Democracy and Growth: A Dynamic Panel Data Study[1]

Jeffry Jacob[†]

Department of Business and Economics
Bethel University

Thomas Osang[*]

Department of Economics
Southern Methodist University

May 2017
Revised March 2018

ABSTRACT

In this paper we investigate the idea whether democracy has a direct effect on economic growth. We use a system GMM framework that allows us to model the dynamic aspects of the growth process and control for the endogenous nature of many explanatory variables. In contrast to the growth effects of institutions, regime stability, openness, geography and macro-economic policy variables, we find that measures of democracy matter little, if at all, for the economic growth process.

***JEL*:** O1, F1

Keywords: Democracy**,** Growth, Institutions, Openness, Dynamic Panel

[1] We would like to thank Daniel Millimet, Duha Altindag, Chris Barrett, Henry Thompson, Gordon McCord, two anonymous referees as well as seminar participants at Bethel University, Auburn University, University of Trier, University of Siegen, Southern Economic Association Meetings and the Conference on Economics of Global Poverty at Gordon College for useful comments and suggestions.
[†] Department of Business and Economics, Bethel University, 3900 Bethel Dr., St. Paul, MN 55112; E-mail: j-jacob@bethel.edu: Tel: (651) 638-6715
[*] Department of Economics, Southern Methodist University, 3300 Dyer, Dallas, TX 75275; E-mail: tosang@smu.edu; Tel: (214) 768-4398; Fax: (214) 768-1821

1. Introduction

Over the past several decades, and in particular after the fall of communism in Eastern Europe and Western Asia, the world has seen a steady rise in the number of countries that became democracies. In 1960, only 39% percent of the world's countries had a democratically-elected government, compared to 61% percent in 2010[1]. While this dramatic rise in the world's level of democratization has undoubtedly affected the political and social context of people's lives, economists have been examining the question whether more democracy had any discernable impact on people's material well-being, that is, economic growth and development.[2] Of crucial importance for this inquiry is an observation that dates back to the seminal work of Huntington (1968) who was one of the first to claim that the democracy-growth link may be tangential. In particular, Huntington argued that it is the efficacy and stability of the governing process rather than a country's level of democracy that matters primarily for economic progress.[3]

In this paper, we re-examine the empirical democracy-growth nexus in the spirit of Huntington. To do so, we distinguish between indicators of democracy - variables that capture the extent to which governments are elected democratically -, and public institution variables that measure the efficacy of the government. These two sets of measures can be quite distinct. While democratic states are generally linked to higher degrees of political stability, there are plenty of examples of unstable and ineffective democracies[4]. Furthermore, as Huntington pointed out, political stability and effective governance can be found in non-democratic societies such as the countries of Eastern Europe during the cold war era.

Huntington is not the only one who has cast doubt on a link between democracy and growth. In effect, several arguments have been advanced why democracies may even be detrimental for economic development. First, democratic elections can be manipulated by corrupt government officials. Second, democracies can suffer from political gridlock due to the fight between contending parties over a country's future path. Third, the existence of checks and balances in a democracy may delay difficult policy choices. Fourth, the preoccupation of policy makers with their re-election may cause higher levels of government

[1] The numbers are based on the Polity2 democracy variable from the Polity IV database. See the data section for further details.
[2] Since much of the increase in democracies occurred after 1990, empirical studies published in the 80s and 90s and early 00s were not able to account for this fundamental shift toward democratic regimes and its potential growth enhancing effect.
[3] "The United States, Great Britain and the Soviet Union have different forms of government, but in all three systems the government governs" (Huntington, 1968).
[4] Bangladesh, Haiti, Pakistan, Iraq, Nigeria and Morocco are countries that fall into this category.

consumption due to pork-barrel spending. Finally, income redistribution, which appears to be more pronounced in democracies, requires higher taxation of wealthy households causing efficiency losses and disincentives for investment.

On the other hand, a quick survey of the political science and economics literature reveals several arguments why a democratic regime may have a positive impact on economic growth. First and foremost, democratic countries grant its people the right to remove a bad government from office. If the new government voted into office is doing a better job at governing the country, the cost of doing business for firms and individuals alike will be lower. This increase in efficiency improves the country's economic output and raises its growth rate. Another argument in favor of the connection between democracy and prosperity stresses the importance of the predictable transfer of power in democracies, which lowers uncertainty and increases growth. Finally, stronger redistribution of income in democracies can increase political stability and reduce the harmful external effects of extreme poverty[5].

When theoretical approaches point to opposing outcomes, empirical research may provide an answer. Unfortunately, the empirical literature too is inconclusive when it comes to the impact of democracy on growth. A number of empirical studies find a positive impact of democracy on growth (e.g., Scully, 1988; Burkhart & Lewisbeck, 1994; Rodrik & Wacziarg, 2005; Epstein et al., 2006; Persson & Tabellini, 2008; Acemoglu et al., 2014). Others report a negative democracy effect (e.g., Landau, 1986; Helliwell, 1994; Barro, 1996; Tavares & Wacziarg, 2001). And a third group of studies finds no connection between democracy and growth (e.g., Barro, 1991; Barro & Lee, 1994; Alesina et al.,1996).[6] Conducting a meta-analysis of 83 studies, Doucouliagos & Ulubaşoğlu (2008) also come to a similar conclusion.

While the empirical literature examining the role of democracy on economic growth and development is extensive, only a relatively small number of papers employ a cross-section time-series approach showing mixed results. One of the first cross-section time-series studies was Barro (1996) who found a weakly negative impact of democracy on economic growth. However, Barro's study did not control for country or time fixed effects. Controlling for unobserved country specific heterogeneity in a panel data set up, Rodrik & Wacziarg (2005) find that countries undergoing democratic transitions, on average,

[5] For a more detailed discussion of the pros and cons of democratic regimes, see Adelman (2016).
[6] For surveys of the early empirical literature on democracy and growth, see Przeworski & Limongi (1993) and Brunetti & Weder (1995).

experience higher economic growth in the subsequent periods.[7] In contrast, Acemoglu (2008) finds that there is no link between the level of democracy and income once country fixed effects are included.[8]

Among regional studies using panel data, empirical results are equally mixed. Rock (2009) finds that in a sample of Asian countries, democracy by itself does not exert a statistically significant impact on economic growth. However, when interacted with a measure of state capacity (constructed from bureaucratic quality and rule of law) democracy did have a positive impact on growth. Bates, Fayad, & Hoeffler (2012) find that the recent wave of democratization in African countries had a positive impact on growth.

More recently, a series of papers have revisited the question of democracy and growth using dynamic panel models. Based on annual data covering the period from 1960 to 2010, Acemoglu et al. (2014) find a positive, instantaneous impact of democracy on growth. Using annual data over long time periods (e.g., 1500-2000, 1820-2000) for different groups of countries, Madsen, Raschky, & Skali (2015) find a positive impact of their lagged democracy measure on per capita income. Grundler and Krieger (2016) construct a novel democracy index using the support vector machine (SVM) estimator. Covering the period from 1981 to 2011 and using five-year averages, their dynamic panel estimators show that democracy enables growth.

This paper extends the empirical democracy and growth literature in several ways. First, we estimate a dynamic panel data model via system generalized method of moments (system GMM, Arellano and Bover, 1995; Blundell and Bond, 1998). This estimation approach enables us to model the dynamics of growth, account for possible endogeneity bias and obtain estimates of the time invariant geography measures. In contrast to the GMM estimation results presented in Acemoglu et al (2014) and Grundler and Krieger (2016), we take the Bazzi & Clemens (2013) critique of dynamic panel GMM estimates more seriously and address each of the potential GMM pitfalls, namely the validity of the exclusion restriction, instrument proliferation, underidentification and weak instrumentation. To this extent, we conduct a large number of diagnostic tests to validate the appropriateness of our estimation results. Second, in addition to

[7] Complementing this finding, Persson & Tabellini (2008) show that a country's transitioning out of democracy results in a substantial negative impact on growth.

[8] Yang (2008) finds a similar result for the democracy - growth volatility nexus. Measuring volatility as the standard deviation of GDP growth over five year intervals, he finds no statistically significant relationship between democracy and growth volatility.

using various measures of democracy, we also control for the quality of public institutions in the spirit of Huntington and North, as well as for the impact of economic integration and geography. This specification known as the deep determinant approach (Rodrick et al., 2004) differentiates this study from the traditional production function based growth regressions used in Grundler and Krieger (2016) and pioneered by Barro (1991). Third, we present a number of robustness checks including results from a likelihood based estimator (Moral-Benito, 2013) which does not rely on the mean stationarity assumption made by system GMM. Finally, we estimate an extended model that accounts for certain macro-policy variables examined by Dollar & Kraay (2003).

Using data from over 160 countries over the 1961 to 2010 period, we find that the various democracy measures used in this study, including Grundler and Krieger's SVM democracy index, do not have a statistically significant impact on economic growth. However, the variables that measure the quality of institutions, political stability, openness and geography exert an appreciably positive and statistically significant effect on growth. The results are supported by a number of robustness tests as well the model that incorporates the Dollar and Kraay extension. Further, our diagnostic tests show the validity of the exclusion restrictions and the rejection of the null of underidentification for a large number of specifications.

The rest of the paper is organized as follows. Section 2 contains the empirical model and a discussion of the estimation methodology. We describe the data in Section 3. In Section 4, we derive and interpret the estimation results including many robustness checks. Section 5 concludes. Appendix A consists of variable definitions and summary statistics. The estimation results are given in Appendix B.

2. Empirical Model

2.1 Structural Model

Every study of the relationship between democracy and growth needs to account for other determinants of economic growth. Over the last decade and a half, a lot of attention has been given to the study of the "deeper" determinants of economic development as coined by Rodrik et al (2004). According to this approach, factors which affect economic development can be classified into two tiers. While inputs in the production function such as labor, physical and human capital directly affect income and thus economic development, they themselves are determined by deeper and more fundamental factors. And although it remains an open question what exactly constitutes a "deeper" determinant of development, three

broad categories have emerged in the literature: Institutions, international trade (integration) and geography.[9]

Thus, our empirical investigation starts with the inclusion of democracy into the deep determinant approach:

$$\text{Income} = f(\text{Democracy, Institutions, Integration, Geography})$$

Geographical factors typically characterize the physical location of a nation such as distance from the equator, access to sea, agro-climatic zone, disease environment, soil type, and natural resources. Geography may matter for development through its impact on transaction costs. For example, a country's size, access to sea and topography can crucially affect transport costs and the extent of its integration with the world market. Latitude and climate are also related to disease environment, which directly impacts labor productivity and life expectancy, among others. In fact, some authors like Gallup, Sachs, & Mellinger (1999) and Sachs (2003) argue that geography is the most important variable of interest for development, even after controlling for the quality of institutions.

The argument for economic integration as a fundamental determinant of development is based on the gains from trade literature. Next to the classic case of comparative advantage gains are more modern approaches that stress the importance of trade in the transfer of new technologies and ideas, which in turn enhance productivity. Moreover, supplying to a larger international market allows higher degrees of specialization and thus entails productivity gains. There are many empirical studies on the link between international trade or integration and economic development. One of the more influential ones is Sachs, Warner, Åslund, & Fischer (1995) who constructed an index of openness and found that greater openness leads to higher growth. As with institutions, trade variables are likely to be endogenous with regard to income. Frankel & Romer (1999) examine this issue in detail. They too find a positive link between integration and income.

In addition to Huntington, the importance of the quality of public institutions for the development process was emphasized in the works of North (1993, 1994a, 1994b, 1994c). His motivation to consider

[9] Easterly & Levine (2003) provide a good overview of studies analyzing the three determinants. In this paper geography is defined as physical geography, as opposed to economic geography as discussed in Redding & Venables (2004).

institutions can be linked to his view that the neo-classical theory is unable to explain widespread differences in economic performances across countries. If only factor accumulation led to progress, then all countries would do so, provided there was a high-enough payoff involved. Differences in income thus require differences in "payoffs" which is where institutions come in (North, 1994a). Institutions are the rules of game which a society lays down for itself and which determine the incentives people face and thus the choices they make. Another way of looking at institutions is through their impact on transaction costs. Well defined rules and their smooth enforcement, i.e. better institutional quality, greatly reduce transaction costs economic agents face and thus lead to more efficient outcomes (North 1993, 1994b). Hall & Jones (1999) was one of the first empirical studies to examine the impact of institutions on economic development. The importance of institutions was further developed by Clague, Keefer, Knack, & Olson (1999), Acemoglu, Johnson, & Robinson (2001) and Acemoglu & Johnson (2005) who show that good institutions, by fostering productive investments, lead to favorable economic outcomes.

Incorporating the above elements along the lines of Caselli, Esquivel, & Lefort (1996) and Dollar & Kraay (2003), we specify the following reduced form dynamic panel data model:

$$g_{it} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 X_{it} + \beta_3 Z_i + \nu_i + \gamma_t + \mu_{i,t} \qquad (1)$$

where g_{it} is the income growth rate defined as the differences in log of GDP per capita, $y_{i,t-1}$ is the previous period's log GDP per capita capturing the idea of convergence, X_{it} is the set of time varying variables that include democracy, institutions, trade, regime instability and in some specifications macroeconomic policy variables. Z_i is the set of time-invariant variables, such as geography, ν_i is a country-specific fixed effect, γ_t is a time dummy and μ_{it} is an idiosyncratic error term. Eq. (1) can be rewritten with $y_{i,t}$ defined as the log of current period GDP per capita:

$$y_{it} = \beta_0 + \tilde{\beta}_1 y_{i,t-1} + \beta_2 X_{it} + \beta_3 Z_i + \nu_i + \gamma_t + \mu_{i,t} \qquad (2)$$

where $\tilde{\beta}_1 = 1 + \beta_1$.

Estimation of (2) poses a number of difficulties that need to be addressed. First and foremost, the endogeneity of the lagged dependent variable and the possible endogeneity of institution, democracy and

trade measures, due to measurement error, omitted variables, and/or reverse causality[10] require the use of instrumental variable estimation methods. Finding suitable instruments in the context of economic development is no easy task[11] and there is much disagreement in the literature as to what constitutes a good instrument. External instruments are hard to find and those that have been used successfully like settler mortality as an instrument of institutions, are time invariant and thus not suitable for panel data estimation. The alternative to external instruments is the use of internal instruments such as the use of higher order lags of the endogenous variables.

2.2 GMM Dynamic Panel Data Estimation

The standard approach is to estimate the model in equation 2 in first differences thus eliminating the individual fixed effects. Specifically, the estimating model thus becomes:

$$y_{i,t} - y_{i,t-1} = \tilde{b}_1(y_{i,t-1} - y_{i,t-2}) + b_2(X_{it} - X_{i,t-1}) + \tilde{g}_t + (m_{i,t} - m_{i,t-1}) \qquad (4)$$

The problem in estimating Eq. (4) is the endogeneity introduced by the lag dependent variable since $E[(y_{i,t-1} - y_{i,t-2})(\mu_{i,t} - \mu_{i,t-1})] \neq 0$. The dynamic panel data estimator developed by Holtz-Eakin, Newey, & Rosen (1988) and Arellano & Bond (1991) and applied to the growth literature by Caselli et al. (1996) and Dollar & Kraay (2003)[12] among others, addresses this issue by using two periods or more lags of the dependent variable as instruments for the differenced lagged dependent variable since

$E[y_{i,t-s}(\mu_{i,t} - \mu_{i,t-1})] = 0$, for $t = 3, 4...T$ and $s \geq 2$, under the assumption that m_{it} is not serially correlated.

Blundell & Bond (1998) show that this difference estimator may not perform well when there is high persistence in the dependent variable and demonstrate that the system GMM estimator, initially proposed by Arellano & Bover (1995), may be better suited in terms of asymptotic efficiency[13]. The system GMM estimator is based on the idea that additional moment conditions can be introduced by adding a level

[10] See Frankel & Romer (1999), Hall & Jones (1999) , Acemoglu et al. (2001), and Baier & Bergstrand (2007). In a recent paper Kotschy and Sunde (2017) examine the impact of democracy on institutional quality in the presence of economic inequality.
[11] Durlauf, Kourtellos, & Tan (2008).
[12] For a more recent application of the dynamic panel data method in the context of corruption and growth, see Swaleheen (2011).
[13] As Hayakawa (2007) has shown, the system GMM estimator also performs better in terms of small sample bias.

equation to the differenced equation and using lagged differences of the explanatory variables as instruments for the level equation since $E[\mu_{it}(y_{i,t-1} - y_{i,t-2})] = 0$, for $t = 3, 4...T$.

Since the persistence of GDP per capita is well established in the literature, the system GMM estimator is a more suitable choice in our context. Another advantage of the system estimator is the identification of the impact of the time-invariant variables. While the Arellano-Bond estimator purges all time invariant measures from the estimating equation, Roodman (2009) shows that time-invariant exogenous variables (which are orthogonal to the individual fixed-effects) can easily be included in the system GMM model. In our context, this means that the economic performance impact of both time varying and time-invariant measures can be estimated directly.

Finally, the potential endogeneity of the time-varying explanatory variables, X_{it}, can be addressed within the GMM approach by using appropriate lags of these variables as instruments. For example, if $E[(x_{i,t} - x_{i,t-1})(\mu_{i,t} - \mu_{i,t-1})] \neq 0$ but $E[x_{i,t-s}(\mu_{i,t} - \mu_{i,t-1})] = 0$ for $s \geq 2$, two or more lags of x_{it} could be used as instruments. Furthermore, in the level equation of the system GMM estimator, lagged differences of x_{it} are used as instruments for x_{it}.

2.3 Specification tests for the dynamic panel data model

To test the validity of our system GMM estimates, we perform a battery of tests. First, since lagged values are used as instruments, consistent estimation requires the absence of second-order serial correlation in the error term (see Arellano and Bond, 1991). To test this requirement, we perform the Arellano-Bond AR(2) test. A sufficiently high p-value implies the absence of second-order autocorrelation[14]. In that case, the system GMM can be applied without any adjustments to the instrument set. A low p-value indicates the presence of an MA error term of order one or higher. In this case, the model needs to be re-estimated with the instrument set lagged by an additional period (Cameron & Trivedi, 2005). To test whether the modified system GMM estimator has the correct error structure, we test for the absence of a third-order autocorrelation using the Arellano-Bond AR(3) test. Failure to reject the null (p-value of greater than 0.05) indicates the absence of higher order serial correlation.

[14] We use a benchmark p-value of 0.05.

Second, to test the validity of the exclusion restrictions, we perform the Hansen *J*-test. Under the null hypothesis, the instruments are correctly excluded from the model. Since we use system GMM, we report a second test of the exclusion restrictions known as the difference-in-Hansen test. This test checks the validity of the additional exclusions restrictions that arise from the level equations of the system GMM model (see Roodman, 2009b)[15].

Our final battery of tests is motivated by the issues of instrument proliferation, underidentification and weak instruments in the system GMM estimator. Roodman (2009) shows that having numerous instruments, which usually is the case in GMM estimation, can result in an over-fitting of the model. This can fail to rid the explanatory variables of their endogenous components, potentially leading to inconsistent estimates. In this case both Hansen tests may produce very high p-values, often close to 1. To avoid instrument proliferation, the instrument set should be reduced by either restricting the number of lags (Beck, Demirguc-Kunt, & Levine, 2000) or by "collapsing" the instrument set into a smaller dimension matrix (Roodman, 2009a; Vieira, MacDonald, & Damasceno, 2012)[16].

As Bazzi and Clemens (2013) point out, GMM estimators can suffer from underidentification or weak instruments or both, making it tenuous to conduct meaningful hypothesis tests. They also show that these problems may exist even after reducing the number of instruments. Currently, there are no formal tests to tackle underidentification/weak instrument issues in the dynamic panel data context. However, Bazzi and Clemens (2013) suggest a number of ad-hoc tests as a second best solution. First, to test the null

[15] Given the similarity in the results from the two tests, we only the difference-in-Hansen test to conserve space.

[16] For the difference equation, the restricted (with the lag length equal to two) and the collapsed instrument sets take the form:

$$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \tfrac{1}{4} \\ 0 & y_{i1} & 0 & 0 & 0 & 0 & \tfrac{1}{4} \\ 0 & 0 & y_{i2} & y_{i1} & 0 & 0 & \tfrac{1}{4} \\ 0 & 0 & 0 & 0 & y_{i3} & y_{i2} & \tfrac{1}{4} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \ddots \end{pmatrix} \text{ and } \begin{pmatrix} 0 & 0 & 0 & \tfrac{1}{4} \\ y_{i1} & 0 & 0 & \tfrac{1}{4} \\ y_{i2} & y_{i1} & 0 & \tfrac{1}{4} \\ y_{i3} & y_{i2} & y_{i1} & \tfrac{1}{4} \\ \vdots & \vdots & \vdots & \ddots \end{pmatrix}, \text{ respectively.}$$

For the level equation the corresponding instrument sets are:

$$\begin{pmatrix} 0 & 0 & 0 & \tfrac{1}{4} \\ \Delta y_{i2} & 0 & 0 & \tfrac{1}{4} \\ 0 & \Delta y_{i3} & 0 & \tfrac{1}{4} \\ 0 & 0 & \Delta y_{i4} & \tfrac{1}{4} \\ \vdots & \vdots & \vdots & \ddots \end{pmatrix} \text{ and } \begin{pmatrix} 0 \\ \Delta y_{i2} \\ \Delta y_{i3} \\ \Delta y_{i4} \\ \vdots \end{pmatrix}.$$

hypothesis of underidentification, they suggest using the Kleibergen-Paap (K-P) rk Wald test (Kleibergen and Paap, 2006) in the first stage of both the level and the difference model. Second, even if underidentification is rejected, there may be a weak instruments problem in the sense that the correlation between the endogenous variables and the instruments could be quite small.

To test for the presence weak identification under the assumption of iid errors, Stock & Yogo (2005) proposed using the Cragg Donald F stat and plotted the critical values for different weak instrument biases of the 2-SLS estimator relative to OLS. However, there are two issues with their approach. First, the iid assumption may be violated. Second, Stock and Yogo (2005) critical values are available for only three endogenous variables, which limits its use in settings where the number of endogenous variables is large. For both reasons, we report the K-P rk F statistic in the first stage of the difference and levels equations as the ad hoc test for weak identification. Finally, we report two-step robust standard errors corrected for finite sample bias (Windmeijer, 2005).

3. Data

The data set covers the five decades from 1961 to 2010. Following Islam (1995) and Caselli et al. (1996), we use five-year averages of all time varying variables from 1960-2010, which yields a maximum of 10 time periods. Taking averages ensures that, to a large extent, short-term fluctuations resulting from changes in business cycles are smoothed out. In addition, by using the time-averages, we capture the longer-term impact of democracy and other explanatory variables on economic growth. The cross-section dimension varies by model specification, ranging from N=100 to N=165[17].

Due to both measurement errors and the inability to capture democracy by the use of a single variable, we employ five different democracy measures, explained in detail in Table A1 below. Our first measure is the institutionalized democracy score from the Polity IV dataset (Marshall et al., 2002), *P-IV Democracy*. Our second democracy measure, *Polity Score,* is the sum of a country's democracy and autocracy score. Following the previous literature (Rodrik & Wacziarg, 2005; Rock, 2009; Acemoglu et al., 2014) a country is classified as democratic if this score is positive. Since we take five-year averages, we consider a country democratic for any period average if its polity score is positive for three or more of

[17] Our sample includes all countries for which we have sufficient time series data on democracy as well as the deep determinant variables (institutions, integration and geography). The actual sample size for each estimated model specification varies due differences in the availability of data for specific variables and is shown at the bottom of each table.

those five years. Our third democracy measure, *FH Index*, is constructed as the average of political rights and civil liberties scores, both from the Freedom House dataset. We also consider two indexes of democracy. The first is the *Unified Democracy Score* from Pemstein, Meserve, & Melton (2010), a measure that is constructed from ten different democracy measures, including the three measures just mentioned. We also use the Support Vector Machine Democracy Index (SVMDI) recently introduced by Grundler & Krieger, (2016). The index is constructed by using a pattern recognition algorithm, called support vector machine learning, on eleven democracy variables to construct a democracy index ranging from 0 to 1. Our final measure of democracy is the Vanhanen Index of Democracy (Vanhanen, 2000). This measure is based on the interaction between two different measures- participation and competition – in the democratic process and is scaled between 0 to 1[18].

To capture the extent of regime turnover, we use *Regime Instability*, taken from the Database of Political Institution (Beck et al., 2011). This measure is used as a proxy for the extent of uncertainty regarding the political decision making process and has been widely used in the literature (Brunetti and Weder, 1995; Farvaque, 2002; Huntington, 1968).

Our preferred measure of the quality of institutions is contract intensive money (*CIM*), defined as the ratio of non-currency money to total money in an economy, as proposed by Clague et al. (1999). The basic argument for such a measure stems from the fact that in societies where the property and contract rights are well defined, even transactions which heavily rely on outside enforcement can be advantageous[19]. Currency in this setting is used only in transactions involving small amounts of money. Agents are increasingly able to invest their money in financial intermediaries and exploit economic gains as a result. Thus, stronger institutions correspond to a greater share of *CIM*.

But is *CIM* indeed a measure of institutional quality and not just a proxy for financial development? Based on a case study of seven countries, Clague et al. (1999) show that *CIM* tracks major political developments that have little direct impact on the financial sector. In fact, Clauge et al. (1999) characterize *CIM* as the "contract-intensive money indicator of property rights enforcement (pp. 186)". In this regard, *CIM* can be seen to be a good proxy for both Acemoglu & Johnson (2005) property rights measures as well

[18] This measure is used in Kotschy and Sunde (2017) as well.

[19] A similar point is made by Acemoglu & Johnson (2005) who examine both, "contracting institutions" and "property rights institutions". The former govern contracting relationships between private parties and the latter govern the relationship between private citizens and those with political power. They show that while contracting institutions may be useful for financial intermediation, it is the property rights institutions that have a positive impact on economic growth and development.

as North's (1994) definition of institutions. Finally, an additional benefit of *CIM* is that it is less subjective and more precisely measured than most survey based institution variables that often suffer from bias and measurement error. It also does not require the use of dimension reduction methods like principal components which can be hard to interpret (see Kotschy and Sunde (2017) for such an approach).

Another measure of institutions used in this study is the "number of veto players" (*Veto Players)* which captures the extent of checks and balances within the government and is obtained from the World Bank's *Data on Political Institutions* (DPI) database (Beck et al., 2001). The motivation here is that countries with multiple decision makers offer greater protection to individuals and minorities from arbitrary government action (Keefer & Stasavage, 2003). *Veto Players* is based on the number of decision makers in the government, taking into consideration whether they are independent from each other.

Finally, we employ a third, slightly broader measure of institutions, the *Economic Freedom of the World* score from the Fraser Institute (2017). This measure is an aggregation of five different subcomponents: Size of government, legal system and property rights, sound money, freedom to trade internationally and regulation. The main problem with this measure is that due to its broad scope, it captures elements of institutional quality, democracy, trade and other policy variables. Unlike *CIM* and *Veto Players*, it thus less suited to identify the true effect of institutions on our outcome variable.

The remaining explanatory variables (see Table A1 in the Appendix for details) fall into three categories: Openness to international trade (*Trade Share* and *Real Openness*), geography (*Dist. Equator* and *Malaria Ecology*) and macroeconomic policy variables (*BMP*, *Inflation rate, Govt. spending/GDP*).

Tables 1a and 1b present the summary statistics (for all variables) and simple correlation coefficients (of time-varying) variables, based on five-year averages.

(Insert Table 1)

4. Empirical Results

4.1 Basic Model

Our benchmark model is presented in Table 2. The model as well as all subsequent models treats all time-varying right hand side variables as endogenous. The time-invariant geography measures are

considered to be exogenous. The dependent variable, *CIM* and both trade measures enter as log transforms implying that the coefficients for those co-variates can be interpreted as long-term elasticity estimates. To check whether instrument proliferation is an issue, we compare estimates of the model with the full instrument set (columns 1-3) to estimates with the collapsed instrument set (columns 4-6) and the restricted instrument set (columns 7-9).

(Insert Table 2 here)

In col. 1 and 2 *Real Openness* is used as a measure of trade while in columns 3, we use *Trade Share*. We also alternate between *Dist Equator* and *Malaria Ecology,* our two measures of geography. *CIM* and both trade measures are statistically significant for the most part and have a positive impact on long-term growth, with the average elasticity of *CIM* in columns 1-3 being larger than that of the two openness measures by a factor of two. *Dist. Equator* (columns 1 and 3) has a positive and significant impact on growth as well, which is similar to Spolaore & Wacziarg (2013) who found that a country's latitude had a significant impact on growth. Similar to Sachs (2013) *Malaria Ecology* in column 2 is negative and statistically significant. The implied coefficient on the lagged dependent variable in columns 1 and 3 indicates a fairly slow rate of convergence, which is similar to the results in Dollar & Kraay (2003). Most importantly, the coefficient estimate of our democracy measure, *P-IV Democracy*, is quite small, negative throughout, and is statistically insignificant, a result that is reminiscent of the finding in Barro (1996).

In terms of diagnostic tests, we first examine the serial correlation of the error structure. The low p-value of AR(2) test indicates the presence of MA(1) error terms in all models necessitating the need for re-estimation with lagged instrument set, the results for which are reported. This time, the high p-value of the AR(3) test implies the absence of serial correlation in the error structure. Regarding overidentification, the difference-in Hansen test indicates that the instruments in the system GMM are correctly excluded. However, the p-values of the difference-in-Hansen test being close to unity in two cases, suggest that instrument proliferation may be an issue.

To address the issue of instrument proliferation, we restrict the number of instruments, both by collapsing the instrument set (columns 4-6) and by limiting the number of lags of the endogenous variables entering the instrument set (columns 7-9). With the collapsed instrument set, the number of instruments is reduced to 45. Like the previous estimation, past GDP and *CIM* continue to be statistically significant, with

CIM exerting a stronger impact on growth than trade and geography. The *P-IV Democracy* coefficient estimates are negative but statistically insignificant. The p-value of difference-in-Hansen test now rejects the null of correct exclusion restriction in all three specifications, casting doubts on the validity of the results with the collapsed instrument sets. With the restricted instrument set, the number of instruments shrinks to 99[20]. *CIM* continues to have strong and significant coefficient estimates. In addition, all openness and geography measures have the expected sign and are statistically significant. Once again, *P-IV Democracy* is negative and statistically insignificant. In terms of diagnostics, the difference-in-Hansen test points to the validity of the exclusion restrictions. Unlike the full instrument set results, the p-values of difference-in-Hansen test are sufficiently bounded away from unity indicating that instrument proliferation is not an issue.

To address the issue of underidentification, we report the Kleibergen-Paap (K-P) rank Wald Test for both the difference and the levels equation. The p values for the KP tests in the levels and difference models allows us to reject the null of underidentification in all cases except for the levels models in column 9.

We also report the K-P rk Wald F values as a test for weak instruments. The F-statistics in cols. 7-9 are on the low side, with higher values for the difference than the level equation. To address the issue of weak identification in our base model (Table 2, Col. 9), we calculate two-dimensional 95 percent weak-instrument robust confidence ellipses for two of the endogenous variables, *CIM* and *Trade Share*, in the 2SLS analogues of the difference (DIF) and levels (LEV) equations in the system GMM estimator following the procedure in Baazi and Clemens (2013, pp 180). The confidence regions are obtained through a four-dimensional grid-search procedure over the domain starting from -0.2 and include the initial instrumental variable point estimates at increments of 0.05 for each of the variables.

(Insert Figure 1 here)

First examining the estimates for the difference equation, we find that the boundary of the ellipse is in the positive quadrant for CIM. The same is not true for *Trade Share.* However, the majority of the mass of the ellipse is in the positive quadrant as well. More importantly, the boundary of the ellipse based on the *levels equation* is entirely in the positive quadrant. Therefore, we conclude that the restricted-instrument system GMM estimates of *CIM* and *Trade Share* are not affected by weak instrument bias.

[20] Specifically, we restrict the instrument set to second and third lags for democracy, institutions and the trade variables and third and fourth lags for lagged GDP.

This along with our rejection of under-identification confirms the statistically significant impact of institutions and trade on economic growth reported in Table 2 (col. 7-9).

As a result of the diagnostic test comparison between the full, collapsed and restricted instrument set reported in Table 2, we will employ the restricted instrument set approach throughout the remainder of the paper. In the next subsection, we check the robustness of the results from Table 2. Specifically, we use alternative measures of democracy and institutions (Section 4.2.1), an alternative estimation method (Section 4.2.2), a different sample specification (Section 4.2.3) and yearly data instead of five-year averages (Section 4.2.4).

4.2 Robustness Checks

4.2.1 Alternative measures of democracy and institutions

(Insert Table 3 here)

In Table 3, we introduce alternative measures of democracy (columns 1-8) and *Regime Instability* (columns 9 and 10). As with *P-IV Democracy*, we treat these measures as endogenous. Our first alternative measure of democracy is *Polity Score*, which classifies a country as democratic for a given five-year period if it was democratic for three or more years within that timeframe. The results in columns 1 and 2 show that *Polity Score* is negative but statistically insignificant. The second alternative measure of democracy is the *FH Inde*x. It is coded such that a higher value of the index reflects lower levels of civil liberty and political rights. The coefficient estimates on this variable are positive and are statistically significant in column 3, indicating an adverse, albeit small impact of democracy on economic growth. In columns 5 and 6, we use a comprehensive democracy score, a measure constructed from ten different democracy measures used in the literature. The parameter estimates of this measure have mixed signs but are also statistically insignificant. Unlike the previous democracy measures, the SVMDI variable (columns 7 and 8) has a positive sign but is also not statistically significant. Further, when evaluated at the sample mean, the average elasticity for SVMDI in column 7 is 0.07, which is much smaller than the corresponding elasticities for *CIM* and *Real Openness* (0.172 and 0.19, respectively). The final democracy measure is the *Vanhanen democracy index* (columns 9 and 10). Similar to *SVMDI*, the parameter estimates are positive but not statistically significant.

In addition to the five democracy measures, we also consider *Regime Instability,* a measure of government turnover (columns 11 and 12)[21]. This variable captures the extent of uncertainty about the political environment. The results show that *Regime Instability* has a strong adverse impact on growth that is statistically significant. Throughout the twelve specifications in Table 3, lagged GDP, *CIM* and the two openness measures are positive and statistically significant. The *Dist. Equator* too has a positive coefficient estimate and is statistically significant in seven specifications. There are two main insights from Table 3. First and foremost, non-significance of democracy shown in Table 2 is not specific to the *P-IV Democracy* but holds for a larger set of democracy measures. Second, in contrast to the democracy variables, *Regime Instability* appears to be detrimental to economic growth.

With regard to the diagnostic tests, we follow the approach of Table 2. We first check the absence of serial correlation in the differenced error terms. We then evaluate the correct exclusion of the instrument set. Finally, we check for the absence of underidentification and weak identification in both the difference and level equations of the system GMM estimator. With all p values less than 0.05 for the AR(2) test, we need to lag the instrument set by an additional period. This is supported by the p-values being greater than 0.05 of the AR(3) test. The difference-in-Hansen test has p-values greater than 0.05 indicating that we cannot reject the null hypothesis that the instruments are correctly excluded. In addition, none of the difference-in-Hansen test p-values are close to unity, suggesting that instrument proliferation is not an issue. All K-P tests of the first-stage structural equations reject the null of underidentification for the difference model. For the model in levels, the K-P test rejects the underidentification null in only three specifications. The low F stats for the K-P Weak id tests point to the possibility of weak instrument bias.

(Insert Table 4 here)

Next, we check the robustness of our results to two alternative institutional measures - *veto players* and Fraser Institute's *Economic Freedom* score (see Table 4). *Veto Players* is positive and significant in all five specifications. The five democracy measures are again statistically insignificant. As in the previous tables, *Trade Share* has a positive and statistically significant impact on growth. The coefficient estimates of *Dist. Equator* are generally positive but smaller in magnitude compared to Table 3 and statistically insignificant. When we replace *Veto Players* with the *Economic Freedom Score,* the results change quite a

[21] *Regime Instability* is treated as predetermined.

bit (columns 6-10). The parameter estimates for the *Economic Freedom Score* are positive and statistically significant in all specifications. Three of the democracy variables are now statistically significant (*P-IV Democracy, FH Index* and *Unified Democracy Index*) but show a *negative* impact on economic growth. In addition, the *Trade Share* is no longer statistically significant in four of the five specifications.

Given the broad scope of the *Economic Freedom Score* discussed above, it may not be surprising that its inclusion as a covariate produces results that differ from the previous findings. Hence, we do not interpret the results in Table 4 as evidence that democracy has a *negative* impact on development or that openness to trade is irrelevant for growth. Instead, we find that once a broad measure such as the Economic Freedom Score is used as a regressor, the separate effects of institutional quality, democracy and trade openness on growth can no longer be identified. *Regarding* the diagnostic tests, the instruments are correctly excluded and the null of underidentification is rejected in all specifications.

4.2.2 Alternative estimation method

A crucial assumption behind the asymptotic efficiency of the system GMM estimator is the 'mean-stationarity' of y_0, typically expressed as $E(\varepsilon_{i2}\Delta y_{i1}) = 0$. This assumption is customarily tested via the difference in Sargan/Hansen test. While the test statistic for this test reported in Tables 2- 4 shows no evidence of violation of this assumption, it is well known that the test has weak power when the number of moment conditions is large. Instead of relying on the validity of the exclusion restrictions, one can use a likelihood based estimator that does not require mean stationarity. Such an approach was proposed by Moral-Benito (2013) who labeled it a subsystem limited information maximum likelihood (ssLIML) estimator. This estimator also tends to have a smaller bias than system GMM, especially in the case of a highly persistent dependent variable. Furthermore, like the system GMM, the ssLIML estimator allows estimation of time-invariant exogenous explanatory variables.

In Table 5, we re-estimate our basic model using three alternative democracy measures introduced in Tables 2 and 3 – *democracy, PIV democracy and unified democracy index*[22]. Since the ssLIML estimator cannot account for endogeneity of time-varying explanatory variables, we include lagged values of these variables instead. The results from Table 5 confirm our previous findings. Most importantly, democracy does not have a statistically significant impact on economic growth regardless of the specific democracy measure chosen. Furthermore, the remaining explanatory variables, *CIM, Trade Share* and *Dist. Equator* have the same signs as in Tables 2 and 3 and for the most part are statistically significant.

[22] Estimation using our fourth democracy measure, *FH Democracy*, did not converge due to data limitations

(Insert Table 5 here)

4.2.3 Alternative sample specifications

We next test the non-exchangeability hypothesis discussed in Brock & Durlauf (2001) and Durlauf, Kourtellos, & Tan (2008). The hypothesis questions whether the growth empirics from the full sample are applicable to specific sub-samples of countries. For example, the sample of developing countries may be on a different regression surface than the sample of developed countries. To address this concern, we re-estimate our baseline model (Tables 2 and 3), including only developing countries. These results are presented in Table 6.

(Insert Table 6 here)

In columns 1 to 5 we use *CIM* and *Trade Share* as our measures of institutions and openness, respectively, while alternating between four democracy variables and *Regime Instability*. These results are consistent with the findings in Tables 2 and 3. In all five regressions, trade and institutions are statistically significant and have a positive impact on growth. *Dist Equator* continues to be positively correlated with growth and is significant in four of the five regressions. None of the four democracy measures is statistically significant. While *Regime Instability* has a negative coefficient estimate, it is statistically insignificant. In columns 6-8 we use *Malaria Ecology* as our measure of geography and alternate between *P-IV Democracy, Polity Score* and *Regime Instability*. While all three measures display negative coefficients, none of them are statistically significant. The same is true of *Malaria Ecology.* Based on the statistically significant estimates, institutions and trade measures have average elasticities of 0.24 and 0.11, respectively, which is similar to our findings in Table 3.

The model diagnostic tests perform well with the difference-in-Hansen test indicating the validity of exclusion restrictions. The K-P test rejects the null of underidentification in all of the difference models and in half of the levels models.

Section 4.2.4: Five- year averages versus yearly data.

A recent paper by Acemoglu et al. (2014) finds a positive and statistically significant relationship between democracy and economic growth. There are several notable differences between their estimation approach and the one presented here. First, they use annual data, which is unusual given that most panel data papers on economic growth use either five or ten year averages to smoothen business cycle fluctuations.

Second, Acemoglu et al. construct a dichotomous democracy variable based on *P-IV Democracy* augmented with the *FH Index* when needed, to account for measurement error in quantifying democracy. Finally, as a robustness check, they address the potential endogeneity of democracy by using an external instrument, regional waves of democratization and reversals. As Baazi and Clemens (2013) point out, external instruments tend to deliver stronger performance with regard to underidentification / weak identification tests, but often fail the exclusion restrictions either empirically or on theoretical grounds. This concern may apply to the instrument used by Acemoglu et al., as Ndulu & O'Connell (1999) use waves of democratization as an explanatory variable in studying economic growth in Africa and find it to be statistically significant.

To compare our findings to the ones in Acemoglu et al., we report estimation results based on annual data as well as five-year averages. We do this with and without treating democracy as endogenous, full and restricted instrument set, and three measures of democracy: *Polity Score, P-IV Democracy,* and *Unified Democracy Score*. Also, similar to Acemoglu et al's democracy measure, one of our democracy measures, *Polity Score,* is a dichotomous measure.

(Insert Table 7)

In Table 7, column 1, we estimate a model that is similar to the baseline specification in Acemoglu et al. In addition to democracy, the model includes four lags of GDP per capita and time dummies. We use the one-step Arrelano-Bond GMM estimator used in their paper. Similar to their results, we find that all measures of democracy have a positive impact on economic growth and are statistically significant. The perfect p value of 1 for the Hansen exclusion test suggests a problem with instrument proliferation. This can also be seen from the number of instruments which far exceeds the number of panel units. For example, there are 1216 instruments compared to 152 countries in column 1, panel A. Therefore, we restrict the instrument set in column 2[23]. Now, none of the democracy variables are statistically significant though all three retain their positive signs from column 1.

The regressions in columns 1 and 2 assume democracy to be exogenous. Column 3 reports results from instrumenting democracy, using the restricted instrument set. The democracy variables have a negative coefficient, though only the *Polity Score* variable is statistically significant.

[23] Acemoglu et al. (2014) re-estimate their baseline model with alternative moment conditions in Table A6, Cols. 2-5 but the number of instruments remains much higher than the number of countries included.

In columns 4-6, we re-estimate the specifications of the first three columns but now use five-year averages instead of yearly data. The differences in the estimation results for the democracy variables are striking, both in terms of the sign and statistical significance. The democracy measures now have a negative impact on growth. In addition, five of the eight democracy estimates are statistically significant.

To summarize, we do find that the positive impact of democracy on growth postulated in Acemoglu et al. vanishes when we address the issues of instrument proliferation and endogeneity of democracy. It also appears to be specific to the use of annual data.

4.3 Inclusion of policy variables

In this section, we combine important features of Dollar and Kraay's (2003) growth model specification with our previous setup. In particular, we include three macro policy variables- the inflation rate, the share of government spending in total GDP and the black market premium – as additional explanatory variables. These results are presented in Table 8.

(Insert Table 8 here)

Columns 1 through 5 show the results from the extended model for five different democracy measures. The coefficient estimates of the first four (*P-IV Democracy, Polity Score, FH Index, Unified Democracy Score)* imply a *negative* impact of democracy on growth, but only the *Unified Score* is statistically significant. SVMDI (column 5) is he only democracy measure that shows a positive effect on growth, but the estimate is statistically insignificant. *Regime Instability* (column) is also not statistically significant, most likely due to partial correlation with the Dollar-Kray policy measures. In contrast, the deep determinants measures display their expected signs and are statistically significant as well. *CIM* has a positive impact on growth with an average elasticity across the first six columns of 0.166. *Trade Share* has a positive but slightly smaller impact than *CIM*, with an average elasticity of 0.146. Finally, distance from the equator too affects growth in a positive way.

As in Dollar and Kraay, the first two policy variables – *Government Spending* and the *inflation rate* – are statistically significant. *Government spending* has a strong negative impact on growth with an average elasticity of -0.21 across columns 1 through 6. In comparison, the negative effect of the *inflation rate* is much smaller, with an average elasticity -0.04. An interesting finding is that the total positive impact of trade and institutions dominates the total negative impact of the two macro-policy variables.

In columns 7-8, we include the third policy variable used by Dollar and Kraay (2003) – black market premium (*BMP).* A drawback of this specification is the approximately 50 percent drop in sample size due to missing values associated with the black market premium. For example, *BMP* data are not available from 1999 onwards. Nevertheless, *BMP* displays the expected negative sign and is statistically significant.[24] The other macro policy measures as well the institutions, trade and geography measures continue to be statistically significant with the expected signs in both columns.

The two democracy measures, P-IV Democracy (column 7) and *Unified Democracy Score* (column 8) exert a negative growth impact, but only the latter one is statistically significant.[25]

For the diagnostic tests, with all p values in excess of 0.05 for the AR(2) test, we cannot reject the null hypothesis of serially uncorrelated error terms. The difference-in-Hansen test has p-values greater than 0.05, indicating that we cannot reject the null hypothesis that the instruments are correctly excluded. However, the unit p-values in columns 7 and 8 indicate that the estimates in those specifications suffer from instrument proliferation. The K-P tests of the first stage structural equations reject the null of underidentification for both the levels and the difference equation, with two exceptions (column 5 for the difference and column 6 for the level model). Given the quality of our diagnostic results taken together, we believe that the estimated models in columns 1 through 6 of Table 8 are correctly identified and justify a causal interpretation of the various growth determinants.

5. Conclusions

Recent results from dynamic panel data studies suggest that democracies tend to grow faster than non-democracies, both in recent decades (Acemoglu et al., 2014; Grundler and Krieger, 2016) and for the past five centuries (Madsen et al, 2015). These results are in contrast to the previous consensus showing the absence of a growth differential between democracies and non-democracies (see the meta-analysis by Doucouliagos & Ulubaşoğlu, 2008). In this paper, we challenge the results from the recent pro-growth papers by embedding the democracy-growth nexus into the deep determinants model of Rodrik et al. (2004)

[24] Typically, government consumption is counter-cyclical with high levels of spending during periods of weak GDP growth. This simultaneity effect between the two variables suggests that we treat *government spending* as weakly endogenous. A similar argument can be made for the *inflation rate* and *BMP.* In contrast, Dollar and Kraay treat the macro-policy variables as exogenous.

[25] Given cultural differences between regions, we test for possible regional differences in the democracy-development nexus. We thus estimate our baseline model by including interaction terms between democracy and regional dummies for East Asia and Asia Pacific, Latin America and Caribbean, Middle East and North Africa, South Asia and Sub-Saharan Africa. In all five specifications, the various democracy measures as well as most regional interaction terms are not statistically significant. The results are available from the authors upon request.

within a dynamic panel data framework. By controlling for the impact of institutions, openness, and geography, the deep determinants approach is particularly appealing as it allows us to account for the observation by Huntington made decades ago that it is the efficacy of public institutions rather than the form of the political system that matters most for economic development.

Employing cross section and time series data for a sample of more than 160 countries over a period of fifty years, we do not find a statistically significant impact of democracy on economic growth. In contrast, variables that measure the quality of public institutions and the stability of the political regime exert a statistically significant and positive impact on growth. These findings are robust to the inclusion of other determinants of growth, such as openness and geography, as well as of the macro-policy measures used in Dollar and Kraay (2003).

Addressing the issues of instrument proliferation and under/weak-identification afflicting dynamic panel data studies (Bazzi and Clemens, 2013), we report a battery of tests that show that our restricted instrument sets are correctly excluded and do not suffer from underidentification. While the results from ad hoc tests for weak identification are mixed, we reject weak identification with regard to institution and openness in our baseline specification. While public institutions, trade, geography and regime stability appear to be valid determinants of economic growth based on statistical significance and robustness, they vary in terms of their economic impact. The quality of institutions, when measured as the extent of contract intensive money, exhibits the strongest economic impact. The trade openness measures are economically important as well, but to a lesser extent than the institution measures. The economic impact of geography, in particular when measured through the relative distance from the equator, cannot be ignored. The macro-policy variables such as inflation, government spending share and the black market premium examined by Dollar and Kraay (2003) are significant as well and exert an adverse, and in the case of government spending, sizeable economic impact on growth.

Our results capture the tension between the various roles of the government in the economy. While the choice of the political regime (democracy versus non-democracy) appears to matter little for economic development, a government's focus on improving the efficacy of public institutions as well as maintaining political stability has an important positive impact on growth. As other studies have found, increased government consumption relative to GDP and high levels of inflation impede economic growth, with inflation having a weaker impact than government consumption expenditure. We should note that treating

government consumption as an aggregate is a simplification that masks that some components of government expenditures, such as spending on education and health, are likely to be growth enhancing.

It is possible that the impact of democracy on growth occurs mainly through indirect channels rather than the direct effect estimated in this paper. Barro (1996), Tavares and Wacziarg (2001), and others have investigated indirect effects of democracy and identified a number of potential channels such as educational attainment, inequality, government spending, and capital accumulation. Their analyses show that some indirect democracy channels have a positive effect of growth while others exert a negative impact. If the growth-enhancing and growth-reducing effects of indirect democracy pathways more or less offset each other, there will be no aggregate effect of democracy on growth, which is precisely the finding of this paper.

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Appendix A: Variable Definitions and Summary Statistics

Table A1: Variable Definitions and Data Sources	
Name	Definition and Source(s)
GDP per capita	PPP converted gross domestic product per capita. From Penn World Tables v7.1 (Heston et al, 2012)
CIM	*Contract Intensive Money*: Defined as the ratio of non-currency to total money (M2). Author calculations from IFS-IMF (2014) (ratio of the sum of lines 15, 24 and 25 to the sum of 14, 15, 24 and 25).
Veto Players	*Number of Veto Players:* This variable counts the number of veto players in a political system, adjusting for whether these veto players are independent of each other, as determined by the level of electoral competitiveness in a system, their respective party affiliations, and the electoral rules. Veto players are defined as the president, largest party in the legislature, for a presidential system; and as the prime minister and the parties in the government coalition in a parliamentary system. (Also see Keefer, 2002). From DPI2000 (Beck at al., 2001), where it is coded as *CHECKS*.
Economic Freedom of the World Score	This index comprises of five sub-indices capturing the size of government, legal system and property rights, sound money, freedom to trade internationally and regulation. Values range from 0 to 10. From Fraser Institute (Fraser Institute, 2017).
P-IV Democracy	*Institutionalized Democracy*: Democracy is conceived as three essential, interdependent elements. One is the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders. Second is the existence of institutionalized constraints on the exercise of power by the executive. Third is the guarantee of civil liberties to all citizens in their daily lives and in acts of political participation. The Democracy indicator is an additive eleven-point scale (0-10). From Polity IV dataset (Marshall et al, 2002), where it is coded as DEMOC.
Polity Score	This democracy measure is derived from the POLITY2 variable in the Polity-IV dataset (Marshall et al 2002). It is essentially the sum of a country's democracy and autocracy score It ranges from -10 to 10. Following the previous literature (Rodrik & Wacziarg, 2005; Rock, 2009) a country is classified as democratic if this score is positive. For the five year averages, a country is coded as a democracy if it has positive POLITY2 score in three of the five years.
FH Democracy Index	Average of Political Rights and Civil Liberty; both indicators from Freedom House (Freedom House, 2013)
Unified Democracy Score	A cumulative democracy score constructed from ten underlying democracy variables. From Pemstein et al (2010)
SVMDI	Support Vector Machine Democracy Index: An index of democracy created using a machine learning algorithm from a collection of 11 underlying democracy variables by Gründler & Krieger (2016)
Vanhanen Democracy Index	Consists of two components: competition and participation in the political process. Following Kotschy and Sunde (2017), the index is constructed by multiplying these components and rescaling to lie between 0-1. From Peace Research Institute Oslo (PRIO, 2017).
Regime Instability	*Regime Instability:* Measure of government stability that captures the extent of turnover in any one year of a government's key decision makers. It is calculated by dividing the number of exits between year *t* and *t+1* by the total number of veto players in year *t*. The variables are therefore on a 0-1 scale, with zero representing no exits and one representing the exit and replacement of all veto players. From DPI 2000 (Beck et al., 2001) where it is coded as STABS.
Trade Share	Imports plus exports relative to GDP; From PWT Mark 7.1 (Heston et al., 2012)
Real Openness	Imports plus exports in exchange rate US$ relative to GDP in purchasing power parity US$. Author calculations from Penn World Table , 7.1 (Heston et al, 2012), following Alcala and Ciccone, 2004))
Dist Equator	*Relative Distance from the equator:* Calculated as distance from the equator, divided by 90. From Gallup et al. (1998) and Hall and Jones (1999)
Malaria Ecology	A measure of malaria incidence that combines temperature, mosquito abundance and vector specificity. The underlying index is measured on a highly disaggregated sub-national level, and then is averaged for the entire country. Because ME is built upon climatological and vector conditions on a country-by-country basis, it is exogenous to public health interventions and economic conditions. From Sachs (2003)
BMP	*Black Market premium*. From World Bank, Global Development Network Database
Inflation Rate	Annual percentage change in the consumer price index. From the World Development Indicators (WDI), World Bank.
Government Spending / GDP	General government final consumption expenditure (% of GDP). From the WDI, World Bank.

Table 1a: Summary Statistics

Variable	Mean	Standard Deviation			Obs	Countries
		overall	between	within		
Ln GDP per capita	8.249	1.309	1.258	0.353	1455	163
CIM	76.460	17.120	15.200	8.920	1275	156
Veto Players	2.461	1.588	1.303	0.933	1182	163
Economic Freedom Score	5.953	1.296	0.899	0.914	1166	141
P-IV Democracy	4.159	4.083	3.478	2.145	1315	151
Polity Score	0.489	0.500	0.392	0.322	1350	153
FH Index	3.881	1.999	1.803	0.880	1186	160
Unified Democracy Score	0.502	0.228	0.203	0.103	1462	163
SVML Democracy Index	0.473	0.381	0.350	0.153	925	161
Vanhanen Democracy Index	0.229	0.262	0.229	0.123	1272	160
Regime Instability	0.114	0.126	0.069	0.107	1063	163
Trade Share	71.988	45.627	40.993	20.249	1456	163
Real Openness	51.246	84.684	61.697	67.156	1456	163
Distance from the Equator	0.290	0.185	0.186	0.000	1630	163
Malaria Ecology	3.811	6.655	6.675	0.000	1570	157
BMP	569.941	13489.750	5756.256	12500.730	925	158
Inflation rate	36.484	254.461	109.217	233.724	1168	157
Share of Govt Spending in GDP	15.724	6.426	5.411	3.879	1327	160

Table 1b: Correlation coefficients (overall) between time varying variables

	Ln GDP per capita	CIM	Veto Players	Economic Freedom Index	P-IV Democracy	Polity Score	FH Index	Unified Democracy Score	SVMDI	Vanhanen Democracy Index	Regime Instability	Trade Share	Real Openness
Ln GDP per capita	1.00												
CIM	0.69	1.00											
Veto Players	0.43	0.44	1.00										
Economic Freedom Index	0.62	0.59	0.45	1.00									
P-IV Democracy	0.59	0.56	0.72	0.54	1.00								
Polity Score	0.44	0.49	0.70	0.42	0.90	1.00							
FH Index	-0.64	-0.59	-0.69	-0.54	-0.92	-0.81	1.00						
Unified Dem Score	0.65	0.56	0.73	0.58	0.93	0.80	-0.95	1.00					
SVMDI	0.59	0.54	0.71	0.51	0.94	0.85	-0.95	0.92	1.00				
Vanhanen Dem. Index	0.65	0.51	0.70	0.51	0.82	0.69	-0.84	0.90	0.85	1.00			
Regime Instability	0.03	0.06	0.18	-0.02	0.31	0.31	-0.23	0.24	0.27	0.22	1.00		
Trade Share	0.28	0.16	0.03	0.35	0.04	0.01	-0.07	0.05	0.04	0.08	-0.13	1.00	
Real Openness	0.44	0.26	0.13	0.43	0.12	0.04	-0.18	0.21	0.12	0.24	-0.15	0.83	1.00

Appendix B: Estimation Results

Table 2: Basic Dynamic Panel Data Model

	1	2	3	4	5	6	7	8	9
Dep. Variable: Log GDP p.c.	Full Instrument Set			Collapsed Instrument Set			Restricted Instrument Set		
Ln GDPpc (t-1)	0.995***	1.000***	0.971***	0.908***	0.942***	0.915***	0.985***	0.990***	0.955***
	(0.016)	(0.015)	(0.019)	(0.052)	(0.046)	(0.038)	(0.018)	(0.018)	(0.023)
Ln CIM	0.151*	0.072	0.280***	0.560***	0.410**	0.525**	0.154**	0.064	0.295**
	(0.086)	(0.074)	(0.101)	(0.191)	(0.162)	(0.231)	(0.075)	(0.079)	(0.134)
P-IV Democracy	-0.005	-0.004	-0.003	-0.009	-0.009	-0.005	-0.006	-0.005	-0.003
	(0.004)	(0.004)	(0.004)	(0.007)	(0.006)	(0.007)	(0.004)	(0.004)	(0.004)
Ln Real Open.	0.050***	0.065***		0.062	0.071		0.065***	0.086***	
	(0.016)	(0.020)		(0.061)	(0.056)		(0.021)	(0.027)	
Ln Trade Share			0.107***			0.113			0.107***
			(0.030)			(0.072)			(0.034)
Dist. Equator	0.123**		0.165**	0.324*		0.267*	0.171**		0.236**
	(0.060)		(0.070)	(0.167)		(0.151)	(0.070)		(0.093)
Malaria Ecology		-0.003**			-0.004			-0.005*	
		(0.002)			(0.005)			(0.003)	
Observations	1,048	1,040	1,048	1,048	1,040	1,048	1,048	1,040	1048
Countries	147	146	147	147	146	147	147	146	147
No. of Instruments in systems GMM	177	177	177	45	45	45	99	99	99
AR(2) pval	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AR(3) pval	0.40	0.33	0.24	0.29	0.19	0.25	0.39	0.31	0
Difference in Hansen test pval	1.00	1.00	1.00	0.02	0.02	0.05	0.16	0.17	0.59
No. of Instruments in difference model	144	144	144	39	39	39	66	66	66
Kleibergen-Paap underid difference pval	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
No. of Instruments in levels model	41	41	41	14	14	14	41	41	41
Kleibergen-Paap underid levels pval	0.09	0.10	0.35	0.08	0.24	0.23	0.01	0.10	0.35
Kleibergen-Paap Weak id difference F	2.21	2.26	2.25	2.06	2.06	2.11	2.15	2.14	2.15
Kleibergen-Paap Weak id levels F	1.43	1.17	0.94	0.76	0.34	0.36	1.43	1.17	0.94

All models estimated using Blundell-Bond two step system GMM estimator with robust finite sample bias corrected standard errors (Windmeijer, 2005)
AR(2) and AR(3): p-value of Arellano and Bond test for autocorrelation of order 2 and 3 of the error term, respectively.
Diff in Hansen test: tests the validity of the mean stationarity assumption in systems GMM, p-values reported
Kleibergen - Paap Underid Tests: Test the null that the first stage regression is underidentified, reported separately for the difference and level models (p val of Wald test)
Kleibergen - Paap Weak id. Tests: Test whether the instruments in the first stage are weak, reported separately for difference and levels models (F stats).
*/**/***: Significant at 10%, 5% and 1%, respectively. Standard errors in paranthesis.
All regressions include time dummies.

Table 3: Dynamic Panel Data Regressions- basic model with alternative democracy variables included (restricted instrument set)

Dep Var: Ln GDP pc	1	2	3	4	5	6	7	8	9	10	11	12
Ln GDPpc (t-1)	0.981***	0.960***	0.957***	0.940***	0.958***	0.953***	0.982***	0.951***	0.973***	0.965***	0.930***	0.930***
	(0.018)	(0.023)	(0.023)	(0.023)	(0.021)	(0.023)	(0.027)	(0.030)	(0.016)	(0.017)	(0.029)	(0.035)
Veto Players	0.174*	0.337**	0.370**	0.418***	0.262**	0.363***	0.199**	0.323**	0.162***	0.209**	0.306**	0.421**
	(0.093)	(0.138)	(0.155)	(0.148)	(0.108)	(0.135)	(0.100)	(0.148)	(0.063)	(0.090)	(0.149)	(0.190)
P-IV Democracy	-0.039	-0.019										
	(0.033)	(0.030)										
FH Index			0.019*	0.007								
			(0.010)	(0.010)								
Unified Democracy Score					-0.083	-0.006						
					(0.091)	(0.098)						
SVML Democracy Index							0.092	0.062				
							(0.062)	(0.066)				
Vanhanen Democracy Index									0.072	0.072		
									(0.075)	(0.088)		
Regime Instability											-0.209***	-0.205***
											(0.056)	(0.054)
Ln Real Open.	0.048**		0.072***		0.100***		0.117**		0.055**		0.124**	
	(0.024)		(0.028)		(0.029)		(0.046)		(0.026)		(0.046)	
Ln Trade Share		0.093**		0.124***		0.113***		0.210***		0.091**		0.177***
		(0.039)		(0.032)		(0.030)		(0.062)		(0.036)		(0.055)
Dist. Equator	0.151**	0.178**	0.184**	0.205**	0.159*	0.149	-0.110	0.061	0.069	0.108	0.179*	0.186*
	(0.067)	(0.089)	(0.082)	(0.092)	(0.084)	(0.104)	(0.113)	(0.126)	(0.073)	(0.095)	(0.102)	(0.108)
Observations	1,055	1,055	1,071	1,071	1,168	1,168	814	814	895	895	927	927
Countries	147	147	161	161	162	162	161	161	144	144	156	156
No. of Inst. in systems GMM	99	99	90	90	99	99	66	66	86.0000	86.0000	79	79
AR(2) pval	0.00	0.0	0.02	0.02	0.01	0.01	0.12	0.11	0.00	0.00	0.04	0.04
AR(3) pval	0.99	0.90	0.64	0.58	0.78	0.82			0.67	0.52	0.15	0.20
Difference in Hansen test pval	0.29	0.34	0.18	0.34	0.28	0.52	0.00	0.19	0.44	0.57	0.08	0.12
No. of Inst. in difference model	66	66	59	59	66	66	42	42	57	57	51	51
K-P underid for diff model pval	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.24
No. of Inst. in levels model	41	41	38	38	41	41	29	29	36	36	34	34
K-P underid levels model pval	0.24	0.62	0.00	0.17	0.03	0.12	0.02	0.31	0.19	0.04	0.72	0.87
K-P Weak id difference F	1.95	1.97	2.00	1.87	2.18	2.14	4.34	3.96	1.64	1.93	1.43	0.00
K-P Weak id levels F	1.01	0.78	1.7	10.9	1.35	1.15	1.47	0.93	1.06	1.32	0.69	0.59

Notes: Same as Table 2

Table 4: Dynamic Panel Data Regressions- basic model with alternative public institution variables included (restricted instrument set)

Dep Var: Ln GDP pc	1	2	3	4	5	6	7	8	9	10
Ln GDPpc (t-1)	0.988***	1.005***	0.986***	0.990***	0.976***	0.929***	0.928***	0.920***	0.929***	0.954***
	(0.017)	(0.017)	(0.018)	(0.022)	(0.022)	(0.017)	(0.017)	(0.016)	(0.016)	(0.019)
Veto Players	0.025**	0.022**	0.023**	0.023**	0.019**					
	(0.010)	(0.010)	(0.010)	(0.011)	(0.009)					
Economic Freedom Index						0.142***	0.130***	0.135***	0.142***	0.107***
						(0.017)	(0.019)	(0.018)	(0.016)	(0.017)
P-IV Democracy	0.001					-0.007*				
	(0.005)					(0.004)				
Polity Score		0.029					-0.029			
		(0.031)					(0.033)			
FH Index			-0.006					0.019**		
			(0.010)					(0.009)		
Unified Democracy Score				0.088					-0.220**	
				(0.138)					(0.092)	
Vanhanen Democracy Index					0.122					-0.053
					(0.086)					(0.078)
Ln Trade Share	0.147***	0.101***	0.184***	0.172***	0.142***	0.046	0.048	0.054	0.035	0.030
	(0.043)	(0.036)	(0.040)	(0.047)	(0.041)	(0.042)	(0.034)	(0.035)	(0.034)	(0.036)
Dist. Equator	0.038	-0.022	0.024	-0.034	0.021	0.179**	0.140*	0.201**	0.208**	0.135
	(0.090)	(0.092)	(0.092)	(0.095)	(0.105)	(0.088)	(0.082)	(0.079)	(0.081)	(0.098)
Observations	1,033	1,051	1,120	1,129	860	868	878	870	920	716
Countries	151	152	160	161	143	134	135	141	141	116
No. of Inst. in systems GMM	92	92	87	92	79	96	96	88	96	83
AR(2) pval	0.31	0.20	0.07	0.06	0.13	0.00	0.00	0.00	0.00	0.00
AR(3) pval	0.33	0.51	0.25	0.25	0.26	0.42	0.44	0.18	0.36	0.82
Difference in Hansen test pval	0.52	0.68	0.54	0.47	0.74	0.25	0.22	0.39	0.54	0.89
No. of Inst. in difference model	60	60	57	60	51	64	64	58	64	55
K-P underid for diff model pval	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
No. of Inst. in levels model	39	39	37	39	34	40	40	37	40	35
K-P underid levels model pval	0.00	0.00	0.00	0.01	0.00	0.03	0.01	0.00	0.02	0.02
K-P Weak id difference F	1.78	2.00	2.25	2.44	2.11	2.26	1.68	2.35	4.04	1.89
K-P Weak id levels F	1.71	1.74	1.74	1.59	1.76	1.37	1.58	1.78	1.44	1.40

Notes: Same as Table 2

*** p<0.01, ** p<0.05, * p<0.1

Table 5: ssLIML Dynamic Panel Data Regressions- basic model with alternative democracy variables included

Dep Var: Ln GDP pc	1	2	3	4	5	6
Ln GDPpc (t-1)	0.966***	0.966***	0.964***	0.946***	0.949***	0.944***
	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)	(0.023)
Ln CIM	0.058*	0.058*	0.064*	0.046	0.046	0.049
	(0.035)	(0.034)	(0.033)	(0.035)	(0.035)	(0.034)
P-IV Democracy	0.001			0		
	(0.002)			(0.002)		
Polity Score		0.015			0.011	
		(0.015)			(0.015)	
Unified Democracy Score			0.063			0.056
			(0.055)			(0.054)
Ln Trade Share				0.037*	0.035*	0.041**
				(0.02)	(0.02)	(0.02)
Dist. Equator	0.218*	0.217*	0.19	0.336**	0.312**	0.300**
	(0.120)	(0.116)	(0.117)	(0.13)	(0.13)	(0.13)
Countries	67	67	70	67	67	70
Periods	9	9	9	9	9	9
p value of Wald	0.00	0.00	0.00	0.00	0.00	0.00

Notes: The Wald statistic tests whether the effects of any of the variables in the model is significantly differ from zero

Standard errors in parenthesis

*/**/***: Significant at 10%, 5% and 1%, respectively

Table 6: Dynamic Panel Data Regressions- sampleof only developing countries, basic model with alternative democracy variables included (restricted instrument set)

Dep Var: Ln GDP pc	1	2	3	4	5	6	7	8
Ln GDPpc (t-1)	0.957***	0.966***	0.968***	0.954***	0.960***	0.962***	0.970***	0.959***
	(0.025)	(0.027)	(0.030)	(0.032)	(0.033)	(0.025)	(0.027)	(0.036)
Ln CIM	0.279**	0.328***	0.316**	0.362***	0.296**	0.164	0.229**	0.245*
	(0.120)	(0.115)	(0.136)	(0.129)	(0.134)	(0.102)	(0.095)	(0.132)
P-IV Democracy	0.001					-0.001		
	(0.005)					(0.004)		
Polity Score		0.001					-0.005	
		(0.029)					(0.030)	
FH Index			0.000					
			(0.011)					
Unified Democracy Score				-0.032				
				(0.118)				
Regime Instability					-0.014			-0.160
					(0.163)			(0.160)
Ln Trade Share	0.102***	0.097***	0.103***	0.112***	0.124***	0.110***	0.106***	0.130***
	(0.034)	(0.037)	(0.033)	(0.034)	(0.043)	(0.034)	(0.034)	(0.047)
Dist. Equator	0.219**	0.188**	0.130	0.207**	0.197**			
	(0.094)	(0.089)	(0.100)	(0.094)	(0.093)			
Malaria Eco.						-0.003	-0.002	-0.002
						(0.002)	(0.003)	(0.003)
Observations	762	769	755	823	657	762	769	644
Countries	106	106	112	113	109	106	106	107
No. of Inst. in systems GMM	99	99	90	99	79	99	99	79
AR(2) pval	0.01	0.01	0.02	0.02	0.03	0.01	0.01	0.02
AR(3) pval	0.15	0.97	1.00	0.79	0.47	0.14	0.99	0.30
Difference in Hansen test pval	0.19	0.40	0.26	0.24	0.16	0.44	0.25	0.14
No. of Inst. in difference model	66	66	59	66	51	66	66	51
K-P underid for diff model pval	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
No. of Inst. in levels model	41	41	38	41	34	41	41	34
K-P underid levels model pval	0.01	0.02	0.12	0.12	0.90	0.04	0.05	0.91
K-P Weak id difference F	2.33	2.09	1.71	2.12	1.37	2.33	2.09	1.33
K-P Weak id levels F	1.43	1.36	1.13	1.13	0.54	1.31	1.26	0.53

Notes: Same as Table 2

Table 7: Yearly and Five year averaged Dynamic Panel Data Regressions with Democracy as the only additional explanatory variable

	1	2	3	4	5	6
	Yearly data#			5 yr average		
Dep. Variable: Log GDP p.c.	Full Inst Set Dem Exog	Rest. Inst Set Dem Exog	Rest. Inst Set Dem IV	Full Inst Set Dem Exog	Rest. Inst Set Dem Exog	Rest. Inst Set Dem IV
Panel A: Dichotomous Democracy Measure						
Ln GDPpc (t-1)	0.974***	0.710***	0.702***	0.649***	0.616***	0.550***
	(0.038)	(0.073)	(0.073)	(0.064)	(0.120)	(0.114)
Ln GDPpc (t-2)*	-0.057*	-0.026	-0.028			
	(0.029)	(0.026)	(0.025)			
Polity2	0.014**	0.007	-0.035*	-0.007	-0.014	-0.127**
	(0.006)	(0.008)	(0.019)	(0.014)	(0.014)	(0.052)
Observations	5659	5659	5659	1,029	1,029	1,029
Countries	152	152	152	153	153	153
No. of Instruments	1216	270	359	45	24	38
AR(2) pval	0.95	0.70	0.47	0.61	0.70	0.76
Hansen Test pval	1.00	1.00	1.00	0.05	0.17	0.08
Panel B: PIV Democracy Measure						
Ln GDPpc (t-1)	0.917***	0.686***	0.723***	0.666***	0.563***	0.516***
	(0.044)	(0.070)	(0.068)	(0.067)	(0.132)	(0.115)
Ln GDPpc (t-2)	-0.054*	-0.029	-0.036			
	(0.032)	(0.028)	(0.028)			
P-IV Democracy	0.002*	0.001	-0.006	-0.005**	-0.006***	-0.023***
	(0.001)	(0.001)	(0.004)	(0.002)	(0.002)	(0.008)
Observations	5390	5390	5390	999	999	999
Countries	151	151	151	151	151	151
No. of Instruments	1216	270	359	45	24	38
AR(2) pval	0.77	0.73	0.70	0.72	0.99	0.64
Hansen Test pval	1.00	1.00	1.00	0.03	0.12	0.03
Panel C: Unified Democracy Score						
Ln GDPpc (t-1)	0.997***	0.774***	0.789***	0.604***	0.521***	0.480***
	(0.053)	(0.074)	(0.068)	(0.073)	(0.143)	(0.127)
Ln GDPpc (t-2)*	-0.072**	-0.043	-0.047*			
	(0.035)	(0.027)	(0.027)			
Unified Dem. Score	0.037*	0.019	-0.098	-0.019	-0.061	-0.269*
	(0.022)	(0.028)	(0.065)	(0.056)	(0.056)	(0.159)
Observations	6031	6031	6031	1150	1150	1150
Countries	169	169	169	169	169	169
No. of Instruments	1119	258	343	45	24	38
AR(2) pval	0.27	0.17	0.11	0.19	0.32	0.53
Hansen Test pval	1.00	1.00	1.00	0.02	0.14	0.00

#: All regression with yearly data also include third and fourth lags of LnGDP. Only in one case were these significant and thus are not reported to conserve space.

Dem Exog/Dem IV: Democracy measure treated as exogenous/ endogenous (instrumented with lagged values)

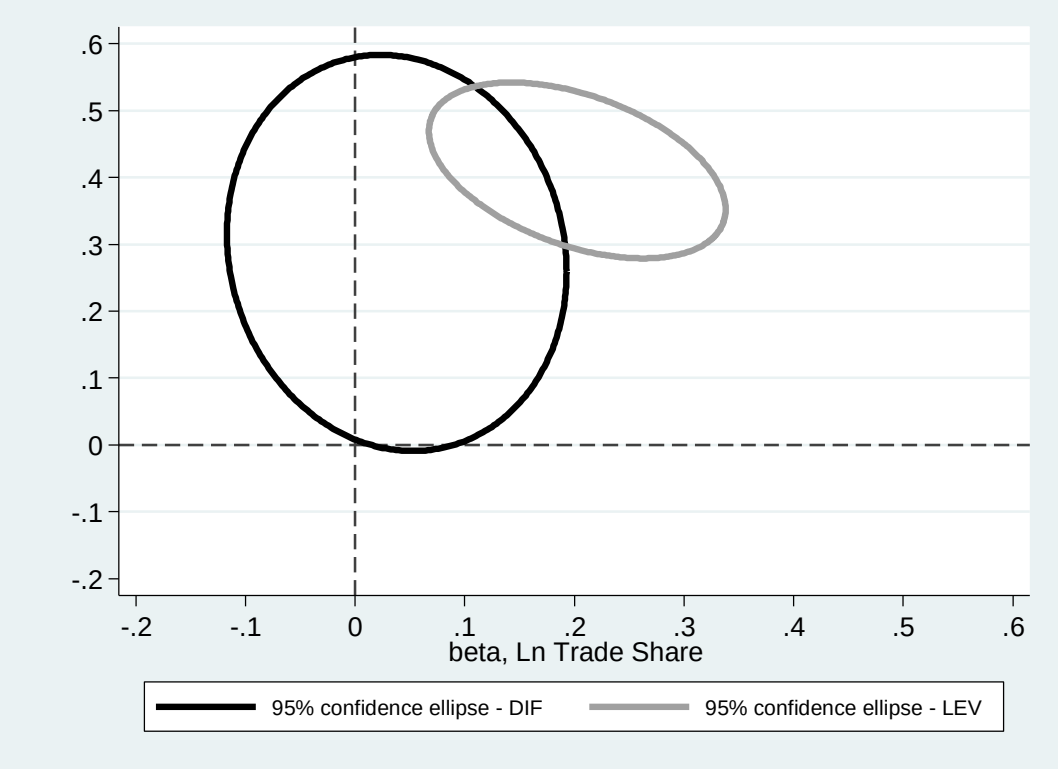
Notes: Same as Table 2

Table 8: Dynamic Panel Data Regressions- inclusion of policy variables (restricted instrument set)

Dep Var: Ln GDP pc	1	2	3	4	5	6	7	8
Ln GDPpc (t-1)	0.976***	0.975***	0.965***	0.975***	0.959***	0.955***	0.997***	0.995***
	-0.015	(0.014)	(0.016)	(0.017)	(0.022)	(0.021)	(0.020)	(0.019)
Ln CIM	0.165***	0.148***	0.213***	0.195***	0.122	0.150*	0.230***	0.271***
	(0.050)	(0.048)	(0.072)	(0.071)	(0.080)	(0.078)	(0.071)	(0.099)
P-IV Democracy	-0.003						-0.005	
	(0.004)						(0.005)	
Polity Score		-0.003						
		(0.024)						
FH Index			0.007					
			(0.009)					
Unified Democracy Score				-0.146**				-0.200**
				(0.068)				(0.094)
SVMDI					0.042			
					(0.056)			
Regime Instability						0.041		
						(0.198)		
Ln Trade Share	0.111***	0.109***	0.165***	0.170***	0.159***	0.160***	0.083***	0.098***
	(0.027)	(0.030)	(0.036)	(0.040)	(0.053)	(0.057)	(0.030)	(0.028)
Ln Inflation rate	-0.035***	-0.036***	-0.038***	-0.039***	-0.048***	-0.040***	-0.016**	-0.012
	(0.009)	(0.008)	(0.010)	(0.010)	(0.012)	(0.013)	(0.008)	(0.008)
Ln (Govt Spending/GDP)	-0.189***	-0.177***	-0.205***	-0.214***	-0.236***	-0.219***	-0.145***	-0.134**
	(0.046)	(0.040)	(0.050)	(0.050)	(0.055)	(0.053)	(0.053)	(0.055)
Ln BMP							-0.016*	-0.016*
							(0.008)	(0.008)
Dist. Equator	0.293***	0.282***	0.270***	0.324***	0.313***	0.339***	0.268***	0.251***
	(0.079)	(0.074)	(0.084)	(0.089)	(0.101)	(0.104)	(0.103)	(0.085)
Observations	873	876	904	975	752	803	422	443
Countries	143	143	157	158	158	153	107	114
Inst. in systems GMM	136	136	122	136	88	105	115	115
AR(2) pval	0.08	0.12	0.17	0.18	0.28	0.19	0.45	0.42
Difference in Hansen test pval	0.91	0.91	0.80	0.93	0.68	0.39	1.00	1.00
No. of Inst. in difference	84	84	74	84	52	63	68	68
K-P underid for diff model pval	0.00	0.00	0.00	0.00	0.18	0.06	0.00	0.00
No. of Inst. in levels model	58	58	55	58	41	48	50	50
K-P underid levels model pval	0.00	0.00	0.00	0.00	0.02	0.67	0.01	0.00
K-P Weak id difference F	1.96	2.60	2.51	2.60	2.01	1.09	2.15	0.03
K-P Weak id levels F	1.41	1.35	1.30	1.36	1.29	0.73	1.23	1.12

Notes: Same as Table 2

Figure 1: Weak-Instrument Robust Confidence Sets for the Joint Impact of *CIM* and *Trade Share* on Economic Growth



Notes: The graphs are the 95 percent weak-instrument robust confidence ellipses for two of the four endogenous variables in the 2SLS analogues of the difference (DIF) and levels (LEV) equations in the system GMM estimates of the dynamic panel regressions of our main specification in Table 2 (Col. 8). The confidence regions are obtained through a four-dimensional grid-search procedure over the domain starting from -0.2 and include the initial instrumental variable point estimates at increments of 0.05 for each of the variables. The procedure follows Baazi and Clemens (2013, pp 180) and is based on the approach developed in Kleibergen (2002). The ellipses are means-centered with a boundary constant of 4.