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Democracy, foreign direct investment and natural resources ☆

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ABSTRACT

Empirical studies that examine the impact of democracy on foreign direct investment (FDI) assume that the relationship between democracy and FDI is the same for resource exporting and non-resource exporting countries. This paper examines whether natural resources in host countries alter this relationship. We estimate a linear dynamic panel-data model using data from 112 developing countries over the period 1982–2007. We find that democracy promotes FDI if and only if the value of the share of minerals and oil in total exports is less than some critical value. We identify 90 countries where an expansion of democracy may enhance FDI and 22 countries where an increase in democratization may reduce FDI. We also find that the effect of democracy on FDI depends on the size and not the type of natural resources.

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1. Introduction

In the past two decades, there has been a significant shift in the attitude towards foreign direct investment (FDI) to developing countries. Specifically, the discussion among academics and policymakers has shifted from *whether* FDI should be encouraged to *how* developing countries can attract FDI. Indeed many international development agencies, such as the World Bank, consider FDI as one of the most effective tools in the global fight against poverty, and therefore actively encourage poor countries to pursue policies that will enhance FDI flows.[2] However, many of the countries that want to attract FDI also have weak democracies or nondemocratic governments. It is therefore important to understand the effect of democratization on FDI. For example, if democracy deters FDI, then countries face a trade off — between increased democratization and attracting more FDI.

This paper answers three questions: (i) Does democracy facilitate FDI?; (ii) Do natural resources alter the relationship between FDI and democracy?; and (iii) Do foreign direct investors prefer less democracy when they operate in natural resource exporting countries? Answers to these questions cannot be discerned from theory because the theoretical impact of democracy on FDI is unclear.[3] On the one hand, democratic institutions may have a positive effect on FDI because democracy provides checks and balances on elected officials, and this in turn reduces arbitrary government intervention, lowers the risk of policy reversal and strengthens property right protection (North and Weingast, 1989; Li, 2009).[4] On the other hand, multinational corporations (MNCs) may prefer to invest in autocratic countries. One reason is that unlike a democracy, autocratic governments are not accountable to their electorates. As a consequence, autocratic governments may be in a better position to provide more generous incentive packages and also offer protection from labor unions (Li and Resnick, 2003). In addition, it is easier for MNCs to exploit their oligopolistic or monopolistic positions when they operate in autocratic countries (Li and Resnick, 2003). Thus, the overall effect of democracy on FDI has to be determined empirically.

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[2] For example, the key function of the World Bank's Multilateral Investment Guarantees Agency (MIGA) is to facilitate FDI to poor countries. Also, the United Nations millennium declaration stipulates that an increase in FDI to developing countries will result in a significant reduction in global poverty rates.

[3] See Li and Resnick (2003) and Jensen (2003) for a detailed discussion about the theoretical impact of democracy on FDI.

[4] Due to the irreversible nature of FDI, the risk of policy reversal (e.g., changes in tax laws, royalty fees, etc.), which may be considered as partial expropriation has a profound adverse impact on FDI (Asiedu et al., 2009). Li (2009) argues that democratic regimes are less likely to expropriate FDI than autocratic governments. He documents that between 1960 and 1990 there were 520 incidents of expropriation, and autocratic governments were responsible for about 80% of these incidents.

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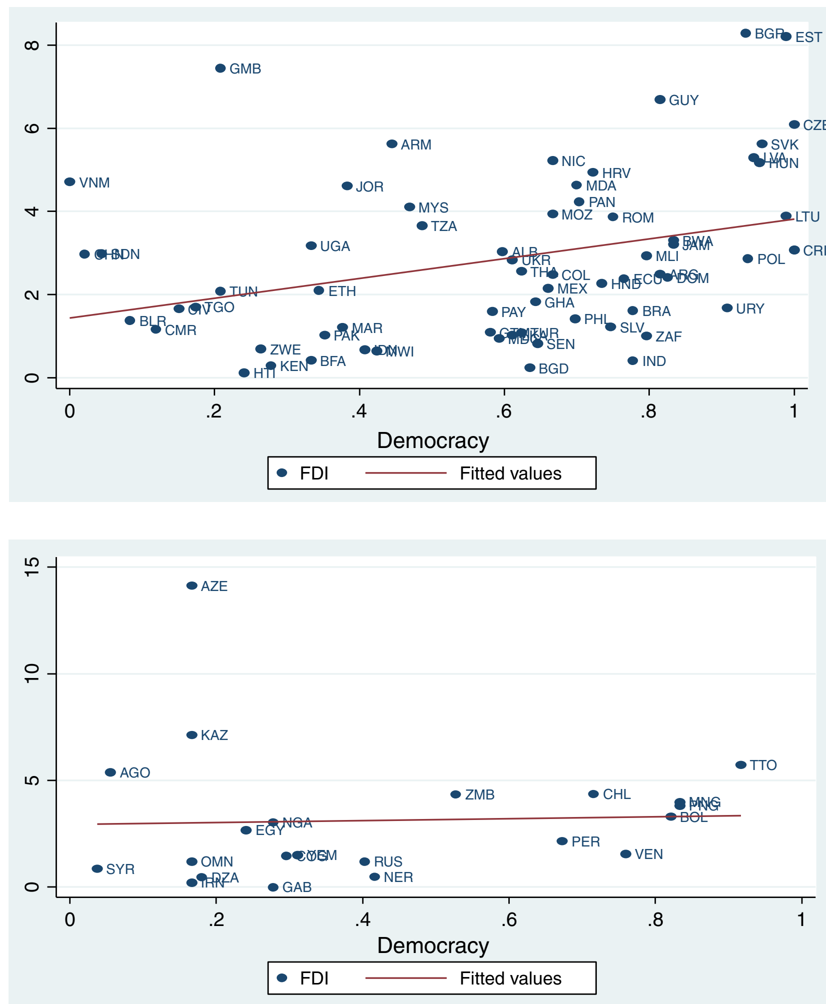

Fig. 1. FDI and freedom house measure of democracy (*free*). a: Non-natural resource exporting countries (Group 1). b: Natural resource exporting countries (Group 2). The data on FDI/GDP and democracy are averaged from 1982 to 2007. The democracy variable ranges from zero to 1, a higher number implies more democratic rights. Non-resource exporting countries (i.e. Group 1) consists of countries where the sum of minerals and oil in total merchandise exports, $\overline{nat}$, is less than 50%, and resource exporting countries (i.e., Group 2) consists of countries where $\overline{nat} \geq 50\%$. There are 65 countries in Group 1 and 22 countries in Group 2. Democracy seems to be positively correlated with FDI/GDP for non-resource exporting countries (a), but uncorrelated for natural resource exporting countries (b). The OLS regression of democracy on FDI for Group 1 countries yields, $\hat{y} = 1.43 + 2.38 \times dem$, with robust p-value = 0.021 and; and for Group 2 countries, $\hat{y} = 2.93 + 0.46 \times dem$, robust p-value = 0.842 and $R^2 = 0.002$. See Table A1 in the appendix for the list of countries.

Natural resources in host countries may affect the FDI-democracy relationship. We provide two plausible explanations. First, note that FDI in natural resource exporting countries tends to be concentrated in extractive industries. Furthermore, a stable policy environment is important to MNCs in general, but more so for MNCs in extractive industries because the exploration and extraction of minerals involve an initial large-scale capital intensive investment (i.e., sunk cost), a high degree of uncertainty and long gestation periods.[5] Thus, to the extent that longevity of government implies a more stable and predictable business environment, democratic regimes are less preferable because democracies are typically associated with a frequent change of government officials.[6] The second explanation is that FDI in extractive industries is mainly driven by access to natural resources in host countries, and natural resources are strategically, politically and financially important to host countries. As a consequence, FDI in natural resources is tightly controlled by the government.[7] Thus, here, having close ties with the government may imply gaining access to an invaluable production input. Clearly, such relationships are easier to foster under autocratic regimes.

[5] The relative importance of a stable policy environment for MNCs in the primary sector is noted in a survey conducted by the Economist Intelligence Unit (EIU) in 2007 (EIU, 2008). In the survey, MNCs in the primary sector indicated that "a stable and business-friendly environment" is the second (out of twelve) most important location criterion (the most important factor is access to natural resources). In contrast a stable policy environment ranked nine out of twelve for MNCs in manufacturing, and seven out of twelve for MNCs in the services sector. The two most important location factors for MNCs in services and manufacturing are the size of local markets and the growth of markets.

[6] The view that autocratic regimes provide a more stable business environment is consistent with the EIU survey results where about 62% of the respondents agreed with the statement that authoritarian regimes provide a more stable and predictable business environment.

[7] For example in Nigeria, the only sector that has restrictions on foreign equity ownership is the oil industry: 100% foreign ownership is allowed in all other sectors except for petroleum where foreign equity share is limited to 50%. See Asiedu and Esfahani (2001) for a discussion about the reasons why governments impose equity restrictions.

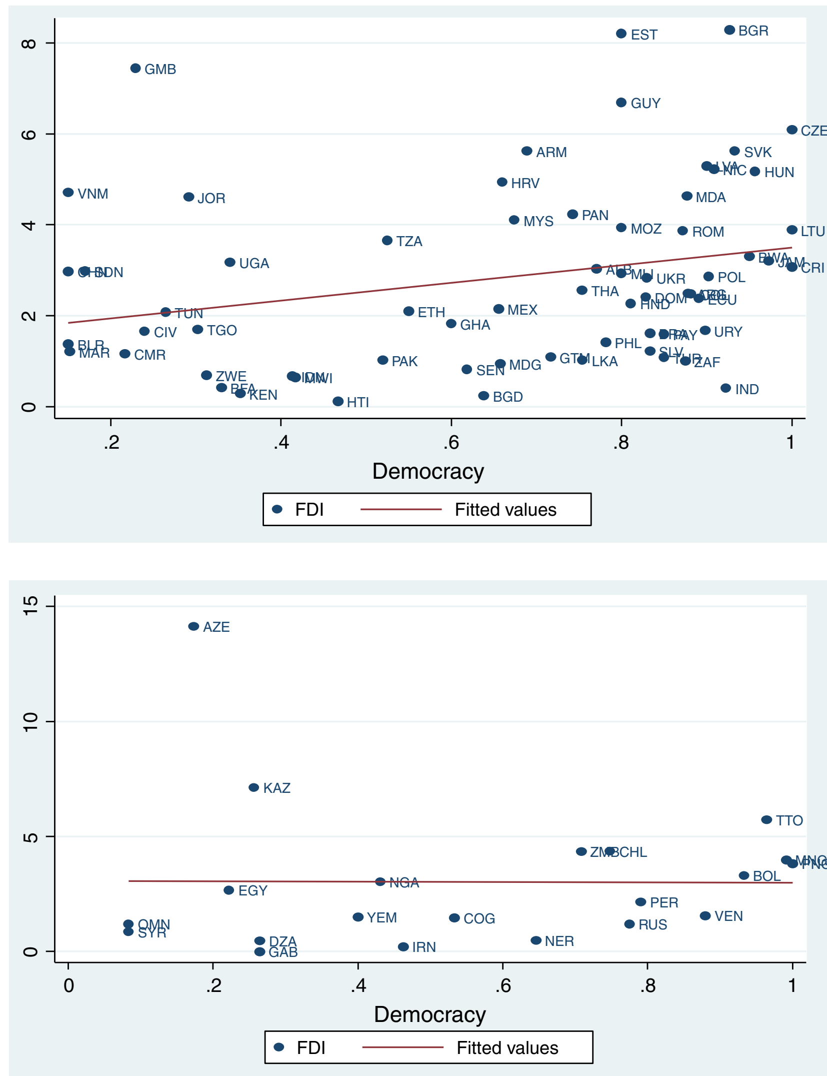

Fig. 2. FDI and Polity IV measure democracy (*polity*). a: Non-natural resource exporting countries (Group 1). b: Natural resource exporting countries (Group 2). The data on FDI/GDP and democracy are averaged from 1982 to 2007. The democracy variable ranges from zero to 1, a higher number implies more democratic rights. Non-resource exporting countries (i.e. Group 1) consists of countries where the sum of minerals and oil in total merchandise exports, $\overline{nat}$, is less than 50%, and resource exporting countries (i.e., Group 2) consists of countries where $\overline{nat} \geq 50\%$. There are 65 countries in Group 1 and 22 countries in Group 2. Democracy seems to be positively correlated with FDI/GDP for non-resource exporting countries (a), but uncorrelated for natural resource exporting countries (b). The OLS regression of democracy on FDI for Group 1 countries yields, $\hat{y} = 1.54 + 1.95 \times dem$, with robust p-value = 0.038 and $R^2 = 0.07$; and for Group 2 countries, $\hat{y} = 3.07 - 0.09 \times dem$, robust p-value = 0.972 and $R^2 = 0.000$. See Table A1 in the appendix for the list of countries.

The importance of natural resources in determining the effect of democracy on FDI can be gleaned from Figs. 1a–3b, which show the association between FDI and three measures of democracy for 87 developing countries. The democracy measures, *free*, *polity* and *icrg* are from three different sources: Freedom House, Polity IV and the International Country Risk Guide, respectively (we provide more details in Section 2). The countries are grouped according to their natural resource export intensity: Group 1 consists of countries where the share of the sum of minerals and oil in total merchandise exports averaged over the period 1982–2007, denoted by $\overline{nat}$, is less than 50%, and Group 2 consists of countries where $\overline{nat} \geq 50\%$. For the countries in Group 1, FDI seems to be positively associated with democracy for all the three measures of democracy (Figs. 1a, 2a and 3a). This contrasts with the Group 2 countries, where democracy seems to be negatively correlated with FDI (Fig. 3b) or uncorrelated with FDI (Figs. 1b and 2b). Thus, the data suggest that foreign direct investors prefer democratic governments when they operate in non-resource exporting countries, but prefer less democratic or nondemocratic governments when they operate in resource exporting countries.[8]

There is a vast empirical literature on the determinants of FDI, however, only a few of the studies include democracy as an explanatory variable. Our literature review reveals that the empirical research on FDI and democracy is scant and also recent. We found only twelve published articles which include democracy as a determinant of FDI, and only two of the papers were published

[8] This observation is FDI-democracy relationship is underscored by the EIU survey results, where about 52% of MNCs reported that democracy was important to their investment decisions, but only 44% of MNCs in extractive industries reported that democracy was a relevant factor (EIU, 2008).

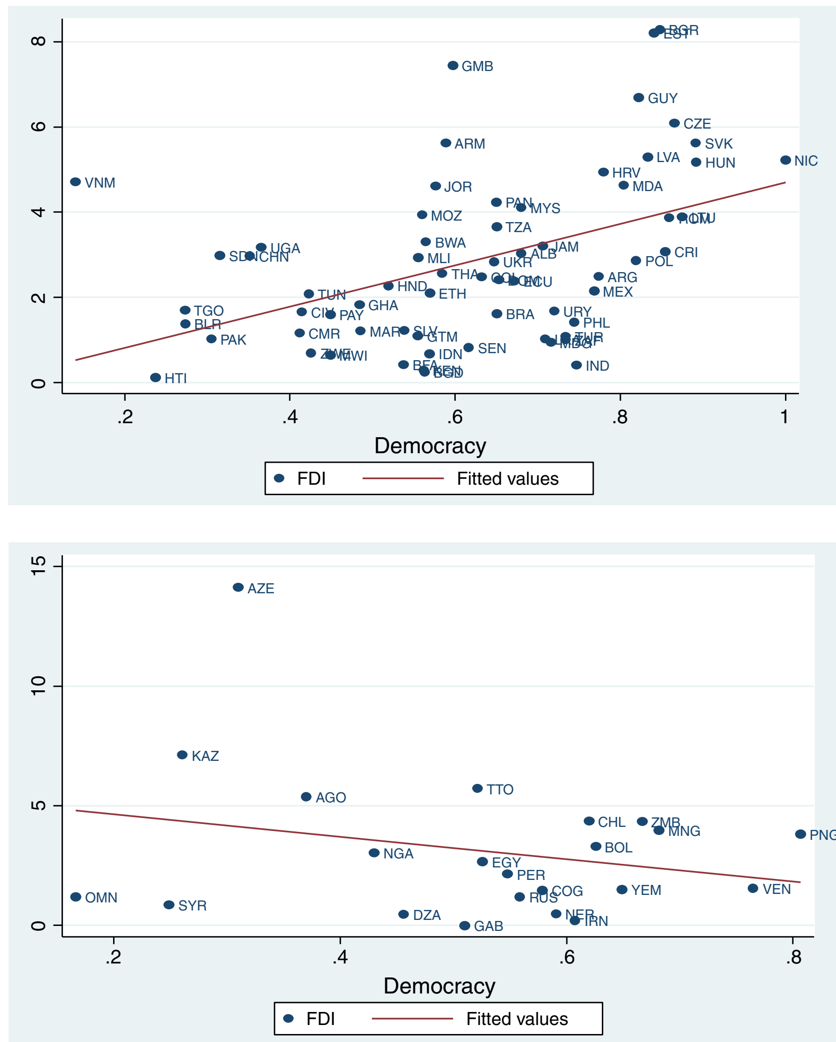

Fig. 3. FDI and ICRG measure of democracy (*icrg*). a: Non-natural resource exporting countries (Group 1). b: Natural resource exporting countries (Group 2). The data on FDI/GDP and democracy are averaged from 1982 to 2007. The democracy variable ranges from zero to 1, a higher number implies more democratic rights. Non-resource exporting countries (i.e. Group 1) consists of countries where the sum of minerals and oil in total merchandise exports, $\overline{nat}$, is less than 50%, and resource exporting countries (i.e., Group 2) consists of countries where $\overline{nat} \geq 50\%$. There are 65 countries in Group 1 and 22 countries in Group 2. Democracy seems to be positively correlated with FDI/GDP for non-resource exporting countries (a), and negatively uncorrelated for natural resource exporting countries (b). The OLS regression of democracy on FDI for Group 1 yields: $\hat{y} = -0.16 + 4.86 \times dem$, with robust p-value = 0.001 and; and for Group 2, $\hat{y} = 5.57 - 4.68 \times dem$, robust p-value = 0.373 and $R^2 = 0.062$.

before 2000.[9] Previous studies do not take into consideration the persistent nature of FDI, the relevance of natural resources in determining the relationship between FDI and democracy, and the possibility of a reverse causality between FDI and democracy.[10] This paper reassesses the relationship between democracy and FDI. To the best of our knowledge, it is the first study to analyze the interaction effect of natural resources and democracy on FDI. In addition, the paper addresses some endogeneity and dynamic issues not considered in previous studies.

We estimate a dynamic panel data model where we interact the measure of democracy with the share of the sum of minerals and fuel in total merchandise exports, *nat*. Our analyses utilize a panel data of 112 developing countries over the period 1982–2007. We employ three measures of democracy from three different sources and we utilize two estimation techniques — the dynamic panel "difference" General Method of Moments (GMM) estimator proposed by Arellano and Bond (1991), and the "system" GMM estimator proposed by Blundell and Bond (1998). We find that democracy promotes FDI if and only if the value of the share of minerals and oil in total exports is less than some critical value. We identify 90 countries where an expansion of democracy may enhance FDI, and 22 countries where an increase in democratization may reduce FDI. We disaggregate the measure of natural resources into its two components: (i) fuel as a share of exports; and (ii) minerals as a share of exports — and find that

[9] Rodrik (1996), Harms and Ursprung (2002), Jensen (2003), Busse (2004), Jakobsen (2006), Jakobsen and de Soysa (2006), Adam and Filippaios (2007) and Busse and Hefeker (2007) found a positive effect; Li and Resnick (2003) found a negative effect; Oneal (1994), Alesina and Dollar (2000) and Büthe and Milner (2008) did not find a significant relationship between democracy and FDI. See Asiedu and Lien (2010) for a review of the literature.

[10] For example, Li and Reuveny (2003) find that FDI has a positive effect on democracy, and Dutta and Roy (2009) find that FDI has a positive and significant effect on press freedom.

the relationship between FDI and democracy depends on the "size" and not the "type" of natural resources. Finally, we show that our results are robust: they hold for different estimation procedures, alternative measures of democracy, different sub-samples, different time periods, when we control for FDI risk, institutional quality, political risk, and when we take into account the endogeneity of natural resources and democracy. In all the regressions, we control for macroeconomic instability, market size, openness to trade, and infrastructure development in host countries.

The remainder of the paper is organized as follows. Section 2 describes the data and the variables, Section 3 discusses the estimation procedure, Sections 4 and 5 present the empirical results, and Section 6 concludes.

2. The data and the variables

Our empirical analyses utilize panel data of 112 developing countries over the period 1982–2007 (see the Appendix for the list of countries). As is standard in the literature, our dependent variable is net *FDI*/*GDP* and we average the data over four years to smooth out cyclical fluctuations. The descriptive statistics of the variables is reported in Table 1.

2.1. Democracy

There are many sources that provide ratings on the level of democratization in various countries. As expected, none of the measures of democracy is perfect. For example, Poe and Tate (1994) argue that the Freedom House data on civil and political liberties, which are one of the most utilized data in the profession, are biased in favor of Christian nations and Western democracies. Casper and Tufis (2003) also caution that different measures of democracy, even when highly correlated, may not be interchangeable because they may produce different results. Therefore in order to increase the credibility of our results, we employ three different measures of democracy from three different sources for our benchmark regressions.

The first measure of democracy, *free*, is derived from the data on political rights published by Freedom House. The data ranges from one to seven. A rating of one implies "there are competitive parties or other political groupings, the opposition plays an important role and has actual power" and a rating of seven indicates that political rights are absent. The second measure, *polity*, is derived from the democracy index published in Polity IV, and it reflects the openness and the competitiveness of the political process as well as the presence of institutions that foster political participation. The index ranges from zero to ten, where a higher rating implies higher levels of democracy. The third measure, *icrg*, is the measure of democracy published in the International Country Risk Guide (ICRG). The data are published by Political Risk Services (PRS), and the data reflect the extent to which elections are free and fair, and the degree to which the government is accountable to its electorate. The index ranges from one to six, a higher score implies more democracy and accountability. To ease comparison between the different measures of democracy, we follow Acemoglu et al. (2008) and normalize *free*, *polity* and *icrg* to lie between zero and one, such that a higher number implies more democracy.

The three measures of democracy vary in terms of coverage and availability. The regressions that employ *free* as a measure of democracy cover 112 countries and have up to 652 observations, the *polity* regressions cover have 614 observations and cover 102 countries, and the regressions that employ *icrg* cover only 87 countries and have up to 551 observations. The ICRG data are targeted toward foreign investors and as a consequence, the data are not available for many small countries, poor countries and countries that receive very little FDI. Furthermore, many of the countries in our sample for which the ICRG data are missing have high FDI / GDP relative to the mean. This clearly generates a potential sample selection problem. With regards to availability, the data for *free* and *polity* are available free of charge, the *icrg* data are not.

Table 1
Summary statistics.

Description	Developing countries		Middle income		Low income		Sub-Saharan Africa (SSA)		Outside SSA		Non transition	
	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev
Free	0.57	0.31	0.63	0.31	0.42	0.27	0.41	0.29	0.63	0.30	0.56	0.31
Polity	0.63	0.32	0.69	0.31	0.51	0.30	0.49	0.30	0.69	0.31	0.62	0.32
Icrg	0.60	0.22	0.63	0.21	0.52	0.21	0.51	0.17	0.62	0.22	0.58	0.21
FDI/GDP (%)	2.85	3.58	3.31	3.94	1.75	2.16	1.84	2.30	3.22	3.88	2.55	3.22
FDI per capita	5.10	14.11	7.37	16.89	0.64	0.95	1.54	5.54	6.75	16.40	4.88	14.30
Trade/GDP (%)	75.09	37.45	81.84	39.11	58.80	26.91	65.23	29.78	78.65	39.28	72.04	37.08
Investment/GDP (%)	21.19	6.46	22.37	6.37	18.36	5.77	18.27	5.66	22.25	6.40	20.97	6.51
Ln (1+ phones)	1.80	1.09	2.30	0.87	0.60	0.47	0.73	0.72	2.19	0.94	1.63	1.04
Inflation (%)	20.65	56.96	22.94	64.91	15.11	29.48	15.75	33.57	22.41	63.25	18.71	54.31
Ln (GDP per capita)	7.10	1.09	7.66	0.73	5.76	0.45	6.12	1.01	7.46	0.87	7.03	1.10
Fuel/exports (%)	16.67	26.49	19.05	27.36	23.40	27.84	16.15	28.86	16.86	25.61	16.45	27.07
Minerals/exports (%)	8.35	14.67	6.64	11.14	10.94	23.36	11.60	19.15	7.17	12.49	8.64	15.50
Fuel and minerals/exports (%)	25.02	28.14	25.68	28.27	12.47	20.31	27.75	30.81	24.03	27.08	25.08	28.81
Corruption	0.56	0.16	0.55	0.15	0.60	0.15	0.59	0.16	0.56	0.15	0.57	0.15
Law and order	0.53	0.19	0.55	0.20	0.49	0.17	0.49	0.16	0.55	0.20	0.51	0.19
Bureaucracy	0.55	0.22	0.52	0.21	0.62	0.22	0.62	0.23	0.52	0.21	0.55	0.22
FDI risk	0.52	0.17	0.50	0.17	0.56	0.15	0.54	0.15	0.51	0.17	0.53	0.16
Conflict	0.25	0.16	0.23	0.16	0.28	0.15	0.27	0.14	0.24	0.16	0.26	0.16
Instability of government	0.37	0.18	0.37	0.17	0.38	0.19	0.37	0.18	0.37	0.17	0.38	0.18

The democracy variables *free*, *polity* and *icrg* are from Freedom House, Polity IV and International Country Risk Guide (ICRG), respectively. The data are normalized to lie between zero and one, such that a higher number implies more democracy. FDI is the net inflows in current US$, trade is the sum of imports and exports, inflation is based on the annual CPI, *investment*/*GDP* is the share of gross fixed capital formation in GDP, phones is the number telephone lines per 100 people, GDP per capita is in constant 2000 US$, *fuel*/*exports* is the share of fuel in total merchandize exports, and *minerals*/*exports* is the share of minerals and ore in total merchandize exports. The data are from The World Development Indicators (2009), published by the World Bank. The data on institutions, FDI risk and political instability are from the ICRG. Corruption reflects the level of corruption within the political system, law and order measures the effectiveness of the rule of law, bureaucracy refers to the institutional strength and quality of the bureaucracy, FDI risk reflects the risk of expropriation and government constraints on profit repatriation, conflict is the average of internal conflict (such as political violence within the country) and external conflict (such as cross-border conflicts), and instability of government reflects the ability of government to stay in office. Similar to the democracy measures, the data are normalized to lie between zero and one, such that a higher number implies more corruption, better law enforcement, higher FDI risk and higher political instability.

2.2. Natural resources

We employ three measures of natural resources to capture a country's natural resource export intensity: (i) the share of fuel in total merchandise exports, *fe*; (ii) the share of minerals in total merchandise exports, *me*; and (iii) the share of fuel and minerals in total merchandise exports, *nat*, where $nat = me + fe$. We use these measures for three reasons. First, they provide an indication of the type of FDI that goes to a country. For example, oil exporting countries are likely to have FDI concentrated in the oil sector. Second, the measures reflect the importance of natural resources to the host country. Such information is important in explaining our main result, that foreign direct investors may prefer less democracy in natural resource exporting countries. Third, the measures have been employed in several studies and also the data are readily available.[11]

We hypothesize a negative association between natural resources and FDI for the following three reasons. The first reason is based on the idea that resource booms lead to an appreciation of local currency. This makes the country's exports less competitive at world prices, and thereby crowds out investments in non-natural resource tradable sectors. If the crowding out is more than one-for-one, it may lead to an overall decline in FDI. The second reason is that natural resources, in particular oil, are characterized by booms and busts, leading to increased volatility in the exchange rate (Sachs and Warner, 1995). In addition, a higher share of fuel and minerals in total merchandise exports implies less trade diversification, which in turn makes a country more vulnerable to external shocks. All these factors generate macroeconomic instability and therefore reduce FDI. Finally, FDI in natural resource rich countries tend to be concentrated in the natural resource sector. While natural resource exploration requires a large initial capital outlay, the continuing operations demand a small cash flow. Thus, after the initial phase, FDI may be staggered.

2.3. Other variables

2.3.1. Control variables

Following the literature on the determinants of FDI, we include the following variables in our regressions. We use trade/GDP as a measure of openness and the rate of inflation as a measure of macroeconomic uncertainty. We employ two measures to capture the level of infrastructure development in host countries: (i) the number of telephones per 100 population; and (ii) gross fixed capital formation as a share of GDP.

All else equal, openness to trade, lower inflation and a better physical infrastructure should have a positive effect on FDI. Higher domestic incomes imply a greater demand for goods and services and therefore makes the host country more attractive for FDI. Asiedu and Lien (2003) find that domestic income has to achieve a certain threshold in order to facilitate FDI flows. Thus, following Asiedu and Lien (2003), we include both GDP per capita and the square of GDP per capita in our regressions.

2.4. Robustness variables

The robustness regressions employ data on measures of institutional quality, political instability and FDI risk in host countries. As pointed out in the introduction, democracies are generally associated with better institutions, such as private property protection and better enforcement of laws and regulations. Thus, it is possible that our measures of democracy are not capturing the "true" level of democratization in FDI host countries, but rather the measures are a proxy for the quality of institutions in these countries. If that is the case, then our results are driven by institutional quality and not by democracy. We attempt to capture the "pure" effect of democracy on FDI by controlling for institutional quality in host countries. We consider three measures of institutional quality which reflect: (i) corruption; (ii) the impartiality of the legal system; and (iii) bureaucratic quality in host countries. We also note that democracy does not necessarily imply political stability. For example, riots and assassinations can occur even in a democratic country (Bollen and Jackman, 1989). We consider two measures of political instability which reflect: (i) the level of internal and external conflict; and (ii) the stability of the government in power. Finally, we include a variable that captures the risk to investment as a result of "hostile" government actions (e.g., expropriation) and restrictions on FDI. We do not include these variables in the benchmark regressions because the data are from the ICRG and are available for a limited number of countries. Specifically, the number of countries drops from 112 to 87, and the number of observations decreases from 652 to 551.

[11] Alternative measures of natural resources, for example, measures that reflect natural resource abundance lack these three attributes.

3. Estimation procedure

We estimate a linear dynamic panel-data (DPD) model to capture the effect of lagged FDI on current FDI. DPD models contain unobserved panel-level effects that are correlated with the lagged dependent variable, and this renders standard estimators inconsistent. The GMM estimator proposed by Arellano and Bond (1991) provides consistent estimates for such models. This estimator often referred to as the "difference" GMM estimator takes the first difference of the data and then uses lagged values of the endogenous variables as instruments. However, as pointed out by Arellano and Bover (1995), lagged levels are poor instruments for first differences. Blundell and Bond (1998) proposed a more efficient estimator, the "system" GMM estimator, which mitigates the poor instruments problem by using additional moment conditions. However, the system estimator has one disadvantage: it utilizes too many instruments. Thus, the difference estimator suffers from the "weak" instruments problem and the system estimator exhibits the "too many" instruments problem (Hayakawa, 2007). Indeed, as shown by Acemoglu et al. (2005) and Bobba and Coviello (2007), the two estimation procedures can produce strikingly different results.

Thus, in order to increase the credibility of our results, we report the estimations for both the difference and system estimators.

Now, the two estimation procedures assume that there is no autocorrelation in the idiosyncratic errors. Hence, for each regression, we test for autocorrelation and the validity of the instruments. Specifically, we report the p-values for the test for second order autocorrelation as well as the Hansen J test for overidentifying restrictions. These tests, however, lose power when the number of instruments, i, is large relative to the cross section sample size (in our case, the number of countries), n — in particular when the instrument ratio, r, defined as $r = \frac{n}{i}$, is less than 1 (Roodman, 2007; Stata, 2009). Thus, when $r<1$, the assumptions underlying the two procedures may be violated. Furthermore, a low r raises the susceptibility of the estimates to a Type 1 error — i.e., producing significant results even though there is no underlying association between the variables involved (Roodman, 2007). The easiest solution to this problem is to reduce the instrument count by limiting the number of lagged levels to be included as instruments (Roodman, 2007; Stata, 2009). In all the 18 benchmark regressions and in 27 out of the 38 robustness regressions, $r \geq 1$, and therefore we do not restrict the number of lags of the dependent variable used for instrumentation. For the 11 cases where $r<1$, we limit the number of lagged levels to be included as instruments to the point where $r \geq 1$, and we check

Table 2
The direct effect of democracy on FDI.

Variables	Difference GMM			System GMM		
	(1)	(2)	(3)	(4)	(5)	(6)
	Free	*Polity*	*Icrg*	*Free*	*Polity*	*Icrg*
Democracy, *dem* ($\hat{\alpha}$)	1.616***	1.189***	3.400***	1.020***	1.140***	3.012***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Natural Resources, *nat*	−0.032***	−0.039***	−0.045***	−0.032***	−0.035***	−0.035***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Lagged FDI/GDP	−0.251***	−0.171***	−0.184***	−0.076***	−0.002	−0.075***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.771)	(0.000)
Trade/GDP	0.023***	0.018***	0.015***	0.019***	0.008***	−0.011***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fixed investment/GDP	0.237***	0.229***	0.221***	0.254***	0.255***	0.237***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln (1+ phones)	2.201***	1.834***	1.955***	2.643***	2.215***	2.486***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation	−0.005***	−0.004***	−0.003***	−0.004***	−0.003***	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.153)
lgdpc = Ln (GDP per capita)	−5.439**	−8.464***	−11.494***	−1.961	−3.956***	−1.456
	(0.034)	(0.000)	(0.000)	(0.181)	(0.003)	(0.186)
lgdpc × lgdpc	0.262	0.479***	0.646***	−0.001	0.202**	0.095
	(0.114)	(0.000)	(0.000)	(0.990)	(0.021)	(0.199)
Constant	17.456*	28.979***	41.129***	5.714	10.656**	−1.210
	(0.074)	(0.000)	(0.000)	(0.283)	(0.027)	(0.767)
Hansen J test (p-value)[a]	0.338	0.424	0.376	0.369	0.311	0.651
Serial correlation test (p-value)[b]	0.662	0.527	0.909	0.493	0.477	0.407
Number of observations	566	541	455	652	614	551
Number of countries, *n*	106	98	86	112	102	87
Number of instruments, *i*	72	72	69	81	81	78
Instrument ratio, $r = n/i$	1.47	1.36	1.25	1.38	1.26	1.12
Limit the no.of lags of dependent variable used in instrumentation?	No	No	No	No	No	No

Notes: p-values in parenthesis. Free, Polity and Icrg are measures of democracy from Freedom House, Polity IV and The International Country Risk Guide, respectively. The data are normalized to lie between zero and one. A higher number implies more democracy.
*** $p<0.01$.
** $p<0.05$.
* $p<0.10$.
[a] The null hypothesis is that the instruments are not correlated with the residuals.
[b] The null hypothesis is that the errors in the first difference regression exhibit no second order serial correlation.

whether our results are robust to the reduction in instrument count.

We end the section by providing some details about our estimation strategy.

First, we use the two-step GMM estimator, which is asymptotically efficient and robust to all kinds of heteroskedasticity. Second, the independent variables are treated as strictly exogenous in all the regressions, with the exception of four robustness regressions where democracy and natural resources are considered to be endogenous. Third, our regressions utilize only internal instruments — we do not include additional (external) instruments. Specifically, both the difference and system estimators use the first difference of all the exogenous variables as standard instruments, and the lags of the endogenous variables to generate the GMM-type instruments described in Arellano and Bond (1991). Furthermore, the system estimations include lagged differences of the endogenous variables as instruments for the level equation, but the difference estimations do not.

Table 3
The interaction effect of democracy and natural resources on FDI.

Variables	Difference GMM			System GMM		
	(1)	(2)	(3)	(4)	(5)	(6)
	Free	*Polity*	*Icrg*	*Free*	*Polity*	*Icrg*
Democracy, *dem*, $\hat{\alpha}$	2.528***	2.048***	6.274***	2.205***	2.120***	5.813***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
nat × *dem*, $\hat{\beta}$	−0.039***	−0.041***	−0.112***	−0.043***	−0.041***	−0.113***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hansen J Test (p-value)[a]	0.320	0.511	0.239	0.414	0.350	0.650
Serial correlation test (p-value)[b]	0.645	0.518	0.900	0.481	0.468	0.650
Number of observations	566	541	455	652	614	551
Number of countries, *n*	106	98	86	112	102	87
Number of instruments, *i*	73	73	70	82	82	79
Instrument ratio, $r = n/i$	1.45	1.34	1.23	1.37	1.17	1.10

[a] The null hypothesis is that the instruments are not correlated with the residuals.
[b] The null hypothesis is that the errors in the first difference regression exhibit no second order serial correlation.
*** $p<0.01$.

Table 4
$\partial fdi/\partial dem = \hat{\alpha} + \hat{\beta} \times nat$, evaluated at various values of *nat*.

Value of *nat*	Percentile of $\overline{nat}$	Corresponding country	Difference GMM			System GMM		
			Free	*Polity*	*Icrg*	*Free*	*Polity*	*Icrg*
0.74	10th	Mauritius	2.499*** (0.000)	2.018*** (0.000)	6.191*** (0.000)	2.173*** (0.000)	2.090*** (0.000)	5.213*** (0.000)
3.5	25th	Thailand	2.390*** (0.000)	1.906*** (0.000)	5.883*** (0.000)	2.054*** (0.000)	1.976*** (0.000)	5.417*** (0.000)
14.4	50th	Ukraine	1.961*** (0.000)	1.464*** (0.000)	4.664*** (0.000)	1.582*** (0.000)	1.582*** (0.000)	4.184*** (0.000)
42.5	75th	Indonesia	0.855*** (0.000)	0.325* (0.058)	1.522*** (0.000)	0.365*** (0.031)	0.373*** (0.000)	1.007*** (0.000)
62.4	90th	Syria	0.072 (0.833)	−0.482* (0.081)	−0.703 (0.136)	−0.500* (0.072)	−0.445*** (0.004)	−1.243*** (0.000)
24.9	Mean	Belarus	1.55*** (0.000)	1.037*** (0.000)	3.486*** (0.000)	1.126*** (0.000)	1.095*** (0.000)	2.994*** (0.000)

Notes: *nat* is the share of the sum of minerals and fuel in total merchandize exports (%), and $\overline{nat}$ is the average of *nat*, from 1982 to 2007.
*** $p<0.01$.
* $p<0.10$.

4. Benchmark regressions

We estimate the equation:

$$fdi_{it} = \alpha dem_{it} + \gamma nat_{it} + \beta nat_{it} \times dem_{it} + \rho fdi_{it-1} + \Sigma_{j=1}^{J} \gamma_j Z_{jit} + \theta_i + \varepsilon_{it} \quad (1)$$

where i refers to countries, t to time, θ_i is the country-specific effect, *fdi* is net *FDI*/*GDP*, *dem* is a measure of democracy, *nat* is a measure of natural resource export intensity, $nat \times dem$ is the interaction term, and Z is a vector of control variables.

(i) Does democracy have a direct effect on FDI?
To answer this question we estimate Eq. (1) without the interaction term, $nat \times dem$. The parameter of interest is the coefficient of *dem*, α. The results are reported in Table 2. Note that $\hat{\alpha}$ is positive and significant at the 1% level in all the regressions, suggesting that all else equal, democracy facilitates FDI flows. We use an example to illustrate the positive effect of democracy on FDI. Consider two countries in the same sub-region in Sub-Saharan Africa (SSA) that have extremely different levels of democratization — Swaziland, the least democratic country in Southern Africa and Mauritius, the country with the highest democracy score. Then the regressions that employ the measure of democracy, *free*, show that an improvement in democracy from the level of Swaziland ($free = 0.06$) to the level of Mauritius ($free = 0.98$) will increase *fdi* by about 1.49 percentage points for the difference regression [$\partial fdi/\partial dem = 1.616 \times (0.98 - 0.06) \approx 1.49$] and about 0.94 percentage points for the system regression [$\partial fdi/\partial dem = 1.020 \times (0.98 - 0.06) \approx 0.94$]. The increase in *fdi* is economically important because the average annual increase in *fdi* to Swaziland, over the period 1984–2007 was about 0.28 percentage points.
We now turn our attention to the other variables. Natural resource export intensity has an adverse effect on FDI; openness to trade, good infrastructure and less inflation promote FDI; and GDP per capita has a positive impact on FDI only if income per capita exceeds a certain threshold. The estimated coefficient of lagged *fdi*, $\hat{\rho}$, is negative, suggesting that current *fdi* is negatively correlated with future *fdi*. Note that a one unit increase in the level of current democracy on current *fdi* is equal to $\hat{\alpha}$, and the long run effect on *fdi* is $\frac{\hat{\alpha}}{1-\hat{\rho}}$. Since $\hat{\alpha} > \frac{\hat{\alpha}}{1-\hat{\rho}}$, this result implies that past levels of democratization have an impact on current and future *fdi* flows, however, the effect subsides over time.

(ii) Do natural resources undermine the positive effect of democracy on FDI?We estimate Eq. (1). Now, $\partial fdi/\partial dem = \alpha + \beta \times nat$, and therefore the parameters of interest are α and β. To conserve on space we report only the values of $\hat{\alpha}$ and $\hat{\beta}$ in Table 3. The full estimation results are available in the supplementary file, available from the authors upon request. In all the regressions, $\hat{\alpha} > 0$ and significant at the 1% level, and $\hat{\beta} < 0$ and significant at the 1% level. This suggests that natural resources significantly alter the relationship between FDI by reducing the positive effect of democracy on FDI. To elucidate our results, we evaluate the estimated value of $\partial fdi/\partial dem$ at reasonable values of *nat*. Specifically, for each country, we calculate the average value of $\overline{nat}$ over the period 1982–2007, which we denote by $\overline{nat}$, and evaluate $\partial fdi/\partial dem$ at the 10th, 25th, 50th, 75th, and 90th percentile and the mean of $\overline{nat}$. The 10th, 25th, 50th, 75th, and 90th percentile and the mean of $\overline{nat}$ correspond to the average value of $\overline{nat}$ for Mauritius, Thailand, Ukraine, Indonesia, Syria and Belarus, respectively. The results are reported in Table 4. Note that $\partial fdi/\partial dem$ drops substantially as $\overline{nat}$ increases from the 10th to the 75th percentile of $\overline{nat}$. For the difference GMM estimations, the decline in $\partial fdi/\partial dem$ is about 83% for the regression using *free*, 82% for *polity*, and 81% for *icrg*; and for the system estimations, $\partial fdi/\partial dem$ decreases by about 83%, 82% and 81% for *free*, *polity* and *icrg*, respectively. This indicates that natural resources drastically reduce the effectiveness of democracy in promoting FDI.

(iii) Can natural resources completely neutralize the positive effect of democracy on FDI?
As shown in Table 4, the estimated value of $\partial fdi/\partial dem$ is positive and significant, up to the 75th percentile of $\overline{nat}$, suggesting that democracy has a positive effect on FDI for at least three quarters of the countries in the sample. However, the estimated value of $\partial fdi/\partial dem$ loses significance or turns negative and significant when evaluated at the 90th percentile of $\overline{nat}$, an indication that for at least 10% of the countries in our sample, democracy has no significant effect on FDI or has a negative effect.

(iv) Which countries may benefit from an improvement in democratization and which countries may not?
To answer this question, we categorize our sample countries into two: Category A refers to countries where an expansion in democratic rights may promote FDI, and Category B refers to countries where an increase in democracy may not

Table 5
The interaction effect of fuel, minerals and democracy on FDI.

Variables	Difference GMM			System GMM		
	Free	*Polity*	*Icrg*	*Free*	*Polity*	*Icrg*
Democracy, *dem*, $\hat{\alpha}$	2.657***	1.971***	6.008***	2.060***	2.115***	5.685***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$fe \times dem$, $\hat{\beta}_1$	−0.043***	−0.034***	−0.116***	−0.045***	−0.046***	−0.101***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$me \times dem$, $\hat{\beta}_2$	−0.034***	−0.041***	−0.120***	−0.035***	−0.037***	−0.131***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$H_o: \beta_1 = \beta_2$ (p-values)	0.556	0.470	0.701	0.390	0.252	0.000
Reject H_0?	No	No	No	No	No	Yes

*** p<0.01.

result in an increase in FDI, and may possibly reduce FDI. We now attempt to identify the countries in the two categories. We first note that $\hat{\alpha} > 0$ and $\hat{\beta} < 0$, implying that there exists a critical value of *nat*, nat^*, such that $\partial fdi / \partial dem = \hat{\alpha} + \hat{\beta} \times nat^* = 0$. This implies that $\partial fdi / \partial dem > 0$ if and only if $nat < nat^*$, suggesting that countries for which $nat < nat^*$ fall in Category A and countries for which $nat \geq nat^*$ fall in Category B. In classifying the countries, we compare each country's $\overline{nat}$ (i.e., the value of *nat* averaged over the period 1982–2007) with nat^*. Note that each of the six regressions will produce a different value of nat^*.[12] Our selection criterion is based on the median value of *nat*, which is approximately equal to 52%. Thus, countries for which $\overline{nat} < 52\%$ fall in Category A and the remaining countries fall in Category B. There are 90 countries in Category A (about 80% of the countries in the sample) and 22 countries in Category B. Note that $\partial fdi / \partial dem \leq 0$ for the Category B countries, suggesting that all else equal, foreign direct investors prefer less democratic governments in these 22 countries. The countries are Algeria, Angola, Azerbaijan, Bolivia, Chile, Congo Republic, Gabon, Iran, Kazakhstan, Mongolia, Niger, Nigeria, Oman, Papua New Guinea, Peru, Russia, Seychelles, Syria, Trinidad, Venezuela, Yemen and Zambia (see Table A1 in the Appendix).[13]

(v) Does the effect of democracy on FDI depend on the type of natural resource?
Recall that $nat = fe + me$, where *fe* is the share of fuel in total merchandise exports and *me* is the share of metals and ore in total merchandise exports. Boschini et al. (2007) find that different types of natural resources have different effects on economic growth. Thus, a question that comes to bear is whether the type of natural resources is relevant in determining the effect of democracy on FDI. For example, Zambia and Nigeria are resource intensive countries. However, Zambia's exports are concentrated in hard minerals (2% oil and 87% minerals) whereas Nigeria's exports are mainly in oil (96% oil and 0.03% minerals). Is the partial effect of democracy on FDI for these two countries statistically different? To answer this question, we re-estimate Eq. (1) where we use *fe* and *me* as measurements of natural resources, i.e.,

$$fdi_{it} = \rho fdi_{i,t-1} + \alpha dem_{it} + \gamma_1 fe_{it} + \gamma_2 me_{it} + \beta_1 fe_{it} \times dem_{it} + \beta_2 me_{it} \times dem_{it} + \Sigma_{j=1}^{J} \gamma_j Z_{jit} + \theta_i + \varepsilon_{it} \quad (2)$$

Here, $\partial fdi / \partial dem = \alpha + \beta_1 \times fe + \beta_2 \times me$. The values of $\hat{\alpha}$, $\hat{\beta}_1$ and $\hat{\beta}_2$ are reported in Table 5. Note that $\hat{\alpha}$ is positive and significant at the 1% level, and $\hat{\beta}_1$ and $\hat{\beta}_2$ are negative and significant at the 1% level in all the regressions. This suggests that both oil and minerals undermine the positive effect of democracy on FDI. We now determine whether the interaction effect of democracy and natural resources on FDI is significantly different for fuel and minerals. Here, we test the hypothesis H_0: $\beta_1 = \beta_2$. As shown in Table 5, we refuse to reject H_0 in five out of the six regressions. Our results therefore suggest that overall, the type and the composition of resource intensity are not relevant in

Table 6
Robustness regressions.

Variables	Difference GMM		System GMM	
	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\alpha}$	$\hat{\beta}$
Panel A: sub-samples				
Middle income countries, $r<1$	3.648***	−0.063***	3.315***	−0.063***
	(0.000)	(0.003)	(0.000)	(0.004)
Middle income countries, $r>1$	2.620***	−0.026***	2.440***	−0.032***
	(0.000)	(0.003)	(0.000)	(0.004)
Low income countries, $r<1$	1.035***	−0.053***	2.763***	−0.030
	(0.000)	(0.000)	(0.000)	(0.109)
Low income countries, $r>1$	0.966***	−0.044***	2.051***	−0.010
	(0.000)	(0.000)	(0.000)	(0.109)
Sub-Saharan Africa (SSA), $r<1$	−0.471	−0.031	2.744***	−0.078***
	(0.782)	(0.112)	(0.008)	(0.000)
Sub-Saharan Africa (SSA), $r>1$	0.799**	−0.056***	−0.082	−0.041***
	(0.013)	(0.000)	(0.831)	(0.000)
Non-SSA countries	3.052***	−0.019***	1.802***	−0.012***
	(0.000)	(0.000)	(0.000)	(0.009)
Exclude transition countries	2.697***	−0.054***	2.674***	−0.075***
	(0.000)	(0.000)	(0.000)	(0.000)
Panel B: sub-periods				
1982–1992	0.884**	−0.035***	1.219***	−0.045***
	(0.018)	(0.000)	(0.003)	(0.000)
1992–2007	2.631***	−0.034***	1.689***	−0.027***
	(0.000)	(0.009)	(0.000)	(0.008)
1970–2007	2.463***	−0.050***	2.218***	−0.049***
	(0.000)	(0.000)	(0.000)	(0.000)
Panel C: alternative measures of democracy				
Principal component	1.126***	−0.020***	1.152***	−0.019***
	(0.000)	(0.000)	(0.000)	(0.000)
Average democracy	5.717***	−0.100***	5.848***	−0.097***
	(0.000)	(0.000)	(0.000)	(0.000)
Panel D: time fixed effects and alternative measure for dependent variable				
Include fixed effects	2.128***	−0.032***	2.177***	−0.038***
	(0.000)	(0.000)	(0.000)	(0.000)
FDI per capita	6.355***	−0.196***	7.130***	−0.207***
	(0.000)	(0.000)	(0.000)	(0.000)

*** p<0.01.
** p<0.05.

[12] The values of nat^* for the difference regressions are 65, 50 and 56 for *free*, *polity* and *icrg*, respectively; and the values for the system regressions are 51, 52 and 51, for *free*, *polity* and *icrg*, respectively.

[13] A word of caution is that the classification of the countries is not clear cut and is based on the GMM estimate of nat^*, which is a random variable.

Table 7
Robustness regressions. FDI Risk, institutional quality and political risk.

Variables	Difference GMM				System GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Include FDI risk	Include institutional quality	Include political risk	Include all variables	Include FDI risk	Include institutional quality	Include political risk	Include all variables
dem, $\hat{\alpha}$	3.572***	3.894***	3.816***	3.644***	3.784***	4.238***	4.272***	4.294***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
nat×*dem*, $\hat{\beta}$	−0.068***	−0.070***	−0.075***	−0.070***	−0.070***	−0.077***	−0.082***	−0.083***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FDI risk	−3.523***			−2.203***	−1.857***			−1.023***
	(0.000)			(0.000)	(0.000)			(0.000)
Corruption		0.974***		0.064		−0.250		−1.550***
		(0.004)		(0.855)		(0.245)		(0.000)
Rule of law		0.477**		0.541*		0.098		1.357***
		(0.044)		(0.067)		(0.644)		(0.000)
Bureaucracy		−1.515***		−1.639***		−0.195		−0.490**
		(0.000)		(0.000)		(0.198)		(0.014)
Conflict			0.811***	1.780***			2.507***	4.012***
			(0.003)	(0.000)			(0.000)	(0.000)
Instability of government			−2.801***	−1.731***			−2.440***	−2.040***
			(0.000)	(0.000)			(0.000)	(0.000)
Number of observations	455	455	455	455	551	551	551	551
Number of countries, *n*	86	86	86	86	87	87	87	87
Number of instruments, *i*	71	73	72	76	80	82	81	85
Instrument ratio, $r=n/i$	1.21	1.18	1.19	1.13	1.09	1.06	1.07	1.02
Limit the no.of lags of dependent variable used in instrumentation?	No	No	No	No	No	No	No	No

FDI risk reflects the risk of exprorpriation and government contraints on profit repatriation; corruption reflects the level of corruption within the political system; law and order measures the effectiveness of the rule of law; bureaucracy refers to the institutional strength and quality of the bureaucracy; conflict is the average of internal conflict and external conflict; and instability of government reflects the ability of government to stay in office.

The data are normalized to lie between zero and one, such that a higher number implies more corruption, better law enforcement, higher FDI risk and more political instability.

*** $p<0.01$.

** $p<0.05$.

determining the interaction effect of democracy and natural resources on FDI.

5. Robustness regressions

In order to have a reasonable sample size, the robustness estimations employ the measure of democracy that has the highest number of observations, i.e., *free*. Furthermore, to keep the discussion focused and also conserve on space, we report a summary of the results in Tables 6, 7 and 8. The full estimation results are available in the supplementary file, available from the authors upon request. Below, we provide a brief discussion of the robustness estimations.

(i) Sub-samples: according to Blonigen and Wang (2005), the determinants of FDI to poor countries are different from the determinants of FDI to more developed economies. Asiedu (2002) also finds that the factors that drive FDI to Sub-Saharan Africa (SSA) are different from the factors that drive FDI to other developing countries. We therefore run separate regressions for middle income, low income, SSA and non-SSA countries. We also note that our results may be driven by the extensive political transformation that took place in Eastern Europe in the 1990s. We examine this hypothesis by running regressions where we exclude Transition countries.
The number of countries for the middle income, low income and SSA samples are small, and as a consequence, the instrument ratio, $r<1$ for these three sub-samples. Hence, for these samples, we check whether the results are robust to a reduction in instrument count, i.e., when we limit the instrument count such that $r>1$. In Panel A of Table 6, we report the values of $\hat{\alpha}$ and $\hat{\beta}$ for $r<1$ as well as $r>1$. Clearly, the results are robust: $\hat{\alpha}$ and $\hat{\beta}$ are significant at least at the 5% level in 14 out of the 16 regressions.

(ii) Different time periods: it is possible that our results are driven by the global expansion of democracy that began in the 1990s, in particular, after the collapse of the Soviet Union in 1991. To test this hypothesis, we split the sample into two sub-periods: 1982–1991 and 1992–2007. Now, recall that the *icrg* data are not available prior to 1982. Hence, in order to facilitate comparison between the three measures of democracy, the benchmark regressions were confined to the period 1982–2007. A relevant question is whether our results hold when we include data from the 1970s, i.e., the period 1970–2007. As shown in Panel B, $\hat{\alpha}$ and $\hat{\beta}$ are significant at the 1% level in all the six regressions.

(iii) Alternative measures of democracy: the definitions of *free*, *polity* and *icrg* are different, suggesting that the information in these indicators is not identical. However, the democracy variables are highly correlated and the correlation coefficients are significant at the 1% level, suggesting that there is a high degree of commonality between the variables.[14] We run a factor analysis on *free*, *policy* and *icrg* and use the principal component as a measure of democracy. We also compute the average of *free*, *polity* and *icrg* and use that as proxy for the overall level of democratization in the host country. Panel C shows that our results are robust to the alternative measures of democracy: $\hat{\alpha}$ and $\hat{\beta}$ are significant at the 1% level in all the four regressions.

(iv) Time fixed effects and alternative measure for the dependent variable: the benchmark regressions do not include time fixed effects. One reason for including time fixed effects is to expunge

[14] The correlation coefficient, ρ, is 0.89 for *free* and *polity*, 0.68 for *icrg* and *free*, and 0.64 for *polity* and *icrg*.

Table 8
Robustness regressions. Endogenous democracy and natural resources.

Variables	Difference GMM				System GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	dem is endogenous	*dem* and *nat* endogenous	*dem* is endogenous	*dem* and *nat* endogenous	*dem* is endogenous	*dem* and *nat* endogenous	*dem* is endogenous	*dem* and *nat* endogenous
dem, $\hat{\alpha}$	3.982***	2.474***	3.775***	3.563***	1.769***	1.601***	1.338***	1.558***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$nat \times dem$, $\hat{\beta}$	−0.092***	−0.062***	−0.107***	−0.107***	−0.036***	−0.048***	−0.027***	−0.046***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Number of observations	566	566	566	566	652	652	652	652
Number of countries, n	106	106	106	106	112	112	112	112
Number of instruments, i	197	259	89	97	224	295	110	105
Instrument ratio, $r = n/i$	0.57	0.41	1.19	1.09	0.50	0.38	1.02	1.07
Limit the no. of lags of dependent variable used in instrumentation?	No	No	Yes, 2	Yes, 2	No	No	Yes, 8	Yes, 4
Limit the no.of lags of endogenous variables used in instrumentation?	No	No	No	No	No	No	Yes, 2	Yes, 2

*** $p<0.01$.

the effect of business cycles. However, including time dummies increases the number of instruments employed in the regressions, and this in turn weakens the reliability of the empirical results. Here, we test whether our results hold when we include time fixed effects.

Note that one can use FDI per capita as a dependent variable to analyze the effect of democracy on FDI flows. We use an alternative measure, *FDI*/*GDP* for the following reasons. First, the studies on the determinants of FDI typically employ *FDI*/*GDP* as dependent variable. Second, the data on *FDI*/*GDP* has a wider coverage. For example the number of observations drop by about 20% (from 650 to 520) when we employ FDI per capita as dependent variable. We note that the effect of democracy on *FDI*/*GDP* might reflect the impact of democracy on FDI, on GDP or both FDI and GDP. Thus, we examine whether our results hold when we use FDI per capita as the dependent variable. Panel D shows that $\hat{\alpha}$ and $\hat{\beta}$ are significant at the 1% level in all the four regressions.

(v) FDI risk, quality of institutions and political risk: the results are reported in Table 7. We consider two specifications. Specifically, we run regressions where we include the measures of FDI risk, institutional quality and political risk one at a time (Columns 1–3 and 5–7), and another where we include all the variables (Columns 4 and 8). The results are robust: $\hat{\alpha}$ is positive and significant at the 1% level and $\hat{\beta}$ is negative and significant at the 1% level in all the regressions. In addition, the magnitudes of $\hat{\alpha}$ and $\hat{\beta}$ are fairly stable across specifications. With regard to the robustness variables, we find that overall, FDI risk, high levels of bureaucracy, and an ineffective legal system impede FDI flows. The effect of political instability on FDI is puzzling. Specifically, the estimated coefficient of the conflict variable, *conflict*, and the measure of instability of government, *govstab*, are significant at the 1% level in all the regressions, but have opposite signs: the coefficient of *conflict* is positive (wrong sign) and the coefficient of *govstab* is negative. The results persist even when *conflict* and *govstab* are included one at a time. Corruption did not display a consistent relationship with FDI.

(vi) Endogeneity of democracy and natural resources: as pointed out in the introduction, democracy can be endogenous. Also, there is a potential endogeneity problem associated with our measure of natural resources. Specifically, it is possible that an unobserved variable may affect both FDI and exports. Since we measure natural resources as a share of exports, it is possible that our estimates are biased. The difference and the system estimators mitigate the endogeneity problem. However, in order to be thorough, we address this issue explicitly by specifying democracy and natural resources as endogenous variables in our regressions.

Note that if democracy is endogenous, then the interaction between democracy and natural resources is also endogenous. We consider two cases. In case 1, only democracy is endogenous. Thus here, we re-estimate Eq. (1) where we specify *dem* and $nat \times dem$ as endogenous variables. In case 2, both democracy and natural resources are endogenous and therefore the endogenous variables are *dem*, *nat*, and $nat \times dem$. The results are reported in Table 8. As expected, the instrument count increases substantially when *dem* and *nat* are endogenous, and this causes r to be low.[15] Columns 1, 2, 5 and 6 show the results when the number of lags of the variables used in instrumentation is unrestricted and Columns 3, 4, 7 and 8 report the results when the number of instruments is curtailed. The results hold in both cases: $\hat{\alpha}$ and $\hat{\beta}$ are significant at the 1% level in all the eight regressions.

6. Conclusion

This paper examines the interaction between democracy, natural resources and FDI. We find that the effect of democracy on FDI depends on the importance of natural resources in the host country's exports. Democracy facilitates FDI in countries where the share of natural resources in total exports is low, but has a negative effect on FDI in countries where exports are dominated by natural resources. This result has important implications for countries in Sub-Saharan Africa — many of the countries in the region are in dire need of FDI (Asiedu, 2002), have weak democracies (Fosu, 2008), and their exports are dominated by primary commodities (Muehlberger, 2007).[16]

[15] For example the instrument count for the system GMM regressions increases from 82 for the case where *nat* and *dem* are exogenous (Column 4 of Table 3) to 295 when *nat* and *dem* are endogenous (Column 6 of Table 8).

[16] In about half of the countries in SSA, the share of primary commodity exports in total merchandise exports exceed 80% (Muehlberger, 2007).

Appendix A

Countries included in regressions.

In Sub-Saharan Africa					Natural resource	Outside Sub-Saharan Africa					Natural resource
Country	Code	*Free*	*Polity*	*Icrg*		Country	Code	*Free*	*Polity*	*Icrg*	
Angola[a]	AGO	0.06	NA	0.37	99.69	Albania[c]	ALB	0.60	0.77	0.68	11.09
Benin	BEN	0.81	0.80	NA	4.75	Algeria	DZA	0.18	0.26	0.46	97.00
Botswana[a]	BWA	0.83	0.95	0.56	8.30	Argentina	ARG	0.81	0.88	0.77	16.04
Burkina Faso	BFA	0.33	0.33	0.54	1.15	Armeniac	ARM	0.44	0.69	0.59	26.12
Burundi	BDI	0.31	0.48	NA	1.74	Azerbaijan[c]	AZE	0.17	0.17	0.31	79.35
Cameroon[a]	CMR	0.12	0.22	0.41	43.28	Bangladesh[b]	BGD	0.63	0.64	0.56	0.82
Central Afr. Rep.	CAF	0.42	0.54	NA	22.07	Barbados	BRB	1.00	NA	NA	6.80
Congo, Rep.[a]	COG	0.30	0.53	0.58	90.65	Belarus[c]	BLR	0.08	0.15	0.27	24.17
Cote d'Ivoire	CIV	0.15	0.24	0.41	17.2	Belize	BLZ	1.00	NA	NA	15.81
Ethiopia	ETH	0.34	0.55	0.57	2.18	Bhutan[b]	BTN	0.00	0.00	NA	32.54
Gabon[a]	GAB	0.28	0.26	0.51	84.72	Bolivia	BOL	0.82	0.93	0.63	63.77
Gambia	GMB	0.21	0.23	0.60	1.66	Brazil	BRA	0.78	0.83	0.65	13.95
Ghana	GHA	0.64	0.60	0.48	16.65	Bulgaria[c]	BGR	0.93	0.93	0.85	21.33
Kenya	KEN	0.28	0.35	0.56	15.36	Cambodia[b]	CAM	0.17	0.60	NA	0.01
Lesothoa	LSO	0.72	0.90	NA	0.05	Chile	CHL	0.72	0.75	0.62	52.84
Madagascar	MDG	0.59	0.66	0.72	8.44	China	CHN	0.02	0.15	0.35	7.50
Malawi	MWI	0.42	0.42	0.45	0.20	Colombia	COL	0.67	0.88	0.63	31.03
Mali	MLI	0.8	0.80	0.56	1.31	Costa Rica	CRI	1.00	1.00	0.85	1.71
Mauritania[a]	MRT	0.17	0.20	NA	43.2	Croatia[c]	HRV	0.72	0.66	0.78	13.69
Mauritius	MUS	0.98	1.00	NA	0.74	Czech Republic[c]	CZE	1.00	1.00	0.87	5.57
Mozambique	MOZ	0.67	0.8	0.56	44.56	Dominica	DMA	0.92	NA	NA	0.95
Niger	NER	0.42	0.65	0.59	59.54	Dominican Rep.	DOM	0.83	0.83	0.65	2.81
Nigeria	NGA	0.28	0.43	0.43	96.48	Ecuador	ECU	0.77	0.89	0.67	47.73
Rwanda	RWA	0.06	0.26	NA	22.09	Egypt	EGY	0.24	0.22	0.53	51.06
Senegal	SEN	0.65	0.62	0.62	22.87	El Salvador	SLV	0.75	0.83	0.54	5.35
Seychelles[a]	SYC	0.33	NA	NA	54.02	Estonia[c]	EST	0.99	0.8	0.84	10.45
Sierra Leone	SLE	0.39	0.15	NA	35.99	Fiji	FJI	0.48	0.75	NA 0.30	
South Africa	ZAF	0.80	0.88	0.73	19.94	Georgia	GEO	0.58	0.76	NA	28.27
Sudan	SDN	0.04	0.17	0.32	31.90	Grenada	GRD	0.96	NA	NA	0.10
Swaziland	SWZ	0.06	0.05	NA	1.06	Guatemala	GTM	0.58	0.72	0.56	4.82
Tanzania	TZA	0.49	0.53	0.65	9.67	Guyana	GUY	0.81	0.80	0.82	14.50
Togo	TGO	0.17	0.30	0.27	36.90	Haiti	HTI	0.24	0.47	0.24	0.09
Uganda	UGA	0.33	0.34	0.37	4.31	Honduras	HND	0.73	0.81	0.52	5.49
Zambia	ZMB	0.53	0.71	0.67	79.12	Hungary	HUN	0.95	0.96	0.89	5.37
Zimbabwe	ZWE	0.26	0.31	0.43	16.53	India[b]	IND	0.78	0.92	0.75	9.71
Indonesia	IDN	0.41	0.41	0.57	42.45	Papua Guinea[b]	PNG	0.83	1.00	0.81	55.09
Iran	IRN	0.17	0.46	0.61	83.37	Paraguay	PAY	0.58	0.85	0.45	0.67
Jamaica	JAM	0.83	0.97	0.71	12.61	Peru	PER	0.67	0.79	0.55	54.85
Jordan	JOR	0.38	0.29	0.58	27.24	Philippines	PHL	0.70	0.78	0.74	7.08
Kazakhstan	KAZ	0.17	0.26	0.26	70.10	Poland[c]	POL	0.94	0.90	0.82	13.45
Kyrgyz	KGZ	0.31	0.38	NA	22.65	Romania[c]	ROM	0.75	0.87	0.86	12.74
Iran	IRN	0.17	0.46	0.61	83.37	Russian	RUS	0.40	0.78	0.56	56.68
Jamaica	JAM	0.83	0.97	0.71	12.61	Slovak Rep[c]	SVK	0.96	0.93	0.89	8.84
Jordan	JOR	0.38	0.29	0.58	27.24	Sri Lanka	LKA	0.61	0.75	0.71	3.47
Kazakhstan[c]	KAZ	0.17	0.26	0.26	70.10	St. Kitts	KAN	0.99	NA	NA	0.03
Kyrgyzc	KGZ	0.31	0.38	NA	22.65	St. Lucia	LCA	1.00	NA	NA	0.03
Latvia	LAV	0.94	0.90	0.83	6.54	St. Vincent	VCT	0.83	NA	NA	0.07
Lithuania[c]	LTU	0.99	1.00	0.88	21.85	Syrian	SYR	0.04	0.08	0.25	62.42
Malaysia	MYS	0.47	0.67	0.68	16.91	Thailand	THA	0.62	0.75	0.58	3.55
Mexico	MEX	0.66	0.66	0.77	28.04	Trinidad	TTO	0.92	0.96	0.52	63.30
Moldova	MDA	0.70	0.88	0.80	2.91	Tunisia	TUN	0.21	0.26	0.42	19.83
Mongolia[b]	MNG	0.83	0.99	0.68	52.09	Turkey	TUR	0.62	0.85	0.73	5.23
Morocco	MAR	0.38	0.15	0.49	17.51	Ukraine[c]	UKR	0.61	0.83	0.65	14.38
Nepal	NPL	0.57	0.53	NA	1.31	Uruguay	URY	0.91	0.90	0.72	1.68
Nicaragua	NIC	0.67	0.91	1.00	2.55	Vanuatu	VUT	0.94	NA	NA	0.06
Oman	OMN	0.17	0.08	0.17	84.84	Venezuela	VEN	0.76	0.88	0.76	88.39
Pakistan[b]	PAK	0.35	0.52	0.31	2.26	Vietnam[b]	VNM	0.00	0.15	0.14	22.15
Panama	PAN	0.70	0.74	0.65	5.54	Yemen[b]	YEM	0.31	0.40	0.65	78.86

The democracy data are normalized so they range from zero to one. A higher number implies more democracy. Natural resources is the share of fuel and minerals in total merchandize exports (%). All the data are averaged from 1982–2007.

[a] Refers to countries in Sub-Saharan Africa that are not low-income.

[b] Refers to countries outside Sub-Saharan Africa that are low-income.

[c] Refers to Transition countries.

Appendix B. Supplementary data

Supplementary data to this article can be found online at doi:10.1016/j.jinteco.2010.12.001.

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