

# **Democracy and Economic Growth: A meta-analysis**

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## Abstract

Despite a sizeable theoretical and empirical literature, no firm conclusions have been drawn regarding the impact of political democracy on economic growth. This paper challenges the consensus of an inconclusive relationship with a meta-analytic review and a quantitative assessment of the democracy-growth literature. We apply meta-regression analysis to the population of 470 estimates derived from 81 papers on the democracy-growth association. In addition to traditional meta-analysis estimators, we use also the bootstrap and clustered data analysis, as well as Fixed and Random Effects meta-regression models. Our meta-analysis derives several robust conclusions on the relationship. First, once all the available evidence is considered, there is, on average, no evidence of democracy being detrimental to growth. Taking all the available published evidence together, we conclude that democracy has no direct effect on economic growth. On the other hand, it has robust and significant indirect effects on growth. The results are consistent with democracies being associated with higher human capital accumulation, lower inflation, lower political instability and higher economic freedom. Additionally, there is some evidence that democracies are associated with larger governments and more restrictions to international trade. Our results also point to the existence of country-specific and region-specific democracy-growth effects. In particular the reported evidence shows that growth effect of democracy is higher in Latin America and lower in Asia. We conclude that whatever other effects democracy may have on society, its net effect on the economy is not detrimental.

“...despite the lengthy and rich dialogue on the subject, many of the central questions pertaining to the developmental consequences of political democracy remain, by and large, unresolved. Instead, the relevant quantitative, cross-national research continues to be plagued by conflicting findings, a state of affairs made only more complex by conceptual, measurement, modelling and research design differences.” (Sirowy and Inkeles 1990, page 127).

“...existing studies fail to develop an adequate political theory of growth and as a result their empirical models are typically misspecified. With competing arguments on both sides of the question, many analysts merely add a variable for democracy to existing economic models and then look at the sign of the coefficient and its significance. This is inadequate.” (Baum and Lake 2003, page 333)

## 1. Introduction

The relationship between political democracy and economic growth has been a center of debate in the past fifty years. A corpus of cross-country research has shown that the theoretical divide on the impact of democratic versus authoritarian regimes on growth is matched by ambiguous empirical results, resulting in a consensus of an *inconclusive relationship*. Through this paper we challenge this consensus. In contrast to the current consensus, we show that once the microscope of meta-analysis is applied to the accumulated evidence, it is possible to draw several firm and robust conclusions regarding democracy and economic growth.

Supporters of democracy argue that the motivations of citizens to work and invest, the effective allocation of resources in the marketplace, and profit maximizing private activity can all be maintained in a climate of liberty, free-flowing information and secured control of property (North 1990). Democracies can limit state intervention in the economy, are responsive to public's demands on areas such as education, justice and health, and encourage stable and long-run growth (Rodrik 1999, Lake and Baum 2001, Baum and Lake 2003). Opponents of democracy, other other hand, argue that democracies lend themselves to popular demands for immediate consumption at the expense of profitable investments, cannot be insulated from the interests of rent-seekers, and cannot mobilize resources swiftly. Democracies are said also to be prone to conflicts due to social, ethnic and class struggles. While some authors favor authoritarian regimes to suppress conflicts, resist sectional interests and take coercive measures necessary for rapid growth, others remain overall sceptical on whether regimes, rather than markets and institutions, matter for growth (Bhagwati 1995).

The availability of data and econometric techniques enables researchers to explore these issues empirically. The empirical findings, however, span a continuum of negative, insignificant and positive estimates, creating a conundrum. For instance, the distribution of results that we have compiled from 470 regression estimates from 81 democracy-growth studies shows that 16% of the estimates are negative and statistically significant, 20% of the estimates are negative and statistically insignificant, 38% of the estimates are positive and statistically insignificant, and

26% of the estimates are positive and statistically significant. This implies that three-quarters of the regressions have not been able to find the “desired” positive and significant sign. It also implies that around half of the regression models have found significant estimates while the other half found insignificant estimates. Such different results are not surprising because research questions posed are understably narrow and approach the issue from different dimensions. For instance, while certain studies focus on the physical investment channel between democracy and growth, others look at human capital or political instability channels. Likewise, certain studies present structural estimates of a well-defined model, whereas others focus on the empirical regularities in the data. Thus, the question is perplexed with a continuum of estimates, which differ due to data sources, estimation methodologies, sample compositions, and time periods.<sup>1,2</sup>

This paper presents a meta-analysis on the democracy-growth relationship, based on 81 published studies. It makes three novel contributions to the democracy-growth literature. First, we offer a comprehensive assessment of the findings based on the entire pool of estimates on democracy on growth. Second, the quantitative assessment is used to draw firm inferences on the magnitude and the significance of the democracy-growth relationship. Third, we explore the driving factors behind the heterogeneity of the results that have been found by single studies so far.

There is a growing list of applications of meta-analysis to political science (Lau 1999 and Roscoe and Jenkins 2005) and political economy (Nijkamp and Poot 2004 and Doucouliagos and Ulubasoglu 2006). Meta-analysis considers all the available results from an empirical literature to draw inference from a larger (ideally the entire) pool of information than what could be provided by a single study. A single study is unlikely to resolve theoretical or empirical debates, if not create them. Validation and generalization of results in the literature require a method of integrating the results, and meta-analysis is an effective method for doing so.<sup>3</sup> The idea of this analysis is to address the “partiality” problem that single studies face and generate, and to arrive at an inductive conclusion by appropriately making use of the “bits” of information provided by

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<sup>1</sup> See Sirowy and Inkeles (1990) and Przeworski and Limongi (1993) for a review of debates. Sirowy and Inkeles (1990) provide a qualitative review covering 13 cross-national studies of early times, as do Przeworski and Limongi (1993), who do it for 18 studies, some newer. Other reviews include Alesina and Perotti (1994), Brunetti (1997) and Aron (2000), while summaries of theoretical debates can be found Gasiorowski (2000), Nelson and Singh (1998), Durham (1999), de Haan and Siermann (1995), Brunetti and Weder (1995), Kurzman *et al.* (2002), Baum and Lake (2003) and Quinn and Woolley (2001).

<sup>2</sup> Przeworski and Limongi (1993, p. 60) note that: “...those who argue that democracy favors growth fail to provide a reasonable model of the democratic process and those who see dictatorship is necessary to restrain particularistic pressures skirt over the motivation of the state apparatus, we do not have a framework within which this controversy could be resolved”.

<sup>3</sup> Other examples of synthesizing results from growth regressions include: “I Just Ran Two Million Regressions” by Sala-i-Martin (1997) and “Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach” by Doppelhofer, Miller and Sala-i-Martin (2004).

these studies. It assumes that each study is a data point in the knowledge generating mechanism towards the true democracy-growth relationship, and may have some random or systematic deviations from the true relationship. An important factor for such deviation is sampling error, which is a significant problem that plagues every individual study. At the level of an individual study, sampling error is a random and unknown event, which can make empirical results appear to be more different than they may in fact be.<sup>4</sup> However, by taking all studies together, meta-analysis informs on the extent of sampling error and enables the removal of its effects from empirical findings (Hunter and Schmidt 2004).<sup>5</sup>

Another factor is research design, in particular specification effects. Meta-analysis can, among other things, help net out such systematic differences across studies, and guide further research towards less biased studies. Studies are multi-dimensional, as they differ across several domains, such as the composition of countries, time periods, the number of countries, control variables and estimation technique.<sup>6</sup> Meta-analysis can be used to model and estimate the impact of these differences.

Once sampling error and research design differences are eliminated, meta-analysis allows investigation of whether there is an underlying relationship between democracy and growth. If there is a relationship, is it positive or negative, and does it differ across countries, regions or time periods? Meta-analysis is also extremely useful for deriving important information on the indirect effects of democracy on growth. Accumulation of factors of production, income distribution, political stability, price stability and the size of government underlie important structural differences between countries and impact on long-run growth. Meta-analysis makes possible exploring the relationships between democracy and these factors in an integrated framework.

This paper is an important step to addressing the extant deadlock on the democracy-growth relationship. The literature needs such an urgent comprehensive assessment on the issue in the wake of massive democratizations “tinkered” for many developing countries. Reviews of

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<sup>4</sup> For example, consider the coefficients and t-statistics associated with the following four studies: Barro (2000) reports a coefficient of +0.05 (t-statistic of +1.83), Leblang (1997) reports a coefficient of +0.12 (t-statistic of +2.18), Dawson (1998) reports a coefficient of -0.003 (t-statistic of -0.05) and Gasiorowski (2000) reports a coefficient of -0.12 (t-statistic of -1.25). Taken together there is one positive and statistically significant effect (Leblang), one positive and weakly statistically significant effect (Barro) and two negative but not statistically significant effects. However, once sampling error is considered in the form of confidence intervals all four studies overlap significantly. The 95% confidence intervals for each of these studies are respectively: -0.004 to +0.11, +0.01 to +0.23, -0.11 to +0.10 and -0.32 to +0.07. Rather than an inconclusive result, the four studies taken together actually share a common interval range of +0.01 to +0.07. There is more to meta-analysis than this however. In the text we show how it is possible to factor out not just sampling error but also differences in research design.

<sup>5</sup> This correction becomes perfect as the number of studies approaches infinity.

<sup>6</sup> Traditional qualitative reviews cannot filter such effects, which are subject to ‘methodological speculation’ (Stanley 2001).

this literature and many authors who have contributed to it, state that the association is inconclusive. Faced with a diverse set of conflicting results, they are unable to conclude whether the association is positive, negative or non-existent. Our results are particularly suggestive. We find that once all the available evidence is considered, holding research design differences constant, the evidence does not point to democracy having a detrimental impact on growth. Moreover, we are able to conclude that the effect is not inconclusive. There is, indeed, a zero direct effect of democracy on growth. Second, democracy has a significant positive indirect effect on growth through human capital accumulation. In addition, democracies are associated with lower inflation, reduce political instability and higher levels of economic freedom. However, there is some evidence that they are associated also with larger governments and more restrictive international trade. Third, there are region-specific effects on the democracy-growth relationship. Specifically, the growth effects of democracy are higher in Latin America and lower in Asia. We find also that much of the variation in results between studies does not reflect real underlying differences in the democracy-growth association. Rather it is due to either sampling error or the research design process.

The paper is structured as follows. Section 2 provides a brief review of the key theoretical arguments behind a democracy-growth association. Section 3 discusses the meta-analysis methodology adopted in this paper. Section 4 discusses the data used. Section 5 is the heart of the paper, presenting meta-analysis and meta-regression analysis results. The paper is concluded in section 6.

## **2. Theoretical Arguments**

### *2.1. Traditional Views*

Does political democracy cause economic growth? Hobbes (1651) is known to have first promoted the conflict view.<sup>7</sup> To Hobbes, absolutist regimes were more likely to improve public welfare simply because they could not promote their own interests otherwise. Huntington (1968) also subscribes to this view. Huntington argues that democracies have weak and fragile political institutions and lend themselves to popular demands at the expense of profitable investments. Democratic governments are vulnerable to demands for redistribution to lower-income groups, and are surrounded by rent-seekers for “directly unproductive profit-seeking activities” (Krueger 1974, Bhagwati 1982). Non-democratic regimes can implement coercively the hard economic policies necessary for growth, and suppress the growth-retarding demands of low-income

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<sup>7</sup> Cited in Kurzman *et al.* 2002.

earners and labor in general, as well as social instabilities due to ethnic, religious, and class struggles. Democracies cannot suppress such conflicts. For economic progress, markets should come first and authoritarian regimes can easily facilitate such policies. In addition, some level of development is a pre-requisite for democracy to function properly (Lipset's 1959 hypothesis). All in all, this view implies that political democracy is a luxury good that cannot be afforded by developing countries. Other proponents of the conflict view and stricter state command on the economy include Galenson (1959), Andreski (1968), Huntington and Dominguez (1975), Rao (1984-5), and Haggard (1990).

Such a view became fashionable after the growth success stories in South Korea, Taiwan, Hong Kong and Singapore in the 1950s and 1960s. The arguments rest on several assumptions, the main one of which is that if given power, authoritarian regimes would behave in a growth-friendly manner. In that vein, several contrasting cases are provided where dictators pursued their own welfare and failed ostensibly in Africa and the socialist world (de Haan and Siemann 1995, Alesina *et al.* 1996).

Proponents of democracy, on the other hand, argue that rulers are potential looters (Harrington 1656) and democratic institutions can act to constrain them (North 1990). Most of the assumptions of the conflict view can be refuted with good reasons (see Sirowy and Inkeles 1990, and the references therein). Implementation of the rule of law, contract enforcement and protection property rights do not necessarily imply an authoritarian regime. The latter has a tendency to confiscate assets if it can expect a brief tenure (Olson 1993) or even in the long-run (Bhagwati 1995), for more corrupt and extravagant use of resources, internally inconsistent policies, and short-lived and volatile economic progress (Nelson 1987). The motivation of citizens for work and invest, the effective allocation of resources in the marketplace, and profit maximizing private activity can be maintained with higher political rights and civil liberties. In addition, Bhagwati (1995) argues that democracies rarely engage in military conflict with each other, and this promotes world peace and economic growth. They are also more likely to provide less volatile economic performance. Finally, de Haan and Siemann (1995) note that a strong state and an authoritarian state are not the same thing.

Among these conflicting views and insignificant empirical results, it is natural that a so-called sceptical view has arisen. The proponents of this view argue that it is the institutional structure and organizations, rather than regimes *per se*, that matters for growth. Pro-growth governmental policies can be instituted in either regime. A sound leadership that will resolve collective action problems and be responsive to rapidly changing technical and market conditions is more essential for growth (Bardhan 1993). Although a supporter of democracy, Bhagwati

(1995) argues that markets can deliver growth under both democratic and authoritarian regimes. However, there have also been examples that the institutional structures under both regimes are afflicted by not making the “right” choices for their subjects.<sup>8</sup>

## 2.2. *The Democracy-Growth Question Today*

The political democracy-growth question is more precise and focused today, thanks to accumulation of research and a growing list of country experiences (e.g., Russia, China, Latin America, and the Asian financial crisis). Theory has moved away from traditional conflict vs compatibility arguments, because different aspects of the broader institutions-growth problem have been identified.<sup>9</sup> For instance, researchers have separated economic democracy from political democracy. Factors like protection of property rights, business, credit and labor market regulations, which were previously attributed to political democracy, are now being treated as part of economic democracy. Analysis of economic freedom indicators from the Fraser Institute (by Gwartney and Lawson 1996, 2000, 2003) and the Heritage Foundation (by O’Driscoll *et al.* 2003) has shown that economic freedom, with also its other aspects,<sup>10</sup> is equally relevant to growth (see Doucouliagos and Ulubasoglu 2006). In addition, Kaufman *et al.* (1999, 2002, 2003) introduced the governance aspect of the institutions problem. Formerly, factors such as rule of law, voice and accountability, government efficiency, political instability, corruption, and regulatory quality were either partly or totally attributed to political democracy.<sup>11</sup> These, too, are associated with higher growth. Recently, the World Bank introduced the “Doing Business” aspect of the institutions problem. In particular Djankov *et al.* (2002a, 2002b, 2005), Djankov, McLiesh and Shleifer (2005), and Botero *et al.* (2004) benchmarked business regulations and quantified the easiness of private sector’s activity in the economies based on labor hiring and firing practices; ease of starting, registering and closing business; protecting investors and enforcing contracts; and dealing with licenses and paying taxes.

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<sup>8</sup> The consensus on the inconclusive relationship led researchers to investigate also other aspects of politics and growth. For instance, Minier 1998 finds that changes in democracy, rather than the level of democracy, matter. Further, decreases in democracy have more significant effects on growth than increases in democracy. Barro (1996) and Plumper and Martin (2003), among others, looked at whether there is a non-linear effect in the form of inverted-U shape from democracy to growth.

<sup>9</sup> Przeworski and Limongi (1997) quote Huntington as having said that: “The problem was not to hold elections but to create organizations. ... Indeed, the primary problem is not liberty but the creation of a legitimate organizations”. Whether it is the politburo, the cabinet, or the president matters little (Przeworski and Limongi, 1997). Rodrik 2000 mentions that the question of “whether institutions matter” is no longer valid; the valid question is “which institutions matter and how does one acquire them?”

<sup>10</sup> Other categories of economic freedom include sound monetary policy, size of government and free trade.

<sup>11</sup> Quality of governance was also explored from the view point of legal systems (see La Porta *et al.* 1999).

At this point one may feel that dissecting these aspects from political democracy reduces its scope to multi-party and free elections only. Political democracy is more than free elections.<sup>12</sup> First, empirical evidence shows that all the aspects of the institutions made precise above, i.e., economic democracy, governance and private sphere in the economy have high correlations with political democracy. In other words, the mere existence of participatory democracy implies the broader institutions conducive to growth. As Rodrik (2000) argues, democratic regimes can be the meta institution for building market-supporting institutions.<sup>13</sup>

Secondly, various studies find that political democracy has enormous indirect effects on growth through human capital accumulation, income distribution, and political stability (see Baum and Lake 2003, Alesina *et al.* 1996). In addition, Sturm and de Haan (2001) find that the presence of democracy in a country positively affects the level of economic freedom.<sup>14</sup> Thus, on the question of political democracy and growth, one should remember the broader associations that encompass the channels, or the indirect effects, between democracy and growth rather than one-to-one causation from regime to growth.

Thirdly, as Bhagwati (1995) and Rodrik (2000) point out, democracies provide higher quality growth through various means. Rodrik puts it in the following way: participatory democracies enable a higher-quality growth by allowing greater predictability and stability in the long-run, by being stronger against external shocks, and by delivering better distributional outcomes. Democratic institutions would help markets function “perfectly”, as is assumed in neoclassical economic models. As an extension to such arguments, the “volatility” channel has also been shown to be an important indirect effect of democracy on growth. Sah (1991) had argued that authoritarian regimes exhibit more volatile performance than democracies. Non-democratic regimes are not a homogenous lot (de Haan and Siermann, 1995, Alesina *et al.* 1996, Alesina and Perotti 1994), whereas democracies are more homogenous and can provide stable economic progress. Such a notion also implies less volatile and long-lived economic progress. Quinn and Woolley (2001) hints the endogeneity between growth and volatility, while Mubarak

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<sup>12</sup> Researchers have advanced various definitions of democracy. The so-called minimalist definition associates democracy with free, contested elections, where the government parties can lose the power (see Przeworski *et al.* 1996 and Przeworski and Limongi 1997, who use this definition). Dahl’s (1971) definition of democracy in *Polyarchy* is by far the most commonly accepted one, upon which widely-used measures are built, e.g., Bollen 1990 and Freedom house indicators. Dahl proposes eight requirements for democracy: 1. freedom to join and form organizations, 2. freedom of expression, 3. right to vote, 4. eligibility for public office, 5. right of political leaders to compete for support and votes, 6. alternative sources of information, 7. free and fair elections, and 8. government policies depend on votes and other expressions of preference (see Bollen 1990 as well).

<sup>13</sup> Rodrik (2000) discusses five types of market-supporting institutions: property rights; regulatory institutions, institutions for macroeconomic stabilization; institutions for social insurance; and institutions of conflict management.

<sup>14</sup> Lundström (2005) finds that higher levels of democracy would lead to an increased reliance of markets as the allocation mechanism, and decreased restraints on international trade.

(2005) analyzes this new channel in multi-equation framework and finds that higher levels of democracy increases growth through lower volatility.

### 3. Methodology of meta-analysis

Our meta-analysis has two key objectives. First, we use all the available empirical evidence to explore whether there exists a genuine association between democracy and economic growth, and whether there is indeed an inconclusive association as many authors assert. Second, we wish to investigate the sources of heterogeneity in the published results. Why do studies report such seemingly divergent results? Is the heterogeneity a feature of the underlying data generating process or is it an outcome of the research design process? That is, we wish to investigate whether there is an underlying *distribution* of democracy-growth population parameter values and whether the reported differences result from artefacts such as differences in econometric specification. A distribution of democracy-growth effects would emerge if democracy has a negative effect in certain situations and positive effect in others.

#### 3.1 Identifying empirical effects

In order to identify empirical democracy-growth effects, first we calculate mean democracy-growth effects and construct 95% credibility and confidence intervals around the mean. These are among conventional meta-analytic techniques. The mean democracy-growth effect is the weighted average of the *standardized* effects derived from each study (e.g, simple correlation, partial correlation or elasticity between democracy and growth). It is customary to use a weighted mean,  $\bar{\mathcal{E}}$ , because studies differ in the amount of information they offer. It is a standard practice in meta-analysis to use sample size as the weight, although we also experiment with the Impact Factor of the journals in which the studies are published.

In this paper we use the partial correlation between democracy and growth as the standardized effect. Partial correlations measure the impact of democracy on growth holding other factors constant.<sup>15</sup> They can also be meaningfully compared across studies. Moreover, many of the empirical studies do not provide sufficient information from which to calculate elasticities. We wish to be as inclusive as possible and the partial correlation facilitates this.<sup>16</sup> Thus, the mean democracy-growth effect, by comprising all the aspects of democracy-growth studies that are represented with a standardized measure and weighted appropriately with a

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<sup>15</sup> Obviously, different factors are held constant in different studies, which maybe one of the reasons for the heterogeneity of the results. We control for this effect through meta-regression analysis.

<sup>16</sup> Partial correlations can be calculated directly from regression output. See Greene (2000, p. 234) for details.

corresponding “quality” indicator, can be regarded as the *best* estimate of the entire empirical literature on the effect that democracy has on economic growth. Formally, it can be represented in the following way:

$$(1) \quad \bar{\mathcal{E}} = \sum [N_{ij}\epsilon_{ij}] / \sum N_{ij}$$

where  $\epsilon_{ij}$  is the *standardized* effect from the  $i^{\text{th}}$  regression estimate of the  $j^{\text{th}}$  study and  $N$  is the associated weight.

The calculation of  $\bar{\mathcal{E}}$  informs on two important issues: (a) does democracy have a positive or negative effect, on average, on economic growth? and (b) is the democracy-growth effect small or large? A positive (negative)  $\bar{\mathcal{E}}$  indicates that, on average, democracy increases (decreases) economic growth. The size of  $\bar{\mathcal{E}}$  is also important. For example,  $\bar{\mathcal{E}}$  may be negative but too small to be of economic significance. Most researchers follow Cohen’s (1988) guidelines and regard  $\bar{\mathcal{E}}$  to be small if its absolute value is less than 0.10, medium if it is 0.25 and large if it is greater than 0.4.

In addition to calculating a mean effect, we construct credibility and confidence intervals around the mean. It is desirable to test whether the mean effect can be used to generalize the findings of the extant literature. That is, we wish to know whether there are situations where the democracy-growth effect will be larger or smaller than the magnitude given by  $\bar{\mathcal{E}}$ . The answer to this question comes from credibility intervals. Credibility intervals are constructed by removing expected sampling error from the observed variance so that the remaining variance is due to factors other than sampling error (see Whitener 1990 and Hunter and Schmidt 2004 for details). A zero inclusive credibility interval suggests that there is variation beyond that created by sampling error and hence suggests the existence of a *distribution* of democracy-growth effects, rather than a single value (Hunter and Schmidt 2004). The remaining variance may be due to real factors that cause the democracy-growth association to vary from situation to situation. Alternatively, it could be due to research design differences that lead to an appearance of variation in the democracy-growth effect.

Second, we are interested in the accuracy of  $\bar{\mathcal{E}}$ , and the answer to this question is given by confidence intervals. There are several ways to construct confidence intervals (see Hedges and Olkin 1985 and Hunter and Schmidt 2004). These include confidence intervals that are constructed using the bootstrap (Adams, Gurevitch and Rosenberg 1997), as well as intervals

that are constructed using Fixed Effects and Random Effects meta-analysis. We report three sets of confidence intervals: those based on a Fixed Effects model, those based on the Random Effects model and those based on Hunter and Schmidt procedure (see Lipsey and Wilson 2001 and Hunter and Schmidt 2004 for details).<sup>17</sup>

In a further attempt to identify genuine democracy-growth effects, we take an alternative approach and focus purely on the number of countries included in a sample. If democracy can explain cross-country differences in growth, then this effect should become more evident as studies use higher number of countries in their sample. This suggests estimation of the following meta-regression analysis (known as an MRA):

$$(2) \quad r_i = \gamma_0 + \gamma_1 C_i + \eta_n \mathbf{K}_n + v_i$$

where  $r$  denotes the partial correlation between democracy and economic growth from study  $i$ ,  $C$  is the number of countries included in the sample of study  $i$ , and  $\mathbf{K}$  is a vector of other variables related to studies' characteristics that influences the magnitude of a partial correlation.<sup>18</sup> A negative  $\gamma_1$  indicates one of two things. First, the democracy-growth association may not be robust and may not even exist. If the democracy-growth effect exists universally, then increasing the number of countries should not lead to smaller democracy-growth effects. Second, a negative or an insignificant  $\gamma_1$  may mean that it is not possible to generalise about the impact of democracy. Unidentified country-specific effects may moderate the association so that democracy works in one group of countries but not in another. A statistically insignificant  $\gamma_1$  is consistent also with the notion that the democracy-growth effect is stable across countries. That is, changing the number of countries included in a sample does not affect the magnitude nor the sign of the democracy-growth effect. A positive  $\gamma_1$  suggests that the democracy-growth effect can be generalized and indicates that the democracy-growth effect becomes stronger as more countries are added to the sample. This would arise if the number of countries was correlated with a study's sample size, so that increasing the number of countries increases the precision of the estimate. Equation 2 is actually the standard meta-regression model (see Stanley and Jarrell 1998) with the inclusion of  $C$ .

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<sup>17</sup> The bootstrap confidence intervals are essentially the same as those reported in Table 1 using Hunter and Schmidt's method (2004) and are hence not reported in that Table 1.

<sup>18</sup> A variant of equation 2 is to use total sample size instead of  $C$ . However, the number of countries is more meaningful here in terms of establishing a robust association between democracy and performance that is of policy value.

### 3.2 Exploring Heterogeneity

In meta-analysis, a distinction is drawn between fixed effects, random effects and mixed effects models (see Lipsey and Wilson 2001). A fixed effects meta-analysis model is appropriate when there is a common democracy-growth effect that all studies are estimating. In such a situation, the only reasons why study results will differ are: (a) sampling error and (b) systematic differences due to the research process. In a random effects meta-analysis model, study differences result from both sampling error as well as *random* differences between studies. The random effects model is appropriate if a sample of empirical studies is used in a meta-analysis (as opposed to the entire population) and if the source of differences between studies cannot be identified. In a mixed effects model there are both random differences as well as systematic differences. We show in this paper that a fixed effects model captures adequately the empirical democracy-growth literature. Our MRA results show that the variation in reported results is not due to random differences between studies. Rather, in section 5.2.2. we identify several variables (known as moderator variables) that capture *systematic* (non-random) differences between studies.

The impact of specification, data and methodological differences on the results of the studies can be investigated by estimating the meta-regression model (MRA). Specifically, in our analysis we estimate versions of equation 3:

$$(3) \quad r_i = \gamma_0 + \gamma_m D_i + \beta_n S_n + \delta_k R_k + \phi_l T_l + \rho_i X_i + v_i$$

where  $r$  denotes the partial correlation between democracy and economic growth,  $\mathbf{D}$  is a vector of data characteristics (including the number of countries,  $C$ ),  $\mathbf{S}$  is a vector of variables representing specification differences,  $\mathbf{R}$  is a vector of regional dummies,  $\mathbf{T}$  is a vector of time dummies and  $\mathbf{X}$  is a vector of other study characteristics. Equation 3 contains both dummy and continuous variables representing characteristics associated with the empirical studies. The disturbance term has the usual Gaussian error properties (see Stanley and Jarrell 1998).

## 4. Data

A comprehensive search of the literature reveals 91 studies that provide estimates of the impact of democracy on economic performance. Of these, 10 explore the impact of democracy on the level of economic activity (per capita GDP) and 81 explore the impact of democracy on economic growth. We prefer to separate these two groups of studies, and focus only on the growth studies. Appendix A lists the studies included in the two sets.

There are actually more than 81 studies exploring democracy and growth. However, we chose a set of studies that report results that are comparable. Our selection criteria are as follows. First, we include only those studies that have been published. This means that we exclude any information that may be contained in working papers. Second, we exclude studies where the dependent variable is a constructed variable that includes economic growth or the level of economic activity. Hence, we exclude studies such as Feirerabend and Feirerabend (1972) where GNP is included as part of modernity index to proxy for the level of development, or where democracy is an input into factor analysis (Adelman and Morris 1967).<sup>19</sup> Such studies are not comparable to studies that just use GDP per capita as the proxy for the level of development. Third, we exclude any studies where GDP per capita or growth are not the dependent variable. Hence, studies such as Laband (1984) that explore the growth-democracy association with democracy as the dependent variable are not included.<sup>20</sup> Fourth, we exclude those studies that estimate the impact of democracy on growth but fail to report the necessary results (e.g. Banks 1970). Some studies (e.g. Ravenhill 1980 and Russett and Monsen 1975), found that democracy was not a significant explanatory variable and do not report the associated coefficient, nor test statistics. Fifth, we exclude the studies that rely on classifications and rankings without conducting any econometric analysis (e.g. Dick 1974).<sup>21</sup> Sixth, we exclude studies that touch on the issue of democracy but are more accurately classified as exploring political instability (e.g. Gounder 2001 and Narayan and Smyth 2005b). Hence, the impact of our selection criteria is to exclude most of the earlier published literature (mostly, of the 1970s) and exclude the newer unpublished literature.<sup>22, 23</sup> The earlier literature is excluded as it is largely not comparable with the subsequent empirical and econometric based literature. The newer literature is not included as working papers may not contain the final set of estimates and have not yet been through the quality filters of the publication process. It should be noted that our dataset includes several single country studies.<sup>24</sup> These were included in order to have a comprehensive dataset. However, none of the conclusions presented in this paper are affected by this inclusion. Excluding the single country estimates does not change any of the results.

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<sup>19</sup> We exclude also studies that proxy GDP per capita with other development indicators, such as energy consumption (e.g. Bollen 1980, Burkhart and Lewis-Beck 1994 and Glasure, Lee and Norris 1999).

<sup>20</sup> A meta-analysis of the determinants of democracy is clearly a separate meta-analysis.

<sup>21</sup> We exclude also studies that touch on the issue but do not offer econometric estimates (see, for example, Huntington and Dominguez (1975) and Kohli (1986).

<sup>22</sup> Other studies excluded by our selection criteria include Cutright (1963), Dick (1974), McKinlay and Cohan (1975), Russett and Monsen (1975) and Marsh (1979).

<sup>23</sup> Note also that we include only studies published in English. Hence, we exclude studies such as Obinger (2001). We are confident that this will not affect any of our conclusions.

<sup>24</sup> We do however exclude Natyan and Smyth (2005a), as this study exhibits outlier effects with partial correlations being close to 1 due to t-statistics around 100.

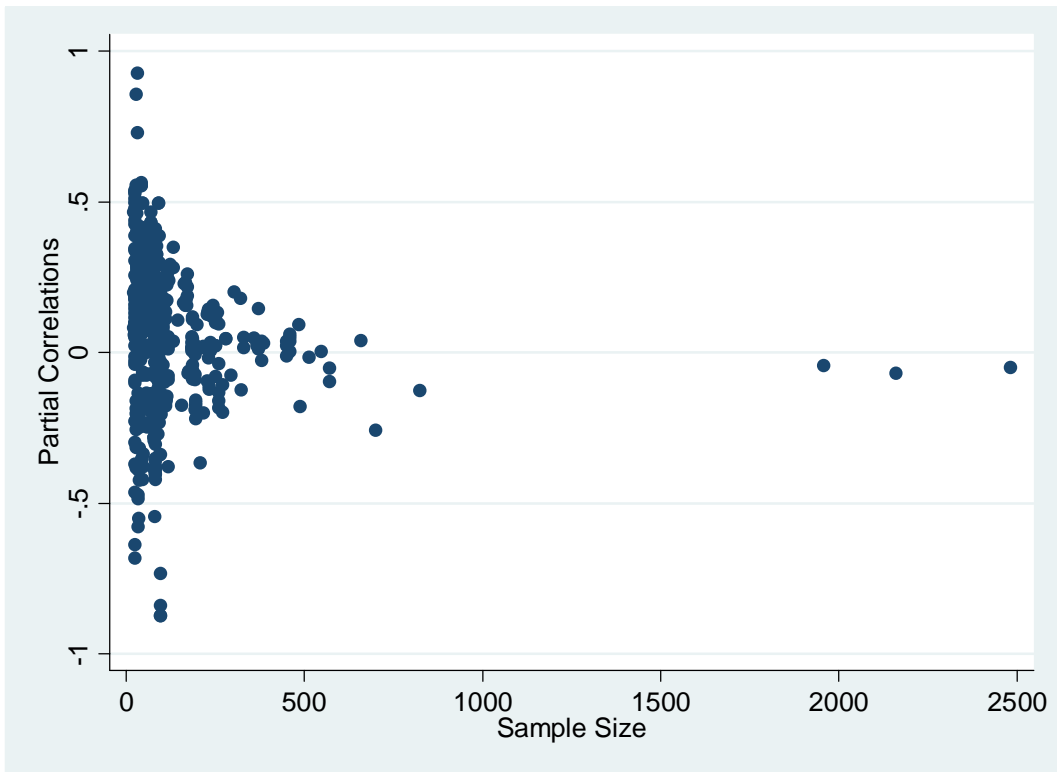
From the group of growth studies we can derive two different datasets. First, we can derive 470 regression estimates on the democracy-growth association. This is the entire pool of publicly available estimates on the democracy-growth effect. We call this the All-Set. Second, we can derive 79 estimates, one from each study, being the best estimate provided by each study (the Best-Set).<sup>25</sup> In most cases, authors state their preferred estimate, but for some studies we have had to make some judgement. In general, we chose estimates that involved larger groups of countries. Hence, where authors report results for both large and small samples, we prefer in most cases to use the larger sample, unless the author states a preference for the smaller sample. Since it is larger and contains greater variation, we focus most of our attention on the All-Set.

The All-Set is displayed in Figure 1 in the form of a funnel plot, and for the Best-Set in Figure 2. Funnel plots trace the association between an effect size (partial correlations in our case) and a measure of precision (sample size in our case). Figures 1 and 2 illustrate the reason for the consensus of an inconclusive democracy-growth effect. There is clearly a wide distribution of results. However, note that the reported democracy-growth effects are distributed around the center of the plot, with the center representing the estimated true underlying effect. *Ceteris paribus*, larger studies will offer more precise estimates and smaller studies will have larger standard errors. The normal expectation is for smaller studies to report effects that fluctuate randomly around the true underlying democracy-growth effect. The distribution of results can arise because of sampling error and/or the effects of research design. It can also, of course, arise from real factors than lead to a distribution of democracy-growth effects. That is, at least some of the variation in reported results that is clearly evident in Figure 1 *may* be due, for example, to a small study making an incorrect inference purely because sampling error. Differences in research design can also result in the distribution of reported results presented in Figures 1 and 2. Hence, it is important to delve deeper into the empirical evidence and isolate the true democracy-growth effect from sampling error and any distortion arising from research design.

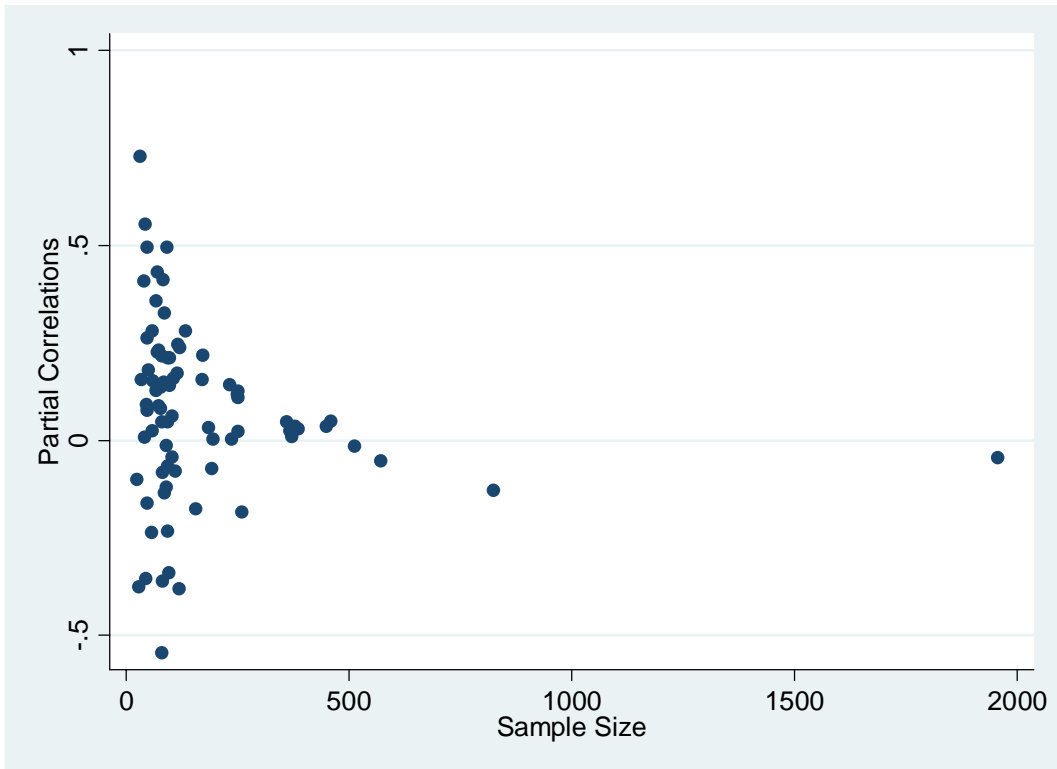
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<sup>25</sup> Note that Ali and Crain (2001, 2002a and 2002b) use the same dataset and the same author. Hence, we combine these together, reducing the number of statistically independent Best-Set studies from 81 to 79.

**Figure 1: Published Democracy-Growth Effects, All-Set (n=470)**



**Figure 2: Published Democracy-Growth Effects, Best-Set (n=79)**



## 5. Analysis and Results

### 5.1. Mean Democracy-Growth Effects

Table 1 presents summary statistics for the extant published empirical democracy-growth literature, reporting the median, unweighted and weighted mean democracy-growth effects. Additionally, credibility intervals and three sets of confidence intervals are reported. The Hunter-Schmidt (2004) approach (HS hereafter) results in weighted mean effects that are identical to the fixed effects model but with larger confidence intervals. Column 1 reports the statistics for the All-Set, while column 2 reports the statistics for the Best-Set. All the averages are positive. However, it is also clear that there is significant variation in the reported results and this warrants investigation. We address the source of variation in reported results with MRA below. The confidence intervals confirm a small, positive partial correlation between democracy and economic growth, but do not rule out the possibility of a zero correlation when the HS intervals are used. Note, however, that the intervals rule out a negative correlation. A negative correlation requires the intervals to exclude the possibility of a zero or positive effect. That is, taking all the available empirical evidence together, there is a zero direct effect on growth. There is, on average, *no* evidence that democracy has a detrimental effect on economic growth.

It is instructive to compare this result with similar finding for the association between economic freedom and economic growth. Doucouliagos and Ulubasoglu (2006) report a weighted average partial correlation of +0.28, with 95% confidence intervals of +0.18 to +0.42. The impact of democracy on growth is significantly different to the impact of economic freedom. Following Cohen (1988) we can state that democracy has a zero direct effect on economic growth whereas economic freedom has a medium positive direct effect on growth.

In order to test the sensitivity of the meta-analysis results, column 3 repeats the meta-analysis after removing 10% of the smallest and largest studies.<sup>26</sup> The weighted average correlation now becomes +0.04 with a 95% confidence interval that does not include zero. The next three columns consider only those estimates that draw on a neoclassical production function framework (i.e., studies that control for both human and physical capital, the initial level of income, as well as population/labor). In column 4 we consider only those estimates that were derived after controlling for the impact of human and physical capital. This results in a negative partial correlation, including the possibility of a zero correlation, and excluding the possibility of a positive association. This result is consistent with the hypothesis that democracy affects factor accumulation. Several authors have presented evidence that democracy has an indirect effect on

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<sup>26</sup> There is, however, no theoretical reason to exclude these studies.

economic growth through its positive effect on human capital accumulation (e.g. Baum and Lake 2003), and sometimes physical capital investment. That is, it is possible for democracy to have a negative (or positive) direct effect and a positive indirect effect. The column 4 results are consistent with this notion and suggest that the direct democracy-growth effect is negative, the indirect effect of democracy on growth working through factor accumulation is positive and that the net effect is overall positive.

In column 5 the dataset is refined further by considering only those studies that controlled for the direct impact of factor accumulation on economic growth, as well as treating democracy as an endogenous variable. Column 6 adds the additional restriction of controlling for country/regional specific effects in the estimation. The sample sizes for columns 5 and 6 are very small, and the statistics indicate no association between democracy and economic growth once factor accumulation, endogeneity and regional effects are controlled for. Columns 1 to 6 combine all studies regardless of where they are published. It is pertinent to ask whether studies published in ranked journals report different results. In column 7, the meta-analysis is conducted upon only those studies that were published in journals listed in the 2004 Social Science Citation Index (SSCI).<sup>27</sup> The results are essentially the same as when the entire pool of studies is used. For comparison purposes only, in column 8, we use a journal's Impact Factor as weights, instead of sample size, and limit the analysis only to those journals whose Impact Factor is greater than 1.<sup>28</sup> These can be regarded as the leading journals and hence in one sense the best set of studies published by the profession.<sup>29</sup> Interestingly, there is now no variation in results beyond that caused by sampling error and the average democracy-effect is estimated to be significantly larger ( $+0.10 > +0.01$ ).<sup>30</sup> Columns 3 to 8 are presented only for sensitivity analysis. There is no reason to discard the information provided by the other studies.

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<sup>27</sup> These are: *Quarterly Journal of Economics*, *Journal of Development Studies*, *Journal of Economic Growth*, *American Journal of Political Science*, *Economics Letters*, *Regional Studies*, *Comparative Political Studies*, *Economic Journal*, *Economic Inquiry*, *Journal of Development Economics*, *Studies in Comparative International Development*, *Growth and Change*, *Contemporary Economic Policy*, *Journal of Monetary Economics*, *Journal of Political Economy*, *British Journal of Political Science*, *Comparative Politics*, *World Development*, *Economic Development and Cultural Change*, *Kyklos*, *Journal of Comparative Economics*, *Review of Economics and Statistics*, *European Economic Review*, *American Economic Review*, *Public Choice*, *Applied Economics*, *Journal of Theoretical Politics*, *World Politics* and *International Sociology*.

<sup>28</sup> These are: *Quarterly Journal of Economics*, *Journal of Economic Growth*, *American Journal of Political Science*, *Regional Studies*, *Comparative Political Studies*, *Economic Journal*, *Studies in Comparative International Development*, *Journal of Political Economy*, *Journal of Monetary Economics*, *Comparative Politics*, *World Development*, *Review of Economics and Statistics*, *European Economic Review*, *American Economic Review* and *World Politics*. Impact Factors derived from the 2004 issue of the SSCI.

<sup>29</sup> This is not to suggest that other journals are not leaders in their own field, as Impact Factors are only one dimension of quality.

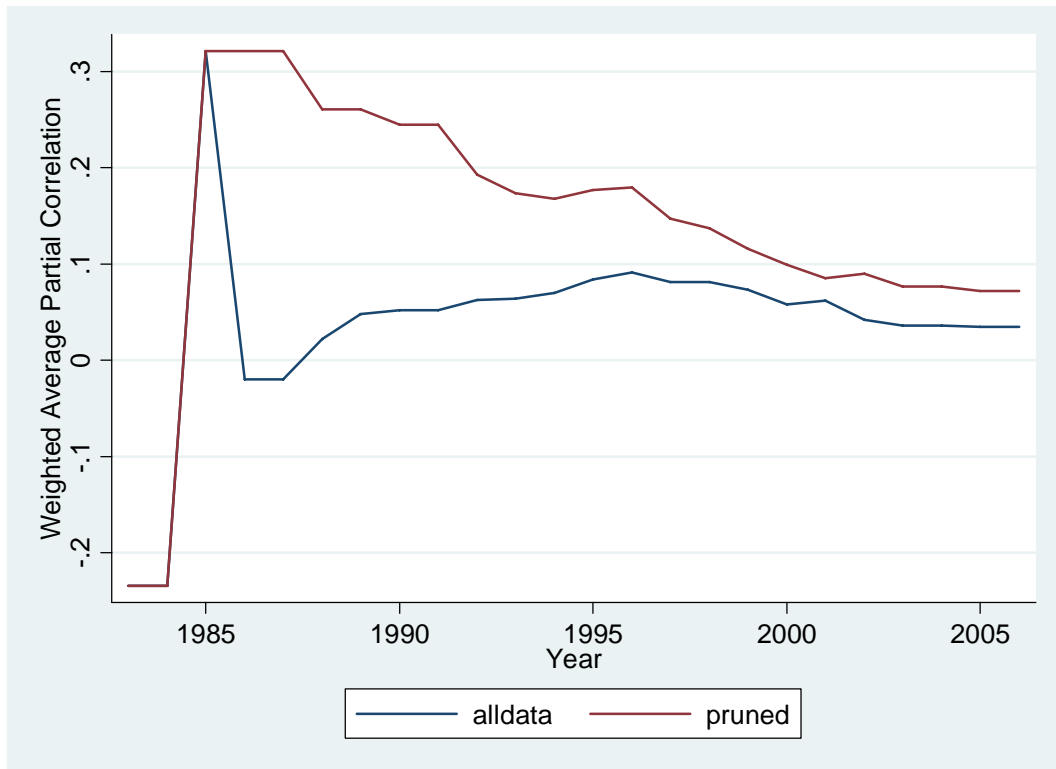
<sup>30</sup> While this is a very interesting result, it should be interpreted with some caution as it is derived from only a sub-set - albeit an important one - of the available results and it uses a non-standard weighting scheme (see however Doucouliagos and Laroche (2003) who use citations as weights in the meta-analysis of unions and productivity). Moreover, the results may very well differ if an earlier (pre-2004) set of Impact Factors is used, although leading journals tend to remain leaders for a fairly long time.

**Table 1: Descriptive Statistics, Published Democracy-Economic Performance Effects**

Statistic	Economic Growth (All-set) (1)	Economic Growth (Best-set) (2)	All-Set, ex top & bottom 10% (3)	All-Set, HK & PK only (4)	All-Set, HK, PK & Endogeneity (5)	All-Set, HK, PK, Endogeneity, & regional (6)	SSCI Journals Only (7)	Impact Factor > 1 Weighted (8)
<i>- Observations -</i>								
Number of studies	81	78	72	41	12	5	55	32
Number of estimates	470	78	378	222	33	18	280	152
Total sample size	58,701	13,543	33,669	27,572	7,011	4,286	40,181	23,523
<i>- Averages -</i>								
Median	+0.07	+0.06	+0.08	+0.02	0.00	+0.01	+0.07	+0.11
Unweighted Average	+0.05	+0.07	+0.05	0.00	-0.02	+0.01	+0.05	+0.10
Weighted Average (FE)	+0.01	+0.02	+0.04	-0.03	-0.02	+0.01	+0.01	+0.10
Weighted Average (RE)	+0.03	+0.07	+0.05	-0.02	-0.02	0.00	+0.04	na
<i>- Intervals -</i>								
95% Confidence Interval (FE)	+0.01 to +0.02	+0.01 to +0.04	+0.03 to +0.05	-0.04 to -0.02	-0.04 to +0.01	-0.03 to +0.04	0.00 to +0.02	-0.03 to +0.23
95% Confidence Interval (RE)	+0.02 to +0.04	+0.03 to +0.11	+0.02 to +0.07	-0.04 to +0.01	-0.08 to +0.03	-0.04 to +0.04	+0.02 to +0.06	na
95% Confidence Interval (HS)	0.00 to +0.03	-0.01 to +0.06	+0.01 to +0.06	-0.05 to 0.00	-0.24 to +0.21	-0.21 to +0.22	-0.01 to +0.03	+0.10
95% Credibility Interval	-0.31 to +0.33	-0.25 to +0.29	-0.35 to +0.43	-0.37 to +0.31	-0.49 to +0.46	-0.43 to +0.44	-0.32 to +0.33	+0.10 to +0.10

FE= fixed effects; RE=random effects; HS = Hunter & Schmidt (2004); na=not applicable.

**Figure 3: Democracy-Growth Effects, 1983-2005, All-Set**



Also of interest is the time-series pattern of the democracy-growth effect. Figure 3 is a time-series graph of the cumulative weighted annual average partial correlation associated with the All-Set, as well as with the “pruned” dataset where the top 10% and bottom 10% of estimates are removed. The cumulative average is calculated as an annual recursive average, with subsequent yearly averages added to the existing cumulative average, without existing observations removed. This shows that the initial findings on democracy-growth relationship were negative. The subsequent early literature reported relatively large, positive and statistical significant effects. As more evidence has accumulated, the average effect has deteriorated to a small positive effect that is effectively zero. It is clear that the democracy-growth effect is either unstable and has declined over time, or if the association has always been non-existent, the early literature erred in its conclusion. Note that since 1988, it has been clear from the literature that the democracy-growth effect *has, on average, not* been negative. Hence, whatever other benefits and costs maybe associated with democracy, we can state clearly that democracy does not come at the cost of economic growth.

## 5.2. Exploring Heterogeneity

We next proceed to MRA to explore the sources of variation in the reported results. In the production of empirical results, researchers transform a set of inputs into a set of outputs (estimates). The key inputs are researchers' human capital, the raw material (data) and know-how (specification, estimation techniques and common knowledge). Accordingly, we find proxies for these inputs in order to explore the heterogeneity in the reported results. They will serve as the moderator variables in the MRA to trace the source of differences in published results.

One of the problems encountered in conducting the MRA analysis, however, is that many of the observations included in the All-Set are not statistically independent. Empirical estimates are regarded as statistically independent if they are reported by a different author, or if the same author reports them, different samples are used. Estimates reported by the same author using the same dataset are not statistical independent. The Best-Set by construction includes *only* statistically independent observations. Doucouliagos (2005) recommends the use of the bootstrap for meta-analysis datasets that include several observations from each study. Accordingly, we use the bootstrap to derive robust standard errors, using 1000 replications with resampling (Efron and Tibshirani 1993, Shao and Tu 1995). An alternative approach is to use clustered data analysis (Hox 2002). Each study can be viewed as a separate cluster and the number of regression estimates reported in each study becomes the number of observations in each cluster. Clustered data do not affect measures of an average but they can distort confidence intervals. Hence, we use also clustered data analysis to derive clustered robust standard errors.<sup>31</sup> In many cases, clustered data analysis results in larger standard errors. We present the clustered data analysis for the purposes of sensitivity analysis. However, certain results prevail, regardless of the method used to construct standard errors, indicating their robustness.

**Table 3: Covariates Used in the Meta-Regression Analysis of Democracy-Growth Effects**

Variable	Description	Mean	S.D.	Mean	S.D.
		All-Set	All-Set	Best-Set	Best-Set
Partial	Partial correlation between democracy and economic growth	0.05	0.25	0.07	0.23
Africa	<i>Country composition in the sample</i> BV: 1 = African countries included in sample	0.74	0.44	0.86	0.35

<sup>31</sup> The average number of observations in each cluster is 12.60, the median is 9.5, with a standard deviation of 11.80. Only five studies report a single estimate.

Latin America	BV: 1 = South American countries included in sample	0.79	0.41	0.90	0.31
Asia	BV: 1 = Asian countries included in sample	0.74	0.44	0.86	0.35
<i>Data differences</i>					
No. Countries	Number of Countries	60	35	71	31
1970s	BV: 1 = data from 1970s included	0.83	0.37	0.87	0.34
1980s	BV: 1 = data from 1980s included	0.83	0.37	0.90	0.31
1990s	BV: 1 = data from 1990s included	0.30	0.46	0.23	0.43
Cross-sectional	BV: 1 = cross-sectional data used	0.59	0.49	0.56	0.50
Single	BV: 1 = time series for single country used	0.09	0.28	0.04	0.19
Gastil	BV: 1 = used Gastil indicator	0.61	0.49	0.56	0.50
Dummy	BV: 1 = used a dummy variable for democracy rather than a democracy index	0.18	0.38	0.17	0.38
<i>Specification differences</i>					
DemoSq	BV: 1 = non-linear terms added	0.11	0.32	0.13	0.34
Region	BV: 1 = regional dummies used	0.16	0.37	0.22	0.42
Inequality	BV: 1 = inequality variable included	0.18	0.38	0.16	0.37
Ecofreedom	BV: 1 = economic freedom included	0.14	0.35	0.16	0.37
Instability	BV: 1 = political instability control included	0.15	0.35	0.18	0.39
Inflation	BV: 1 = controls for inflation included	0.17	0.37	0.18	0.39
Population	BV: 1 = controls for population included	0.31	0.46	0.29	0.45
Convergence	BV: 1 = controls for initial income included	0.75	0.44	0.73	0.45
Human Capital	BV: 1 = controls for human capital included	0.66	0.47	0.68	0.47
Physical Capital	BV: 1 = controls for physical capital included	0.63	0.48	0.68	0.47
Openness	BV: 1 = controls for foreign trade included	0.25	0.43	0.27	0.45
Govt Size	BV: 1 = controls for government included	0.29	0.45	0.38	0.49
<i>Estimation differences</i>					
Non-OLS	BV: 1 = did not use OLS	0.30	0.46	0.36	0.48
Endogenous	BV: 1 = democracy is endogenous	0.10	0.30	0.17	0.38
<i>Knowledge Effects</i>					
Crossauthor	BV: 1 = author declares receiving feedback from other authors who have published democracy-growth effects	0.65	0.48	0.62	0.49
Prior	BV: 1 = author has published previously in this area	0.18	0.38	0.18	0.39
Cumulative	The estimate of the population partial correlation established by the literature in t-1	0.06	0.05	0.05	0.08

*Other*

Primary	BV: 1 = if democracy is the primary issue of interest	0.69	0.46	0.66	0.48
Economics	BV: 1 = if published in an economics journal	0.77	0.42	0.75	0.43
Politics	BV: 1 = if published in a political science journal	0.15	0.35	0.18	0.39

BV: Binary Variable.

### 5.2.1. Explanatory variables

Table 2 lists the variables used in the MRA, together with the means and standard deviations for the two datasets. Through these variables we wish to test whether differences in study results are due to real world factors (such as differences between regions, time periods, and applicability of the relationship to all countries) or due to the research process (such as differences in specification, measurement and estimation).

It should be noted that all these variables have been chosen as they are all potentially important. That is, we have avoided data mining and have considered which factors are likely to be important in influencing reported results. An important source of variation in the results is the type and the composition of countries used in the studies. Accordingly, we delve deeper into the datasets of the studies and see which countries are employed for the analysis. Data preclude the exploration of country-specific democracy-growth effects, as most of the studies do not provide enough detail to identify all the individual countries. We can, however, identify four broad regional groupings: *Africa*, *Asia*, *Latin America* and rest of the world (mainly the OECD), which is used as the base. These dummies are used to derive region specific democracy-growth effects.<sup>32</sup> A similar approach to the regional dummies can be adopted to investigate time-period effects. We construct three time dummy variables, *1970s*, *1980s* and *1990s*, with data from the 1960s as the base. By including these dummies we are then able to identify decade-specific effects in the democracy-economic growth association and can explore whether the association is time-varying.

Different measures of democracy have been argued to be an important source of variation in empirical results (Sirowy and Inkeles 1990, Bollen 1990). Thus we use the *Gastil* variable to check whether studies that use this index tend to find different results, as compared those that use other indices (which are mainly Polity measures in our data set). In addition, while some authors argued that democracy is a continuous concept (e.g., Bollen 1990), others such as Przeworski *et al.* 1996 and Przeworski and Limongi 1997 prefer to represent it with a

<sup>32</sup> The tendency in the early literature to provide detailed country composition information has been abandoned in recent years. Several studies do not provide sufficient information on the country composition, resulting in loss of data points.

dichotomous indicator.<sup>33</sup> We use the *Dummy* variable to check whether dichotomization of the democracy measure impacts the reported partial correlations.<sup>34</sup>

The indirect effects of democracy on growth are critically important. Such channels are generally addressed in an augmented-neoclassical growth model format by adding the channel variables into the right-hand side of the regressions and observing their magnitude and the significance as well as that of the democracy variable (See Dawson 1998 for an exposition). In our context, these indirect effects can be explored through the variables *Human Capital, Physical Capital, Ecofreedom, Inequality, Instability, Govt Size, Openness* and *Inflation*. Human and physical capital are particularly important, because as noted earlier, they are factor accumulation channels. To see how meta-analysis can inform on the existence of indirect channels, consider the following two specifications of a growth model:

$$(4) \quad g = \beta_0 + \beta_h H + \beta_d D + \beta_z Z + u$$

$$(5) \quad g = \alpha_0 + \alpha_d D + \alpha_z Z + v$$

where  $g$  denotes growth,  $D$  is democracy and  $H$  and  $Z$  are other factors that impact on growth and where  $H$  is a function of democracy. If a researcher estimates equation 5,  $\alpha_d$  is the estimate of the *total* effect of democracy on growth. If a researcher estimates equation 4,  $\beta_d$  is the estimated of the direct effect of democracy on growth, with a further indirect channel on growth working through the impact of  $D$  on  $H$  and then from  $H$  to  $g$ .<sup>35</sup> Hence, when  $H$  is included as a control variable in an MRA model (such as that given by equation 3), the coefficient on  $H$  will show the impact of including  $H$  on the estimated democracy-growth effects. That is, the coefficient of  $H$  in an MRA will be an estimate of the indirect effect of democracy on growth working through the  $H$  channel.

Other differences in specification can be explored through variables *Demosqr, Region*<sup>36</sup> and *Convergence*.<sup>37</sup>

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<sup>33</sup> Minier (1998), following Durlauf and Johnson (1994), treats each value in the Gastil index as different political regimes with different aggregate production functions.

<sup>34</sup> An important issue relates to measurement error and the reliability of both the GDP and democracy data. Errors of measurement in the democracy score will have the same effect of artificially depressing correlations. There is little information on the reliability of democracy measures. Bollen (1990) notes that one of the main measures - the Gastil index - is fairly reliable.

<sup>35</sup> Estimating equation 5 means excluding  $H$  and hence resulting in a possible misspecification of the model.

<sup>36</sup> Note that the variable *Region* indicates whether the regressions in the studies include a regional dummy, while the variables *Latin America, Asia* and *Africa* indicate whether the samples of the studies include countries from those continents, regardless of whether a regional dummy is used in the regressions or not.

<sup>37</sup> Selection of all such variables depends on the extent to which they are commonly used across studies.

Knowledge differences between authors are captured by three variables. The variable *Prior* represents whether the author had published previously in this area. This variable captures individual author specific knowledge effects in modelling the democracy-growth process. Second, we construct the variable *Crossauthor*, which captures whether the author had received comments/feedback from others publishing in this area.<sup>38</sup> Third, we construct the variable *Cumulative* which captures the cumulative publicly available knowledge in this area, up to the year prior to the publication of the study. We have no priors regarding the sign on any of these variables. We merely wish to test whether these knowledge effects impact on reported coefficients.

The *Politics* and *Economics* variables are included to test whether journals belonging to different discipline tend to publish different results.

Most studies use OLS, while others use GLS, 2SLS or 3SLS. Among this latter group, some of the studies treat democracy as an endogenous variable.<sup>39</sup> We test to see whether estimation technique has an impact.

### 5.2.2. Results

Table 3 presents the results for various specifications of the MRA model, for the All-Set. Column 1 presents the OLS results for full model applied to the All-Set, using robust standard errors. The results presented in column 2 use the bootstrap to derive robust standard errors. For comparison purposes, clustered data analysis is used to derive the robust standard errors for the results presented in column 3. Column 4 presents the MRA after eliminating the top 10% and bottom 10% of estimates. In Column 5 we present the results of using a Random Effects meta-regression model.<sup>40</sup> Columns 6 to 12 show the results from including only specific groups of variables, using the bootstrap to derive standard errors.

The Best-Set results are presented in Table 4. Column 1 presents the estimates using OLS (a Fixed Effects meta-regression model) and Column 2 using a Random Effects meta-regression model. To facilitate comparison, Column 3 repeats the bootstrap MRA for the All-Set. Note that there is little difference between the estimated Fixed Effects and Random Effects models. Table 4 presents also more parsimonious (specific) models where statistically

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<sup>38</sup> This information can be collected from footnotes in the original papers.

<sup>39</sup> A number of studies that use non-OLS estimation treat democracy as an exogenous variable, but make other variables endogenous.

<sup>40</sup> In the Random Effects model, the total variance in the democracy-growth effects is assumed to consist of variance due to sampling error as well as variance due to other factors that are randomly distributed. We used the standard error of each partial correlation to calculate the variance due to sampling error (see Hald 1952 and Fisher 1970), and we estimate the second variance term using the so-called iterative restricted maximum likelihood method, or REML (Raudenbush 1994).

insignificant variables were eliminated until the remaining variables had a t-statistic of at least one. Table 4 reports also the results of Wald tests on the excluded variables, confirming the validity of removing them from the MRA. Our preferred set of results is presented in Table 4 in Columns 1, 3, 4 and 5. Many of the potential explanatory variables are not statistically significant. However, several robust results emerge from Tables 3 and 4.

### *Regional Effects*

Real world factors appear to be important. The coefficient on Latin America is positive and statistically significant. That is, partial correlations from studies that include Latin American observations are larger than those that use OECD without Latin American observations (OECD is the base year with respect to regions). We conclude from this that the reported democracy-growth effect is stronger in Latin America than it is elsewhere. It is an interesting issue for future research to explain why the democracy-growth experience has been different in Latin America. Studies report lower democracy-growth effects when Asian countries are included in their data sets. Such a result may arise due to the rapid growth experiences of some authoritarian regimes in Asia, such as South Korea, Taiwan, Hong Kong and Singapore.

The number of countries is not statistically significant different from zero, when all control variables are included in the MRA.<sup>41</sup> Column 6 (Table 3) reports the MRA after excluding regional dummies and time dummies. Columns 7, and 8 to 12 report the MRA with various combinations of control variables, but without the *No.Countries* variable. These regressions were reestimated with the addition of the *No.Countries* variable. The coefficient on this variable for these regressions is reported in the third last row of Table 3. These regressions show that for the combination of control variables included in columns 9 to 12, the coefficient for the number of countries has a negative and statistically significant sign. However, once all aspects of research design are controlled, the coefficient becomes positive but is no longer statistically significant.<sup>42</sup> We conclude that it is the country composition of the sample rather than its size that leads to differences in reported democracy-growth effects. One way of interpreting this is that democracy-growth association is not the same in every region. This is consistent with the notion of a distribution of democracy-growth effects that depends on regional factors or on unidentified country-specific effects.

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<sup>41</sup> Regressing (with bootstrapping) the partial correlations on the number of countries produces a coefficient of -0.001 with a t-statistic of -3.87 for the All-Set. For the Best-Set, however, the coefficient is -0.0004 with a t-statistic of -0.45.

<sup>42</sup> The addition of countries squared does not change this set of result.

### *Time-Varying Effects*

The time dummies are significant in several specifications, with the 1990s variable statistically significant and with a positive coefficient in all cases. The 1990s is the post-Cold War period and it appears that the studies that use data from the 1990s tend to report larger democracy-growth effects.<sup>43</sup> Since the MRA controls for other data and specification differences, this variable is unlikely to be picking up differences in the way studies were conducted. Instead, the 1990s variable suggests that larger democracy-growth effects are reported for the 1990s compared to the 1960s and earlier periods.<sup>44</sup> In the Best-Set, the 1970s also produces stronger democracy-growth effects. In contrast, the 1970s produces *lower* effects in the All-Set. This is the only variable to have the opposite sign when the two datasets are compared. The All-Set data suggests that the 1980s produced higher democracy-growth effects, although these were smaller than those that occurred in the 1990s (coefficient of 0.091 for 1980s compared to 0.135 for 1990s). The positive coefficients on the time dummies in the Best-Set may be one reason why the earlier (pre-1988) literature tended to find negative democracy-growth effects. The time-varying effects can arise from structural changes in either the direct or indirect effects. It would be interesting for future research to explore the factors that have driven this structural change in the association.

### *Other Data Effects*

Cross-sectional data sets result in larger democracy-growth effects than the use of panel data. This suggests that democracy-growth effects are larger in the long-run than they are in the short-run. Importantly, studies that use a dichotomous representation (*Dummy*) of democracy report larger effects. Thus, aggregation of different categories of freedom results in a higher relationship.<sup>45</sup> Indeed, Elkins (2000) shows that continuous measures have superior validity and reliability over dichotomous measures. The *Gastil* index, however, is insignificantly different than other measures (mainly Polity measures) in affecting the democracy-growth relationship. This is not surprising, because these measures generally address similar aspects of the definition of democracy and are highly correlated.<sup>46</sup>

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<sup>43</sup> This result is not contradicted by Figure 3 which shows cumulative effects. The 1990s dummy variable is time specific rather than cumulative.

<sup>44</sup> It should be noted that this result is not driven by a handful of observations. Approximately 48 percent of the 470 estimates used data from the 1960s and earlier periods.

<sup>45</sup> Doucouliagos and Ulubasoglu (2006) find the same result regarding the economic freedom-growth relationship.

<sup>46</sup> Early studies mostly constructed their own democracy indices or proxied democracy with different statistics, such as political stability, years of democracy, political party composition of the legislative bodies or voter turn-out statistics (see Bollen 1990 and the references therein). This created a pool of heterogeneous measures and hence the conclusion that different measures led to different results. The studies of the time period that we cover, however, mostly adopt standard measures, such as Gastil Indicators or Polity.

### *Indirect Channels*

Our results have extremely important implications on controlling for other political economy variables in the democracy-growth regressions, i.e., indirect effects. The economic freedom variable has a robust, significant and negative sign in the MRA. This implies that if economic freedom is positively (negatively) related to growth, then democracy is positively (negatively) related to economic freedom. In terms of equations 5 and 6 above, the negative coefficient on *Ecofreedom* in the MRA means that  $\beta_d < \alpha_d$ . In order for the direct effect to be smaller than the total effect, the indirect effect between democracy and economic freedom must be positive. Various studies have shown that economic freedom fosters growth; thus our MRA implies that the two freedoms are positively correlated. This is consistent with the finding of de Haan and Sturm (2003) and Dawson (2003), among others.

The human capital result emerged also in Table 1, and reflects the indirect effect of democracy on factor accumulation. Studies that control for human capital report smaller democracy-growth effects. This result implies that if human capital is positively (negatively) related to growth, then democracy is positively (negatively) related to human capital. It is well established that human capital contributes to economic growth (Levine and Renelt 1992, Doppelhofer, Miller and Sala-i-Martin 2004). Thus, our results predict a positive association between democracy and human capital. Indeed, Acemoglu and Robinson (1996) argue that majority voting can lead to higher human capital as people vote for better educational facilities for their children. Baum and Lake (2003) argue that democracies provide more basic services, such as health and education than non-democracies.

The inclusion of physical capital however does not make any noticeable difference to reported results. That is, democracy does not operate on growth through physical capital investment. Such a notion is consistent with Tavares and Wacziarg's (2001) argument that the democracy-physical capital investment relationship is inconclusive. They note that Rodrik (1997) presents empirical evidence supportive of the hypothesis that democracies produce greater stability in economic performance. However, by redistributing to the poor, democracy also increases wages and decreases the return and incentives to invest.<sup>47</sup> All these suggest that democracy's primary contribution to factor accumulation is through human capital.

The negative coefficient on *Inequality* is strongly significant in the All-set and less so in the Best-Set. This result is consistent with one of two scenarios. If inequality is positively (negatively) related to growth, then democracy is positively (negatively) related to inequality. There are various contrasting theoretical and empirical findings on the inequality-growth

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<sup>47</sup> In support for the latter argument, Rodrik 1999 finds that democracies pay higher wages.

relationship. The *political economy* approach, for instance, predicts a negative relationship. The argument is that the larger gap between the median-voter's and the mean income in an income distribution results in higher pressures for redistribution, which would in turn cause higher distortionary taxation and lower growth (Persson and Tabellini 1992, 1994, and Alesina and Rodrik 1994). Positive predictions between inequality and growth are generally human-capital related. Saint-Paul and Verdier (1993) argue that in more unequal societies, the median-voter would vote for higher taxation for public education, which would in turn increase aggregate human capital and therefore growth.<sup>48</sup> Higher voice of median-voter in this case implies higher democracy, and therefore a positive correlation between democracy and inequality. Nevertheless, the overall relationship between democracy and inequality in our context depends on the inequality-growth relationship, which is far from conclusive.

Inflation, too, is estimated to be significant with a negative sign in our MRA. Thus if inflation is positively (negatively) related to growth, then the MRA results suggest that democracy is positively (negatively) related to inflation. There is a common consensus on the negative impact of inflation on growth, as price instability erodes the values of the assets and decreases the incentives for work and investment. Thus, our result implies that democracies are associated with lower inflation. Indeed, the impact of democracy on inflation is a long-held debate in the comparative political economy literature, with competing views on both sides. Desai, Olofsgard and Yousef 2003 reflect the two views. The *populist* approach argues that elected governments generate income through inflation to redistribute to the poor. The *State-capture* approach argues that incumbent politicians and their elite links – i.e., lesser scope for democracy, obtain private benefits from money creation. We find that democracies foster growth through greater price stability.

The coefficient on *Instability* is also negative. Several authors (e.g. Alesina *et al.* 1996 and Barro 1991) have found that political instability is detrimental for growth. The MRA suggests that democracy leads to greater political stability and hence contributes indirectly to growth through this channel.

In contrast, including openness and the size of government in the democracy-growth regressions leads to larger democracy-growth effects. This implies that if the size of government is negatively (positively) related to growth, then democracy is positively (negatively) related to larger governments. It is largely agreed that bigger governments are negatively associated with economic growth. Thus our results imply that democracies are associated with larger governments. Indeed, several researchers have found that redistribution of income as well as the

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<sup>48</sup> Acemoglu and Robinson's (1996) argument is also in similar vein but they admit that such taxation may lead to lower growth. See also Forbes (2000) for positive empirical prediction between inequality and growth.

protection of economic freedom and civil and political rights require government spending (Pritchett and Kaufman 1998 and de Mello and Sab (2002). Our MRA confirms this when the Best-Set is used, although the level of significance is weak in column 1, becoming much stronger in column 2.

On the other hand, our MRA for the All-Set results imply that if openness is negatively (positively) related to growth, then democracy is positively (negatively) related to openness. Frankel and Romer (1999), among others, find that trade causes higher growth. Thus, our result implies that democracies are associated with less free international trade. It is a matter of debate whether democracies cause less openness or openness causes less democracy. Rigobon and Rodrik (2005) provide an answer to this question: openness is bad for democracy, while democracy has ignorable effects on openness. They argue that openness tends to weaken democratic institutions, perhaps because openness tends to exacerbate distributional conflicts. Our result is in line with this finding.<sup>49</sup>

The direct and indirect democracy-growth effects are summarized in Table 5.

### *Specification Effects*

*Convergence* is statistically significant with a positive sign when the All-Set is used but not significant when the Best-Set is used. The All-set result implies that if *Convergence* – i.e., an initial income variable - is negatively (positively) related to growth, then democracy is positively (negatively) related to the initial income. The Solow growth model predicts a negative sign for initial income if conditional convergence exists across countries. Numerous studies provided empirical evidence in favour of conditional convergence. Thus, our result implies that democracy is positively related to initial income. In other words, higher levels of initial income correspond to higher levels of democracy. Nevertheless, the reader should bear in mind that *Convergence* is insignificant with the Best-set.

The use of regional dummies in the regressions – i.e. the *Region* variable - results in higher democracy-growth effect when the All-Set is used. Such an effect is not significant when the Best-Set is used. The All-set result implies that if region-specific effects are negatively (positively) related to growth, then democracy is positively (negatively) related to region-specific effects.

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<sup>49</sup> While Rigobon and Rodrik (2005) find the *general* result that democracies have ignorable effects on openness, a stronger feedback from democracy to openness could be found in *narrower* dimensions. For instance, in a two-sector, two-factor Heckscher-Ohlin framework, Dutt and Mitra (2002) find that governments raise trade barriers in labor-abundant countries, while lower them in capital-abundant countries. Thus democracy may lower openness here *due to an unequal income distribution*, which allows poorer median-voters to receive greater redistribution through trade policy.

However, it is difficult to find out the relationship between region-specific effects and growth in our context.

*Democracy squared*, on the other hand, is estimated to be insignificant with both sets.<sup>50</sup> Thus the partial correlation on democracy and growth is not affected with the test of a curvilinear effect between democracy and growth.

We also find that the discipline specific journal dummies (*Politics* and *Economics*) are not statistically significant, except for a weak significance in column 5 for the All-Set. There is no real difference in the type of results reported across different types of journals.

#### *Estimation Effects*

Once other study characteristics are controlled for, studies that use OLS do not report results that are different to studies that use an alternative estimator. However, there is some evidence (albeit of weak statistical significance) that treating democracy as an endogenous variable results in larger democracy-growth effects. This is an interesting result that suggests that specification is much more important than is estimation. That is, it is not the use of non-OLS that matters, but the control variables included in the empirical growth equation and the treatment of endogeneity that matters. There is a sizeable literature on the endogeneity of democracy (Lipset 1959, Heliwell 1994, Muller 1995, Barro 1999). Hence, our MRA suggests that studies that fail to control for the endogeneity of democracy are understating the democracy-growth effect.

#### *Knowledge Effects*

All three knowledge variables, *Prior*, *Crossauthor*, *Cumulative*, are statistically significant and all have negative coefficients when the All-Set is used. However, when the Best-Set is used, they are not statistically significant except for *Cumulative* which is weakly significant in column 4. This indicates that influence affects the reporting of results (e.g. in terms of the sensitivity analysis reported) but does not affect the study's preferred result and, hence, does not affect the study's contribution to the literature. Studies where democracy was the primary variable of interest also report lower effects when the All-Set is considered, but not for the Best-Set.

About one third of the variation in results can be explained by the estimated MRA models, with most of this attributed to specification differences (as measured by the adjusted R-squared). If our MRA model is correct, most of the differences in the results can be attributed to sampling error and research design differences. Lipsey and Wilson (2001) recommend a Chi-square test on

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<sup>50</sup> This is not inconsistent with the so-called "Barro effect". The quadratic term can still be statistically significant even if the linear term is not.

the residuals. The test shows that all the remaining variability in the residuals is not greater than what would be expected from sampling error. The credibility intervals reported in Table 1 show that there was variability in the estimates in excess of sampling error. The MRA model has successfully captured this variability. That is, the MRA model captures the impact of research design differences and any remaining variability can be attributed to sampling error.

Spurious regression is an ever constant threat in any regression analysis. Hence, as a final test of our MRA, we used permutation tests as an alternative way of exploring the statistical significance of the covariates (explanatory variables). Higgins and Thompson (2004) argue that MRA is vulnerable to spurious regression especially if there is a small number of studies and a large number of covariates. While we have a large sample size, we have also many explanatory variables. Following Higgins and Thompson (2004), the permutation tests were carried out by *randomly* reallocating the democracy-growth partial correlations to sets of covariates. The MRA was then reestimated. The reallocation and reestimation was repeated 1,000 times. We then compared the number of times the test statistic from the random reallocations equals or exceeds our initial test statistics (those based on non-random assignments and reported in Tables 3 and 4). The permutation tests accord with our MRA results.<sup>51</sup> Hence, we have a very high degree of confidence that the associations are robust (as supported by the different MRA models), as well as non-spurious (as supported by the permutation tests).<sup>52</sup>

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<sup>51</sup> These are available from the authors.

<sup>52</sup> For example, for the Best-Set MRA estimated using the Random Effects model, the following variables all pass the permutation tests (in order of significance): *1990s*, *Cross-sectional*, *Human Capital*, *Ecofreedom*, *Latin America*, *Dummy*, *Inflation*, *Asia*, *1970s*, *Inequality*, *Cumulative*, *1980s*, and *Govt Size*.

**Table 3. Meta-Regression Analysis, Published Democracy and Economic Growth Effects,  
All-Set (Dependent variable = partial correlations)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All-Set OLS	All-Set (boot)	All-Set (cluster)	All-Set (pruned)	All-Set RE	All-Set	All-Set	All-Set	All-Set	All-Set	All-Set	All-Set
Latin America	0.087 (2.23)**	0.087 (2.22)**	0.087 (1.08)	0.090 (2.00)**	0.099 (2.58)**	-	0.101 (2.82)***	-	-	-	-	-
Africa	0.078 (1.57)	0.078 (1.45)	0.078 (1.20)	0.099 (1.76)*	0.065 (1.31)	-	-0.052 (-1.17)	-	-	-	-	-
Asia	-0.163 (-3.18)***	-0.163 (-3.05)***	-0.163 (-1.37)	-0.201 (-3.60)***	-0.193 (-4.45)***	-	-0.149 (-3.09)***	-	-	-	-	-
No. countries	0.0005 (0.96)	0.0005 (0.93)	0.0005 (0.68)	0.000 (0.56)	0.0007 (1.16)	-0.0003 (-0.66)	-	0.0002 (0.53)	-	-	-	-
1970s	-0.092 (-1.88)*	-0.092 (-1.78)*	-0.092 (-1.23)	-0.091 (-1.41)	-0.064 (-1.29)	-	-	-0.085 (-2.59)**	-	-	-	-
1980s	0.078 (1.76)*	0.078 (1.74)*	0.078 (2.25)**	0.068 (0.94)	0.100 (2.60)***	-	-	0.023 (0.54)	-	-	-	-
1990s	0.142 (4.15)***	0.142 (3.97)***	0.142 (3.48)***	0.183 (3.82)***	0.173 (5.50)***	-	-	0.050 (1.88)*	-	-	-	-
Cross-sectional	0.056 (2.19)**	0.056 (2.06)**	0.056 (1.41)	0.048 (1.44)	0.066 (2.53)**	0.075 (3.36)***	-	0.018 (0.79)	-	-	-	-
Single	0.069 (0.93)	0.069 (0.91)	0.069 (0.59)	0.068 (0.73)	0.103 (1.41)	-0.004 (-0.06)	-	0.113 (1.97)*	-	-	-	-
Gastil	0.022 (0.83)	0.022 (0.76)	0.022 (0.52)	0.012 (0.35)	0.039 (1.50)	0.016 (0.57)	-	0.032 (1.21)	-	-	-	-
Dummy	0.243 (4.93)***	0.243 (4.77)***	0.243 (2.38)**	0.261 (4.57)***	0.276 (6.42)***	0.162 (3.75)***	-	0.163 (3.86)***	-	-	-	-
Crossauthor	-0.075 (-2.58)**	-0.075 (-2.53)**	-0.075 (-1.27)	-0.094 (-2.59)**	-0.101 (-3.94)***	-0.047 (-1.68)*	-	-	-0.020 (-0.80)	-	-	-
Prior	-0.113 (-3.31)***	-0.113 (-3.17)***	-0.113 (-1.40)	-0.101 (-2.21)**	-0.121 (-3.81)***	-0.150 (-4.63)***	-	-	-0.060 (-1.71)*	-	-	-
Cumulative	-0.807 (-3.51)***	-0.807 (-3.14)***	-0.807 (-2.86)***	-0.844 (-3.27)***	-0.920 (-4.84)***	-0.643 (-2.51)**	-	-	-0.943 (-3.40)***	-	-	-
Non-OLS	-0.038 (-1.17)	-0.038 (-1.14)	-0.038 (-0.79)	-0.043 (-1.14)	-0.031 (-0.97)	-0.018 (-0.64)	-	-	-	-0.104 (-4.21)***	-	-
Endogenous	0.054 (1.56)	0.054 (1.43)	0.054 (0.86)	0.079 (1.72)*	0.060 (1.54)	0.044 (1.12)	-	-	-	0.009 (0.28)	-	-

Demosq	-0.019 (-0.55)	-0.019 (-0.52)	-0.019 (-0.32)	-0.021 (-0.48)	-0.027 (-0.74)	-0.059 (-1.77)*	-	-	-	-	-0.010 (-0.28)	-
<b>Table 3 (Continued)</b>												
Region	(1) 0.067 (2.39)**	(2) 0.067 (2.36)**	(3) 0.067 (1.43)	(4) 0.075 (2.15)**	(5) 0.060 (2.05)**	(6) 0.110 (3.48)***	(7) -	(8) -	(9) -	(10) -	(11) 0.082 (2.55)**	(12) -
Ecofreedom	-0.241 (-6.80)***	-0.241 (-6.64)***	-0.241 (-3.79)***	-0.207 (-5.09)***	-0.240 (-7.48)***	-0.195 (-5.90)***	-	-	-	-	-0.133 (-4.59)***	-
Inequality	-0.155 (-3.78)***	-0.155 (-3.55)***	-0.155 (-2.40)**	-0.176 (-3.36)***	-0.135 (-3.68)***	-0.178 (-4.66)***	-	-	-	-	-0.120 (-3.59)***	-
Instability	-0.078 (-1.99)**	-0.078 (-1.90)*	-0.078 (-1.14)	-0.105 (-2.19)**	-0.058 (-1.63)	-0.144 (-4.28)***	-	-	-	-	-0.150 (-4.76)***	-
Inflation	-0.209 (-4.62)***	-0.209 (-4.53)***	-0.209 (-2.88)***	-0.227 (-3.53)***	-0.241 (-7.29)***	-0.152 (-3.36)***	-	-	-	-	-0.106 (-2.36)**	-
Population	-0.049 (-1.98)*	-0.049 (-1.88)*	-0.049 (-1.13)	-0.048 (-1.51)	-0.049 (-1.79)*	-0.079 (-3.48)***	-	-	-	-	-0.046 (-2.07)**	-
Convergence	0.101 (3.00)***	0.101 (2.95)***	0.101 (1.84)*	0.122 (2.63)**	0.089 (2.84)***	0.031 (1.10)	-	-	-	-	0.009 (0.34)	-
Human Capital	-0.126 (-3.81)***	-0.126 (-3.81)***	-0.126 (-2.71)***	-0.118 (-3.02)***	-0.133 (-4.90)***	-0.085 (-2.68)***	-	-	-	-	-0.090 (-3.14)***	-
Physical Capital	-0.004 (-0.19)	-0.004 (-0.19)	-0.004 (-0.08)	-0.024 (-0.85)	-0.0003 (-0.01)	0.011 (0.44)	-	-	-	-	-0.043 (-1.91)*	-
Openness	0.124 (4.46)***	0.124 (4.12)***	0.124 (2.59)**	0.139 (4.49)***	0.110 (4.22)***	0.115 (4.14)***	-	-	-	-	0.092 (3.11)***	-
Govt Size	0.031 (1.02)	0.031 (0.96)	0.031 (1.10)	0.045 (1.07)	0.058 (2.13)**	0.016 (0.53)	-	-	-	-	0.059 (1.89)*	-
Politics Journal	-0.083 (-1.69)*	-0.083 (-1.60)	-0.083 (-1.48)	-0.094 (-1.61)	-0.134 (-3.18)***	0.002 (0.04)	-	-	-	-	-	0.028 (0.62)
Economics Journal	0.008 (0.25)	0.008 (0.23)	0.008 (0.20)	0.004 (0.09)	-0.012 (-0.35)	0.076 (2.38)**	-	-	-	-	-	-0.082 (-3.02)***
Primary	-0.085 (-3.06)***	-0.085 (-2.95)***	-0.085 (-2.73)***	-0.072 (-2.14)**	-0.066 (-2.38)**	-0.053 (-2.22)**	-	-	-	-	-	-0.006 (-0.24)
Constant	0.180 (2.57)**	0.180 (2.43)**	0.180 (2.18)**	0.192 (1.84)*	0.159 (2.25)**	0.180 (3.00)***	0.135 (4.65)***	0.008 (0.15)	0.137 (5.22)*	0.081 (5.80)***	0.172 (6.88)***	0.114 (3.67)***
No. Countries	na	na	na	na	na	na	-0.0002 (-0.47)	na	-0.001 (-4.04)***	-0.001 (-3.13)***	-0.0008 (-2.16)**	-0.001 (-3.50)***
Observations	432	432	428	333	432	460	442	470	460	470	470	470
Adjusted R-squared	0.38	0.38	0.38	0.43	na	0.34	0.07	0.08	0.05	0.03	0.21	0.02

\*, \*\*, \*\*\* statistically significant at the 10%, 5% and 1% level, respectively. t-statistics in brackets. Columns 1 and 11 estimated using OLS, with robust t statistics in parentheses. Column 3 uses clustered data analysis to construct t-statistics. The other columns use the bootstrap to construct t-statistics. na means not applicable. Except for columns 5 and 14, all columns report Fixed Effects meta-regression models.

**Table 4. Meta-Regression Analysis, Published Democracy and Economic Growth Effects,  
Best-Set and Specific Models  
(Dependent variable = partial correlations)**

	(1) Best-Set OLS	(2) Best-Set RE	(3) All-Set (boot)	(4) Best-Set specific	(5) All-Set specific
Latin America	0.343 (2.99)***	0.338 (2.69)**	0.087 (2.22)**	0.341 (2.73)***	0.100 (2.48)**
Africa	-0.031 (-0.21)	-0.050 (-0.41)	0.078 (1.45)	-	-
Asia	-0.302 (-2.51)**	-0.313 (-2.33)**	-0.163 (-3.05)***	-0.267 (-2.25)	-0.124 (-2.98)***
No. countries	0.0009 (0.84)	0.001 (0.84)	0.0005 (0.93)	-	-
1970s	0.237 (2.21)**	0.236 (2.09)**	-0.092 (-1.78)*	0.201 (2.77)***	-0.079 (-2.05)**
1980s	0.168 (0.99)	0.187 (1.87)*	0.078 (1.74)*	0.165 (1.62)	0.091 (2.32)**
1990s	0.288 (4.46)***	0.283 (4.07)***	0.142 (3.97)***	0.267 (5.16)***	0.135 (4.24)***
Cross-sectional	0.153 (3.18)***	0.153 (2.75)***	0.056 (2.06)**	0.148 (3.18)***	0.059 (2.28)**
Single	-0.123 (-0.53)	-0.061 (-0.33)	0.069 (0.91)	-	-
Gastil	0.046 (0.75)	0.056 (0.95)	0.022 (0.76)	-	-
Dummy	0.216 (1.83)*	0.232 (2.41)**	0.243 (4.77)***	0.136 (2.40)**	0.215 (5.43)***
Crossauthor	-0.066 (-1.17)	-0.065 (-1.25)	-0.075 (-2.53)**	-0.069 (-1.61)	-0.077 (-2.69)***
Prior	-0.050 (-0.81)	-0.037 (-0.55)	-0.113 (-3.17)***	-	-0.113 (-3.26)***
Cumulative	-0.634 (-1.41)	-0.696 (-1.92)*	-0.807 (-3.14)***	-0.635 (-1.90)*	-0.801 (-3.43)***
Non-OLS	0.006 (0.07)	0.003 (0.05)	-0.038 (-1.14)	-	-0.041 (-1.30)
Endogenous	0.083 (1.08)	0.078 (0.99)	0.054 (1.43)	0.080 (1.84)*	0.065 (1.96)*
Demosq	0.001 (0.02)	-0.01 (-0.15)	-0.019 (-0.52)	-	-
Region	-0.015 (-0.33)	-0.023 (-0.39)	0.067 (2.36)**	-	0.082 (2.93)***
Ecofreedom	-0.208 (-2.88)***	-0.215 (-2.66)***	-0.241 (-6.64)***	-0.182 (-3.47)***	-0.235 (-7.19)***
Inequality	-0.153 (-1.71)*	-0.149 (-2.01)**	-0.155 (-3.55)***	-0.131 (-2.04)**	-0.164 (-4.13)***
Instability	-0.094 (-1.58)	-0.083 (-1.26)	-0.078 (-1.90)*	-0.118 (-2.61)**	-0.081 (-2.07)**
Inflation	-0.174 (-2.29)**	-0.173 (-2.50)**	-0.209 (-4.53)***	-0.155 (-2.46)**	-0.198 (-4.65)***
Population	-0.059 (-1.01)	-0.059 (-0.94)	-0.049 (-1.88)*	-	-
Convergence	-0.004 (-0.09)	-0.011 (-0.17)	0.101 (2.95)***	-	0.082 (2.89)***
Human Capital	-0.210 (-2.75)***	-0.195 (-2.94)***	-0.126 (-3.81)***	-0.182 (-2.92)***	-0.111 (-3.48)***
Physical Capital	0.008 (0.14)	0.013 (0.23)	-0.004 (-0.19)	-	-
Openness	0.100 (1.59)	0.096 (1.63)	0.124 (4.12)***	0.074 (1.37)	0.124 (4.76)***

**Table 4 (Continued)**

	(1)	(2)	(3)	(4)	(5)
Govt Size	0.109 (1.72)*	0.117 (1.73)*	0.031 (0.96)	0.122 (2.15)**	-
Politics Journal	-0.041 (-0.44)	-0.056 (-0.70)	-0.083 (-1.60)	-	-0.082 (-1.85)*
Economics Journal	0.007 (0.09)	-0.003 (-0.05)	0.008 (0.23)	-	-
Primary	-0.002 (-0.03)	0.002 (0.04)	-0.085 (-2.95)***	-	-0.086 (-3.27)***
Constant	-0.325 (-1.28)	-0.336 (-1.71)*	0.180 (2.43)**	-0.289 (-2.25)**	0.239 (4.41)***
Wald Test	na	na	na	8.56	5.62
- Prob-value				0.86	0.69
Observations	76	76	432	76	432
Adjusted R-squared	0.37	na	0.38	0.48	0.38

\*, \*\*, \*\*\* statistically significant at the 10%, 5% and 1% level, respectively. t-statistics in brackets. Columns 1 and 4 estimated using OLS, with robust t statistics in parentheses. Columns 3 and 5 use the bootstrap to construct t-statistics. na means not applicable. Except for column 2, all columns report Fixed Effects meta-regression models.

**Table 5: Direct and Indirect Democracy-Growth Effects**

<b>Direct Effect of Democracy on Growth:</b>	<b>Zero</b>
<b>Indirect effects of Democracy on Growth through:</b>	
Economic Freedom	<b>Positive</b>
Human Capital	<b>Positive</b>
Inflation	<b>Positive</b>
Political Stability	<b>Positive**</b>
Size of Government	<b>Negative*</b>
International Trade	<b>Negative**</b>

\* detected only in the Best-Set. \*\* detected only in the All-Set.

## 6. Conclusion

The aim of this paper was to review the accumulated evidence on the impact of democracy on economic growth. Existing reviews and authors of primary studies have drawn inferences from only a limited set of information and have failed to reach a decisive conclusion. In contrast, we apply meta-analysis and meta-regression analysis to the total pool of 81 studies with 470 published estimates of the democracy-growth association, and are able to draw five *firm* conclusions. First, we find no accumulated evidence of democracy being detrimental to economic growth. Taking all the data together, the published evidence points to a zero direct effect on economic growth. This is in line with Bhagwati's (1995) prediction that democracy does not handicap development. Second, while the direct effect is found to be zero, our results indicate that democracy has significant indirect effects on growth through various channels. In particular, we find that democracy has a favourable impact on human capital formation, on the

level of economic freedom, inflation and political instability. However, we find also that democracy is associated with greater government spending and less free international trade. Third, while there is no evidence of a democracy-growth effect for all countries pooled together, there are clear regional effects. The available evidence suggests that democracy has a larger effect on economic growth in Latin America, and that this is lower in Asia. Moreover, it appears that there are country-specific effects. Fourth, at least a third of the differences in reported results can be attributed to differences in research design and econometric specification. That is, most of the differences in results are due to either sampling error or differences in the research process, rather than underlying differences in the democracy-growth effect. Fifth, comparing the democracy-growth association to research conducted elsewhere on the economic freedom-growth association (Doucouliagos and Ulubasoglu 2006), we find that democracy's direct effect on growth is zero, while economic freedom has a positive direct effect.

We conclude that the empirical evidence that has accumulated over the past 30 years points to a zero direct effect on growth and significant indirect effects on growth through factor accumulation, economic freedom, inflation and openness, with an adverse effect through government spending and international trade. The net effect is that democracy does not harm economic performance.

Meta-analysis can be applied to other dimensions of democracy. For example, the links between democracy and the level of development rather than growth, the channels through which democracy impacts on both growth and development, as well as the determinants of democracy, are all promising areas for future meta-analysis research.

## Appendix A – Studies included in the meta-analysis

**Table A1: Studies exploring democracy and output levels**

Adkins (2000)	Feld & Savioz (1997)
Bardhan (2005)	Hanke & Walters (1997)
Campos & Nugent (1999)	Rigobon & Rodrik (2005)
Chatterji et al (1993)	Spindler (1991)
Friedman (1988)	Vorhies and Glahe (1988)

**Table A2: Studies exploring democracy and economic growth**

Alesina & Rodrik (1994)	Goldsmith (1995)	Mo (2000), (2001)
Ali (2003)	Gounder (2002)	Nelson & Singh (1998)
Ali & Crain (2001), (2002a), (2002b)	Grier & Tullock (1989)	Oliva & Rivera-Batiz (2002)
Almeida & Ferreira (2002)	Gupta et al (1998)	Perotti (1996)
Assane & Pourgerami (1994)	Gwartney et al (1999)	Persson & Tabellini (1992), (1994)
Barro (1996), (2000)	Haan & Sierman (1995)	Pitlik (2002)
Baum & Lake (2003)	Mobarak (2005)	Plumper & Martin (2003)
Bhalla (1994)	Helliwell (1994)	Pourgerami (1988)
Bleaney & Nishiyama (2002)	Henisz (2000)	Pourgerami & Assane (1992)
Chatterji (1998)	Heo & Tan (2001)	Pourgerami (1992)
Chen (2003)	Knack & Keefer (1995)	Remmer (1990)
Cohen (1985)	Kormendi & Meguire (1985)	Rivera-Batiz (2002)
Collier (1999), (2000)	Kosack (2003)	Rodrik (1999)
Comeau (2003)	Kurzman <i>et al</i> (2002)	Quinn & Wooley (2001)
Dawson (1998)	Landau (1996)	Sala-i-Martin (1998)
Doucouliaagos and Ulubasoglu (2006)	Leblang (1997)	Scully (1988)
Durham (1999)	Leschke (2000)	Siermann (1998)
Esfahani & Ramirez (2003)	Levine & Renelt (1992)	Svensson (1999)
Farr <i>et al</i> (1998)	Li & Zhou (1998)	Tavares & Wacziarg (2001)
Fayissa & El-Kaissy (1999)	Lindenberg & Devarajan (1993)	Weede (1983), (1993), (1997)
Feng (1995), (1996), (1997)	Lundberg & Squire (2003)	Wu & Davis (1999)
Fidrmuc (2003)	Marsh (1988)	
Gasiorowski (2000)	Mbaku (1994)	
Glaeser <i>et al</i> (2004)	Minier (1998), (2003)	

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