

Democracy and Economic Growth: A Meta-Analysis

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Despite a sizeable theoretical and empirical literature, no firm conclusions have been drawn regarding the impact of political democracy on economic growth. This article challenges the consensus of an inconclusive relationship through a quantitative assessment of the democracy-growth literature. It applies meta-regression analysis to the population of 483 estimates derived from 84 studies on democracy and growth. Using traditional meta-analysis estimators, the bootstrap, and Fixed and Random Effects meta-regression models, it derives several robust conclusions. Taking all the available published evidence together, it concludes that democracy does not have a direct impact on economic growth. However, democracy has robust, significant, and positive indirect effects through higher human capital, lower inflation, lower political instability, and higher levels of economic freedom. Democracies may also be associated with larger governments and less free international trade. There also appear to be country- and region-specific democracy-growth effects. Overall, democracy's net effect on the economy does not seem to be 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, 127)

The relationship between political democracy and economic growth has been a center of debate in the past 50 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*. This article challenges 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 the “democracy promotes growth” hypothesis 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 the public's demands on areas such as education, justice, and health; and encourage stable and long-run growth (Baum and Lake 2003; Lake and Baum 2001; Rodrik 1998). Opponents of this hypothesis, on the 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 implement coercive measures necessary for rapid growth, others remain overall skeptical on whether regimes, rather than markets and institutions, matter for growth (Bhagwati 1995).

The availability of data and a number of econometric techniques have enabled researchers to explore

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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 483 regression estimates from 84 published democracy-growth studies shows that 15% of the estimates are negative and statistically significant, 21% of the estimates are negative and statistically insignificant, 37% of the estimates are positive and statistically insignificant, and 27% of the estimates are positive and statistically significant. This implies that nearly three-quarters of the regressions have not been able to find the “desired” positive and significant sign for the impact of democracy on growth. It also implies that around half of the regression models have found statistically significant estimates while the other half found statistically insignificant estimates. Such different results are not surprising because the research questions posed are understandably narrow and approach the issue from different dimensions. For instance, while some studies focus on the physical investment channel between democracy and growth, others look at the human capital or political instability channels. Likewise, certain studies present structural estimates of a well-defined model, whereas others focus on 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.¹

This article presents a meta-analysis on the democracy-growth relationship, based on 84 published studies. It makes three novel contributions to the democracy-growth literature. First, it offers a comprehensive assessment of the democracy-growth findings based on the entire pool of estimates in the published literature. Second, the quantitative assessment is used to draw firm inferences on the magnitude and the significance of the democracy-growth relationship. Third, it explores the factors driving the heterogeneity of the results that have been reported by individual studies.

There is a small but growing list of applications of meta-analysis to political science (Bishop and Smith 2001; D’Alessio and Allen 2000; Imbeau and Lamari 2001; Lau 1999; Roscoe and Jenkins 2005) and political economy (Doucouliagos and Ulubaşoğlu 2006; Nijkamp and Poot 2004). Meta-analysis considers all the available results from an empirical literature to draw inferences from a larger (ideally the entire) pool of information than what could be provided by a single study. A single study is un-

likely to resolve theoretical or empirical debates, if not create them. Validation and generalization of results in a literature require a method of integrating results, and meta-analysis is an effective method for doing so. 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 individual papers. Meta-analysis assumes that each study is a data point in the knowledge-generating mechanism towards the true democracy-growth relationship and that it may exhibit some random or systematic deviations from the true relationship. An important factor for such deviation is sampling error. 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. However, by taking all studies together, meta-analysis informs on the extent of sampling error and enables removing these effects from empirical findings (Hunter and Schmidt 2004).²

Another factor is research design. Studies deliver different results due to differences in econometric specifications, country composition of samples, time periods, control variables, and estimation techniques. Meta-analysis can, among other things, help net out such differences across studies, estimate their impact, and guide future research towards less biased studies.³

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 among countries and affect long-run growth. Meta-analysis enables the statistical exploration of the relationships between democracy and these factors in an integrated framework.

This article 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 this literature and many authors who have contributed to it state that the association is inconclusive. Faced with a diverse

¹Useful reviews of the empirical literature can be found in Alesina and Perotti (1994), Aron (2000), Przeworski and Limongi (1993), and Sirowy and Inkeles (1990). Summaries of the theoretical debates can be found in Baum and Lake (2003), de Haan and Siermann (1995a), Gasiorowski (2000), Kurzman, Werum, and Burkhart (2002), and Quinn and Woolley (2001), among others.

²This correction becomes perfect as the number of studies approaches infinity.

³Traditional qualitative reviews cannot filter such effects, which are subject to “methodological speculation” (Stanley 2001).

set of conflicting results, they are unable to conclude whether the association is positive, negative, or nonexistent. This article offers particularly suggestive results. It finds 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, reduced political instability, and higher levels of economic freedom. However, there is also some evidence that democracies are associated with larger governments and more restrictive international trade. Third, the results are suggestive of region-specific effects on the democracy-growth relationship. Specifically, the growth effects of democracy appear to be higher in Latin America and lower in Asia. This article also finds 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 article is structured as follows. The second section provides a brief review of the key theoretical arguments behind the democracy-growth association, and the next section discusses the meta-analysis methodology adopted in this article. The fourth section discusses the data used. The fifth section is the heart of the article, presenting meta-analysis and meta-regression analysis results. The last section concludes the article with suggestions for future research.

Theoretical Arguments

Traditional Views

Does political democracy cause economic growth? Kurzman, Werum, and Burkhart (2002) cite Hobbes ([1651] 1967) as being the first to promote the conflict view. To Hobbes, absolutist regimes were more likely to improve public welfare simply because they could not promote their own interests otherwise. Huntington (1968) 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” (Bhagwati 1982; Krueger 1974). Nondemocratic regimes can implement coercively the hard economic policies necessary for growth, and they can suppress the growth-retarding demands of low-income 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 prerequisite 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. The conflict view became fashionable after the growth success stories in South Korea, Taiwan, Hong Kong, and Singapore in the 1950s and 1960s. However, critics point to several contrasting cases where dictators pursued their own welfare and failed ostensibly in Africa and most of the socialist world (Alesina et al. 1996; de Haan and Siemann 1995a).

Proponents of the “democracy aids growth” view, on the other hand, argue that rulers are potential looters (Harrington [1656] 1992),⁴ 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 of property rights do not necessarily require an authoritarian regime. The latter has a tendency to confiscate assets if it expects a brief tenure (Olson 1993), or even a long one (Bhagwati 1995). Authoritarian regimes tend to be more corrupt and prone to extravagant use of resources, internally inconsistent policies, and short-lived and volatile economic progress (Nelson 1987). The motivation of citizens to work and invest, the effective allocation of resources in the marketplace, and profit-maximizing private activity can all 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 (1995a) note that a strong state does not imply an authoritarian state.

Among these conflicting views and ambiguous empirical results, it is natural that a so-called “skeptical view” has arisen. The proponents of this view argue that it is the institutional structure and organizations, rather than regimes per se, that matter for growth. Progrowth 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

⁴Cited in Kurzman, Werum, and Burkhart (2002).

democratic and authoritarian regimes. However, there have also been examples where the institutional structures under both regimes are afflicted by not making the “right” choices for their citizens.⁵

The Democracy-Growth Question Today

The political democracy-growth question is more precise and focused today. Theory has moved away from traditional conflict versus compatibility arguments, because different aspects of the broader institutions-growth problem have been identified. For instance, researchers have separated economic democracy (i.e., economic freedom) from political democracy. Factors such as the protection of property rights, and business, credit, and labor market regulations, which were previously attributed to political democracy, are now being treated as part of economic freedom (Gwartney and Lawson 2003; O’Driscoll, Feulner, and O’Grady 2003).⁶ Analyses of economic freedom indicators have shown that economic freedom is an important ingredient for growth (see Doucouliagos and Ulubaşoğlu 2006). Economic freedom operates on growth by providing an atmosphere to maintain individualistic incentives to engage in economically productive activities. Individuals are assured to receive the fruits of their investments and labor through securely enforced contracts and a stable economic climate for long-term decision making.

In addition, Kaufman, Kraay, and Zoido-Lobaton (1999) introduced the governance aspect of the institutions problem. Formerly, factors such as the rule of law, voice and accountability, government efficiency, political instability, corruption, and regulatory quality were either partly or totally attributed to political democracy. These, too, are now known to be associated with higher growth. Also, the World Bank has recently introduced “Doing Business” indicators, helping assess the role of the private sector in economic activities (see, among others, Djankov, McLiesh, and Shleifer 2005).

At this point one may feel that dissecting these aspects from political democracy reduces its scope to multiparty and free elections only. Political democracy is, of

course, more than free elections.⁷ First, empirical evidence shows that all the aspects of the institutions made precise above, i.e., economic freedom, governance, and the private sphere in the economy, have high correlations with political democracy. In other words, the mere existence of participatory democracy tends to imply the broader institutions conducive to growth. As Rodrik (2000) argues, democratic regimes can be the meta-institution for building market-supporting institutions.

Second, various studies find that political democracy has enormous indirect effects on growth through human capital accumulation, income distribution, economic freedom, and political stability (see Alesina et al. 1996; Baum and Lake 2003; Sturm and de Haan 2001). 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.

Third, 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. Nondemocratic regimes are not a homogenous lot (Alesina et al. 1996; Alesina and Perotti 1994; de Haan and Siermann 1995a), 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 at the endogeneity between growth and volatility, while Mobarak (2005) analyzes this link in a multiequation framework and finds that higher levels of democracy increase growth through lower volatility.

Methodology of Meta-Analysis

This article has two key objectives. First, it uses all the available empirical evidence to explore whether there exists a

⁵The consensus on the inconclusive relationship led researchers to investigate also other aspects of politics and growth. For instance, Minier (1998) finds that it is changes in democracy, rather than the level of democracy, that matter. Further, decreases in democracy have more significant effects on growth than increases in democracy. Barro (1996) and Plumper and Martin (2003), inter alia, look at whether there is a nonlinear relationship between democracy and growth.

⁶Economic freedom represents a variety of policies consistent with i) smaller governments; ii) security of property rights; iii) access to sound money; iv) freedom to exchange with foreigners; and v) freer credit and labor markets (Gwartney and Lawson 2003).

⁷Researchers have advanced various definitions of democracy; see Przeworski et al. (1996) and Przeworski and Limongi (1997). 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 the Freedom House indicators.

genuine association between democracy and economic growth and whether there is indeed an inconclusive association as many authors assert. Second, it investigates 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? The former implies that there is an underlying *distribution* of democracy-growth population parameter values which are negative in certain situations and positive in others, and the latter implies that reported differences result from artifacts, such as differences in econometric specification.

Identifying Empirical Effects

In order to identify the magnitude of the democracy-growth relationship, we calculate a mean democracy-growth effect from the literature and construct 95% credibility and confidence intervals around this mean.⁸ This metric is the weighted average of a *standardized* democracy-growth effect derived from each study (e.g., simple correlation, partial correlation, or elasticity between democracy and growth). In this article, the partial correlation is used as the standardized effect. Partial correlations measure the impact of democracy on growth holding other factors constant.⁹ They can also be meaningfully compared across studies. An alternative is elasticities, but many studies do not provide sufficient information from which to calculate the associated elasticities.

It is also customary to weight the partial correlations. A standard weight in meta-analysis is the sample size of the regression from which the partial correlation is derived, as sample size affects the amount of information that is offered. In addition to sample size, we consider two measures of research quality as a weight: (1) the number of citations that each individual study has received, and (2) impact factors of the journals where the studies are published (both as listed in the 2004 Social Science Citation Index). Thus, the mean democracy-growth effect, $\bar{\epsilon}$, by comprising all the aspects of democracy-growth studies that are represented with a standardized measure and weighted appropriately with a 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:

$$\bar{\epsilon} = \frac{\sum [N_{ij}\epsilon_{ij}]}{\sum N_{ij}} \quad (1)$$

where ϵ_{ij} is the standardized effect from the i^{th} regression estimate of the j^{th} study and N is the associated weight.

$\bar{\epsilon}$ informs on two important issues: (a) on average, does democracy have a positive or negative effect on economic growth? and (b) is the democracy-growth effect small or large? For instance, $\bar{\epsilon}$ may be negative but too small to be of economic significance. Most researchers follow Cohen’s (1988) guidelines and regard $\bar{\epsilon}$ 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.

It is also desirable to test whether this mean effect can be used to generalize the findings of the extant literature. Are there situations where the democracy-growth effect will be larger or smaller than the magnitude given by $\bar{\epsilon}$? The answer to this question comes from credibility intervals. Credibility intervals are constructed by removing expected sampling error from the observed variance in the findings so that the remaining variance is due to factors other than sampling error (see Hunter and Schmidt [2004] and Whitener [1990] 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, or it could be due to research design differences that lead to an appearance of variation in the relationship.

The accuracy of $\bar{\epsilon}$, on the other hand, is given by confidence intervals. There are several ways to construct confidence intervals (see Hedges and Olkin 1985; Hunter and Schmidt 2004). They can be constructed using the bootstrap (Adams, Gurevitch, and Rosenberg 1997) or by using Fixed Effects and/or Random Effects meta-analysis. We report three sets of confidence intervals: those based on (1) a Fixed Effects model, (2) a Random Effects model, and (3) the Hunter and Schmidt procedure (see Hunter and Schmidt 2004; Lipsey and Wilson 2001).¹⁰

Exploring the Heterogeneity in Reported Results

In meta-analysis, a distinction is drawn between fixed effects, random effects, and mixed effects models (see

⁸A technical appendix on the application of meta-analysis can be found at www.deakin.edu.au/buslaw/aef/meta-analysis.

⁹Partial correlations can be calculated directly from regression output. See Greene (2000, 234) for details. Different factors are held constant in different studies, contributing to the heterogeneity of the results. We control for this through meta-regression analysis.

¹⁰The bootstrap confidence intervals are essentially the same as using Hunter and Schmidt’s (2004) method and are hence not reported.

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 subsample 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 between studies. In the results section of this article, several variables (known as moderator variables) are identified that capture *systematic* (nonrandom) differences between studies. It is shown there that a fixed effects model captures adequately the distribution of the findings of the empirical democracy-growth literature and that the variation in reported results is not due to random differences between studies.

The impact of specification, data, and methodological differences on the results of the studies can be investigated by conducting the meta-regression analysis (MRA). Specifically, we estimate several versions of equation (2) below:

$$r_i = \gamma_0 + \gamma_m \mathbf{D}_i + \beta_n \mathbf{S}_n + \delta_k \mathbf{R}_k + \phi_l \mathbf{T}_l + \rho_t \mathbf{X}_t + v_i \quad (2)$$

where, for each study j , r denotes the partial correlation between democracy and economic growth given by regression i , \mathbf{D} is a vector of data characteristics used in the regression i , \mathbf{S} is a vector of variables representing specification differences (i.e., whether a particular variable is used in the regression or not), \mathbf{R} is a vector of regional dummies (i.e., specific regions of the world that the sample of the regression utilizes), \mathbf{T} is a vector of time dummies (i.e., decades that the regression's sample utilizes), and \mathbf{X} is a vector of other study characteristics. Note that equation (2) contains both dummy and continuous variables representing characteristics associated with the studies.

Data

A comprehensive search of the literature reveals 95 studies that provide estimates of the impact of democracy on economic performance.¹¹ Of these, 11 explore the impact

of democracy on the level of economic activity (per capita GDP), and 84 explore the impact of democracy on economic growth. We prefer to separate these two groups of studies and focus only on the growth studies. The appendix lists the growth studies.

There are actually more than 84 studies exploring democracy and growth. However, it is more plausible to use the studies whose results are comparable. The selection criteria are as follows.¹² First, we include only those studies that have been published and exclude working papers. Second, studies where the dependent variable is a *constructed* variable that may include economic growth or the level of economic activity are excluded. Third, studies that estimate the impact of democracy on growth but fail to report the necessary results are excluded as well. Fourth, only those studies that conduct econometric analysis are included. Thus, all the studies included in the meta-analysis were chosen on the basis that they offered statistics from which standardized measures of the impact of democracy on growth could be calculated. Some studies report separate regressions for democracies and nondemocracies (e.g., Przeworski et al. 2000). While insightful, these studies cannot be included in the meta-analysis. Hence, in general the impact of our selection criteria is to exclude most of the earlier published literature (mostly published in the 1970s) and exclude the newer unpublished literature. 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 because 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 some single-country studies. These were included in order to have a comprehensive dataset. Excluding the single-country studies does not change any of our results.

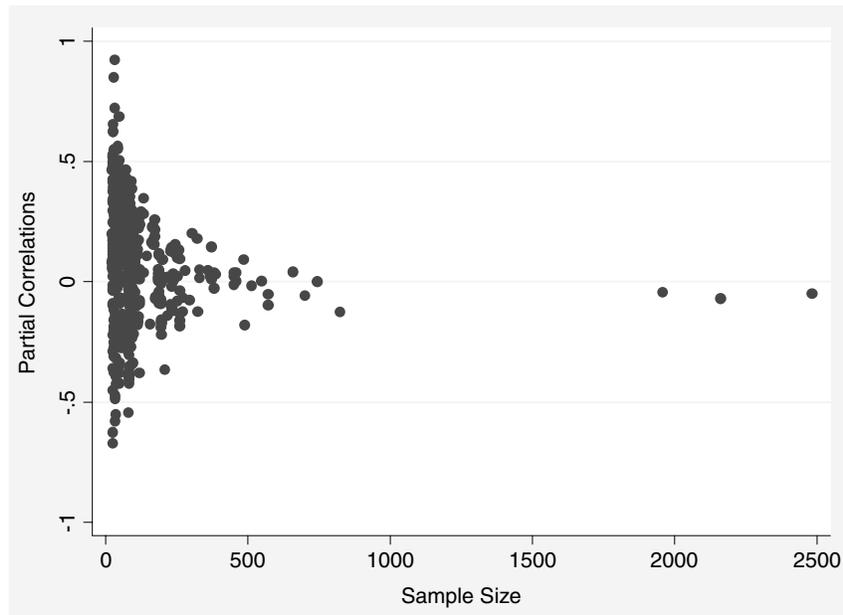
Two different datasets are derived from the set of 84 comparable studies. The first is the All-Set, which includes the democracy-growth estimates of 483 regressions. This is the entire pool of publicly available estimates on the democracy-growth association. Second, we can derive 81 estimates, one from each study, being the best estimate provided by each study (the Best-Set).¹³ In most cases, authors state their preferred estimate, but for some studies we have had to make some judgment. In general, estimates that involve larger groups of countries have been

¹²A full list of *excluded* studies is available from the authors.

¹³Some studies use the same dataset and the same authors. For the Best-Set, we combine these, reducing the number of statistically independent Best-Set studies from 84 to 81.

¹¹The search for studies ended in December 2005.

FIGURE 1 Published Democracy-Growth Effects, All-Set
($n = 483$)



chosen. 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.

The All-Set is displayed in Figure 1 in the form of a funnel plot (the figure for the Best-Set looks alike and hence is not reported). Funnel plots trace the association between an effect size (e.g., partial correlations) and a measure of precision (e.g., sample size). Figure 1 illustrates 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. This wide distribution can arise because of sampling error and/or the effects of research design. *Ceteris paribus*, larger studies should offer more precise estimates and smaller studies should have larger standard errors and report effects that fluctuate randomly around the true underlying democracy-growth effect. That is, at least some of the variation in reported results *may* be due, for example, to a small study making an incorrect inference purely because of sampling error. However, a distribution in results can also arise from real-world factors. 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.

Analysis

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. For both the All-Set and the Best-Set, 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 preferred 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. In other words, there is, on average, *no* evidence that democracy has a detrimental effect on economic growth.¹⁴

¹⁴This is based on the observed distribution of results in the literature. A possible selection of studies in the publication process on

TABLE 1 Descriptive Statistics, Published Democracy-Growth Effects

Statistic	Economic Growth (All-Set) (1)	Economic Growth (Best-Set) (2)	All-Set, Excluding Top and Bottom 10% (3)	All-Set, HK and PK Only (4)	All-Set, HK, PK and Endogeneity (5)	All-Set, HK, PK, Endogeneity, and Regional (6)
<i>Observations</i>						
Number of studies	84	81	73	41	12	5
Number of estimates	483	81	387	222	33	18
Total sample size	59,773	14,560	34,084	27,572	7,011	4,286
<i>Averages</i>						
Median	+0.07	+0.05	+0.09	+0.02	0.00	+0.01
Unweighted Average	+0.06	+0.06	+0.07	+0.01	-0.01	+0.01
Weighted Average (FE and HS)	+0.02	+0.02	+0.05	-0.02	-0.01	+0.01
Weighted Average (RE)	+0.05	+0.05	+0.06	-0.01	-0.01	0.00
<i>Intervals</i>						
95% Confidence Interval (FE)	+0.01 to +0.03	0.00 to +0.04	+0.04 to +0.06	-0.03 to -0.01	-0.03 to +0.02	-0.03 to +0.04
95% Confidence Interval (RE)	+0.03 to +0.06	+0.02 to +0.09	+0.04 to +0.09	-0.03 to +0.02	-0.05 to +0.03	-0.04 to +0.04
95% Confidence Interval (HS)	0.00 to +0.03	-0.01 to +0.05	+0.02 to +0.07	-0.04 to 0.00	-0.23 to +0.22	-0.21 to +0.22
95% Credibility Interval	-0.26 to +0.30	-0.23 to +0.27	-0.30 to +0.39	-0.30 to +0.27	-0.47 to +0.46	-0.43 to +0.44

FE = fixed effects; RE = random effects; HS = Hunter and Schmidt (2004); HK = human capital; PK = physical capital.

It is instructive to compare this result with similar findings for the association between economic freedom and economic growth. Doucouliagos and Ulubaşoğlu (2006) report a weighted average partial correlation of +0.28, with 95% confidence intervals of +0.18 to +0.42. Thus, the impact of democracy on growth is significantly different from 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.

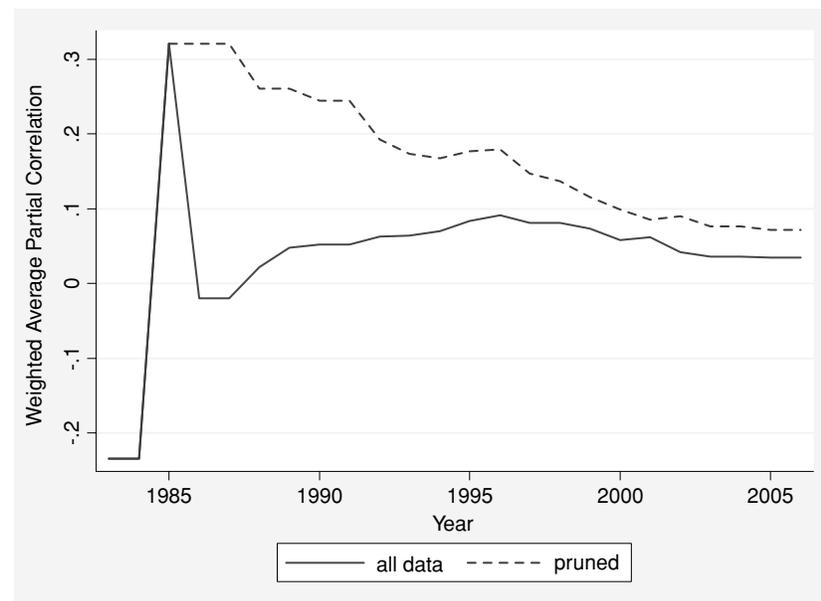
In order to test the sensitivity of the meta-analysis results, column 3 repeats the meta-analysis after removing 10% of the smallest and largest studies.¹⁵ The weighted average correlation now becomes +0.05 with a 95% confidence interval that does not include zero. The next three columns consider only those estimates that are derived

the basis of their results may affect averages. However, it should be noted that while 64% of the 483 estimates are positive, 58% of the estimates are not significant. Hence, any effect that such selection may have on inference should be modest.

¹⁵There is, however, no theoretical reason to exclude these studies.

from the 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). Column 4 considers 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 intuitive and consistent with the hypothesis that democracy affects factor accumulation. Several authors have presented evidence that democracy has an indirect effect on 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 on growth. The column 4 results are consistent with this notion and suggest that the direct democracy-growth effect is zero and that the indirect effect of democracy on growth working through factor accumulation is positive.

In column 5 the dataset is refined further by considering only those studies that controlled for the direct

FIGURE 2 Democracy-Growth Effects, 1983–2005, All-Set

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- and region-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. Using the number of citations that each individual study has received to weight the reported democracy-growth effects produces a citations-weighted mean democracy-growth effect of +0.01. Restricting the meta-analysis to only studies that were published in journals listed in the 2004 Social Science Citation Index and constructing various subgroups of studies with different impact factors leads essentially to the same result.¹⁶

The time-series pattern of the democracy-growth effect is important. Figure 2 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 being removed. This shows that the initial

findings of the literature on the democracy-growth relationship were negative. The subsequent early literature reported relatively large, positive, and statistically significant effects. As more evidence has accumulated, the average effect has diminished 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 nonexistent, the early literature erred in its conclusion. Note that since 1988, the democracy-growth effect *has, on average, not* been negative. Hence, whatever its other benefits and costs may be, the literature finds that democracy does not come at the cost of economic growth.

Heterogeneity

We next proceed to the 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. That is, through these variables, the MRA investigates whether differences in the study results are due to the research process (such as differences in specification, measurement, and estimation) or due to real-world factors (such as differences between regions, time periods, and applicability of the relationship to all countries).

¹⁶These results are available from the authors.

One of the problems encountered in the MRA, however, is that many of the observations included in the All-Set are not statistically independent. In meta-analysis, 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 statistically independent. Doucouliagos (2005) recommends the use of the bootstrap for meta-analysis datasets for the statistical dependence problem. Accordingly, we use the bootstrap to derive robust standard errors, using 1,000 replications with resampling (Shao and Tu 1995).

There is some disagreement in meta-analysis on the treatment of independent studies that draw from similar or even the same countries. It is, however, standard practice in meta-analysis in economics and political science to treat the studies of different authors as independent estimates even if they use the same countries and/or time periods (see Abreu, de Groot, and Florax 2005; Hunter and Schmidt 2004; Stanley 2001). Hence, the Best-Set by construction includes *only* statistically independent observations.¹⁷

Moderator Variables. Table 2 lists the variables used in the MRA, together with the means and standard deviations for the two datasets.

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, it is important to 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. It is possible, however, to identify four broad regional groupings: *Africa*, *Asia*, *Latin America*, and *rest of the world* (mainly the OECD), which is used as the base. We use these dummies to derive region-specific democracy-growth effects (holding research design dif-

ferences constant).¹⁸ A similar approach to the regional dummies can be adopted to investigate time-period effects. In particular, three time (decade) dummy variables are constructed: *1970s*, *1980s*, and *1990s*, with the 1960s as the base. By including these dummies it is then possible to identify decade-specific effects in the democracy-growth association and explore whether the association is time varying.

The use of different measures of democracy might be an important source of variation in empirical results (Bollen 1990; Sirowy and Inkeles 1990). Thus, we use the *Gastil* variable to check whether studies that use this index tend to find different results, as compared to those that use other indices (which are mainly Polity measures in our dataset). In addition, while some authors have 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 dichotomous indicator. The *Dummy* variable checks whether dichotomization of the democracy measure impacts on the reported partial correlations.

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 their 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 (dropping the usual subscripts):

$$g = \beta_0 + \beta_h H + \beta_d D + \beta_z Z + u \quad (3)$$

$$g = \alpha_0 + \alpha_d D + \alpha_z Z + v \quad (4)$$

where g denotes growth, D is democracy, H and Z are other factors that affect growth, and H is a function of democracy. If a researcher estimates equation (4), α_d is the estimate of the *total* effect of democracy on growth. If a researcher estimates equation (3), β_d is the estimate of the direct effect of democracy on growth, with a further indirect channel on growth working through the impact

¹⁷Stanley (2002, 228) notes that “A set of data does not contain one right answer, but rather a distribution of *plausible* estimates. This distribution is a function of largely random (mis)specification errors. By including multiple studies based on the same data set, a meta-regression would be better able to identify and to estimate the sensitivity of our empirical knowledge to model (mis)specification.” This is exactly what we do in the results section.

¹⁸The tendency in the early literature to provide detailed country compositions has been abandoned in recent years, resulting in loss of data points in the MRA.

TABLE 2 Covariates Used in the Meta-Regression Analysis of Democracy-Growth Effects

Variable	Description	Mean All-Set	S.D. All- Set	Mean Best- Set	S.D. Best- Set
Partial	Partial correlation between democracy and economic growth	0.06	0.24	0.06	0.22
<i>Country composition in the sample</i>					
Latin America	BV: 1 = Latin American countries included in sample	0.75	0.44	0.89	0.32
Africa	BV: 1 = African countries included in sample	0.80	0.40	0.86	0.34
Asia	BV: 1 = Asian countries included in sample	0.75	0.44	0.85	0.36
<i>Data differences</i>					
No. Countries	Number of Countries	59	35	70	31
1970s	BV: 1 = data from 1970s used	0.83	0.37	0.86	0.34
1980s	BV: 1 = data from 1980s used	0.81	0.39	0.88	0.33
1990s	BV: 1 = data from 1990s used	0.29	0.46	0.25	0.43
Cross-sectional	BV: 1 = cross-sectional data used	0.60	0.49	0.57	0.50
Single	BV: 1 = time series for single country used	0.08	0.28	0.04	0.19
Gastil	BV: 1 = used Gastil indicator	0.60	0.49	0.54	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>Knowledge effects</i>					
Crossauthor	BV: 1 = author declares receiving feedback from other authors who have published democracy-growth effects	0.64	0.48	0.60	0.49
Prior	BV: 1 = author has published previously in this area	0.19	0.40	0.17	0.38
Cumulative	The estimate of the population partial correlation established by the literature in t-2	0.06	0.05	0.05	0.06
<i>Estimation differences</i>					
Non-OLS	BV: 1 = did not use OLS	0.31	0.46	0.36	0.48
Endogenous	BV: 1 = democracy is endogenous	0.10	0.30	0.16	0.37
<i>Specification differences</i>					
DemoSq	BV: 1 = nonlinear terms of democracy added	0.11	0.32	0.12	0.33
Region	BV: 1 = regional dummies used	0.16	0.36	0.21	0.41
Ecofreedom	BV: 1 = economic freedom variable included	0.14	0.34	0.15	0.36
Inequality	BV: 1 = inequality variable included	0.17	0.38	0.15	0.36
Instability	BV: 1 = political instability variable included	0.14	0.35	0.17	0.38
Inflation	BV: 1 = inflation variable included	0.19	0.39	0.20	0.40
Population	BV: 1 = population variable included	0.33	0.47	0.30	0.46
Convergence	BV: 1 = initial income variable included	0.75	0.43	0.74	0.44
Human Capital	BV: 1 = human capital variable included	0.64	0.48	0.65	0.48
Physical Capital	BV: 1 = physical capital variable included	0.63	0.48	0.67	0.47
Openness	BV: 1 = foreign trade variable included	0.27	0.44	0.28	0.45
Govt Size	BV: 1 = government size variable included	0.31	0.46	0.38	0.49
<i>Other</i>					
Politics	BV: 1 = if published in a political science journal	0.14	0.35	0.17	0.38
Primary	BV: 1 = if democracy is the primary issue of interest	0.69	0.46	0.65	0.48

BV: binary variable. S.D.: standard deviation.

of D on H and then from H to g (as captured by β_H).¹⁹ Thus, the partial correlation between g and D will differ depending on whether the researcher estimates equation (3) or (4). Therefore, in an MRA model (such as that given by equation (2)), where the dependent variable explored is the partial correlation between g and D, the coefficient of the moderator variable that indicates whether H is used in the original study or not shows the impact of including H on the democracy-growth relationship. This coefficient will be the average indirect effect estimate of the literature of democracy on growth working through the H channel. In addition, its sign suggests the direction of effects between D and H (given that the relationship between H and g is known).

Other differences in specification can be explored through the variable democracy squared (*DemoSq*), regional dummies (*Region*),²⁰ and an initial income variable (*Convergence*).

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, the variable *Crossauthor* captures whether the author had received comments/feedback from others publishing in this area.²¹ Third, the variable *Cumulative* shows the cumulative publicly available knowledge in this area, as measured by the weighted average partial correlation, up to two years prior to the publication of the study. We have no priors regarding the sign on any of these variables. We merely test whether these knowledge effects impact on reported coefficients.

The *Politics* variable is included to test whether journals of different disciplines tend to publish different results (economics is the base). *Primary* represents whether a study's primary focus is the democracy-growth relationship, as opposed to the inclusion of democracy merely as a control variable.

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.²² The MRA tests whether estimation technique has an impact on published democracy-growth effects.

Results

Table 3 presents the key results.²³ For the Best-Set, Column 1 presents the estimates using OLS (a Fixed Effects meta-regression model) and Column 2 using a Random Effects meta-regression model.²⁴ Column 3 reports the results of applying the bootstrap MRA for the All-Set and the corresponding Random Effects estimates are presented in column 4. Note that there is little difference between the estimated Fixed Effects and Random Effects models. In such cases, the Fixed Effects model is preferred (see Hunter and Schmidt 2004). That is, the apparent differences in results across studies are not due to random factors, but are due to systematic differences in research design. Robust regression is used to explore the sensitivity of the results to extreme estimates. These estimates are presented in column 5. Table 3 presents also more parsimonious (specific) models where statistically insignificant variables were eliminated until the remaining variables had a z-score or t-statistic of at least 1. Table 3 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 relates to the Best-Set, and these are presented in Table 3 in Columns 6 and 7.²⁵ Several robust results emerge from Table 3. The key findings are summarized in Table 4.

²²A number of studies that use an estimation method other than OLS treat democracy as an exogenous variable, but make other variables endogenous.

²³The full set of MRA results is available from the authors.

²⁴In the Random Effects model, the total variance in the democracy-growth association is assumed to consist of variance due to sampling error, as well as variance due to other factors that are *randomly* distributed. The standard error of each partial correlation is used to calculate the variance due to sampling error (Fisher 1970; Hald 1952) and the second variance term is estimated using the iterative restricted maximum likelihood method (Raudenbush 1994).

²⁵An 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 analysis is used to derive clustered robust standard errors. These results are available from the authors and confirm the main findings reported in Table 3. For example, applying clustered data analysis to Table 3 column 8, the t-statistics for the *Ecofreedom*, *Inequality*, *Instability*, *Inflation*, *Population*, *Convergence*, and *Human Capital* variables are -3.47 , -2.76 , -2.82 , -2.14 , -1.19 , 2.88 , and -2.24 , respectively. The associated coefficient estimates are identical to those reported in Table 3.

¹⁹Excluding H in equation (4) may result in a possible misspecification in the model.

²⁰Note that the variable *Region* indicates whether researchers include a regional dummy in their regressions or not, while the variables *Latin America*, *Asia*, and *Africa* mentioned above 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).

²¹This information can be collected from footnotes in the original studies.

TABLE 3 Meta-Regression Analysis, Published Democracy and Economic Growth Effects, All-Set, Best-Set, and Specific Models (Dependent variable = partial correlations)

	(1) Best-Set OLS	(2) Best-Set RE	(3) All-Set (Boot)	(4) All-Set RE	(5) All-Set (Robust) FE	(6) Best-Set Specific FE	(7) Best-Set Specific RE	(8) All-Set Specific FE	(9) All-Set Specific RE
Latin America	0.330 (3.21)***	0.305 (2.62)**	0.107 (2.68)***	0.107 (3.03)***	0.098 (2.92)***	0.344 (3.69)***	0.366 (3.75)***	0.118 (3.16)***	0.114 (3.61)***
Africa	-0.080 (-0.67)	-0.069 (-0.68)	0.027 (0.50)	-0.004 (-0.10)	0.049 (1.14)	-0.097 (-1.01)	-	-	-
Asia	-0.305 (-3.02)***	-0.299 (-2.33)**	-0.117 (-2.33)**	-0.121 (-3.05)***	-0.121 (-3.35)***	-0.303 (-3.21)***	-0.343 (-3.40)***	-0.101 (-2.55)**	-0.101 (-3.26)***
No. Countries	0.001 (0.70)	0.001 (0.60)	0.000 (0.00)	0.001 (0.49)	0.000 (0.05)	0.001 (1.03)	-	-	-
1970s	0.267 (4.46)***	0.273 (3.26)***	0.011 (0.21)	0.044 (1.05)	0.016 (0.35)	0.277 (5.05)***	0.283 (3.96)***	-	-
1980s	0.275 (1.93)*	0.272 (2.86)***	-0.030 (-0.64)	-0.007 (-0.22)	-0.059 (-1.78)*	0.271 (2.16)**	0.260 (3.48)***	-	-
1990s	0.288 (4.55)***	0.278 (4.38)***	0.124 (3.70)***	0.124 (4.41)***	0.148 (5.06)***	0.284 (5.26)***	0.250 (4.97)***	0.126 (4.20)***	0.109 (4.37)***
Cross-sectional	0.172 (3.61)***	0.178 (3.78)***	0.063 (2.52)**	0.080 (3.46)***	0.068 (2.66)***	0.156 (3.98)***	0.165 (4.26)***	0.062 (3.25)***	0.072 (3.81)***
Single	-0.200 (-1.07)	-0.185 (-1.06)	0.087 (1.08)	0.102 (1.53)	0.065 (0.97)	-0.212 (-1.33)	-0.166 (-1.20)	0.098 (1.73)*	0.127 (2.67)***
Gastil	0.024 (0.45)	0.051 (1.05)	-0.007 (-0.26)	0.012 (0.53)	-0.002 (-0.07)	-	-	-	-
Dummy	0.157 (1.55)	0.181 (2.19)**	0.094 (2.02)**	0.129 (3.32)***	0.132 (3.35)***	0.119 (1.84)*	0.112 (2.13)**	0.103 (2.97)***	0.115 (3.94)***
Crossauthor	-0.063 (-1.32)	-0.063 (-1.42)	-0.092 (-3.34)***	-0.113 (-4.92)***	-0.110 (-4.50)***	-0.055 (-1.36)	-0.056 (-1.55)	-0.089 (-3.91)***	-0.110 (-5.36)***
Prior	-0.031 (-0.49)	-0.029 (-0.50)	-0.016 (-0.52)	-0.033 (-1.16)	-0.044 (-1.51)	-	-	-	-0.034 (-1.38)
Cumulative	-1.395 (-2.35)**	-1.357 (-3.03)***	-0.514 (-1.78)*	-0.544 (-2.50)**	-0.352 (-1.59)	-1.311 (-2.81)***	-1.255 (-3.49)***	-0.573 (-2.29)**	-0.578 (-3.09)***
Non-OLS	0.033 (0.38)	0.032 (0.47)	0.000 (0.00)	-0.002 (-0.06)	0.001 (0.03)	-	-	-	-
Endogenous	0.057 (0.77)	0.073 (1.04)	0.009 (0.24)	0.025 (0.72)	0.026 (0.66)	0.068 (1.59)	0.095 (2.09)**	-	-
DemoSq	0.003 (0.04)	-0.008 (-0.13)	0.028 (0.81)	0.020 (0.60)	0.029 (0.79)	-	-	-	-
Region	0.018 (0.36)	0.004 (0.08)	0.071 (2.40)**	0.055 (2.01)**	0.046 (1.53)	-	-	0.076 (2.87)***	0.067 (2.73)***
Ecofreedom	-0.159 (-2.68)**	-0.172 (-2.52)**	-0.179 (-4.92)***	-0.155 (-5.35)***	-0.161 (-5.66)***	-0.150 (-2.92)***	-0.142 (-2.55)**	-0.184 (-5.96)***	-0.157 (-5.96)***
Inequality	-0.101 (-1.27)	-0.108 (-1.63)	-0.139 (-3.65)***	-0.108 (-3.32)***	-0.173 (-5.22)***	-0.095 (-1.62)	-0.110 (-2.04)**	-0.144 (-4.25)***	-0.105 (-3.71)***
Instability	-0.165 (-2.93)***	-0.140 (-2.36)**	-0.151 (-4.10)***	-0.144 (-4.27)***	-0.140 (-3.73)***	-0.161 (-3.34)***	-0.131 (-2.80)***	-0.148 (-4.66)***	-0.149 (-4.88)***
Inflation	-0.233 (-2.86)***	-0.229 (-3.39)***	-0.100 (-2.99)***	-0.101 (-3.37)***	-0.095 (-3.02)***	-0.228 (-3.44)***	-0.218 (-3.96)***	-0.107 (-3.49)***	-0.097 (-3.47)***
Population	-0.058 (-1.03)	-0.066 (-1.19)	-0.041 (-1.70)*	-0.056 (-2.35)**	-0.066 (-2.49)**	-0.057 (-1.27)	-0.051 (-1.12)	-0.039 (-1.86)*	-0.044 (-2.24)**
Convergence	0.009 (0.23)	0.001 (0.03)	0.110 (2.97)***	0.095 (3.48)***	0.107 (3.56)***	-	-	0.111 (4.05)***	0.107 (4.67)***

continued

TABLE 3 Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Best-Set OLS	Best-Set RE	All-Set (Boot)	All-Set RE	All-Set (Robust) FE	Best-Set Specific FE	Best-Set Specific RE	All-Set Specific FE	All-Set Specific RE
Human Capital	-0.217 (-3.49)***	-0.220 (-3.66)***	-0.096 (-2.94)***	-0.092 (-3.73)***	-0.097 (-3.72)***	-0.214 (-4.19)***	-0.211 (-4.23)***	-0.093 (-3.16)***	-0.083 (-3.64)***
Physical Capital	0.014 (0.24)	0.022 (0.42)	-0.014 (-0.54)	-0.014 (-0.63)	-0.041 (-1.73)*	—	—	—	—
Openness	0.083 (1.28)	0.071 (1.28)	0.132 (5.11)***	0.123 (5.10)***	0.162 (6.53)***	0.088 (1.53)	0.066 (1.38)	0.129 (5.61)***	0.117 (5.29)***
Govt Size	0.147 (2.39)**	0.151 (2.61)**	0.036 (1.27)	0.052 (2.12)**	0.031 (1.27)	0.152 (2.72)***	0.135 (2.97)***	0.038 (1.56)	0.042 (1.98)**
Politics Journal	-0.013 (-0.18)	-0.011 (-0.18)	0.024 (0.61)	0.000 (0.00)	0.000 (0.00)	—	—	—	—
Primary	0.031 (0.62)	0.034 (0.72)	-0.002 (-0.09)	0.008 (0.34)	-0.009 (-0.38)	—	—	—	—
Constant	-0.338 (-2.17)**	-0.388 (-2.53)**	0.092 (1.42)	0.055 (0.92)	0.139 (2.35)**	-0.339 (-2.87)***	-0.340 (-3.28)***	0.067 (1.66)*	0.079 (2.07)**
Wald Test	na	na	na	na	na	0.13	0.31	2.53	0.26
– Prob-value						0.99	0.98	0.99	0.99
Observations	80	80	450	450	450	80	80	450	450
Adjusted R-squared	0.61	na	0.33	na	na	0.62	na	0.34	na

*, **, *** statistically significant at the 10%, 5%, and 1% level, respectively. t-statistics in brackets. Columns 1 and 6 estimated using OLS, with robust t-statistics in parentheses. Columns 3 and 8 use the bootstrap to construct t-statistics. Column 5 reports results from robust regression. FE and RE denote Fixed Effects and Random Effects meta-regression models, respectively. na means not applicable.

TABLE 4 Direct and Indirect Democracy-Growth Effects

Association	Finding	Inference Drawn from:
Direct effect of democracy on growth:	Zero	Table 1, columns 1 and 2
Robust indirect effects of democracy on growth:		
Economic Freedom	Positive	Table 3, all columns
Human Capital	Positive	Table 3, all columns
Inflation	Positive	Table 3, all columns
Political Stability	Positive	Table 3, all columns
Other indirect effects of democracy on growth:		
Size of Government	Negative*	Table 3, columns 6 and 7
Convergence	Positive**	Table 3, columns 8 and 9
Inequality	Unclear**	Table 3, columns 8 and 9
International Trade	Negative**	Table 3, columns 8 and 9

* identified in the Best-Set. ** identified in the All-Set.

Indirect Effects

Our results have extremely important implications for the control of the effects of 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 eco-

nomics freedom is positively (negatively) related to growth, then democracy is positively (negatively) related to economic freedom. In terms of equations (3) and (4) 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 Dawson (2003) and de Haan and Sturm (2003), among others.

The human capital result that emerged also in Table 1 reflects an important 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 (Sala-i-Martin, Doppelhofer, and Miller 2004; Levine and Renelt 1992). *Thus, our results predict a positive association between democracy and human capital*. Indeed, Acemoglu and Robinson (2000) 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 nondemocracies.

The inclusion of physical capital, however, does not make any noticeable difference to reported results. *That is, democracy is not likely to operate on growth through physical capital investment* (see Baum and Lake 2003 for a similar finding). 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 (1998) 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.²⁶ 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 relationship. The *political economy* approach, for instance, predicts a negative relationship. The argument is that the larger the gap between the median-voter's income and mean income, the greater the pressure for redistribution, which would in turn cause higher distortionary taxation and lower growth (Alesina and Rodrik 1994; Persson and Tabellini 1992, 1994). Positive predictions between inequality and growth are generally human capital related. For example, Saint-Paul and Verdier (1993) argue that in more un-

equal societies, the median-voter would vote for higher taxation to finance public education, which would in turn increase aggregate human capital and therefore growth.²⁷ The greater voice of the 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 given that literature's findings*.

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 suggests 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 value of assets and decreases the incentives for work and investment. Thus, this 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 links with the elites lessen the scope for democracy and 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; Barro 1991) have found that political instability is detrimental for growth. *The MRA suggests that democracy leads to greater political stability and, hence, higher growth*.

In contrast, including openness and the size of government in the democracy-growth regressions leads to larger democracy-growth effects. Both of these variables have positive coefficients in the MRA. 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 growth. *Thus, this result implies that democracies are associated with larger governments*. Indeed, several researchers have found that the redistribution of income, as well as the protection of economic freedom and civil and political rights, requires government spending (de Mello and Sab 2002; Pritchett and Kaufman 1998). Our MRA confirms this when the Best-Set is used (but not in the All-Set).

²⁶In support for the latter argument, Rodrik (1999a) finds that democracies pay higher wages.

²⁷Acemoglu and Robinson's (2000) argument is also in a similar vein but they acknowledge that such taxation may lead to lower growth. See also Forbes (2000) for a positive empirical prediction between inequality and growth.

On the other hand, our MRA for the All-Set results implies 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. According to Rigobon and Rodrik (2005), 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 reasoning.

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 countries in their samples are larger than those that use OECD without Latin American observations (OECD is the base region). In addition, studies report lower democracy-growth effects when Asian countries are included in their datasets. The positive sign found in the MRA implies a pattern of low democracy-low growth and high democracy-high growth performance in Latin America, and the negative sign implies low democracy-high growth and high democracy-low growth performance in Asia. In Latin America, success stories such as Costa Rica and some small island economies have had high democracy-high growth experiences, while larger countries in the south such as Argentina and Peru have had fragile democracies and economic performance. In Asia, countries like South Korea, Taiwan, Hong Kong, and Singapore and China have exhibited low democracy-high growth performance, while democracies such as India and Sri Lanka have had lower growth. In the presence of a large array of moderator variables in the MRA, the Latin America and Asia variables are expected to capture distinct regional, but common within each region, effects on the democracy-growth relationship. These may be social, cultural, and demographic institutions that may not be easily measured with data. Thus, the effect found in our MRA suggests that (1) those institutions differ across Asia and Latin America (by the construction of the dummies), and (2) such common regional characteristics manifest differently on the democracy-growth association within each region, leading to different levels of the democracy-growth relationship. It would be interesting for future research to distinguish such regional effects and to iden-

tify why and how they act differently within and across Latin America and Asia.

The number of countries is not statistically significant different from zero. 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 the democracy-growth association is not the same in every country. This is consistent with the notion of a distribution of democracy-growth effects that depends upon unobserved country-specific effects.

Time-Varying Effects

The time dummies are significant in several specifications, with the *1990s* variable being positive and significant in all cases. Since the MRA controls for all other data and specification differences, this variable is unlikely to pick up differences in the way studies were conducted. Considering that the 1990s is the post-Cold War period, *the 1990s variable suggests that larger democracy-growth effects are reported for the 1990s compared to the 1960s and earlier periods.*^{28,29} In the Best-Set, the 1970s and the 1980s also produce stronger democracy-growth effects. The positive coefficients on the time dummies in the Best-Set confirm that the earlier (published pre-1988) literature reported negative democracy-growth effects. The time-varying effects can arise from structural changes in either the direct or indirect effects. Hence, it would be interesting for future research to explore the factors behind these effects as well.

Other Data Effects

Cross-sectional datasets result in larger positive democracy-growth effects than the use of panel data. This means that *studies report democracy-growth effects that 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, *representing democracy with an aggregate indicator delivers a larger democracy-growth relationship.*³⁰ Indeed, Elkins

²⁸This result is not contradicted by Figure 2, which shows cumulative effects. The *1990s* dummy variable is time specific rather than cumulative.

²⁹It should be noted that this result is not driven by a handful of observations. Approximately 48% of the 483 estimates used data from the 1960s and earlier periods.

³⁰Doucouliagos and Ulubaşoğlu (2006) find the same result regarding the economic freedom-growth relationship.

(2000) shows that continuous measures have superior validity and reliability over dichotomous measures. The *Gastil* variable, on the other hand, is insignificantly different from other measures (mainly Polity measures) in affecting the reported democracy-growth association. This is not surprising, because these measures generally address similar aspects of democracy and are highly correlated.³¹

Specification Effects

Convergence is statistically significant with a positive sign when the All-Set is used but it is not significant when the Best-Set is used. The All-Set result implies that if *Convergence*—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 have provided empirical evidence in favor of conditional convergence. Thus, our result implies that democracy is positively related to initial income. That is, higher levels of initial income correspond to higher levels of democracy. Nevertheless, this result is not identified in the Best-Set.

The use of regional dummies in the regressions—the *Region* variable—results in higher democracy-growth effects when the All-Set is used, but not 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 regional effects. However, it is difficult to establish the relationship between regional effects and growth in our context.

DemoSq, on the other hand, is estimated to be insignificant with both datasets.³² Thus, *the partial correlation of 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 dummy (*Politics*) is not statistically significant. *There are*

no real differences in the types of results reported in economics and politics journals.

Estimation Effects

Once other study characteristics are controlled for, studies that use OLS do not report results that are different from studies that use an alternative estimator. However, there is some evidence (though it is not robust across datasets and specifications and hence is only suggestive) that treating democracy as endogenous results in larger democracy-growth effects. There is a sizeable literature on the endogeneity of democracy (Barro 1999; Heliwell 1994; Lipset 1959; Muller 1995). Rigobon and Rodrik (2005, 557) note that the literature on the impact of institutions on income usually finds that the instrumental variable (IV) coefficient is larger than the OLS estimate. This finding is often attributed to large error-in-variables, negative feedback from income to institutions, or invalid instruments. Rigobon and Rodrik's analysis indicates that it is generally when the instruments are not valid and that endogeneity of institutions is not modelled properly that IV produces larger effects. Hence, rather than suggesting that controlling for the endogeneity of democracy overstates the democracy-growth effect, the MRA may be detecting the findings of a literature that has not adequately modelled the endogeneity of democracy in the institutions-growth relationship.

Knowledge Effects

All three knowledge variables—*Prior*, *Crossauthor*, *Cumulative*—have negative coefficients but only *Cumulative* is statistically significant in both datasets. This indicates that influence (*Crossauthor*) 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 report effects that are similar to studies that include democracy as a control variable.

Around one-third and nearly two-thirds of the variation in the All-Set and Best-Set democracy-growth effects, respectively, 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 the residuals. Applying this test shows that

³¹Early 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 turnout statistics (see Bollen 1990 and the references therein). This created a pool of heterogeneous measures. The studies that we cover, however, mostly adopt the standard measures of Gastil or Polity.

³²Note that *DemoSq* is capturing the effect of a nonlinear specification on the linear term. This is *not* a test on the existence of nonlinear democracy-growth effects. The quadratic term in a growth regression can still be statistically significant even if the linear term is not.

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 relatively large number of observations, 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 nonrandom assignments and reported in Table 3). The permutation tests accord with the MRA results. Hence, we have a very high degree of confidence that the associations are robust (as supported by the different MRA models), as well as nonspurious (as supported by the permutation tests).

Conclusion

The aim of this article 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 84 studies with 483 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, democracy

has significant indirect effects on growth through various channels. In particular, we find that democracy has a favorable impact on human capital formation, and 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 impact on economic growth in Latin America and lower in Asia, due to region-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 Ulubaşoğlu 2006), democracy's direct effect on growth is found to be zero, while economic freedom has a positive direct effect. We conclude that the net effect of democracy on economic growth is not negative.

The MRA indicates that future research in this area will be more informative if it focuses on three areas. First, the source of any difference in the experience of different regions in the world, especially Latin America and Asia, warrants closer investigation. What are the fundamental regional differences that may have resulted in different social, cultural, and demographic institutions leading to different democracy-growth relationships? How does import-substitution and export-oriented industrialization moderate this relationship? In addition, what are the within-region differences leading the democracy-growth relationship to different equilibrium points? Or, are we living in a world of disequilibrium?

Second, detailed analysis is needed of the various channels through which democracy can indirectly impact on growth. The question is how to uncover pathways through which such channels work. In this regard, estimation of systems of equations that enable identifying both the direct and indirect effects promises to be a very productive line of inquiry. Identifying these possibly conflicting effects may enable the design of more effective policies aimed at institutional reform.

Third, this line of research can be usefully extended to explore the total welfare effects of democracy on growth. For example, human capital that is accumulated as a result

of democracy will increase welfare indirectly through growth but also through its own direct effects on individuals and their families. These broader effects of democracy on well-being and happiness are critical to the evaluation of competing regimes.

The policy implications of the meta-analysis are less sanguine. The available evidence suggests that economic freedom and market reforms have positive direct effects on growth (see Doucouliagos and Ulubaşoğlu 2006) but not so with political freedom. However, even if political freedom does not increase economic growth on average, it may still be welfare enhancing through its indirect effects. Hence, the available empirical evidence does not support the notion that developing countries need to forego civil liberties and political freedoms in order to enjoy faster economic growth.

Theory shapes empirical explorations and these in turn induce changes in theory. The accumulated evidence on the growth impact of democracy points also to the need to revise some of the extant theories, with greater emphasis on the indirect links. The central issue seems to be the democracy–human capital relationship; however, democracy–inequality, democracy–government size and democracy–openness relationships are equally important.

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

Studies Included in the Meta-Analysis

Alesina and Rodrik (1994)	Glaeser et al. (2004)	Miguel et al. (2004)
Ali (1997, 2003)	Goldsmith (1995)	Minier (1998, 2003)
Ali and Crain (2001, 2002)	Gounder (2002)	Mo (2000, 2001)
Almeida and Ferreira (2002)	Grier and Tullock (1989)	Mobarak (2005)
Assane and Pourgerami (1994)	Gupta (1988)	Nelson and Singh (1998)
Barro (1996, 2000)	Gupta et al. (1998)	Oliva and Rivera-Batiz (2002)
Baum and Lake (2003)	Gwartney et al. (1999)	Perotti (1996)
Bhalla (1994)	Heliwell (1994)	Persson and Tabellini (1992, 1994)
Bleaney and Nishiyama (2002)	Henisz (2000)	Pitlik (2002)
Chatterji (1998)	Heo and Tan (2001)	Plumper and Martin (2003)
Chen (2003)	Knack and Keefer (1995)	Pourgerami (1988, 1992)
Cohen (1985)	Kormendi and Meguire (1985)	Pourgerami and Assane (1992)
Collier (1999, 2000)	Kosack (2003)	Quinn and Wooley (2001)
Comeau (2003)	Kurzman et al. (2002)	Remmer (1990)
Dawson (1998)	Landau (1986)	Rivera-Batiz (2002)
de Haan and Sierman (1995a, 1995b)	Leblang (1997)	Rodrik (1999b)
Doucouliagos and Ulubaşoğlu (2006)	Leschke (2000)	Sala-i-Martin (1997)
Durham (1999)	Levine and Renelt (1992)	Scully (1988)
Esfahani and Ramirez (2003)	Li and Zhou (1998)	Siermann (1998)
Farr et al. (1998)	Lindenberg and Devarajan (1993)	Svensson (1999)
Fayissa and El-Kaissy (1999)	Lundberg and Squire (2003)	Tavares and Wacziarg (2001)
Feng (1995, 1996, 1997)	Marsh (1988)	Weede (1983, 1993, 1997)
Fidrmuc (2003)	Mbaku (1994)	Wu and Davis (1999)
Gasiorowski (2000)	Mbaku and Kimenyi (1997)	

Includes only studies published prior to December 2005.

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