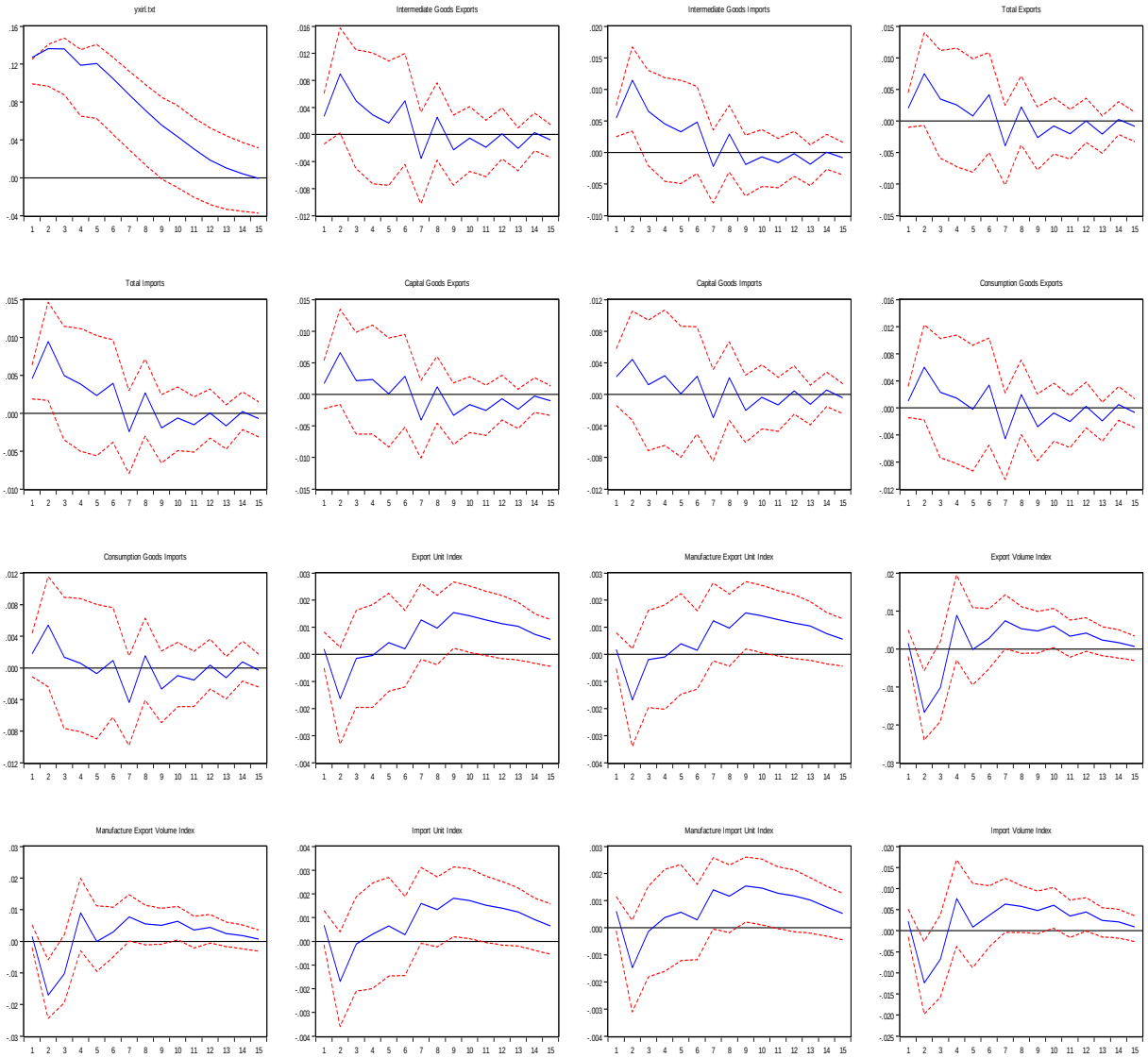


Note: Responses are accumulated. Shocks are one standard deviation, and vertical axes represent the percentage change.

The following figures look at the reaction of trade in more detail. Figure 5. and Figure 6. which interannual changes were used as the price changes reveal the responses of some trade

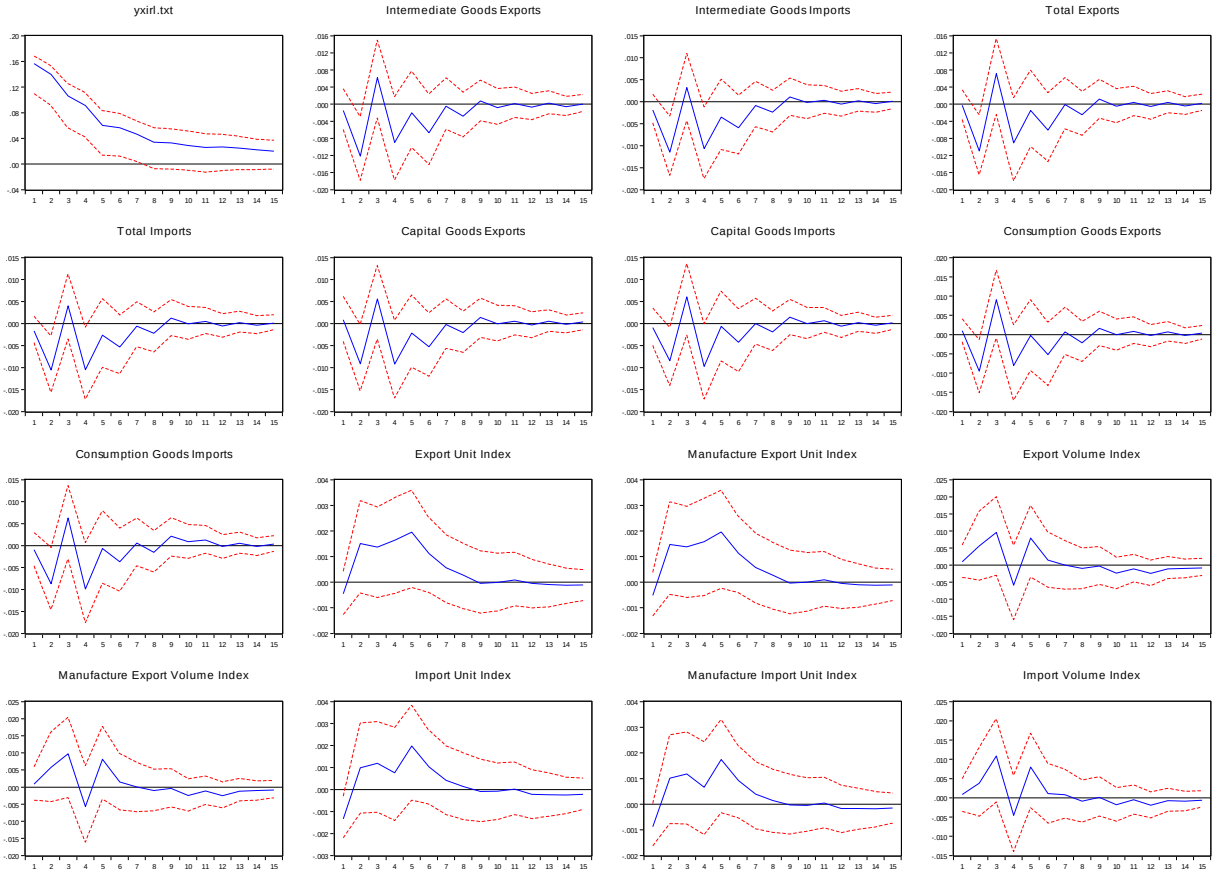
variables to price shocks of oil and natural gas. These graphs suggest some exciting results. Firstly, the responses have great varieties. A second and maybe more important result is that while imports, oil price hurt imports, exports have to decrease with the positive oil price shocks. Reduces the imports sourced by intermediate goods imports. In other face of the coin, manufacture export volume index decreases.

Figure 5. Responses of the Some Trade Variables to Interannual Price Changes of Oil



Note: Responses are accumulated. Shocks are one standard deviation, and vertical axes represent percentage change.

Figure 5. Responses of the Some Trade Variables to Interannual Price Changes of Natural Gas



Finally, we decompose the variances of the trade variables. The variance decomposition analysis shows how are oil price shocks play a role in the variables. Oil shocks can explain the variance of the trade factor, and this share is greater than all of the trade variables. It can be concluded that factor analysis reveals the underestimation of the effects of oil shocks on trade. Moreover, contributions to the oil price changes to variances of the exports and imports are 1% and 2.2%, respectively. Oil has a greater share of the changes in imports by comparison to exports. So, price changes in the oil have a greater part of intermediate goods.

Table 3. Decomposition of Variances

Variables	Contribution of the Oil Shocks to Variance
Unobservable Factor of Foreign Trade	11.08
Total Exports	1.00
Total Imports	2.20
Export Volume Index	2.9
Import Volume Index	2.00
Export Unit Index	1.40
Import Unit Index	1.50
Intermediate Goods Imports	3.00

4. Conclusion

This paper focuses the trade when investigates the effects of energy prices in Turkey. It uses the FAVAR approach because of some advantages. A data-rich method of the FAVAR approach allows us to analyze a large dataset that includes 135 macroeconomic series. This flexibility overcomes the problem of VAR is that few variables cannot truly represent the whole macroeconomy.

As a result, we can use said that firstly oil have a reducing effect on the unobserved factor of trade, but natural gas has no significant impact. On the other hand, the derivations of energy prices have not changed the results considerably. This robustness shown us that using the effects of the positive or negative innovations of energy prices make no significant difference. In detail analysis, the paper calculates the impulse responses of some trade variables rather than unobserved factors. Responses showed that price increases in oil reduces intermediate goods imports and rises manufacture goods exports. It c2an be said that the cost effect of oil works. Finally, factor analysis reveals the underestimation of the effects of oil shocks on trade.

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Exchange Rate Regimes as Thresholds: The Main Determinants of Capital Inflows in Emerging Market Economies

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Abstract

This study investigates whether the impacts of the main common push (global financial conditions, GFC) and country-specific pull (growth) factors on capital inflows are invariant to the prevailing exchange rate regimes (ERRs) in emerging market economies. Our results suggest that endogenously estimated ERR thresholds do matter especially for the impact of GFC. The impact of GFC is substantially high under more flexible ERRs for all capital inflow types except FDI. FDI inflows are basically determined by the pull factor across all ERRs. Portfolio inflows are mainly determined by GFC. The sensitivity of aggregate and other investment inflows to the pull factor seems to be much higher under more rigid ERRs. Our results are broadly in line with the literature suggesting that credible managed ERRs encourage capital inflows by allowing countries to import monetary policy credibility of the center country and to provide exchange rate guarantee.

Key words: Capital Inflows, Emerging Market Economies, Exchange Rate Regimes, Global Financial Conditions, Panel Threshold Model.

JEL Classification: F21, F30, F32, G01

1. Introduction

Capital flows and global financial conditions have often been found amongst the main determinants of growth in emerging market economies (EME) as suggested by the seminal contribution by Calvo, et al. (1996). This important finding is strongly supported also by the recent studies including Cardarelli, et al. (2010) and Rey (2016). The recent two decades have witnessed a dramatic increase in capital flows not only in advanced economies (AE) but also in EME, leading to substantially higher international financial integration (Lane and Milesi-Ferretti, 2018). Consequently, investigating the basic determinants of capital inflows has become much more topical in international macroeconomics.

There is a wide and growing literature on the determinants of capital flows (see, e.g. Forbes and Warnock, 2012; Montiel, 2014; Avdjiev, et al. 2017; Koepke, 2018). The recent literature, following the seminal contributions by Calvo, et al. (1996) and Taylor and Sarno (1997), typically classifies the determinants of capital flows mainly as country-specific (pull) and common (push) factors. "Push" factors primarily refer to changes in global financial conditions and monetary policy stance in AE. "Pull" factors are basically the variables representing domestic macroeconomic and institutional conditions. These include a broad range of factors such as growth, financial and trade openness, institutional quality, domestic policy stance and interest rate differentials.

The results by Forbes and Warnock (2012) suggest that extreme capital flow episodes are mainly driven by global factors. The findings by Ahmed and Zlate (2014) support the postulation that both the domestic pull factors (growth and interest rate differentials) and global risk appetite are significant determinants of net capital flows to EME. Ghosh et al. (2014) suggests that while global factors act as "gatekeepers", pull factors including financial openness and exchange rate regimes (ERRs) determine the final magnitude of the surges in capital inflows to EME.

Rey (2015, 2016) convincingly argues that the VIX index (Chicago Board Options Exchange's equity option volatility index) proxies global financial cycle which is closely associated with capital flows, credit growth and asset prices. In the same vein, Forbes et al. (2012) reports that the global financial conditions (GFC) is the only variable explaining

surges and stops in capital flows. Cerutti et al. (2017a), on the other hand, finds that GFC proxied by VIX explains systematically only a small proportion of the variation in capital flows. The results by Sarno et al. (2016) and Boero, et al. (2019) suggest that global economic forces prevail over domestic variables in explaining movements in international portfolio flows. According to Rey (2016), capital inflows (except FDI) are negatively correlated with the GFC. Avdjiev, et al. (2017) finds that capital inflows are negatively associated with VIX and positively associated with GDP growth across all capital flow types, except portfolio equity.

According to the conventional wisdom, credible managed exchange rate regimes (ERRs) encourage capital inflows as they allow countries to import monetary policy credibility (and thus lower inflation) of the anchor currency country, reduce transaction costs and provide exchange rate guarantee (Rogoff et al. 2004). Under international capital flows, ERR flexibility gives economies greater ability to pursue an independent macroeconomic policy as postulated by the impossible trinity of international macroeconomics. Edwards (2011), for instance, presents evidence that ERR flexibility allows countries to accommodate external shocks. Accordingly, the impacts of external shocks are amplified in countries that have more rigid ERRs (di Giovanni and Shambaugh, 2008). In the same vein, Erdem and Özmen (2015) finds that, the impacts of external real and financial shocks and domestic variables are significantly greater under managed regimes as compared to floats.

The empirical literature, however, provides mixed and often conflicting results on the impact of ERR on capital inflows. Magud *et al*. (2014) and Boudias (2015) find that ERRs have no impact on the cyclical component of capital flows in EME. The results by Passari and Rey (2015) also provides a support to the postulation that the insulation properties of floating ERRs may have been overestimated. Cerutti, et al. (2017a) indicates that the sensitivity of capital inflows to global financial cycle is independent of the ERR. Cerutti, et al. (2017b), on the other hand, reports that the impact of global push factors on portfolio bond inflows higher in EME with more flexible ERRs. The results by Obstfeld et al. (2018) suggest that the transmissions of global financial shocks and domestic pull factors are magnified under a fixed ERR relative to more flexible regimes in EME. According to Ghosh et al. (2014), countries with less flexible ERRs are more likely to experience capital inflow surges.

The literature has often focused on the behavior of net capital flows, measured as the difference of the purchases of domestic assets by non-residents (gross inflows) and the purchases of foreign assets by residents (gross outflows), which is, indeed a mirror of the negative of the current account balance. The recent literature, however, shows that gross capital flows are much larger and more volatile than net capital flows and, thus, crucially important for growth and financial stability issues (Forbes and Warnock, 2012; Broner, et al. 2013; Ghosh et al. 2014). Furthermore, the literature, however, often considers aggregate capital inflows and ignores their main components. The recent studies, including Blanchard et al., (2017), Eichengreen et al. (2018) and Koepke, (2018), on the other hand, convincingly stress the importance of the evolution, causes and consequences of the main components of capital flows. Blanchard et al. (2017), for instance, reports that capital inflows can be expansionary or contractionary conditioning on their types. The results by Eichengreen et al. (2018) suggest that foreign direct investments are driven mainly by pull factors, portfolio flows seem to be driven mainly by push factors whilst other investment flows are driven by both push and pull factors.

The literature is yet to investigate whether prevailing ERR provide endogenous thresholds for the impacts of basic pull and push factors on capital flows. In this context, the main aim of this paper is to investigate this important issue empirically for a balanced panel of EME by employing panel threshold model of Hansen (1999). To this end, in accord with the main findings of the recent literature, we postulate global financial conditions proxied by VIX as the main push factor and real GDP as the main pull factor to explain capital inflows in EME. In this context, we consider also the main components of capital (portfolio equity, foreign direct investment and other investment) inflows.

The plan of the rest of this paper is follows. The following section presents our estimation results. In this section, we first maintain that the impact of the push factor may vary according to the prevailing ERR. We then proceed with the alternative case that ERRs provide an endogenous threshold for the impact of the main pull factor. Finally, Section 3 presents an evaluation of our main findings.

2. Exchange Rate Regimes as Thresholds: Empirical Results

To investigate the main determinants of gross capital inflows, we consider the following simple benchmark equation:

$$CIF_{it} = a_0 + a_1 GROWTH_{it-1} + a_2 \Delta vix_t + u1_{it} \quad (1)$$

In (1), the subscript i and t denote, respectively country and time, Δ is the difference operator, CIF is gross capital inflows scaled by GDP in current US dollars[8], GROWTH is the real GDP growth and vix is the natural log. of the VIX (Chicago Board Options Exchange's equity option volatility index) to proxy the global financial cycle. A decrease in VIX is associated with a greater risk-appetite or better global financial conditions. We postulate that capital inflows may parsimoniously be explained by the main pull (GROWTH) and push (Δvix) factors. Considering the potential endogeneity of real GDP growth for the evolution of capital flows, we consider lagged GROWTH in (1).

The benchmark equation (1) maintains that the impacts of the main pull and push factors are invariant to the prevailing exchange rate regimes (ERRs). Alternatively, ERR may be an endogenous threshold variable magnifying the impacts of the main determinants of capital inflows. In the context of the panel fixed effect threshold model of Hansen (1999), we first consider the impact of the push factor:

$$CIF_{it} = b_0 + b_1 GROWTH_{it-1} + b_2 \Delta vix_t \, (ERR \leq \lambda) + b_3 \Delta vix_t \, (ERR > \lambda) + u2_{it} \quad (2)$$

Alternatively, the ERR may be postulated as a threshold for the impact of the main pull factor:

$$CIF_{it} = c_0 + c_1 \Delta vix_t + c_2 GROWTH_{i,t-1} \, (ERR \leq \lambda) + c_3 GROWTH_{i,t-1} \, (ERR > \lambda) + u3_{it} \quad (3)$$

In (2) and (3), λ is endogenously estimated single threshold value for the ERR. Under the null hypothesis that $b_2 = b_3$ in (2) or $c_2 = c_3$ in (3), there are no significant thresholds for the effects of the ERR and thus we obtain (1). We estimate the equations also for the main

[8] All capital flows data, measured in US dollars, are from International Financial Statistics of the International Monetary Fund (IMF). Following the IMF's Balance of Payments Statistics Yearbooks, capital inflows are defined as net purchases of domestic assets by foreign residents. The GDP data are from World Bank World Development Indicators. The VIX data are from Chicago Boards Options Exchange website.

components of gross capital (foreign direct investment, portfolio and other investment) inflows. For the ERRs, we consider the *de facto* –i.e. the actually followed, rather than the officially declared- classification by Ilzetzki, et al. (2017) (IRR). The classification by IRR divides *de facto* regimes into 6 "coarse" -fixed, limited flexibility, managed floating, freely floating, freely falling, dual market in which parallel market data is missing- and 15 "fine" (ERR1, ERR2, … ERR15) categories. IRR notes that classifying episodes of severe macroeconomic instability with very high inflation and exchange rate change as floating, intermediate or pegged may be misleading as they could be incorrectly attributed to the ERR[9]. IRR classifies these episodes as "freely falling". In these classifications, higher values (up till 4 and 13, respectively in the coarse and fine classifications) denote more flexible exchange rate arrangements. As it allows more flexibility to estimate the thresholds, we consider the "fine" classification of IRR in our empirical analysis. However, we interpret our results considering also the "coarse" classification. Our effective estimation sample does not contain the fine (coarse) ERR classification greater than 13 (4). Our balanced panel data contain 27 emerging market economies[10] (EME) spanning the period between 1996 and 2015. The choice of the sample is basically determined by data availability to obtain a balanced data which is necessary to employ the Hansen (1999) procedure.

Table 1 presents the results of the estimation of Eq. (2) employing the Hansen (1999) procedure[11]. The equation specifies that the impact of the main push factor (GFC, proxied by Δvix) may change across the prevailing *de facto* ERRs. The results by Table 1 suggest that, the pull factor (GROWTH) is positive and significant in explaining all capital inflow types except portfolio inflows. These results also strongly suggest that, ERR10 (crawling band narrower or equal to +/- 5 %) is the threshold for the impact of GFC on aggregate and portfolio inflows. The ERR regime threshold is estimated as 8 (crawling band narrower or equal to +/- 2 %) for FDI flows. The threshold estimates for other investment inflows (12, de

[9] Note that, Magud et al. (2014) and Boudias (2015) results are based on estimations of the equations which include ERRs defined by the IRR coarse classification ranging from 1 to 6. As already noted, in the IRR classification, the higher numbers correspond to more flexible ERRs up till 4. Consequently, maintaining that the "freely falling" and dual markets as more flexible ERRs than the floating regime may be seriously misleading. Therefore, the results by Magud et al., (2014) and Boudias (2015) should be interpreted with a caution.

[10] Emerging market economies (EME) are those included in the Morgan Stanley Capital International (MSCI) index, and comprises Argentina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Czech R., Egypt, Hungary, India, Indonesia, Israel, Kenya, Lithuania, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Romania, Russian F., S. Africa, S. Korea, Thailand, Turkey.

[11] Our preliminary results (not reported to save the space but available on request) suggested not to reject the null hypothesis that two thresholds (three regimes) are insignificant for all the specifications considered in this paper. The trimming parameter for the Hansen procedure is set to be 0.05 at both ends of the threshold variable but our results are found to be robust for different plausible values.

facto moving band +/- 5 %) appears to be statistically insignificant. For aggregate and portfolio inflows, "managed floating" regimes in the *de facto* coarse classification of IRR are estimated as the endogenous threshold. For FDI inflows, the threshold appears to be the "limited flexibility" regime. The results suggest that, the push factor (VIX) is not significantly negative for all capital inflow types, except portfolio inflows, in the low regime (more rigid ERRs). The exchange rate stability appears to be effective in preventing a decrease in these capital inflows in countries with more rigid ERRs. Worsening global financial conditions, on the other hand, leads to a decrease in aggregate, portfolio and other investment inflows in EME implementing more flexible ERRs. This is consistent with an interpretation that worsening GFC leads to capital move from EME to the other EME with more rigid ERRs or to AE, respectively, due to exchange rate guarantee or flight to safety concerns.

Table 1. Exchange Rate Regimes and the Impact of the Push Factor

Capital flows variable	**Aggregate Capital inflows**	**Portfolio inflows**	**FDI inflows**	**Other inv. inflows**
Threshold ERR	10	10	8	12
F_B[.]	9.47[0.02]**	7.83[0.05]**	5.68[0.02]**	5.33[0.19]
The Determinants of Capital Inflows				
$Growth_{i,t-1}$	0.360 (0.057)**	-0.007 (0.021)	0.128 (0.035)**	0.240 (0.036)**
Δvix_{it} **ERR ≤ λ**	0.938 (0.851)	-0.691 (0.392)*	1.321 (0.573)**	0.503 (0.435)
Δvix_{it} **ERR > λ**	-3.269 (1.102)**	-2.126 (0.414)**	-0.601 (0.592)	-9.221 (4.223)**
Constant	2.412 (0.280)**	0.790 (0.105)**	1.718 (0.172)**	-0.106 (0.181)
Statistics	N=27 NT=513 R^2 = 0.10 F = 17.40[0.00]	N=27 NT= 513 R^2 = 0.06 F = 10.9 [0.00]	N=27 NT= 513 R^2 = 0.05 F = 7.9[0.00]	N=27 NT= 513 R^2 = 0.10 F = 19.6[0.00]

Notes: F_B is the bootstrapped F-test based on 1000 replications to test the statistical insignificance of the threshold level and [.] is the p-value of the test. The values in parentheses are the standard errors. * and **, respectively, denote significance at 5 % and 1 % levels. N and NT are, correspondingly, the numbers of countries and the effective number of observations.

We now consider the alternative case that the impact of the pull factor (GROWTH) changes across the ERRs. Table 2 presents the results of the estimation of Eq. (3) which

maintains ERR as a threshold for the impact of GROWTH. For FDI and portfolio inflows, estimated threshold (ERR7) is statistically insignificant. Therefore, the ERRs appear not to provide a significant threshold for the impact of domestic growth on FDI and portfolio inflows. For aggregate capital and other investment inflows, on the other hand, ERR5 (Preannounced crawling peg; de facto moving band narrower than or equal to +/-1%) is estimated as the significant endogenous threshold. This threshold corresponds to mainly pegged ERRs in the "coarse" classification of IRR (2017). The impact of domestic economic conditions, proxied by GROWTH, appears to be substantially much higher on aggregate capital and other investment inflows under pegged ERRs than more flexible ERR arrangements. GFC, proxied by Δvix, on the other hand, is negative and significant only for portfolio inflows. This result is indeed consistent with the results presented by Table 1 suggesting that ERRs provide thresholds for the impact of GFC. Consequently, ignoring these thresholds may lead to misleading results.

Table 2. Exchange Rate Regimes and the Impact of the Pull factor

Capital flows variable	**Aggregate Capital inflows**	**Portfolio inflows**	**FDI inflows**	**Other inv. Inflows**
Threshold ERR	5	7	7	5
F_B[.]	20.3[0.00]**	5.39[0.13]	4.67[0.17]	28.4[0.00]**
The Determinants of Capital Inflows				
Δvix_{it}	-0.578 (0.672)	-1.204 (0.255)**	0.361 (0.416)	0.408 (0.422)
$Growth_{i,t-1}$ ERR ≤ λ	0.734 (0.099)**	-0.650 (0.342)*	0.226 (0.056)**	0.519 (0.062)**
$Growth_{i,t-1}$ ERR > λ	0.252 (0.062)**	0.021 (0.240)	0.936 (0.039)**	0.161 (0.039)**
Constant	2.460 (0.278)**	0.803 (0.106)**	1.681 (0.172)**	-0.121 (0.740)
Statistics	N=27 NT=513 R^2 = 0.12 F = 21.2[0.00]	N=27 NT= 513 R^2 = 0.06 F = 10.0 [0.00]	N=27 NT= 513 R^2 = 0.04 F = 7.6[0.00]	N=27 NT= 513 R^2 = 0.15 F = 28.0[0.00]

Notes: F_B is the bootstrapped F-test based on 1000 replications to test the statistical insignificance of the threshold level and [.] is the p-value of the test. The values in parentheses are the standard errors. * and **, respectively, denote significance at 5 % and 1 % levels. N and NT are, correspondingly, the numbers of countries and the effective number of observations.

3. Concluding Notes

Capital inflows have often been assessed as amongst the main determinants of growth especially in EME. This paper investigates whether the impacts of the main common external (push) and country-specific (pull) factors on capital inflows are invariant to the prevailing de facto exchange rate regimes (ERRs) in EME.

Our results are mainly consistent with the recent literature, including Eichengreen et al. (2018) and Koepke (2018), suggesting that FDI are mainly driven by pull factors, portfolio flows seem to be driven mainly by push factor and other investment flows are driven both by push and pull factors. We also find that ERRs do often matter for the impacts of the main push (global financial conditions captured by Δvix) and the main pull (proxied by GROWTH) factors. The impact of GFC is substantially high under more flexible ERRs for all capital inflow types except FDI. FDI inflows are basically determined by GROWTH across all ERRs. Portfolio inflows are mainly determined by GFC. This supports the recent Sarno et al. (2016) finding that global economic forces seem to prevail over domestic economic forces in explaining portfolio flows. The sensitivity of portfolio inflows to GFC is substantially higher under more flexible ERRs. The impact of the domestic pull factor on aggregate and other investment inflows tends to be much higher under more rigid ERRs. GFC are not significant in determining the evolution of aggregate and other investment inflows under rigid ERRs.

The impact of the external financial conditions on capital inflows increases with ERR flexibility. This result is consistent with the conventional wisdom suggesting that credible managed ERRs encourage capital inflows by allowing countries to import monetary policy credibility of the center country and to provide exchange rate guarantee. Our findings provide a further support also to the seminal paper by Calvo *et al.* (1996) which argues that greater exchange rate flexibility introduces uncertainty and thus may discourage cross-border flows. An adverse global financial shock may be expected to lead to domestic currency depreciation and thus to increase exchange rate risk in EME with floating ERRs. All these may discourage foreign residents to buy domestic assets (capital inflows) of these countries. Consistent with this interpretation, Ghosh et al. (2014) finds that countries with less flexible ERRs are more likely to experience capital inflow surges.

Our results also support the Passari and Rey (2015) postulation that the insulation properties of floating ERRs may have been over-estimated[12].

To conclude, ERRs appear to matter for the impacts of the main global push and country-specific pull factors on the evolution of capital inflows to EME. Exchange rate regime flexibility, albeit potentially providing a buffer against external shocks by allowing more monetary policy independence, also contains uncertainty and exchange rate risk discouraging capital inflows during the episodes of global financial turbulence.

[12] Our results, however, fail to provide a support to the recent Obstfeld et al. (2018) finding that the transmissions of global financial shocks and domestic pull factors are magnified under a fixed ERR relative to more flexible regimes in EME. Obstfeld et al. (2018) defines the ERRs thresholds as exogenous and maintains floating ERR as the reference category. Furthermore, this finding by Obstfeld et al. (2018) is basically based on the estimation of equations containing a dummy variable to control for the recent global financial crisis.

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Are Private Banks More Sensitive to Interest Rate Structure Than Public Banks: The Analysis of Ownership Structure

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Abstract

The most influential channel of monetary transmission mechanism is interest rate. The decisions of the monetary authority for policy rate influence both short and long-term rates and inevitably interest rate structure. This study investigates how the public and private Turkish banks respond to changes in the interest rate structure. The main motivation of the study is to examine whether there exists a significant difference between behaviors of the public and private banks. Using quarterly dynamic panel model over last 16 years, we find that private Turkish banks are more sensitive to the interest rate structure than public banks. That is to say, one unit rise in the interest rate structure would affect the private banks' balance sheet income more than the whole sample.

Keywords: Interest Rate Structure, Panel Data, Ownership Type and Banking

JEL: E40, E43, E44

1. Introduction

As an emerging economy, Turkey has very volatile interest rate structure since 2002. Between the period of 2002 and 2017, we observe different up and down trends in interest rate structure. During the same period, Turkish banking industry has reached its maximum profitability level through credit channels and GDP growth rate. Based on the ownership type, private and public banks set or price different loan and deposit interest rates in response to change in monetary policy/interest rate.

In this study, the central question we ask is "are private banks more sensitive to the interest rate structure than public banks in the Turkish economy. This question appears to be significant since public banks might tend to operate for the sake of public and government interests whereas private banks have more tendency to work according to financial/free market conditions.

By applying dynamic panel model (unbalanced since we have some missing observation for some banks during the sample period) for 26 commercial Turkish banks between 2002 and 2017 on a quarterly basis, we try to examine the impact of the interest rate structure on the banking performance by controlling ownership type, public or private. We estimate one model with two different samples, one with private the other with public banks. We find that private Turkish banks are more sensitive to the interest rate structure than public banks. Interestingly, private banks are being influenced by the change in short-term interest rate while the public banks not. Moreover, both public and private banks have sensitivity to slope of the interest rate structure, that is constructed by subtracting the short-term rate from the long-term rate.

2. Literature

The empirical literature about public or private ownership of banks examines large dimensions of subjects. These subjects are efficiency, capacity, privatization, management, performance, credit and some macroeconomic variables. These subjects might be categorized in two main parts: Internal and External factors. Internal factors focus on banking variables while external factors try to explain the effects of some macroeconomic variables on banking

sector. Brown and others (2006) state that foreign privatization increases the banking efficiency compared to domestic privatization. In other words, their study claims that there exists a significant difference between foreign and domestic owners for banking efficiency. Regarding to profitability, privatization in developing economies might result in higher performance and lower cost. For instance, Karas and others (2010) find that the efficiency of the Russian banking system may benefit more from increased levels of competition and greater access of foreign banks than from bank privatization. They conclude that foreign ownership dominates privatization.

Related to banking performance, for example, Ganesan (2001) derive a profit function for public banks in India and shows that interest income plays a crucial role on the profitability of the Indian public banks. Similar, Chaudhary and Sharma (2011) examines the determinants that influence the performance of the public and private banks in India. They find that increased competition, new technologies, declining costs and less restrictive governmental regulations have significant impact on public banks in India to compete with private sector. The main difference between public and private banks in India occurs in efficient management and bank staff indicators.

Similar to above studies about India, Azam and Siddiqui (2011) tries to explain the determinants that affect the profitability of the Pakistan Commercial banks including both private and public. They show that foreign banks are more profitable than all domestic banks. In other words, ownership plays a significant role in explaining banking performance. As a current study, Shah and others (2018) seeks key to analyze the banks' profitability and their determinants in China over the period 2011-2016. The empirical findings show a significant positive relationship between unsecured/secured borrowing and bank profitability. It is recommended that Chinese banks should focus to increase their loan administration and credit capacity in order to get more benefit.

3. Model and Results

We utilize the relevant variables using balance sheet data on a quarterly basis from the Central Bank of Turkey and the Banks Association of Turkey between 2002 and 2017 for 26 commercial banks.. We obtain three alternative measures for profitability: the net interest margin (NIM), return on equity (ROE), and return on asset (ROA) (Aydemir and Ovenc,

2016). We also employ bank-specific factors such as the leverage rate and the growth rate of real total assets as explanatory variables. To capture the real economic activity, we use the quarterly growth rate of real GDP. For the short-term interest rate and the slope of the yield curve, we work with several variables. In our baseline estimations, we use the quarterly average of the weekly interest rate (repo rate) and the 2-year government bond rate. The weekly repo rate is a good proxy for the Central Bank of Turkey's monetary policy stance. The government bond rate with 2 years maturity is considered as the benchmark rate for the Turkish financial markets (Aydemir and Ovenc, 2016).

We use the similar model used by Alessandri and Nelson (2015); Aydemir and Ovenc (2016). We use the fixed effect GMM estimator to run the model. This estimator produces more efficient result compared to other GMM estimator when the number of quarters in the panel data is greater than the number of banks. In our panel data we have 62 quarters and 26 banks.

$$y_{it} = \alpha y_{i,t-1} + \beta 1 llevrate + \beta 2 lgrowthasset + \beta 3 gdpgrowth + \beta 4 lgdpgrowth + \vartheta reporate + \kappa dreporate + \lambda ldreporate + \mu slope + \nu dslope + \varpi ldslope + \rho hhi + \varepsilon_{it}$$

Table 1: Summary Statistics

Variables	Obs.	Definitions	Mean	Std. Dev.	Min	Max
NIM	1502	Net Interest Income	0,0106	0,0153	-0,08	0,23
ROA	1502	Return on Asset	0,0027	0,0132	-0,22	0,09
ROE	1502	Return on Equity	0,0256	0,0610	-1,15	0,61
LEVERAGE	1502	Debt to Asset	0,8419	0,1481	0,04	0,96
ASSETGROWTH	1502	Growth Rate in Asset	0,0065	0,1617	-0,63	1,76
GDPGROWTH	61	Growth Rate in GDP	-0,1402	0,1028	-0,18	0,14
BOND	61	2-year Government Int.	0,1568	0,1133	0,06	0,65
REPO	61	Weekly Interest Rate	0,1283	0,1012	0,04	0,54

Table 2: Estimation Results With Public Banks

NIM	**COEFFICENT**	**P-VALUE**
LNIM	0.0059	0.91
LLEVERAGE	-0.0088	0.85
LGROWTHASSET	0.0071	0.67
GDPGROWTH	0.0071	0.00
LGDPGROWTH	-0.0001	0.95
REPO	0.0118	0.36
DREPO	-0.0944	0.12
LDREPO	-0.0497	0.25
SLOPE	0.1175	0.01
DSLOPE	-0.1073	0.00
LDSLOPE	-0.0686	0.05
HHI	0.0834	0.09

Table 3: Estimation Results With Private Banks

NIM	**COEFFICENT**	**P-VALUE**
LNIM	0.0115	0.86
LLEVERAGE	-0.0191	0.02
LGROWTHASSET	0.0022	0.52
GDPGROWTH	0.0037	0.00
LGDPGROWTH	0.0015	0.59
REPO	0.0280	0.00
DREPO	-0.1554	0.00
LDREPO	0.0338	0.17
SLOPE	0.1994	0.00
DSLOPE	-0.1756	0.00
LDSLOPE	-0.0599	0.04
HHI	0.4042	0.00

The Table 1 shows the summary statistics for the main variables that are used in our estimation. For instance, during the sample period, the minimum value and maximum value of the repo (short-term interest rate) was 0,04 (% 4) and 0,54 (% 54), respectively

Table 2 shows the estimation results for the sample that just includes the commercial public banks. Regarding the short-term rate, repo, there is not any significant relationship between profitability (NIM) in the public banks and interest rate. Similarly, the short-run impact of the repo has also no impact on profitability. In relation to slope variable, slope of the interest rate structure that captures the impact of the long-term interest rate, the result shows that the public banks in Turkey is affected by the slope of the interest rate structure through credit channel. One unit increase in the slope of the interest rate structure would significantly affect the public banks' performance by 0.11 unit.

Based on the Table 2 that covers the estimation results for the private banks in Turkey, it can be asserted that both repo and slope variable have significant and positive impact on the private banks. One unit increase in repo rate would influence the profitability of the private banks in Turkey by 0,02 unit, keeping all other variables constant.

In both estimation results (Table 2 and 3), the slope variable is dominating the short-term interest rate which means that banks have more sensitivity to the long-term interest rate compared to short-term rate. This result is consistent with existing literature since slope variable gives signal for future economic expectations and growth. An increase in the slope factor result in boom in economic activities and credit expansion which affect the profitability of the banking sector positively. To sum up, our findings show that there exists significant difference in price setting (loan and deposit rate) behaviors of the public and private banks in Turkey.

4. Conclusion

The main motivation of the study is to examine whether there exists a significant difference between behaviors of the public and private banks. Using quarterly dynamic panel model over last 16 years, we find that private Turkish banks are more sensitive to the interest rate structure than public banks. That is to say, one unit rise in the interest rate structure would affect the private banks' balance sheet income more than the whole sample.

Interestingly, private banks are being influenced by the change in short-term interest rate while the public banks not. Moreover, both public and private banks have sensitivity to slope of the interest rate structure, that is constructed by subtracting the short-term rate from the long-term rate. In other words, credit channel through slope variable has impact on both public and private banks. These findings suggest that public banks, compared to private, in Turkey might have short-term duty losses resulting from unexpected rise in short-term interest rate. We hope to develop this research and look at the details of other ownership types such as foreign private and domestic private in the aftermath of 2001.

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Censorship Or Digital Protectionism? : Governmental Intervention In The Age Of The Internet

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Abstract

In this paper, I examine the evolving role of nation states in controlling and monitoring the global trade of intangible resources such as the user data, software, cloud and web storage, advertising, communication services, and access to communication networks. The research question of the paper is the following: What are the nature and consequences of digital protectionism in the age of the Internet? Digital protectionism is a governmental policy that aims at taking measures to localize data by preventing it from being transferred internationally. Since the 2000s, protectionist policies have been adopted in order to decrease the dependence of the nation on digital media corporations that collect, store, and commodify user data. I focus my attention on the global trade of intangible goods and aim at solving a policy puzzle where digital protectionism that allegedly favours the nation's digital industries causes, to varying degrees, suppression, censorship, and violation of the freedom of speech and other civil rights on the Internet.

Keywords: Economics of digitalization, the Internet economy, big data capitalism, economic philosophy of artificial intelligence

1. Introduction

In this paper, I examine the evolving role of nation states in controlling and monitoring the global trade of intangible resources such as user data, software, cloud and web storage, advertising, communication services, and access to communication networks. A digital economy creates added value not only when tangible goods are bought and sold in local and global markets but also when the data produced by online users are commodified by digital media corporations. The user data include emails and messages posted on digital media websites and the metadata of each item traded on the Internet such as clicks, page views, profiles of users including age, gender, and country of origin. Files stored on the hard-drives of individual users (also known as cookies) allow corporations to monitor (a) the location where the websites are visited, (b) which pages the Internet users visit, (c) when they visit these sites, (d) how much time they spend on the web pages, (e) how much money they spend on shopping (Turow. 2011). Since the advent of the Internet of Things (IoT), physical devices connected to each other have enabled corporations to collect, store, and exchange data about the types of equipment that an individual owns, how frequently they are used, where they are located etc.

The goal of the paper is to analyze the roles of nation states on the Internet in terms of digital protectionism. Digital protectionism is a governmental policy that aims at taking measures to localize data by preventing it from being transferred internationally. Governments adopt protectionist policies in order to decrease their dependence on digital media corporations that collect, store, and commodify user data.

The theory of path dependence holds that the economic institutions which played a role in the development of a nation in the past play significant roles on the economic performance of a nation today (North, 1981). My goal will be to explore whether the analyzed nation states have historically regulated their television, radio, film, and recorded music industries. If the politics of a nation have favored government intervention historically, it is likely that the governments will implement protectionist policies on the Internet, such as “halal Internet” (Iran) or “local and national Internet” (Turkey), to regulate the international trade of digital commodities. It is not realistic to expect such nation states to develop non-protectionist policies in the short term even though import substitution is economically unjustifiable.

In the paper, I focus my attention on the global trade of intangible goods and aim at solving a policy puzzle where digital protectionism that allegedly favors a nation's digital industries causes, to varying degrees, suppression, censorship, and violation of the freedom of speech and other civil rights on the Internet. The specific objectives of the paper are as follows:

- Objective 1: to collect data and information on the pervasiveness of digital protectionism in China, Russia, Iran, Turkey, and the EU countries.
- Objective 2: to assess whether (and to what extent) the "local" digital industries (see table in page 3) have benefitted from the protectionist policies of nation states in terms of research, development, and innovation (RDI)

The research question of the paper is the following: What are the nature and consequences of digital protectionism in the economy of digital media? Nation states are not unitary; they adopt various policies to safeguard the political interests of those in power. Nevertheless, protectionist policies are implemented by many, if not all, nation states around the globe. In the paper, my goal will be to explore the reasons that governments provide to the general public so as to restrict access to the Internet.

The invention of the Internet has increased the quality of many people's lives. The Internet has been a domain for individuals to express themselves freely and openly. It has allowed the users to collaborate with other users to develop websites and desktop applications such as WikiPedia, Open Office, DSpace, and Moodle and make these services available for all. Though, the Internet has not led to the weakening of digital monopolies neither has it caused the erosion of the power of nation states (Sunstein. 2017). In fact, it has become a sphere where nation states have invented new methods of collecting, storing, and processing data drawn from the networks of individual users. Today, nation states are developing more sophisticated tools, such as installing malicious software on the devices of individuals without their consent and organizing cyber-attacks and interfering in democratic processes of other nations such as general elections and referenda (Marczak, Dalek, McKune, Senft, Scott-Railton and Deibert, 2018)

A significant amount of research has been done into suppression, censorship, and violation of civil rights on the Internet as a result of governmental blocking to several websites (Xu,

Mao, and Halderman. 2011) These studies emphasize the roles played by digital media platforms for individuals to participate in political protests. A significant amount of attention has also been paid to the issue of potential risk leading to political surveillance on digital media platforms (Tufekci and Wilson, 2012) Academics have published on the consequences of shutting down web sites related to terror organizations, child pornography, human trafficking, and hate speech (Alkiviadou, 2018). Only recently, the contradictory articulation of nation states and corporate interests have been analyzed in a few numbers of articles (Lu and Liu, 2018). The economic nature of such interventions has been understudied.

I intend to go beyond the state-of-the-art by investigating whether nation states only want to achieve control on the global trade of hardware, computers, and mobile phones but also have control on the global processes of commodification of data by offering protectionist policies within nations where they encourage "local" digital media corporations to store the user data within the national borders nation states block digital media websites and impose taxes on their transactions so as to allow "local" corporations to advance new technologies.

Nation states have invested economic resources in monitoring the communications, encrypted or open, among peers on the Internet. The governments have declared that they will respond to the raised tariffs that the US placed on commodities from around the world by employing higher taxes and quotas on American imports (Statement from President Donald J. Trump on Additional Proposed Section 301 Remedies). Such protectionist policies will have effects not only on the global trade of steel and aluminum but also commodities produced by digital media corporations on the Internet. Therefore, the hypothesis of the paper is that "trade wars" have started in the economies of the Internet and digital media long before the US government announced its new policies against China, Russia, Iran, Turkey, and the EU countries.

Digital protectionism takes place in two ways. Firstly, nation states block or restrict access, temporarily or partially, to the websites of large Internet corporations, mostly registered in the US, such as Google, Facebook, Twitter, Instagram, WhatsApp, YouTube, Uber, and PayPal, that acquire confidential information about the users and process this information to derive profits. Although censorship is not only an economical issue but also political and cultural, the nation states of China, Russia, Iran, and Turkey, among others, often claim that these corporations either do not abide with the laws of taxation or break the rules of fair

competition in their countries despite the size of such corporations and the value that they create for their national economies (Calder, 2017).

Secondly, nation states impose fines on digital media platforms on the basis that they do not always abide with the laws and treaties related to intellectual property and anti-trust. For instance, on 20 April 2016, the European Commission informed Google that "the company has, in breach of EU antitrust rules, abused its dominant position by imposing restrictions on Android device manufacturers and mobile network operators." As a result, on 18 July 2018, the Commission decided to fine Google 4.34 billion Euros for breaching the EU anti-trust rules (Antitrust: Commission Sends Statement of Objections to Google on Android Operating System and Applications, 2018). Some of the North American and European countries restrict access to several digital media platforms, such as Netflix, HBO, and BBC iPlayer, according to the user's geographical location. Countries allow large Internet corporations to employ geo-blocking techniques for the purposes of price discrimination and tax avoidance. On 27 February 2018, the European Council adopted a new regulation that bans "unjustified geo-blocking" in the European Single Market (Geo-blocking: Council Adopts Regulation to Remove Barriers to E-commerce, 2018). However, geo-blocking is still in use among non-EU states.

Digital Media Platforms	**"Local" Alternatives and the Nation States that Block the Platform (in parenthesis)**
Google.com (US)	Baidu.com (China); Yandex.ru (Russia); Yaani.com.tr (Turkey)
Gmail.com (US)	Mail.ru (Russia); Mail.qq.com (China)
Facebook.com (US)	Vk.ru (Russia); Renren.com (China)
Twitter.com (US)	Weibo.com (China)
Youtube.com (US)	Youku.com (China); Mehr.ir (Iran)
Amazon.com (US)	Alibaba.com (China); Avito.ru (Russia); Digikala.com (Iran)
Whatsapp.com (US)	Wechat.com(China); PTT Messenger (Turkey); Soroush-app.ir (Iran)
Paypal.com (US)	Alipay.com (China); Enpara.com (Turkey)
Uber.com (US)	Didiglobal.com (China); Bitaksi.com (Turkey)
Booking.com (Holland)	Ctrip.com (China); Tatil.com (Turkey)
Dropbox.com (US)	Disk.yandex.ru (Russia)

The left column of the table shows some of the largest digital media corporations that are blocked by several nation states to ensure that their citizens use the "local" alternatives. The right column shows some of the "local" websites that nation states allow or encourage their citizens to use.

In many high-income economies, nation states either employ geo-blocking techniques or block the websites that violate the laws of anti-trust and intellectual property (The World Bank's classification). In the paper, I will focus my attention on China, Russia, Iran, Turkey, and the EU because in economies where the number of Internet users is high (Internet Users by Country, 2016), the governments implement protectionist policies to decrease their dependency on the digital media corporations that are mainly based in the US. My goal in this stage is to examine the reports, newsletters, and press releases of the Internet and Information Center (China), Federal Service for Supervision of Communications, Information Technology and Mass Media (Russia), Information and Communication Ministry (Iran), Information and Communications Technologies Authority (Turkey), and the European Commission. I will look into reports containing information about the blocked websites around the globe published by international associations, such as Freedom House and Reporters without Borders, as well as UNCTAD Data Centre publications on detailed country profiles that include statistics about imports and exports of digital commodities, RDI expenditures, and in- and outflows of various types of digital commodities.

The added value of the interdisciplinary aspect of the paper is to put under scrutiny the economics of a new form of protectionism and a large-scale emergent phenomenon that I call import substitution digitalization. Import substitution digitalization is a policy type for regulating the Internet where nation states implement protectionist policies by encouraging "local" digital media corporations to store, analyze, and commodify the data within national borders although such data are collaboratively produced by digital media users from various countries.

Import substitution digitalization is a new form of the policies of import substitution industrialization that dominated the Global South, from the 1950s until the 1980s, where underdeveloped countries aimed at reducing their dependency on developed countries by

implementing protectionist policies that subsidized their developing industries (Baer, 1972). Policies of import substitution were designed to increase labour productivity by creating incentives for the "infant industries" (Chang, 2002) of a nation to invest in R&D. By so doing, economic planners thought that various industries of the nation would become able to produce the commodities that the nation used to import and save the nation's foreign exchange to buy raw materials and natural resources that were required to achieve self-sufficiency and economic independence from the developed world.

It is not obvious, however, that the best way to diminish the digital dependence of countries to large Internet corporations is to block websites and increase censorship. Governors and "local" corporation owners often have the opinion that the best policy to diminish economic dependence is to introduce import substitution policies. However, the experience that economists gained from the policies of import substitution in the Global South tell us that the implementation of protectionist policies is not always the best way for nations to achieve remarkable growth rates in certain industries. Digital protectionism can fail to cause the desired outcomes because it is often possible and easy to develop alternative technologies, such as VPNs, to access blocked websites. Although it is neither possible nor desirable for underdeveloped countries to give up the policies of import substitution, policy makers require an understanding of the needs of nations where RDI expenditure in digital media industries are low. Also, many governmental regulations aim at constituting the rule of law on the Internet where large digital media corporations seek opportunities to be exempt from a nation's laws of taxation, anti-trust, and intellectual property. The originality and innovative aspect of the paper is to formulate a balanced approach view based on the facts and figures of the digital economies. This will require an optimized solution where digital protectionism neither serves the purpose of justification for political censorship and suppression nor overshadows the harmful actions of digital media corporations that violate the laws of privacy, anti-trust, and intellectual property.

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