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Is Democracy Beneficial for Growth in Countries with Low Ethnic Diversity?

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Abstract: We study the impact of democracy on economic growth for a panel of the most and least ethnically diverse nations as documented by Easterly and Levine (1997). Using a GMM system to capture endogeneity and simultaneity, we find that democracy exerts a direct positive impact on growth, in addition to ameliorating the adverse effects of ethnic diversity on growth, unlike some of the results of the previous empirical literature.

Keywords: Ethnic diversity, Democracy, Economic growth, Panel data, GMM system.

JEL classification: C33, O11, O43.

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1. Introduction

Democracy is often regarded in policy circles as a sort of panacea for overcoming the problems associated with coordination failure in ethnically divided societies on the grounds that the electoral process would address such problems in a synchronized way. However, the role of democracy cannot be underestimated even in ethnically homogeneous societies, where it acts as an effective check on the political power that can be exercised by the status quo, and brings about their accountability to the people. In this paper, we try to empirically assess the impact of democracy on growth for highly ethnically fractionalised as well as less fractionalised countries, and find that the institution of democracy positively affects efficiency and growth for both sets of countries, and the relationship is quite robust.

Since the influential empirical work of Easterly and Levine (1997), which argues persuasively that ethnic divisions negatively affect growth, it is widely acknowledged that ethnicity is a factor that deters growth. The basic idea is that societies that are highly polarised find it difficult to find common ground as regards the type and amount of public goods like infrastructure that they would like their governments to provide (see Alesina and Drazen (1991), Alesina and Rodrik (1994), among others). Ethnic diversity may increase polarisation and create incentives for policies that reduce growth, such as financial repression, etc. Easterly and Levine (1997) study the direct impact of ethnicity on growth and the effect on policies that influence long-run growth, and find that ethnic diversity adversely affects many public policies associated with growth, though the direct link between ethnicity and growth is more ambiguous.

Bluedorn (2001) shows that democracy, as an institution, can be an important factor in ameliorating the adverse effects of ethnic diversity on growth. The finding is that democratic institutions could quite successfully resolve conflict in ethnically diverse nations, although their role in nations with fewer ethnic divisions could be less prominent.[1] Bluedorn (2001) presents empirical evidence supportive of democracy's positive role, but also points to the fact that "endogeneity problems and some negative

[1] The positive and significant effect of democracy which eliminates the negative effects of ethnic diversity is evident also in Collier (1998).

direct effects of democracy weaken the case for establishing democratic institutions as a policy solution for poor economic performance due to ethnic diversity" (page 122).

In a similar vein to Bluedorn (2001), but investigating the link between democracy and growth *volatility*, a recent paper by Yang (2008), finds that democracy can significantly reduce growth volatility for countries with high degrees of ethnic heterogeneity, but this is not true for countries with low ethnic diversity.

There are a number of studies that focus on the democracy-growth relationship without explicitly looking at the ethnicity issue. Some of these, like Tavares and Wacziarg (2001), contend that if an important institution such as democracy influences growth, then it should matter *indirectly* through its effects on variables that in turn determine economic growth.[2] Using a panel of 65 developed and developing countries for 1970-89, they find that democracy improves (reduces) the accumulation of human (physical) capital, and therefore growth. In a similar vein, Baum and Lake (2003) argue that there are important indirect effects of democracy on growth that are manifested through public health and education. Using a panel of 128 countries from 1967 to 1997, they find significant and positive effects of democracy on growth through life expectancy in relatively poor countries, and through secondary enrolment ratios in non-poor countries.

A recent paper, Papaioannou and Siourounis (2008a), analyses the effect on growth before and after incidents of permanent democratic transitions. To quantify the effect of a successful democratisation, they focus on countries that pursued liberalisation during the "Third Wave of Democratisation" that followed the collapse of communism in the 1990s.[3] Using panel regression techniques, they find that democratisation leads to almost a 1% increase in real annual per capita GDP growth. Although during the transition, growth drops substantially, it stabilises at a higher rate after the transition. This concurs with our result that democracy has a powerful positive – rather than negligible – effect on growth.

[2] For example, if democracy improves human capital accumulation, which in turn is a channel through which growth is enhanced, then the multiplicative effect of the two coefficients gives the impact of democracy on growth via the education channel.

[3] In Papaioannou and Siourounis (2008b), the authors identify 63 democratic transitions during the 1960-2005 period. Using their data-set to test theories on the pre-requisites for democracy in the countries that entered the Third Wave as non-democracies, they find that democratization is more likely to emerge in affluent and especially educated societies.

In this paper, we investigate the democracy-growth relationship, first, for a panel of highly ethnically fractionalised economies, and then for a panel of countries where ethnic divisions hardly exist. This procedure enables us to assess the effects of democracy on growth for the two very different sets of countries, distinguished clearly in terms of ethnicity. In a generalized set-up, we study both the direct and indirect (via ethnicity) effects of democracy. An important aspect of our methodology is the use of the system Generalized Method of Moments panel estimator. In our view, this tackles quite effectively the endogeneity and possible joint determination problems mentioned by Bluedorn (2001). Like Bluedorn, we obtain the result that democracy mitigates the adverse effects of ethnic diversity. However, in contrast to Bluedorn's findings, in our model, the direct effects of democracy turn out to be *positive* and significant, and this result holds for the panel of highly ethnically diverse as well as ethnically non-diverse countries, and lends support to the view that democracy *per se* is good for growth.

This result is significant and can be rationalised because in general, a greater degree of political freedom through more developed democratic institutions often fosters more economic freedom, which tends thereby to stimulate growth (see, for example, Friedman (1962), and Barro (1996)). Besides, we regard ethnicity as only one (though quite important) reason for which growth could be thwarted. A key reason for an economy's growth to be retarded is often the prevalence of corruption in public policy. And democracy, manifesting through the ballot-box, acts as a suitable commitment device in countering corruption. As Olson (1993) points out, the promises that an autocrat may make (about not confiscating society's wealth, for example) are never completely credible, "because autocratic power by definition implies that there cannot be any judges or other sources of power in the society that the autocrat cannot overrule" (page 571). And as Drury *et al*. (2006) observe, it is not that corruption does not occur in democracies, but that politicians in power in democratic forms of government are much more likely to refrain from indulging in rampant corruption, given the threat of being punished in the next election.

The remainder of the paper is organized in the following way: Section 2 discusses the data and specifies the empirical model. Section 3 discusses the econometric

methodology. Section 4 reports and analyses the empirical results, and Section 5 concludes.

2. Data and Model Specification

The empirical analysis uses panel data for the time period, 1960-1990.[4] We follow Easterly and Levine (1997) in the choice of countries for our study. To avoid sample selection bias, we construct panel estimates for the 15 countries that are most fractionalized, and also of the 14 least fractionalized countries reported in their paper (for more details see Easterly and Levine, (1997), Table III, page 1220, reproduced in Table 1 below).[5] This is in contrast to Bluedorn (2001), who considers a set of ethnically diverse African and Latin American countries for his study.[6]

[INSERT TABLE 1 HERE]

The dependent variable for our analysis is the real per capita GDP growth rate. Clearly, the two most important explanatory variables in this study are the fractionalization index and the democracy index. The fractionalization index is constructed from the Soviet ethnolinguistic fractionalization measure, *Atlas Narodov Mira* (1964), and considered by Easterly and Levine (1997) and Bluedorn (2001). Easterly and Levine construct a measure of ethnolinguistic diversity that measures the probability that two randomly selected individuals in a country belong to different ethnolinguistic groups. They focus on the Soviet measure because of its overall coverage, and the fact that the relevant literatures lean heavily in favour of the Soviet measure.

The democracy measure constructed by us is based on Gastil (1990), where his ranking from 1 to 7 has been converted to a scale from 0 to 1, where 0 corresponds to the fewest political rights (Gastil's rank 7), and 1 to the most political rights (Gastil's rank 1). This indicator of political rights is based on the procedural definition of democracy.[7] As argued by Tavares and Wacziarg (2001), this is the appropriate

[4] Easterly and Levine (1997) and Bluedorn (2001) use pooled regression analysis over the time period, 1960-1990.
[5] Note that in Easterly and Levine (1997), the number of least fractionalised countries is actually 15, but we have to exclude Hong Kong, as we cannot obtain a democracy index for Hong Kong.
[6] Note that the exact set of countries is not reported in his study.
[7] The 0-1 scale corresponds to Bollen (1990) - see Barro (1996) for more details on this.

definition of democracy for the type of study they (and we) conduct: Democracy is " … a body of rules and procedures that regulates the transfer of political power and the free expression of disagreement at all levels of public life. In particular, democracy must be distinguished from its outcomes" (page 1342).

The other variables used in the regression are controls that are chosen along the lines of Easterly and Levine (1997) and Bluedorn (2001). These are the (log of) initial income and its square, (log of) schooling, assassinations, financial depth (M2 as percentage of GDP), black market exchange rate premium, fiscal surplus (as percentage of GDP), and (log of) telephones per worker. Log of initial income captures the convergence effect, and its square depicts the fact that this effect is non-linear (first rising and then falling with per capita income). Political instability is controlled for by including a measure of assassinations, which Barro (1991) found to be negatively associated with growth. Financial depth is closely linked with financial sector policies. The black market premium variable captures the effects of distortionary domestic (trade, exchange rate, etc.) policies that also affect the growth rate in countries where there generally exist a black market for foreign exchange; see Fischer (1993), Barro (1996), Devarajan *et al*. (1996), etc. The ratio of fiscal surplus to GDP is an indicator of fiscal stance (see Fischer (1993)), and is expected to have a positive relationship with growth. Telephones per worker are indicative of a country's infrastructural facilities, and is expected to have a positive effect on growth.

Following Bluedorn (2001) who builds on Easterly and Levine's (1997) framework, we examine the effects of democracy on growth by implementing a multivariate testable relationship of the following form:

$$G_{it} = a_i + b_t + \phi(ELF_{it}) + \eta(DEM_{it}) + \mu(ELF_{it}.DEM_{it}) + \zeta(X_{it}) + e_{it}, \qquad (1)$$

where i indexes nations, and t denotes the time period; a_i captures the time-invariant unobserved country-specific fixed effects, and b_t captures the unobservable individual-invariant time effects. G is the growth rate of real GDP per capita, ELF is the ethnolinguistic fractionalization measure, DEM is the democracy measure, X is a vector of controls, and e is a white noise error term. A negative sign for ϕ indicates that ELF affects growth adversely, a positive sign for η implies that democracy is good for growth, and a positive sign for μ - the coefficient on the interactive term

(ELF.DEM) - is indicative of the fact that democracy has a moderating influence on the deleterious effects of ethnicity on growth.

3. Econometric Methodology

3.1. Seemingly Unrelated Regression (SUR)

Easterly and Levine (1997), and Bluedorn (2001) employ a SUR system estimator. This is because it deals with contemporaneous correlation, which they assumed to exist between the three different decades that they examined (the 1960s, 1970s and 1980s).

We begin the empirical analysis by examining if cross-country residuals are contemporaneously correlated, since countries are exposed to similar kinds of systematic shocks. We test for the contemporaneous error correlations by computing the Breusch and Pagan (1980) Lagrange Multiplier (LM) statistic, λ_{LM} :

$$\lambda_{LM} = T\sum_{i=2}^{n}\sum_{j=1}^{i-1} r_{ij}^2 , \qquad (2)$$

where r_{ij}^2 is the squared ij^{th} correlation coefficient of cross-country residuals. Under the null of no contemporaneous error correlations across the countries, the test statistic is asymptotically χ^2 distributed with N(N-1)/2 degrees of freedom, where N denotes the number of countries in the panel. The p-value of the LM test statistic is zero, which rejects the null hypothesis, suggesting that error series are contemporaneously correlated across all the countries in each of the samples, therefore justifying the use of the SUR econometric methodology used in previous studies. [8]

3.2. Generalized Method of Moments (GMM)

Even though the SUR estimator takes into account contemporaneous correlation across countries, it fails to capture the endogeneity in the explanatory variables of the

[8] Note the fixed effects panel estimator is not applicable to our econometric analysis because it does not encapsulate the contemporaneous correlation across the countries in our sample.

panel.[9] The endogeneity issue is particularly relevant for some of the included variables, e.g., schooling (human capital). A higher level of education acquired through schooling is likely to be a determinant of democracy as well as one of its outcomes. Tavares and Wacziarg (2001) make the point that the link between democracy and development may originate in the fact that education increases the demand for democracy. This example demonstrates that tackling the endogeneity issue is particularly important in our context.

Initially, we embark upon the use of the single equation GMM panel estimator developed by Arellano and Bond (1991) to deal with the endogeneity of our explanatory variables. We implement the GMM single equation estimator instead of the Two Stage Least Squares method because, as mentioned in Biorn and Klette (1999), the GMM is asymptotically efficient under non-restrictive assumptions about error autocorrelation and heteroscedasticity. We test the validity of the instruments with the use of the Sargan test under the null hypothesis that the instruments used are valid. The Sargan test results in a p-value of zero confirming that the instruments used are not valid. The fact that the GMM single equation estimator yields invalid instruments suggests that the empirical findings in our analysis based on this estimator would be weakened.

A possible reason for the weak instruments in our study (which is likely to be true also for Easterly and Levine (1997) and Bluedorn (2001)) is that the time dimensions of the panels are relatively small (30 annual observations for our study and theirs). The single equation estimator suffers from the problem of weak instruments also when the cross-sectional component of the panel is small. This implies that there is a weak correlation between the regressors and the instruments. As a result of this problem, the estimated coefficients suffer from poor precision (see, among others, Staiger and Stock (1997)). We can overcome this problem by using the panel GMM

[9] In order to formally test the explanatory variables for endogeneity, we perform a Hausman test for the hypothesis that the explanatory variables are strictly exogenous. If the null hypothesis is rejected, it leads to the conclusion that the explanatory variables in equation (1) are endogenously determined. In our empirical estimates, the Hausman test rejects the null hypothesis at all conventional significance levels. This leads to the conclusion that we need to tackle the econometric issue of endogeneity for our explanatory variables. The result of the Hausman test is not reported by the authors, but is available upon request.

system estimator proposed by Blundell and Bond (1998), which radically reduces the imprecision associated with the single equation estimator. [10]

A system of equations in first differences and levels is estimated by the GMM system estimator. The system estimator combines the standard set of transformed equations in first differences (used in the GMM single equation estimator) with an additional set of equations in levels. The first set of transformed equations continues to use the lag levels as instruments. The level equation, on the other hand, uses the lagged first differences as instruments. Their validity is based on the following two moment conditions:[11]

$$E\begin{bmatrix}(a_{it}+e_{it})\Delta G_{i,t-z}\\(a_{it}+e_{it})\Delta W_{i,t-z}\end{bmatrix}=0 \qquad for\ \mathrm{z}\geq 1, \tag{3}$$

where W denotes the explanatory variables in (1) and z represents the lag structure of the GMM estimator. In addition to reducing the poor precision of the GMM single equation estimators, the GMM system has the added advantage of dealing with explanatory variables being jointly determined with the growth rate, which as mentioned by Bluedorn (2001) and Tavares and Wacziarg (2001), is likely to be the case.[12]

4. Empirical Results and Discussion

[INSERT TABLE 2 HERE]

First of all, we find from Table 2 that the fixed and time effects are significant, suggesting that the country and time-specific shocks differ significantly across the nations in our sample, justifying the use of the panel. In addition, all estimated models pass the diagnostic tests. A test for first order serial correlation is insignificant, which

[10] Yang (2008), in examining the relationship between democracy and growth volatility, also employs the GMM system panel estimator to tackle endogeneity.

[11] The time-varying matrix of instruments for the first difference GMM estimator can be observed in Blundell and Bond (1998).

[12] The Three Stage Least Squares (3SLS) panel estimator also estimates a system of equations simultaneously and is regarded as an alternative to the GMM system estimator. Tavares and Wacziarg (2001) use the 3SLS technique, where they first estimate the effect of democracy on a variable (e.g., physical capital) that affects growth, and then find the effect of that variable on growth. However, we implement the GMM system estimator, given that it accommodates for the possibility of joint determination of an equation system with different instruments for different equations (Schmidt (1990)).

suggests that the panels do not suffer from serial correlation. The Jarque-Bera normality test indicates that the residuals of the models are normally distributed, implying that the empirical estimates obtained are not due to any outliers in the data. The Sargan tests confirm the validity of the instruments in both GMM system models.

The estimates for the SUR, which are performed first (for both most and least fractionalized countries), are strikingly similar to those obtained by Bluedorn (2001), with the control variables having exactly the same sign and being significant at the 5% level.[13] In addition, both ELF and DEM are negative and significant, while the (ELF.DEM) interaction term is positive and significant.[14]

Columns (3) and (4) report the results for the most and least fractionalized countries using the GMM system. It is clear from the diagnostics that the standard error of the GMM system is significantly less than the SUR, and the R^2 is also much bigger, which amply demonstrates the better fit obtained from using the GMM. It can be observed that other than the coefficient on democracy, all the other coefficient estimates are of the same sign (and significant) as obtained under the SUR.[15] So, using the system, we find that democracy is not only effective in ameliorating the negative effects of ethnic divisions on growth, but is by itself a positive influence on growth, unlike what is obtained by Bluedorn (2001).[16] Thus, overcoming endogeneity by the use of the system GMM also seems to enable us to obtain the positive growth effects of democracy (on its own), something that the SUR do not yield.

For robustness, in order to account for the possibility of reverse causality between democracy and the effect on output growth, we implement a three-year moving average of growth as the dependant variable in equation (1).[17] There is a lag in the

[13] The signs of the different coefficients also agree with Tavares and Wacziarg (2001).
[14] Unlike us, in Collier (1998), where endogeneity and simultaneity are not accounted for, inclusion of the interaction term leads to both ethnic diversity and political rights becoming insignificant.
[15] We use alternative lag structures, but to save space, we only report the results using one lag.
[16] In the cross-section analysis of Barro (1996), if rule of law, schooling, life expectancy and fertility variables as explanatory variables are excluded, then the estimated coefficient of democracy becomes positive and significant. But including those variables makes the democracy coefficient moderately negative.
[17] See, for example, Tavares and Wacziarg (2001), where most of the variables, including growth and the democracy index, enter as five-year averages, which limits the potential for measurement error and business cycle effects driving the results. See also Devarajan *et al*. (1996) and Ghosh and Gregoriou (2008), who in examining the link between the composition of public spending and growth, also use the moving average of growth to eliminate short term business cycle fluctuations induced by shifts in public spending.

response of growth to changes in democracy, which is picked up by the moving average. The results are reported in Table 3.[18]

[INSERT TABLE 3 HERE]

Our system estimates negate the Bluedorn result that "democracy may actually have a negative effect on growth for relatively ethnically homogeneous nations", and generate the powerful result that democracy has positive and significant effects on growth for ethnically heterogeneous as well as homogeneous nations. Although it is true that democracy, by mitigating social conflict, may have a large effect on growth in ethnically divided societies; it is important to note that even in societies that are relatively homogeneous from an ethnic perspective, a well-functioning democracy adds the vote/voice of the vast number of 'have-nots' (economically poor) to that of the few 'haves' (rich), and brings about more accountability for the government towards the people. Although it is possible for democracy to lead to redistribution in favour of the labour-endowed median voter, which could thwart growth (Alesina and Rodrik (1994)), it is also possible for democracies to foster growth by improving investment opportunities in an environment of inclusivity. Helliwell (1994), for instance, found a positive and significant coefficient for the effect of democracy on physical capital accumulation. Kurzman *et al*. (2002) too find the effect of democracy on investment levels to be positive and significant, and obtain therefore a positive indirect effect on economic growth via investment.

Another important reason for having a positive association between democracy and growth *per se* is that under non-democratic regimes, there is often the possibility that the dictator uses his/her power to appropriate a country's wealth and carry out non-productive investments that hamper growth. As mentioned by Barro (1996), this is true of many governments in Africa, and of some in Latin America and the former East European planned economies, for example. A good example of an ethnically

[18] The explanatory variable in the Easterly and Levine (1997) regressions is the average annual growth rate of GDP per capita in the 1960s, 1970s and 1980s, on the grounds that since they are focusing on long-run growth, they could abstract from business cycle fluctuations by studying economic performance over decades. The Bluedorn (2001) study also uses decadal averages. To be in line with their analysis, we carried out further robustness tests by replacing individual-invariant time effects with dummies for each decade in Tables 2 and 3. The results (not reported) are quantitatively similar, and are available from the authors upon request. Note also that Tavares and Wacziarg (2001) split their 1970-89 sample period into four time periods, and Yang (2008) uses a five-year panel of 138 countries over the 1968-2002 period.

homogeneous nation that suffered under a non-democratic regime is provided by Haiti (which has a fractionalization index of 1: see Table 1) under the Duvaliers – a stark reminder of the fact that much of the country's productive resources had been siphoned off by corrupt politicians is that 150 km of railroad were sold as scrap metal by a member of the ruling elite (see Abbott (1988), page 172)! This, being one of the worst recorded incidences of corruption in the world, highlights the point that non-democratic regimes are not subject to any credible commitment device in the absence of regular elections (see Olson (1993)), and this is true irrespective of whether or not there are ethnic divisions in society. The study by Drury *et al.* (2006) confirms that non-democracies suffer significant economic harm from corruption: a one standard deviation increase in corruption leads to nearly a full point decrease in the annual growth rate, supporting their contention that democracy mitigates the negative effects of any given level of corruption.

Our results on the positive effects of democracy on growth concur with the results obtained by Papaioannou and Siourounis (2008a) – using a different framework – which show that democratisation events have sizeable long-run benefits. They demonstrate that though growth fluctuates for some years after a democratic transition, it stabilises at a higher rate after the consolidation of democracy than in the pre-transition period. They also show that countries that did the reverse switch from democracy to autocracy (like Gambia, Lebanon and Zimbabwe) experienced slower growth.

We conclude this section with a quote from Wittman (1989), which nicely summarises some arguments in favour of democracies being able to produce efficient outcomes: "To say that democratic political markets tend toward efficiency does not imply that political markets are superior to economic markets; rather it implies that democratic governments will allocate to the economic markets those tasks in which the economic market is most efficient" (Wittman (1989), page 1421).[19]

[19] Note that Barro (1996) advocates the propagation of Western-style economic systems (rather than their political systems *per se*) to the poorer nations as the effective way to expand democracy to the world. Our results indicate that propagation of economic and political freedom could go hand in hand.

5. Conclusion

The purpose of this study was to ascertain whether democracy, by itself, has a positive effect on growth, and also whether it mitigates the adverse effects of ethnic diversity on growth, once endogeneity and joint determination issues had been captured by the panel estimator. We employed the GMM system estimator to tackle these two aspects, and found that there is a direct positive effect of democracy on growth – in addition to its role in ameliorating the adverse effects of ethnicity.

Given the importance of democracy and growth from the perspective of policy prescriptions, and given that this paper attempts to resolve the endogeneity and simultaneity issues not directly addressed in much of previous research, the empirical findings of this paper seem particularly important.

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Table 1. Ethnolinguistic Fractionalisation Index (ETHNIC)
(66 countries, 1960)

15 Most fractionalized 15 Least fractionalized

Country	ETHNIC	Country	ETHNIC
Tanzania	93	Haiti	1
Uganda	90	Japan	1
Zaire	90	Portugal	1
Cameroon	89	Hong Kong	2
India	89	Yemen	2
South Africa	88	Germany	3
Nigeria	87	Burundi	4
Ivory Coast	86	Dominican Repub	4
CAR	83	Egypt	4
Kenya	83	Ireland	4
Liberia	83	Italy	4
Zambia	82	Norway	4
Angola	78	Iceland	5
Mali	78	Jamaica	5
Sierra Leone	77	Jordan	5

(Reproduced from Easterly and Levine (1997), Table III, page 1220.)

Table 2. Growth regressions: SUR and GMM system panel estimates over the time period, 1960-1990.

	(1)	(2)	(3)	(4)
Variable	**SUR Estimates Most Fractionalized Countries**	**SUR Estimates Least Fractionalized Countries**	**GMM System Estimates - Most Fractionalized Countries**	**GMM System Estimates - Least Fractionalized Countries**
Constant	14.26 **(2.53)***	14.30 **(2.51)***	15.20 **(2.67)***	15.27 **(2.70)***
Log initial income	0.042 **(2.55)***	0.055 **(2.32)***	0.077 **(2.76)***	0.081 **(2.79)***
Log initial income square	-0.0013 **(-2.82)***	-0.0017 **(-2.54)***	-0.0020 **(-2.60)***	-0.0026 **(-2.63)***
Log schooling	0.018 **(2.06)***	0.024 **(2.00)***	0.0016 **(2.09)***	0.0020 **(2.01)***
Assassinations	-7.13 **(-2.73)***	-7.45 **(-2.80)***	-7.77 **(-2.90)***	-7.80 **(-3.02)***
Financial Depth	0.033 **(2.37)***	0.039 **(2.30)***	0.040 **(2.22)***	0.045 **(2.24)***
Black Market Premium	-0.022 **(2.00)***	-0.025 **(2.05)***	-0.020 **(2.08)***	-0.033 **(2.16)***
Fiscal surplus /GDP	0.11 **(2.08)***	0.16 **(2.10)***	0.19 **(2.08)***	0.20 **(2.13)***
Log telephones per worker	0.0022 **(2.81)***	0.0015 **(2.56)***	0.0027 **(2.67)***	0.0028 **(2.60)***
ELF	-0.0056 **(-3.02)***	-0.0061 **(-3.56)***	-0.0050 **(-3.14)***	-0.0055 **(-3.17)***
Democracy	-0.019 **(-2.42)***	-0.023 **(-2.56)***	0.015 **(2.50)***	0.020 **(2.53)***
(ELF*Democracy)	0.047 **(2.89)***	0.055 **(3.01)***	0.040 **(2.92)***	0.050 **(2.94)***
a_i	(0.00)	(0.00)	(0.00)	(0.00)
b_t	(0.00)	(0.00)	(0.00)	(0.00)
SE	0.54	0.66	0.32	0.36
AR(1)	(0.42)	(0.47)	(0.52)	(0.55)
NORM(2)	(0.33)	(0.35)	(0.44)	(0.49)
Diff Sargan	NA	NA	(0.58)	(0.60)
Hausman test	NA	NA	90.23	94.52
R^2	0.33	0.22	0.65	0.60
Observations	450	450	450	450

Notes: AR(1) is the first order Lagrange Multiplier test for residual serial correlation, undertaken on the residuals for the SUR estimates and on the first difference of the residuals for the GMM system because of the transformations involved. SE represents the standard error of the panel estimator. a_i and b_t are the fixed and time effects. Sargan tests follow a χ^2 distribution with r degrees of freedom under the null hypothesis of valid instruments. Note: the Difference-Sargan test is applicable to the GMM system estimator due to the transformations involved. To establish the validity of the instrument set. NORM(2) is the Jarque-Bera normality test. The Hausman test follows a χ^2 distribution with 11 degrees of freedom, resulting in a critical value of 19.68, at the 95% confidence level. The endogenous explanatory variables in the panel are GMM instrumented setting, $z \geq 1$. (.) are p values, **(.)** are t statistics, * indicate significant at the 5% level.

Table 3. Growth regressions: SUR and GMM system - three year moving average panel estimates over the time period, 1960-1990.

	(1)	(2)	(3)	(4)
Variable	**SUR Estimates Most Fractionalized Countries**	**SUR Estimates Least Fractionalized Countries**	**GMM System Estimates - Most Fractionalized Countries**	**GMM System Estimates - Least Fractionalized Countries**
Constant	14.34 **(2.61)***	14.44 **(2.58)***	15.27 **(2.71)***	15.43 **(2.80)***
Log initial income	0.045 **(2.51)***	0.047 **(2.39)***	0.082 **(2.79)***	0.087 **(2.70)***
Log initial income square	-0.0016 **(-2.87)***	-0.0026 **(-2.50)***	-0.0024 **(-2.62)***	-0.0033 **(-2.54)***
Log schooling	0.022 **(2.09)***	0.027 **(2.07)***	0.0019 **(2.12)***	0.0029 **(2.07)***
Assassinations	-7.18 **(-2.66)***	-7.51 **(-2.75)***	-7.64 **(-2.86)***	-7.87 **(-3.12)***
Financial Depth	0.038 **(2.30)***	0.042 **(2.22)***	0.044 **(2.27)***	0.052 **(2.14)***
Black Market Premium	-0.029 **(2.05)***	-0.033 **(2.07)***	-0.025 **(2.12)***	-0.037 **(2.22)***
Fiscal surplus /GDP	0.10 **(2.12)***	0.14 **(2.19)***	0.22 **(2.18)***	0.27 **(2.22)***
Log telephones per worker	0.0027 **(2.89)***	0.0018 **(2.66)***	0.0031 **(2.71)***	0.0036 **(2.53)***
ELF	-0.0051 **(-2.92)***	-0.0065 **(-3.61)***	-0.0054 **(-3.06)***	-0.0066 **(-3.22)***
Democracy	-0.022 **(-2.49)***	-0.028 **(-2.60)***	0.018 **(2.40)***	0.025 **(2.44)***
(ELF*Democracy)	0.045 **(2.80)***	0.058 **(3.12)***	0.046 **(2.96)***	0.057 **(3.03)***
a_i	(0.00)	(0.00)	(0.00)	(0.00)
b_t	(0.00)	(0.00)	(0.00)	(0.00)
SE	0.57	0.69	0.28	0.41
AR(1)	(0.38)	(0.49)	(0.55)	(0.60)
NORM(2)	(0.36)	(0.37)	(0.47)	(0.53)
Diff Sargan	NA	NA	(0.63)	(0.67)
Hausman test	NA	NA	90.44	95.67
R^2	0.37	0.28	0.62	0.58
Observations	447	447	447	447

Notes: AR(1) is the first order Lagrange Multiplier test for residual serial correlation, undertaken on the residuals for the SUR estimates and on the first difference of the residuals for the GMM system because of the transformations involved. SE represents the standard error of the panel estimator. a_i and b_t are the fixed and time effects. Sargan tests follow a χ^2 distribution with r degrees of freedom under the null hypothesis of valid instruments. Note: the Difference-Sargan test is applicable to the GMM system estimator due to the transformations involved. To establish the validity of the instrument set. NORM(2) is the Jarque-Bera normality test. The Hausman test follows a χ^2 distribution with 11 degrees of freedom, resulting in a critical value of 19.68, at the 95% confidence level. The endogenous explanatory variables in the panel are GMM instrumented setting, $z \geq 1$. (.) are p values, **(.)** are t statistics, * indicate significant at the 5% level.