

The Effect of Democracy on Different Categories of Economic Freedom*

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Abstract:

Many previous empirical studies conclude that democracy increases economic freedom. However, these studies use highly aggregated indices of economic freedom, which eliminate interesting information and obstruct policy conclusions. The purpose of this study is to empirically study how different categories of economic freedom are affected by democracy in developing countries. There seems to be a positive effect of democracy on the categories *Government Operations and Regulations* and *Restraints on International Exchange*, but for the categories *Money and Inflation* and *Takings and Discriminatory Taxation* there is no effect. The robustness to extreme points and the model specification is tested.

Keywords: democracy, economic freedom, decomposition.

JEL classification: P51

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1 INTRODUCTION

There are many studies showing a positive effect of economic freedom on growth (see e.g. Vanssay and Spindler, 1994; Easton and Walker, 1997; Wu and Davis, 1999; Gwartney et al., 1999; de Haan and Strum, 2000; Strum and de Haan, 2001). The importance of analysing the impact of democracy on economic freedom comes mainly from the findings that political freedom increases growth indirectly by its impact on economic freedom, while the direct effects on growth often are negligible (see e.g. De Melo, et al., 1996; Dehtier et al., 1999; Fidrmuc, 2000, Popov, 2000). Many other empirical studies confirm that democracy increases economic freedom (see e.g. de Melo et al, 1997; Sturm and de Haan, 2002).¹ However, all these studies use highly aggregated indices of economic freedom, which eliminate a lot of interesting information and obstructs policy conclusions. One might ask what kind of economic freedom increases as political freedom increases? Can it be that some categories of economic freedom are not related to democracy at all, or even that some categories decrease as democracy increases?

There exist many arguments for positive and negative, as well as insignificant, effects of democracy on economic liberalisation. On the basis of the inconclusive theoretical arguments it is not at all obvious that all categories in an economic freedom are equally affected by democracy. The rationale for decomposing the economic freedom index becomes even more obvious when taking into account the effects on economic growth. Studies show that depending on the category of economic freedom used, the impact on economic growth differs when it comes to sign, significance and robustness (Ayal and Karras, 1998; Carlsson and Lundström, 2002).

The purpose of this study is to empirically study how different categories of economic freedom are affected by democracy in developing countries. The sensitivity of the results are analysed when it comes to extreme points and model specification.

The paper is organized as follows. Chapter 2 gives a theoretical background and discusses, on the basis of these arguments, the effect of democracy on different categories of economic freedom. In chapter 3 the data is presented. The model

¹ Clague et al. (1996) finds however that it is rather the length of the period in power than the type of regime that determine property and contract rights, which is one dimension of economic freedom.

specification and sensitivity tests are described in chapter 4. Chapter 5 presents and analyses the results from the basic regressions and the sensitivity tests. Chapter 6 concludes.

2 THEORETICAL ARGUMENTS

The theoretical arguments for the impact of democracy on economic freedom and growth are ambiguous. The arguments can be divided into three groups; the conflict perspective, the compatibility view and the sceptical view (Sirowy and Inkeles, 1990).

According to the *conflict view* there is a choice between either a democratic process or rapid economic transition. A first argument is that political and civil freedom make it harder for a government to make tough but necessary decisions (World Bank, 1991). An authoritarian government is needed at least in the beginning of the liberalisation process since massive layoffs and cuts in entitlements are common at initial stages (Fidrmuc, 2000). Examples in favour of this view are countries such as Chile, South Korea and Taiwan that successfully implemented the economic reform under an autocratic regime and subsequently replaced the regime with a more democratic government (Edwards, 1991). Another example is Russia who started out with a political liberalisation that ended up in institutional chaos, which retarded the economic reforms (Shleifer, 1998). A second argument for a negative effect of democracy on economic freedom is that the positive long run effects of the reform involves great uncertainty. This may lead a rational voter to oppose the changes in economic freedom even though the final effects are expected to be welfare augmenting for a majority (Fernandez and Rodrik, 1991). An example is workers that oppose privatisation, even though they believe most of them will benefit in the end, because they do not know if their individual skill will be demanded after the reform. Only an autocratic regime would be able to implement these policies, with important political backlashes, which ex-post would be popular. A third argument concerns the inefficiencies that might be created by the lobbying of interest groups under a democratic regime. Some argue that elected governments are more likely to follow the demand of some interest groups in society as a mean to win votes in the short run. The redistributive role of a democratic government may lead to overspendings and adverse effects on savings and productive investment (Alesina and

Perotti, 1994). Necessary restraints on consumption and real wages would decrease the probability of re-election. Alesina and Drazen (1991) illustrate how efficiency-enhancing reforms may be delayed because of war over asymmetric pay-offs. The welfare-loss is not only the delayed reform but also the loss of productive activity during the conflict.

The arguments of the *compatibility view*, i.e. increased democracy foster economic freedom, are similar to the argument why democracy would facilitate economic growth (see Przeworska and Limongi (1993) and De Haan and Siermann (1995) for surveys). First, some argue, in contrast to the conflict view, that only a government with some legitimacy will be able to stand by policies with short run costs. Democratic regimes can be assumed to have greater legitimacy because of the political and civil freedom the system allows the people to have. Second, many of the institutions needed in a democracy are also the source of a successful economic liberalisation, such as an independent legal system, a professional civil service and stable property rights. Third, democracy, and not autocracy as argued by the conflict perspective, may limit rent seeking because of its system of checks and balances that would hinder self-interested leaders. Åslund et al. (1996) argue that in countries absent of such a system the old elite, especially state enterprise directors and political leaders, continues to have advantages over the rest of the population and a demopolization becomes difficult. According to North (1993) civil and political liberties are necessary to protect citizens from predatory behaviour of the government. Finally, the institutions for debate following politically free systems, such as free elections with opposition parties and freedom of speech, may be a fundamental base for conflict management under liberalisation (Rodrik, 1999). An authoritarian regime may avoid conflicts in the short run but has no institution for solving them.

Followers of the *sceptical view* argue more or less that the question is misspecified and that it is other institutions, not directly connected to a specific regime, that affect economic development. According to Clague et al. (1996) there are large variations within a democratic or an autocratic regime. In autocracies it is the time horizon of the individual autocrat that determines property and contract rights, whereas in democracies it is the durability of the regime that determine these rights. Alesina and Perotti (1994) argue that instability and uncertainty discourage investments and growth, rather than the specific political system. Moreover, it is not

at all clear if a dictator would be more resistant against interest groups and rent-seeking behaviour or a better conflict manager than a democratic government.

As is clear from the survey of arguments above, there are many aspects on the effect of democracy on economic freedom. However, this it is not very surprising. Economic freedom includes many, sometimes very different, aspects and the effect of democracy can be expected to depend on what kind of economic freedom you refer to. Earlier empirical studies have tended to support the compatibility view but this does not mean that this is the only proper view since only the effects on a summary index has been analysed. For example, the compatibility view may be right when predicting the government size as a measure of economic freedom, while the conflict view is more appropriate when looking at discriminatory regulations and the sceptical view is maybe more in accordance with reality if economic freedom refers to inflation issues. The aim of the following empirical analysis is to examine the possibility of parallel views on the relation between democracy and economic freedom depending on the specific economic freedom measure.

3 DATA

The data on economic freedom is obtained from 'Economic freedom of the world; 1975-1995' by Gwartney et al (1996), an often used index. The main components of the economic freedom index are personal choice, protection of property and freedom of exchange. The index is divided into four categories, each measured on a scale between 0 and 10, where 10 is the highest level of freedom. The first category, *Money and Inflation (EFmon)*, is a measure of the availability of 'sound' money to the citizens. High economic freedom in this sense means slow monetary expansion, stable price levels and absence of restrictions that limit the use of alternative currencies. The category is constructed by the variables (i) Average annual growth rate of the money supply during the last five years minus the annual growth rate of potential GDP, (ii) the standard deviation of annual inflation rate during the last five years, (iii) freedom of residents to own foreign money domestically, and (iv) freedom of residents to maintain bank accounts abroad.

The second category, *Government Operations and Regulations (EFgov)*, represent the extent of reliance on market allocation rather than allocation through the

political process. High economic freedom is assumed to prevail if the government mainly function as a provider of protection and public good producer. The category consists of the variables (i) government general consumption expenditures as a share of GDP, (ii) government-operated enterprises as a share of the economy, (iii) price controls – the extent that businesses are free to set their own prices, (iv) freedom to enter and compete in markets, (v) equality of citizens under the law and access of citizens to non-discriminatory judiciary, and (vi) freedom from government regulations and policies that cause negative real interest rates.

The third category, *Takings and Discriminatory Taxation (EFtak)*, measure the extent the government treat citizens equally rather than engage in tax and transfer activities. High economic freedom is achieved if the government does not involve in actions that favours or discriminate one group of citizen. The category includes the variables (i) transfers and subsidies as a percent of GDP, (ii) top marginal tax rate and (iii) the use of conscripts to obtain military personnel.

The last category, *Restraints on International Exchange (EFint)*, is a measure of citizens' possibility to gain from division of labour, economies of scale and specialization in areas where they have comparative advantage. High economic freedom defined in this sense means low restrictions on exchange over the nation borders. The category is constructed by the variables (i) taxes on international trade as a percent of exports plus imports, (ii) difference between the official exchange rate and the black market rate, and (iii) actual size of the trade sector compared to the expected size.

Gwartney et al (1996) presents three alternative aggregation techniques to construct an economic freedom *Summary Index* from the different variables; Ie, Is1 and Is2. The variables in Ie are weighted by the inverse of its standard deviation. In the other summary indices each variable is assigned a weight based on expert surveys, with experts in the field of economic freedom for Is1 and country experts for Is2. Since all three indices gives very similar results only the results from the regressions with Ie (*EFsum*) will be presented in the paper.

The democracy variable is based on the Freedom House indices of political and civil freedom (Freedom House, 1999). The political freedom index measures whether a government came to power by election or by gun, whether elections, if any, are free and fair, and whether an opposition exists and has the opportunity to take power at the consent of the electorate. The civil freedom index measures constraint on

the freedom of the press, and constraints on the rights of individuals to debate, to assemble, to demonstrate, and to form organizations, including political parties and pressure groups. Even thus the two indices are highly correlated we will use both freedom variables as a proxy for democracy to see if this affects the result. The democracy measure is measured on a scale between 1 and 7, where 7 is the highest level of freedom.²

The control variables and the variables used in the model sensitivity analysis are all from the *2000 World Development Indicators CD-Rom* (World Bank, 2000), with the exception of the dummy variables for regions, legal origin and developing country that come from the *Global Development Network Data Base* (World Bank, 1999). The resulting samples include 60 developing countries, presented in table A.1 in Appendix, for the period 1975-1995. Table 1 presents descriptive statistics for the variables included in the basic regressions and in the model specification test. Note that income is presented in dollars per capita and that gEF_j is the change in EF_j from 1975 to 1995, where $j = sum, mon, gov, tak$ or int .

Table 1: Descriptive statistics. Developing countries.

Variable	Mean	Std.Dev.	Minimum	Maximum	Variable	Mean	Std.Dev.	Minimum	Maximum
CIVIL	3,64	1,50	1	7	Y75	1403,79	1038,83	231,78	4593,24
POLIT	3,31	1,83	1	7	Aid75	4,54	5,76	-0,01	30,20
gEFsum	0,78	1,50	-3,30	3,58	Open7090	22,67	15,99	3,77	73,28
gEFmon	1,53	2,57	-5,54	6,73	Growth6575	5,02	2,59	-0,54	13,82
gEFgov	-0,42	1,81	-5,52	3,30	SSA	0,30	0,46	0	1
gEFtak	-0,41	3,82	-10	6,04	MENA	0,13	0,33	0	1
gEFint	1,02	1,90	-5,74	6,37	ECA	0,02	1,13	0	1
EFSum75	3,99	1,12	2,11	7,27	EAP	0,11	0,31	0	1
EFMon75	2,64	1,79	0	7,92	SA	0,09	1,29	0	1
EFGov75	5,21	1,70	1,17	8,86	LAC	0,36	0,48	0	1
EFTak75	6,20	2,84	0	10	British	0,30	0,46	0	1
EFInt79	3,65	1,80	0,24	8,48	French	0,68	0,47	0	1

CIVIL is civil freedom and *POLIT* is political freedom both measured as the average between 1973 and 1975; gEF_j is the change in EF_j from 1975 to 1995, where $j = sum, mon, gov, tak$ or int ; $EF_j 75$ is the level of economic freedom j in 1975; *Y75* is the level of income in 1975; *Aid75* is aid received as a share of GDP 1971 to 1975; *Open7090* is the share of imports and exports as a share of GDP 1970 to 1990; *Growth6575* is growth of GDP 1965 to 1975; the regional dummies are Sub Saharan Africa (*SSA*), Middle East and North Africa (*MENA*), East Europe and Central Asia (*ECA*), East Asia and the Pacific (*EAP*), South Asia (*SA*) and Latin America and the Caribbean (*LAC*); *British* and *French* are dummies for legal origins.

² The variable is rescaled since 1 is the highest level of political and civil freedom, and 7 the lowest level, in the original data set.

Already by looking at the partial regressions plots in Figure A.1 in Appendix we could suspect different effect of democracy on the change of economic freedom depending on the economic freedom category analysed. None of the categories seems to be affected negatively but the categories *Government Operations and Regulations* and *Restraints on International Exchange* seem to have a stronger positive relation to democracy than the *Money and Inflation* and *Takings and Discriminatory Taxation*.³

4 THE MODEL

4.1 Basic regressions

The model specification follows the methodology of Levine and Renelt (1992)⁴. The control variables are the same as Sturm and de Haan (2002) apply with the exception that all regional dummies are included.

$$gEF_{j,i} = \alpha M_i + \beta EF_{j,i} + \gamma Z_i + u_i$$

where $dEF_{j,i}$ is the change in the economic freedom measure j in country i 1975 to 1995; M_i is a vector of standard explanatory variables, which according to previous studies have shown to be robustly related to economic freedom; $F_{j,i}$ is the variable of interest, i.e. democracy in our case; Z_i is a vector of up to three possible explanatory variables, which according to previous literature may have an impact on the change in economic freedom; and u_i is an error term. By examining earlier empirical studies and testing for several potential explanatory variables we conclude that the vector M_i should contain $EF_{i,j}$ is the initial, 1975, level of economic freedom measure j , and regional dummies, since they are the only variables showing a robustly significant relation to the dependent variable. The regional dummies are Sub Saharan Africa (SSA), Middle East and North Africa (MENA), East Europe and Central Asia (ECA),

³ Only the partial regression plots for civil freedom are presented but the plots for political freedom are very similar.

⁴ Levine and Renelt studies changes in income while we look at changes in economic freedom but this does not affect the appropriateness of the regression methodology.

East Asia and the Pacific (*EAP*), South Asia (*SA*) and the base case Latin America and the Caribbean (*LAC*). F_i is initial democracy and is measured either as the average value of civil freedom or political freedom over 1973 to 1975. In the basic regressions there are no variables included in the Z_i vector, which will be added in the model specification test in the next section. This results in ten models; two models for each economic freedom variable $j = \text{sum}, \text{mon}, \text{gov}, \text{tak}$ or int , using either civil freedom or political freedom as the democracy measure. Since all variables refer to the beginning of the estimation period there is no problem of reverse causality.

4.2 Sensitivity tests

4.2.1 Extreme points

There are several ways to identify extreme points and several ways to deal with the identified points. This section gives a brief explanation of the identification tests and the robust regression technique used, while Appendix A.1 presents the methods in more details. An outlier is an observation with a large residual, i.e. a point with a large deviation from the fitted value. The studentized residual r_i measures the residual of the i th observation, adjusted for its standard deviation. r_i can hence be interpreted as the t -statistic for testing the significance of a dummy taking the value 1 if the i th observation is excluded and 0 otherwise.

Observations that are isolated or “outliers” in the \mathbf{X} space, where \mathbf{X} represents the matrix of the independent variables, have a large leverage on the prediction value. Hence, a point with a high leverage value may have a small residual and can in that case not be identified as an outlier. The leverage method tests the change in prediction of the dependent variable from the whole sample and from the sample with the i -th observation deleted.

There are several summary statistics based on an index, increased both by a large residual and a large leverage point. Here we will use the Cook’s Distance, D_i , which can be viewed as the scaled measure of the distance between the coefficient vectors when the i th observation is deleted.

If extreme points that may influence the basic regression have been identified there are reasons to use a robust regression technique to see if the basic result changes significantly or not. The robust regression technique used in this study is the biweight procedure where weights between 0 and 1 are attached to the residuals, with lower weights on large residuals. However, first observations are deleted if they have a Cook's distance larger than 1. After this initial screening the procedure is iterative; after a regression, weights are calculated on the basis of absolute residuals and then re-estimated using those weights. First, Huber iterations are performed until the change in the Huber weights falls below a tolerance level, then biweight iterations are performed until convergence in the biweights.⁵

4.2.2 Model Specification

To check how robust the coefficients of economic freedom are to changes in the conditioning set of information, we first apply the extreme bound analysis (see Levine and Renelt, 1992). We add up to three new control variables to the vector Z_i described above, which according to the literature may have explanatory value, to each of the ten basic models and then re-estimate the models. The Z_i variables are log of initial income in 1975 ($\log Y75$), aid received as a share of GDP during 1971 to 1975 ($Aid75$), openness measured as imports and exports as a share of GDP during 1970 to 1990 ($Open7090$), economic growth 1960 to 1975 ($Growth6975$), and a dummy representing a French legal origin ($French$)⁶. This results in 25 regressions for each of the ten basic models, with different combination of the new variables. For each of these new models $z = 1, \dots, 25$, we estimate the parameter for the democracy variable, β_z , and the corresponding standard deviation, σ_z . The lower extreme bound is defined to be the lowest value of $\beta_z - 2\sigma_z$ and the upper extreme bound to be the largest value of $\beta_z + 2\sigma_z$. If the lower and upper extreme bounds are of opposite sign, then the variable is not robust according to the extreme bound test.

⁵ The reason why both methods are used are that Huber weights have problems dealing with large outliers and biweights sometimes fail to converge or have multiple solutions. The initial Huber weighting is performed to improve the behaviour of the biweights.

⁶ Most other countries have a British legal origin (*British*).

The extreme bound analysis has been criticised for being too restrictive. Sala-i-Martin (1997a,b) suggests a method looking at the whole distribution of the estimator β_z . We start by assuming a normal density function and calculate beta values and standard deviation of all z models, produced in the same way as explained in the extreme bound case. Thereafter the means, $\bar{\beta}_z$ and $\bar{\sigma}_z$, are calculated as the average of the z estimated β values and variances.⁷ The cumulative density function CDF(0) can then be constructed using the normal tables and is used to estimate the robustness of the variables when it comes to model specification.

5 RESULTS

The results for the basic regressions are presented in table 3.

Table 3: Basic regressions. All models also include a constant and control variables for initial economic freedom and regional dummies.

	GEFSum	gEFMon	gEFGov	gEFTak	gEFInt
Civil	0,236** (2,140)	-0,010 (-0,058)	0,316** (2,198)	0,294 (1,460)	0,257* (1,962)
Adj-R2	0,57	0,54	0,62	0,56	0,49
	GEFSum	gEFMon	gEFGov	gEFTak	GEFInt
Political	0,188** (2,411)	0,050 (0,036)	0,214** (2,084)	0,247 (1,646)	0,245** (2,393)
Adj-R2	0,57	0,54	0,60	0,57	0,50

t-values in the parenthesis. *** = variables significant at the 1% level, ** = the 5% level and * = the 10% level.

The first impression from the basic regressions is that the results are almost identical for the models using civil freedom and political freedom as a proxy for democracy. The first column represents the regression seen in many previous studies with the summary index as the measure of economic freedom, and the democracy variable is, as in most of these studies, positive and significant. The other columns represent the models with the decomposed parts of the summary index. Democracy only affects two of the categories, *EFgov* and *EFint*, and as in the case with the summary index the effect is positive. The effect of democracy on the categories *EFmon* and *EFtak* is insignificant.

⁷ Sala-i-Martin also calculates the likelihood for all models and constructs a weighted average of beta and the variance. We do not do this since the goodness of fit does not vary considerably in our models.

In all basic regressions a constant and the control variables in M_i are included, even thus they are not presented in Table 3. The initial level of economic freedom has also been strongly significant in previous studies, and this is confirmed in this study for all ten models. It has a negative effect on the change in economic freedom, implying that low initial economic freedom leads to larger changes in economic freedom. Hence, there seems to be a strong convergence effect no matter which of the economic freedom categories that is analysed.⁸ The significance of the regional dummies varies dependent on the economic freedom variable used.

So far there seems to be a positive relation between democracy and two of the economic freedom categories while there are no relation with the two remaining categories. But do the results hold for robustness tests? In Table A.2 in Appendix the countries identified as extreme points in each of the ten models are presented using the studentized residual method, the leverage value and the Cook's distance. Since and there are up to 6 extreme points depending on the model and identification test, it is of interest to estimate the models using a robust regression technique. The results from biweight regressions are presented in table 4.

Table 4: Robust regressions. All models also include a constant and control variables for initial economic freedom and regional dummies.

	GEFSum	gEFMon	gEFGov	gEFTak	gEFInt
Civil	0,185*	0,098	0,133	0,150	0,199
	(1,960)	(0,470)	(1,290)	(0,610)	(1,410)
Political	0,161**	0,073	0,117	0,065	0,247**
	(2,410)	(0,430)	(1,460)	(0,330)	(2,270)

t-values in the parenthesis. *** = variables significant at the 1% level, ** = the 5% level and * = the 10% level.

The overall result from the robust regressions is again that the result is similar independent on the democracy proxy used and, with some exceptions, a general decrease the explanatory power of democracy compared to the basic results. However, the results seem to go through except for *EFgov*, which becomes insignificant. The result from earlier studies is still reproduced with a significant effect of democracy on the *gEFsum* even though extreme points are down weighted. This follows the results of De Haan and Sturm (2002). The insignificant effect of

⁸ To some extent this may follow naturally since there is an upper limit of ten for the economic freedom score.

democracy on *gEFmon* and *gEFtak* also remains after dealing with extreme points. The explanatory power of the democracy variable is affected in the model with *gEFint* as the measure of economic freedom, but only in the case where civil freedom is used. When using political freedom the result is robust. Concluding, only in the model with *EFgov* as the economic freedom measure the explanatory power of democracy seems to be fragile to extreme points.

In table 5 the results from the model specification analysis are presented. We first report the share of number of times the variable is significant at the 5% level. For the extreme bound test, a variable passes if the lower and upper bound is of the same sign, and the critical value of the CDF normal test, the Sala-i-Martin test, is set to 0.95. Concluding from the extreme bound test, the democracy variable is only robust in the *gEFgov* model with civil freedom as the democracy proxy, while it is fragile in all other models. But, as mentioned, the extreme bound analysis has been criticized for being too restrictive and it is therefore important to complement this result with the results from the share significant and the Sala-i-Martin method before drawing any firm conclusions. Starting with the share of time the democracy variable was significant when running the $z=25$ numbers of models, the results are indeed robust in all models except for *gEFint* using civil freedom. In all other cases the democracy variable was significant in 100% of the regressions when it was significant in the basic model, and significant in 0% of the regressions when it was insignificant in the basic model. Using the Sala-i-Martin test all models seem to be robust to the model specification, even though the model with *gEFint* using civil freedom is just at the limit of passing the test. In all other cases the democracy variable passed the 0,95 limit when it was significant in the basic model, but did not pass when it was insignificant in the basic model. A general conclusion from these tests is therefore that the basic results seem to be robust to the model specification.

Table 5: Effects on the democracy variable from the model specification tests.

Civil Freedom					
	gEFSum	gEFMon	gEFGov	GEFTak	gEFInt
Beta	0,232	-0,001	0,356	0,223	0,229
Variance	0,014	0,040	0,023	0,049	0,021
Share sign	1	0	1	0	0,35
Lower	-0,027	-0,460	0,015	-0,420	-0,119
Upper	0,539	0,480	0,774	0,746	0,583
Normal	0,974	0,502	0,991	0,844	0,945
Political Freedom					
	gEFSum	gEFMon	gEFGov	GEFTak	gEFInt
Beta	0,171	0,028	0,219	0,145	0,233
Variance	0,007	0,023	0,011	0,025	0,011
Share sign	1	0	1	0	1
Lower	-0,025	-0,344	-0,032	-0,334	-0,027
Upper	0,381	0,405	0,518	0,559	0,491
Normal	0,979	0,573	0,981	0,819	0,987

How democracy affects the different measures of economic freedom is summarized in table 6. The results are the same for all models no matter if civil or political freedom is used as a proxy for democracy, with the exceptions for the sensitivity tests of the last economic freedom category. The results for the model with the *Summary Index* are not surprising. As in earlier studies the effect is positive and robust both to extreme points and the model specification. When economic freedom is measured as *Money and Inflation*, democracy has no effect and this seem to hold even though the model specification is changed or if a robust estimation technique is used to deal with the extreme points. With *Government Operations and Regulations* democracy is again positive and significant. Democracy is stable when it comes to the model specification but fragile to extreme points. Using *Takings and Discriminatory Taxation* as the economic freedom measure, the democracy variable is again insignificant and the result passes both robust regressions and model specification tests. In the model with the *Restraints on International Exchange* as the economic freedom measure, democracy is positive and significant in the basic regressions, no matter what proxy of democracy used. However, using political freedom the result is robust both to extreme points and the model specification while using civil freedom the result is fragile to extreme points and at least slightly fragile to the model specification.

Table 6: Summary results for the democracy variable.

	Basic regression	Extreme points	Model specification
gEFsum	Positive	Robust	Robust
gEFmon	Insignificant	Robust	Robust
gEFgov	Positive	Fragile	Robust
gEFtak	Insignificant	Robust	Robust
gEFint	Positive	Robust/Fragile	Robust/Fragile

6 CONCLUSIONS

The purpose of this study was to empirically study how different categories of economic freedom are affected by democracy in developing countries. Both civil and political freedom was used as proxies for democracy but the result is in general not dependent on the kind of democracy measure applied. The results for the model with the *Summary Index* as the economic freedom measure are not surprising. As in earlier studies the effect of democracy on economic freedom is positive and robust, supporting the so-called compatibility view. There seems to be a positive effect of democracy on the categories *Government Operations and Regulations* and *Restraints on International Exchange*, but for the categories *Money and Inflation* and *Takings and Discriminatory Taxation* there is no effect. Accepting the definition of the categories, the result would imply that higher democracy leads to an increased reliance on the market as the allocation mechanism and decreased restraints on international trade, while democracy has no effect on the availability of sound money or the tendency to discriminate against one group of citizen. However, some of these results may be fragile for alternative samples and specifications. The result for the measure *Government Operations and Regulations* is fragile to extreme points. The only case where the type of democracy proxy matters is for the robustness of democracy as an explanatory variable to the measure *Restraints on International Exchange*. Using civil freedom it is fragile both to extreme points and the model specification, while using political freedom it is robust in both cases. All other results are robust both to extreme points and the model specification.

Hence, the compatibility view, predicting a positive effect of democracy on economic freedom, seems to be suitable when the relation between democracy and

either of the economic freedom measures *Government Operations and Regulations* or *Restraints on International Exchange* are analysed. However, there are no relation between democracy and *Money and Inflation* or *Takings and Discriminatory Taxation*, supporting the so-called sceptical view, which argues that other institutions not connected to the type of regime are the true determinants. None of the economic freedom measures used in this study seems to be negatively affected by democracy, which would be the prediction of the conflict view.

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Appendix

A.1 Extreme Point Identification

Studentized Residual

The test statistic looks as follows,

$$r_i = \frac{e_i}{(s_{(i)}\sqrt{(1-h_i)})}$$

where e_i is the residual of the i th observation and $s_{(i)}$ the corresponding standard deviation. h_i is defined below. r_i can hence be interpreted as the t -statistic for testing the significance of a dummy taking the value 1 if the i th observation is excluded and 0 otherwise.

Leverage Point

High leverage points are points for which the input vector \mathbf{x}_i is far from the rest of the data. The so-called ‘hat-matrix’, $\mathbf{H} = \mathbf{X}\mathbf{inv}(\mathbf{X}'\mathbf{X})\mathbf{X}'$, where \mathbf{X} represents the matrix of the independent variables, plays a central role. For any vector \mathbf{y} , $\mathbf{H}\mathbf{y}$ is the set of fitted values in the least squares regression of \mathbf{y} on \mathbf{X} . \mathbf{H} is also called the prediction matrix since it is the transformation matrix that, when applied to \mathbf{y} produces the predicted values. $(\mathbf{I} - \mathbf{H})$ is hence the ordinary residuals matrix. A high leverage point means a high value of the diagonal value $h_i = \mathbf{x}_i\mathbf{inv}(\mathbf{X}'\mathbf{X})\mathbf{x}_i'$. The average of h_i is k/n , k being the number of independent variables and n the number of observations, and an observation is a leverage point if $h_i > 2k/n$ as suggested by Hoaglin and Welsh (1978).

Cook's Distance

The test statistic looks as follows,

$$D_i = \frac{1}{k} r_i^2 \frac{h_i}{(1-h_i)} \frac{s_{(i)}^2}{s^2}$$

where k is the number of dependent variables, r_i is the studentized residual, h_i the leverage value, s is the root mean square error of the regression and $s_{(i)}$ the root

mean square error when the i th observation is deleted. The Cook's distance can also be written,

$$D_i = \left(\frac{1}{ks^2} \right) (\hat{\beta} - \hat{\beta}(i))' X' X (\hat{\beta} - \hat{\beta}(i)).$$

According to Bollen and Jackman (1990) the i th observation deserves further investigation if $D_i > 4/n$.

The Biweights Procedure

The biweights can be described with the following function,

$$\omega_i = \begin{cases} \left[1 - (u_i/c)^2 \right]^2 & \text{if } |u_i| \leq c \\ 0 & \text{otherwise} \end{cases}$$

where c is a constant and u_i the scaled residual of the i th observation. $u_i = e_i/m$ where e_i is the residual of the i th observation and m the residual scale estimate. $m = M/0.6745$ where M is the median absolute deviation from the median residual, i.e. $M = \text{med}|e_i - \text{med}(e_i)|$. Hence,

$$u_i = \frac{e_i}{\text{med}|e_i - \text{med}(e_i)|} \frac{0.6745}{c}.$$

A low c downweights outliers much, while a large c make the estimator more like OLS. $c = 4.685$ is used here.

Figure A.1: Partial leverage plots of the change in economic freedom and civil freedom. a=mon, b=gov, c=tak and d=int.

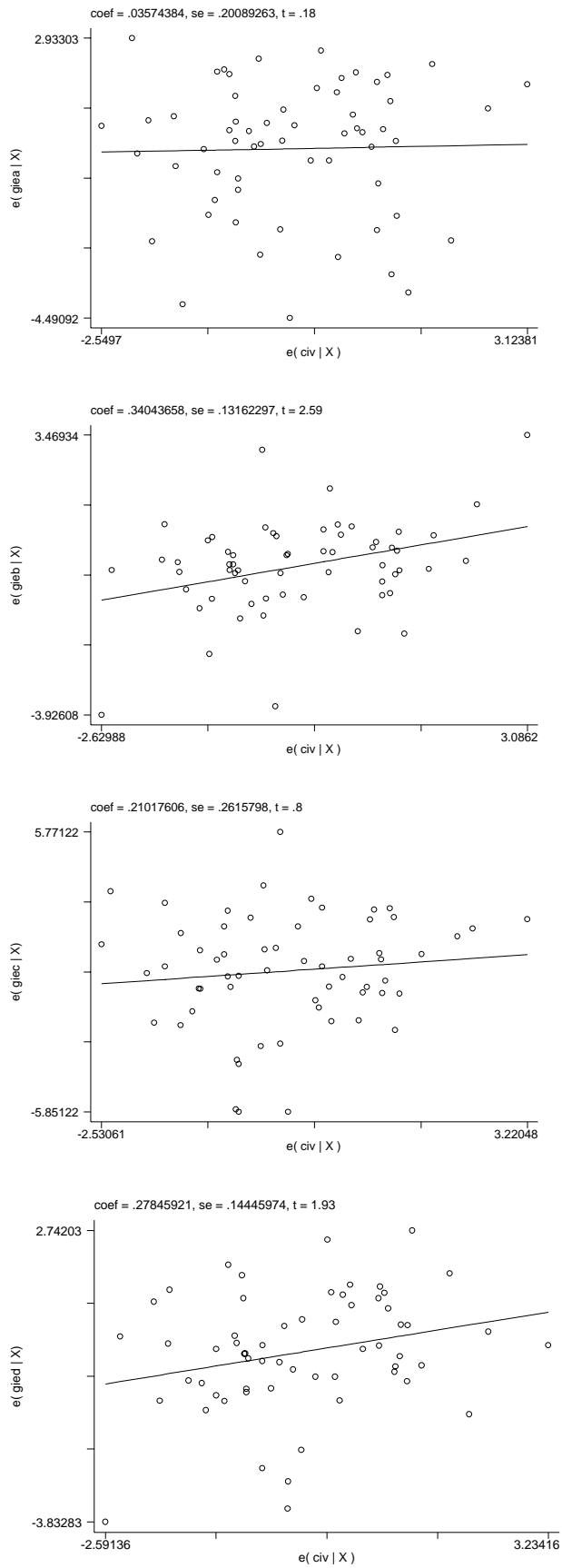


Table A.1: Countries included.

Africa	America(Ce/So)	Asia	Middle East	Europe (East)
Algeria	Argentina	Bangladesh	Iran	Hungary
Benin	Bolivia	Fiji	Jordan	
Botswana	Brazil	India	Syria	
Cameroon	Chile	Indonesia	Turkey	
Chad	Colombia	Malaysia		
Cote d' Ivoire	Costa Rica	Nepal		
Egypt	Dominican Rep	Pakistan		
Gabon	Ecuador	Philippines		
Ghana	El Salvador	South Korea		
Kenya	Guatemala	Sri Lanka		
Malawi	Haiti	Thailand		
Mali	Honduras	Trinidad/Tobago		
Mauritius	Jamaica			
Morocco	Mexico			
Niger	Nicaragua			
Nigeria	Panama			
Rwanda	Peru			
Senegal	Uruguay			
Sierra Leone	Venezuela			
South Africa				
Tanzania				
Tunisia				
Uganda				
Zambia				

Table A.2: Result from the extreme point tests.

	gEFsum		gEFmon		gEFgov		gEFtak		gEFint	
	<i>Civ</i>	<i>Pol</i>	<i>Civ</i>	<i>Pol</i>	<i>Civ</i>	<i>Pol</i>	<i>Civ</i>	<i>Pol</i>	<i>Civ</i>	<i>Pol</i>
Stud Res	Panama	Mauriti. Panama	Panama	Panama	Mauriti. Chile	Mauriti. Chile	Haiti Jordan	Jordan	Jamaica	Argent. Pakistan Argent.
Leverage	Panama Hungary Turkey	Nepal Hungary Turkey	Hungary Turkey	Nepal Hungary Turkey	India Nepal Turkey Hungary	India Jamaica Nepal Hungary Turkey	Nepal Pakistan Hungary Turkey Hungary	Pakistan Nepal Turkey Hungary	Panama Nepal Turkey Hungary Turkey	
Cooks	Fiji Iran Venezu. Nicarag. Brazil Panama	Venezu. Nicarag. Brazil Iran Panama	Fiji Brazil Panama Hungary Turkey	Fiji Brazil Panama Hungary Turkey	Nicarag. S. Korea Mauriti. Haiti Hungary Turkey	Nicarag. Haiti Mauriti. Turkey Hungary Turkey	Jordan Jordan	Jordan	Hungary Argent. Argent. Pakistan Fiji Haiti Banglad. Fiji Haiti Banglad. Pakistan Iran Iran	