Democracy and Reforms:
Evidence from a New Dataset[†]

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Empirical evidence on the relationship between democracy and economic reforms is limited to few reforms, countries, and years. This paper studies the effect of democracy on the adoption of economic reforms using a new dataset on reforms in the financial, capital and banking sectors, product markets, agriculture, and trade for 150 countries over the period 1960–2004. Democracy has a positive and significant impact on the adoption of economic reforms, but there is scarce evidence that economic reforms foster democracy. Our results are robust to the inclusion of a large variety of controls and estimation strategies. (*JEL* D72, E02, E60, L51, O17, O20)

Political and economic freedoms go hand in hand...or do they not? This is one of the oldest questions in economics and in political science, which is still largely unanswered. This paper answers this question using a novel dataset on economic reforms, which is the most exhaustive in the literature in terms of country, year, and reform coverage. This question is still open because there are very good theoretical arguments and numerous examples as to why political freedom can either hinder or facilitate economic reforms.

History offers numerous examples where economic reforms were undertaken by nondemocratic regimes. Take the historical examples of Chile under Augusto Pinochet, South Korea under Chung-hee Park, Mexico in 1986, or Guyana in 1988. In these cases, important economic reforms were undertaken under nondemocratic regimes. Historically, many contemporary industrialized countries were not democracies when they took off economically (Schwarz 1992). Most East Asian economies did not develop under fully democratic regimes. In addition to these historical examples from several regions of the world and different historical periods, compelling

theoretical reasons may explain why less democratic regimes may favor economic reforms and growth.

Democracy can hinder reforms if special interests prevail on the general welfare. A democratic regime can fall prey to interest groups, which put their goals before general well being. Capitalists entrenched in their rent-seeking positions are often the main opponents of economic reforms (Rajan and Zingales 2004). Interest groups can block reforms if there is uncertainty about the distribution of the benefits (Fernandez and Rodrik 1991). A benevolent dictator can shelter the institutions, avoid that the state becomes captive of any specific interest group, and allow the state to perform its function in an efficient way. Along these lines, Haggard 1990 argues "...Institutions can overcome collective-action dilemmas by restraining the self-interested behavior of groups through sanctions: collective action problems can be resolved by command." In addition to pressure from interest groups, wages are typically higher under democracy (Rodrik 1999) and democracy can lead to excessive private and public consumption and lack of sufficient investment (Huntington 1968). Dictatorial regimes can also rely on financial repression to increase the domestic saving rate. Several countries, including the Soviet Union and many East Asian countries, have been able to increase savings, and ultimately achieve high economic growth rates, thanks to a repressive political system and an attendant highly regulated financial system.

In sum, do the historical examples and the theoretical arguments provide a compelling case against the role of democracy in fostering economic reforms? The answer to this question is a resounding no.

The alternative view that democracy often accompanies economic reforms is also based on strong theoretical arguments and solid empirical evidence. Secured property rights, as guaranteed by a democracy, are considered key to economic development (de Soto 2000). In general, dictators cannot credibly make commitments because of time-inconsistency; so no reform can be undertaken (McGuire and Olson 1996). Autocratic rulers tend to be predatory, disrupting economic activity and making any reform effort meaningless; autocratic regimes also have an interest in postponing reforms and maintaining rent-generating activities for a restricted number of supporting groups (Acemoglu and Robinson 2012). On the opposite side, democratic rulers should be more sensitive to the interest of the public, and so more willing to implement reforms that destroy monopolies in favor of the general interests. In addition to these theoretical arguments, there is strong empirical evidence that reforms are highly correlated with democracy.

Figure 1 shows the behavior over time of the index of democracy (measured as polity2 and normalized between zero and one)[1] and our deregulation indices (all the indices are normalized between zero and one, with 0/1 corresponding to the lowest/highest degree of deregulation) in the following six sectors (or areas)-(i) domestic financial, (ii) capital account, (iii) product markets (electricity and telecommunications), (iv) agriculture, (v) trade (based on tariffs), and (vi) current account transactions (see below for description). In all sectors, democracy and regulation indices move together over time, with democracy usually preceding the deregulation

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[1] Note that the slightly different values for the polity2 index in Figure 1 are due to the different coverage of countries for each sector.
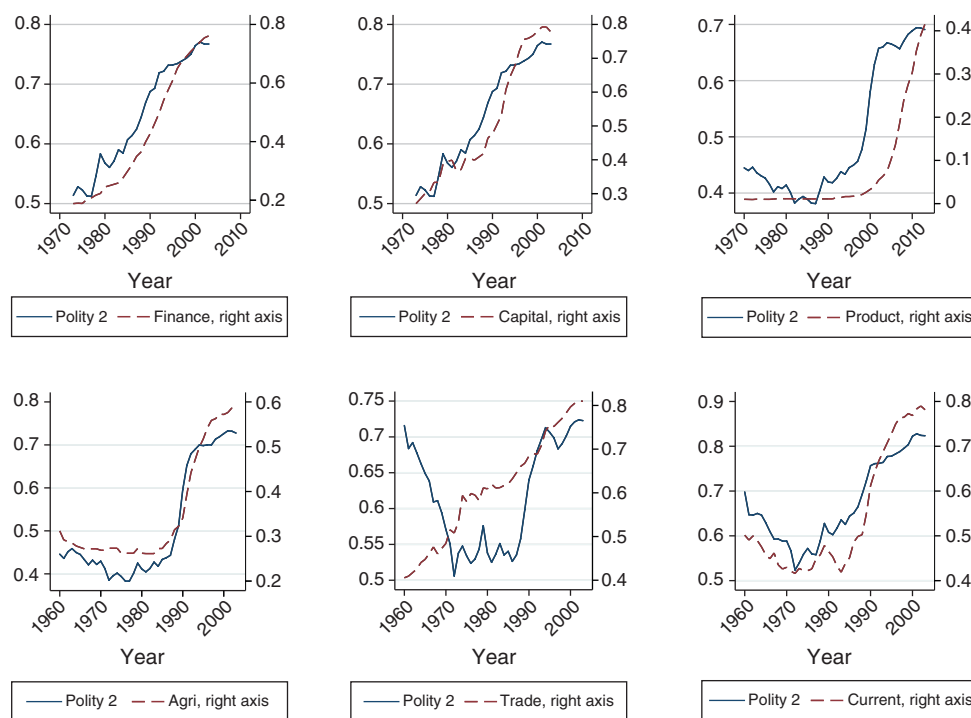
FIGURE 1. DEMOCRACY AND DEREGULATION

Notes: This figure shows the behavior over time of the index of democracy (measured as Polity 2 and normalized between zero and one) and six indices of regulation (all indices are normalized between zero and one, with 0/1 corresponding to the lowest/highest level of deregulation): (i) domestic financial sector, (ii) capital account, (iii) product markets (electricity and telecommunications), (iv) agriculture, (v) trade (based on tariffs), and (vi) current account transactions. The definitions are given in Table 1. Note that the average Polity 2 index is calculated over the countries for which a liberalization index is available.

process. The figure in itself, however, does not show that an increase in democracy necessarily causes economic reforms. The relationship could run in the opposite direction, or the increase in democracy and economic reforms could be driven by a common third factor.

The sharp contrast between these opposing views has left the question of the effects of democracy on economic reforms largely unanswered. The goal of this paper is to address, again, this issue, using a novel database that covers almost 150 countries, six sectors, and spans more than 40 years of data.

The main findings are that an increase in the quality of democratic institutions, as measured by the commonly used indices, is significantly correlated with the adoption of economic reforms, but there is little evidence of a feedback effect from economic to political reforms. These results are robust to controlling for country, reform-specific effects, and any possible interaction among them. Global reform waves and possible country-time varying determinants of reforms (including crises, reforms in neighboring countries, existence of compensation for losers, human capital and bureaucratic quality, and several political variables) do not weaken these results, which are also robust to using an instrumental variable strategy.

The remainder of the paper is organized as follows. Section I reviews the existing literature on economic reforms and democracy. Section II presents the data. Section III presents the results on the effects of democracy on reforms, controlling for other possible determinants of reforms and the possibility of reverse causality and omitted variables. Section IV concludes.

I. Democracy and Reforms: Theory and Empirics

While there are many theoretical predictions about the relationships between political and economic reforms, empirical evidence on the subject is limited to reforms in specific sectors, in particular, international trade and finance, micro-reforms, or specific countries over a short period of time. Our study is the first one to combine a comprehensive coverage of reforms in different sectors, a significant coverage of countries, and a long time period. In particular, the dataset used in this paper spans six sectors, and a set of both developing and developed countries from 1960 up until 2004.

A. *Theory*

Economic theory does not give a clear answer on whether democratization favors or hinders economic reforms, or if the relationship could go both ways. A priori, indeed, democratic regimes lead to more economic reforms if reforms create more winners than losers. Democratically elected governments may also have greater legitimacy to implement and sustain policies bearing short-term costs. Similarly, institutional changes—e.g., strengthening an independent legal system or a professional civil service required to ensure political freedom and democracy—also could lead to successful market reforms. Alternatively, democratization could lead to less economic reforms if the electoral system creates a pivotal voter with veto power. In fact, uncertainty about the impact of economic reforms at the individual level could also lead a rational electorate to vote against reforms even if they are known ex ante to benefit a majority of them (Fernandez and Rodrik 1991).

The theoretical predictions about the feedback effect from economic reforms to democratization are ambiguous as well. Economic reforms improve the quality of democratic institutions by increasing the power of the middle class (López-Córdova and Meissner 2008; Papaioannou and Siourounis 2008; Acemoglu and Robinson 2006; Rajan and Zingales 2003). On the other hand, economic reforms could lower democracy through increases in income inequality and the associated political strife and violence (Quinn 1997, Dixon and Boswell 1996).

B. *Empirical Evidence*

A few empirical papers have looked at the relationship between democracy and reforms. None of these studies provide a systematic and comprehensive coverage in term of sectors and countries, but they all look at reforms in one specific sector and their relationship with political liberalization. Results are mixed.

Looking at the relationship between economic liberalization in the trade sector and democratization, Giavazzi and Tabellini (2005) find evidence of a positive and significant relationship between political and economic liberalization. They find that the feedback effect could run in both directions although the causality is *more* likely to run from political to economic liberalization.[2] Persson (2005) also shows that the forms of democracy (e.g., parliamentary, proportional, and permanent ones) explain variation in trade reforms (measured by the Wacziarg and Welch index and an index of property rights protection). In a similar vein, Banerji and Ghanem (1997) and Milner and Kubota (2005) find evidence that democracy leads to liberalization in the trade sector.[3]

On the relationship between democracy and a more general measure of reforms (including capital account in addition to trade), Eichengreen and Leblang (2008) find evidence of a positive two-way relationship between the two.[4] Quinn (2000) finds evidence that democracies liberalize international finance, especially capital accounts.[5] He also finds evidence of feedback effects from financial liberalization to democratizations, whereby capital account liberalization is associated with decreases in democracy 6 to 15 years later.

Overall, most cases in literature suggest that causality is more likely to run from political to economic reforms. Some evidence for a feedback effect also exists, but it is limited to few sectors and time periods. Our dataset allows us to study this relationship systematically across a large number of sectors, countries, and spanning a longer time period. We find consistent and robust evidence of an effect of democracy on reforms. There is scarce evidence that economic reforms foster democracy. We see our results as more general and robust across specifications, sectors and time periods.

II. Data

A. *Regulation Indices*

Our analysis is based on a completely new and extensive dataset, compiled by the Research Department of the IMF, describing the degree of regulation for a sample of 150 industrial and developing countries. The new dataset thus has significant advantages over existing data sources, which cover a limited number of sectors and countries. Regulation indices cover six sectors, including both financial and real sectors. Financial sector regulation indices cover the domestic financial market and the external capital account, while real sector indicators include measures of regulation for product and agriculture markets, trade, and the current account. Each indicator

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[2] Economic liberalization is defined as the event of becoming open in the trade sector (the measure of openness is taken by Wacziarg and Welch 2008). Political liberalization is the event of becoming a democracy, defined by strictly positive values of polity2. Their sample covers a panel of 140 countries over the period 1960–2000.

[3] The former presents cross-country evidence to show that authoritarian regimes are associated with higher protectionism (measured by an index of protectionism from Dollar 1992), while the latter shows that regime changes toward democracy are associated with greater liberalization (measured by tariff rates and Sachs Warner indices).

[4] See also Alesina, Ardagna, and Trebbi (2006); Abiad and Mody (2005); Drazen and Easterly (2001); and Lora (1998).

[5] Financial regulation is measured through changes in current and capital account openness created using the *Exchange Arrangement and Exchange Restrictions* from the International Monetary Fund (IMF). Democracy is measured by changes in polity2. The sample consists of 50 countries over the period 1950–1997.

TABLE 1—REGULATION INDICES

	Financial sector
	The index of domestic financial liberalization is an average of six subindices, five related to *banking* and one related to the *securities market*
Banking	The banking subindex is an average of the following five indicators: (i) interest rate controls, such as floors or ceilings; (ii) credit controls, such as directed credit and subsidized lending; (iii) competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks; (iv) the degree of state ownership; and (v) the quality of banking supervision and regulation, including power of independence of bank supervisors, adoption of Basel capital standards, and a framework for bank inspections.
Securities market	The sixth subindex relates to *securities markets* and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents. The subindices are aggregated with equal weights. Each subindex is coded from zero (fully repressed) to three (fully liberalized).
Data sources	Abiad, Detragiache, and Tressel (2008), following the methodology in (Abiad and Mody 2005), based on various IMF reports and working papers, central bank websites, and others.
Coverage	1973–2005; Minimum and maximum number of countries in any year are 72 and 91, respectively.

	Capital account
	Qualitative indicators of restrictions on financial credits and personal capital transactions of residents and financial credits to nonresidents, as well as the use of multiple exchange rates. Index coded from zero (fully repressed) to three (fully liberalized).
Data sources	Abiad, Detragiach, and Tressel (2008), following the methodology in (Abiad and Mody 2005), based on various IMF reports and working papers, central bank websites, and others.
Coverage	1973–2005; Minimum and maximum number of countries in any year are 72 and 91 respectively.

	Product market
Electricity	The electricity indicators capture (i) the degree of unbundling of generation, transmission, and distribution; (ii) whether a regulator other than government has been established; and (iii) whether the wholesale market has been liberalized; and (iv) privatization. Each subindex is coded from zero to one or from zero to two.
Telecommunication	The telecommunication indicator captures (i) the degree of competition in local services; (ii) whether a regulator other than government has been established; (iii) the degree of liberalization of interconnection changes; and (iv) privatization. Each subindex is coded from zero to one or from zero to two.
Data sources	Electricity: Based on various existing studies and datasets as well as national legislation and other official documents. Telecommunication: Based on IMF commodities data, various existing studies and datasets, and national legislation and other official documents.
Coverage	1960–2003; Minimum and maximum number of countries in any year are 106 and 108 respectively.

(*Continued*)

contains different subindices summarizing different dimensions of the regulatory environment in each sector. The subindices are then aggregated into indices and normalized between zero and one. Higher values are associated with lower regulation.

TABLE 1—REGULATION INDICES (*Continued*)

	Agriculture market
	The index captures intervention in the market for the main agricultural export commodity in each country. The index can take four values (i) zero (public monopoly or monopsony in production, transportation, or marketing, e.g., export marketing boards); (ii) one-third (administered prices); (iii) two-thirds (public ownership of relevant producers or concession requirements); and (iv) one (no public intervention).
Data sources	Based on IMF commodities data, various existing studies and datasets, and national legislation and other official documents.
Coverage	1960–2003; Minimum and maximum number of countries in any year are 96 and 104, respectively
	Trade
	Trade liberalization is defined by looking at average tariff rates, with missing values extrapolated using implicit weighted tariff rates. Index normalized to be between zero and unity: zero means the tariff rates are 60 percent or higher, while unity means the tariff rates are zero.
Data sources	Various sources, including IMF, World Bank, WTO, UN, Clemens and Willamson (2004).
Coverage	1960–2005; Minimum and maximum number of countries in any year are 47 and 142, respectively.
	Current account
	Current account liberalization is defined with an indicator describing how compliant a government is with its obligations under the IMF's Article VIII to free from government restriction the proceeds from international trade in goods and services. The index represents the sum of two subcomponents, dealing with restrictions on trade in visibles, as well as in invisibles (financial and other services). It distinguishes between restrictions on residents (receipts for exports) and on nonresidents (payments for imports). Although the index measures restrictions on the proceeds from transactions, rather than on the underlying transactions, many countries in practice use restrictions on trade proceeds as a type of trade restriction. The index is scored between zero and eight in half-integer units, with eight indicating full compliance. Data sources based on the methodology in Quinn (1997) and Quinn and Toyoda (2007), drawing on information contained in the Fund's AREAER database (Annual Reports on Exchange Arrangements and Exchange Restrictions). Coverage 1960–2005; Minimum and maximum number of countries in any year are 50 and 65, respectively.

Notes: This table presents brief description of the reform indicators used in the paper. For a full description of all variables, data and sources refer to Ostry, Prati, and Spilimbergo (2009).

Table 1 presents a brief definition and sources of the regulation indicators used in this paper. Ostry, Prati, and Spilimbergo (2009) describes all data sources and full details of the construction of the indicators.

Domestic Financial Sector.—The measure of regulation in the domestic financial market is captured by two different subindicators.

(i) A measure of securities markets. This subindex assesses the quality of the market framework, including the existence of an independent regulator and the extent of legal restrictions on the development of domestic bond and equity markets.

(ii) A measure of banking sector regulation. This subindex captures reductions or removal of interest rate controls (floors or ceilings), credit controls (directed credit and subsidized lending), competition restrictions (limits

Table 2—Correlation between Reform Indicators

	Agriculture	Product market	Trade	Cap. acc.	Curr. acc.	Finance
Agriculture	1					
Prod. Mkt	0.30***	1				
Trade	0.32***	0.35***	1			
Cap. Acc.	0.40***	0.46***	0.57***	1		
Curr. Acc.	0.42***	0.47***	0.63***	0.77***	1	
Finance	0.44***	0.63***	0.62***	0.73***	0.71***	1

***Significant at the 1 percent level.

on branches and entry barriers in the banking market, including licensing requirements or limits on foreign banks), and public ownership of banks. This subindex also captures a measure of the quality of banking supervision and regulation, including the power and independence of bank supervisors, the adoption of Basel capital standards, and the presence of a framework for bank inspections.

Capital Account.—The regulation index for the capital account includes information on a broad set of restrictions, such as, for example, controls on external borrowing between residents and nonresidents, as well as approval requirements for foreign direct investment (FDI).

Product Market.—Turning to the real sector, the product market indicator covers the degree of regulation in the telecommunication and electricity markets, including the extent of competition in the provision of these services, the presence of an independent regulatory authority, and privatization.

Agricultural Market.—The agricultural sector indicator captures intervention in the market for the main agricultural export commodity in each country. It measures the extent of public intervention in the market going from total monopoly or monopsony in production, transportation or marketing (i.e., the presence of marketing boards), the presence of administered prices, public ownership of relevant producers or concession requirements to free markets.

Trade.—The degree of regulation in the trade sector is meant to capture distortions in international trade. It is measured by average tariffs and normalized between 0 and 1, where a 0 value means that tariff rates are 60 percent or higher and 1 means that tariff rates are 0.

Current Account.—Another way of looking at the degree of regulation in the trade sector is to define the extent of current account liberalization. This measure captures the extent to which a government is compliant with its obligations under the IMF's Article VIII to free from government restriction the proceeds from international trade in goods and services.

Additional details on the sources and specifics of each indicator can be found in Ostry, Prati, and Spilimbergo (2009) and Table 1.

B. *Aggregation and Normalization*

For each of our six sectors, we construct an aggregate index of regulation by averaging the subindices for that particular sector (for the cases in which we do have multiple subindices, like product market or the financial sector). Each sectoral indicator is then normalized between zero and one, where one indicates a higher degree of deregulation. Table 2 reports the pair-wise correlations between the different regulation indices. Overall, we do find that the degree of regulation is correlated across sectors. More specifically, financial sector, trade, current, and capital account indices are strongly correlated among themselves, and less so with agricultural and product market indices (with the exception of the financial sector index which is strongly correlated to the product market one).

For all of our analysis, "reform" in a given sector is defined as an annual change in the index. We run most of our regressions at the sector-country and year level; however, as one of our robustness checks, we also aggregate the six reform indicators using a principal component analysis.

C. *Other Data*

Democracy is measured using the standard, well-established measure of democracy taken from the Polity IV database. In particular, we use the combined polity2 index ranging from -10 to 10 ($-10 =$ high autocracy; $10 =$ high democracy). We also check our results using the *Freedom House Index* and the index proposed by Przeworski et al. (1993). Note that the trend toward more democratic regimes has not been linear. Significant retrenchment of democracy has not only been observed in isolated countries but also in several regions of the world. The examples include the general decrease in democracy in Asia in the 1950s and 1960s, the marked decline in Latin America in 1960s and 1970s, and the prolonged stasis in Africa since the 1960s (Acemoglu and Robinson 2006). We normalize the index so that one indicates the most democratic country and zero the least democratic regime.

We also include in our specifications the following controls:

- Initial level of regulation (as measured by the lagged level of the regulation index): this variable can be a proxy for important incentives in favor and against the implementation of structural reforms. Excessive government regulation and/or market failures may be perceived as more costly when the economy is least reformed. At the same time, the beneficiaries of existing large rents may oppose reforms.
- Economic crises: according to a widely held view, economic crises foster economic reforms by making evident the cost of stagnation and backwardness. The opposite view maintains that it is easier to implement reforms during periods of economic growth when potential losers can find other opportunities in a booming economy or when countries become richer and have more resources to compensate the losers. In order to test for this hypothesis, we use several measures of crisis: a dummy equal to 1 if the country is experiencing inflation larger than 40 percent in that year, a measure for recession (as summarized

by a dummy indicating negative growth in per capita GDP), terms of trade shocks, and banking and debt crises. The data on banking and debt crises come from Reinhart and Rogoff (2008).

- Public expenditures/GDP and real devaluation: Compensation schemes can offset costs associated with reforms. A large government may compensate losers from reforms compared to a very lean government with a small budget. We use public expenditures/GDP as a proxy of the size of social safety nets. As an alternative measure of compensation, we also control for real devaluation, which could promote exports and therefore help compensate losers from reforms. For instance, some important reforms happened together with large devaluations and in the context of IMF-supported programs.

- Human capital and effectiveness of bureaucracy could also facilitate reforms (Besley and Persson 2007). We use enrollment in tertiary education from Barro and Lee (2001) as a measure of human capital and bureaucratic quality from the International Country Risk Guide. The measure of bureaucratic quality from ICRG is scored between zero and six. High scores indicate "autonomy from political pressure" and "strength and expertise to govern without drastic changes in policy or interruptions in government services;" also existence of an "established mechanism for recruiting and training."

- Reforms in neighboring countries or in trading partners may affect the adoption of domestic reforms through peer pressure and imitational effects. We use the weighted average of reforms in neighboring countries, where the weights are given by two concepts of distance defined by geography and trade. The source for geographic distance is http://www.cepii.fr/anglaisgrap/h/bdd/distances.htm and for bilateral trade flows, the IMF's Direction of Trade Statistics.

- The ideology of the ruling government and the form of government may determine the adoption of reforms. Alesina and Rubini (1992) argue that right-wing governments are normally considered more inclined to market-oriented reforms. Persson and Tabellini (2002) finds that a presidential system facilitates reforms, as they are more able to overcome the resistance of small interest groups. We capture the ideological orientation of the executive with the indicator *left*, which is equal to one if the executive belongs to a party of the left, and zero if it belongs to a right-wing, centrist, or other party.[6] The form of government is proxied by the variable *presidential*, which takes the value of one if the system is directly presidential, and zero if the president is elected by the assembly or parliamentary. The source for these two variables is the Database of Political Institutions from the World Bank. We also included in the regressions additional political variables, such as the number of executive constraints, the presence of legislative or executive elections, the number of years left in the current term for the executive, and the presence of an absolute majority in the legislature by

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[6] Note that the Dataset of Political Institutions defines the ideology of the government also for autocratic regimes.

the party of the executive. The results are robust to the inclusion of these additional political variables.

Table 1 in the online Appendix provides the summary statistics for the key variables used in the empirical analysis.

III. Empirical Strategy

The unit of analysis is a sector-country-year observation (there are 6 sectors, 150 countries, and 45 years). The resulting dataset is a panel of 20,123 observations. We define reform as a change over time in the index of regulation for each of the six sectors, s, in country c at time t:

$$reform_{s,c,t} \equiv Index_{s,c,t} - Index_{s,c,t-1}.$$

Our baseline specification is as follows:

$$(1) \qquad reform_{s,c,t} = \alpha Index_{s,c,t-1} + \beta democracy_{c,t-1} + \phi \mathbf{X}_{c,t-1} + \delta_s + \gamma_c$$

$$+ \chi_t + \delta_s \times \gamma_c + \delta_s \times \chi_t + \varepsilon_{s,c,t},$$

where δ_s, γ_c, χ_t are sector, country, and year fixed effects, respectively, and $\mathbf{X}_{c,t-1}$ are country-specific and time-varying controls to be described below.[7] $\delta_s \times \gamma_c$ and $\delta_s \times \chi_t$ are the interactions between country and sector fixed effects, and sector and time fixed effects, respectively.

We also control for the lagged level of the index to identify the existence of convergence toward some possible country specific levels of regulation. Being bounded between zero and one, the reform variables do not have a unit root; however, they can still exhibit a trend within the bounds. In Table 2 in the online Appendix, we report standard panel unit root tests for each reform indicator and for the democracy index. We reject the null of unit roots for polity2 at the 10 percent level. In addition, most of our reform indices do not show evidence of unit roots. Hence, we use the level of the reform index, $reform_{s,c,t}(\equiv \Delta Index_{s,c,t})$, as the dependent variable.

The dependent variable (reform in a country) is highly persistent. For this reason the error terms in specification (1) may also exhibit serial correlation. We allow for first-order serial correlation in the error terms: $\varepsilon_t = \rho \varepsilon_{t-1} + u_t$. The Durbin-Watson

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[7] All of our independent variables are lagged to avoid problems of endogeneity. Note that the choice of the lag structure does not affect our results. As a robustness check, we run our regressions with contemporary controls. The coefficient on democracy stays the same, whereas the controls are, for most of the cases, not significant, with the exception of the coefficient on bureaucratic quality and the presence of presidential democracy (both significant at the 10 percent level when controls are included one by one). In addition, we also test the robustness of the results to a longer lag structure (2, 3, and 4 lags). When we include all lagged controls in the regression, the coefficient on democracy is equal to 0.082, 0.085, and 0.059, all significant at the 1 percent level, for two, three, and four lags, respectively. Among the controls, human capital appears to be consistently significant when we use a longer time structure. The sample with the inclusion of all controls and a longer lag structure is substantially smaller (4,756 observations when we use two lags and only 4,503 observations when we use four lags). We decided to report the results using a one-year lag, since it is the most common lag structure that has the advantage of reducing problems of endogeneity without losing too many observations.

TABLE 3—REFORMS AND DEMOCRACY

Dependent variable: reform in (country, sector, year)				
	(1)	(2)	(3)	(4)
Lagged democracy	0.16***	0.017***	0.033***	0.017***
	[0.003]	[0.003]	[0.003]	[0.003]
Lagged level of index	−0.073***	−0.124***	−0.047***	−0.131***
	[0.003]	[0.004]	[0.002]	[0.004]
Country FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country × sector FE		Yes		Yes
Sector × year FE			Yes	Yes
Observations	20,123	20,123	20,123	20,123

Notes: The estimators are within estimators and allow for first-order autoregressive disturbance term. Standard errors are denoted in parentheses.

   ***Significant at the 1 percent level.
   **Significant at the 5 percent level.
   *Significant at the 10 percent level.

statistic for the transformed regression is 1.94, indicating that there is little evidence of serial correlation in the transformed error terms.[8]

Our first specification includes only sector, country, and time fixed effects (Table 3, column 1). The coefficient on the lagged level of the index is negative and significant at the 1 percent level, indicating convergence toward country specific levels of regulation. The coefficient on the lagged level of democracy is significant at the 1 percent level. The magnitude of the estimated effect implies that a 1 standard deviation increase in the democracy index explains 7 percent variability in reforms. In addition, moving to a complete democracy in the long-run is associated with a $0.22 \left(-\frac{\beta}{\alpha} \right)$ increase in the index of reform (using the coefficients of column 1).

We then add country-sector specific effects, and sector-year specific effects, and both of them (column 2, 3, and 4, respectively).[9] The interactions between country and sector fixed effects take into account that reforms are inherently different across countries, e.g., trade sector reforms in India have different characteristics than banking reforms in Brazil (specification 2). The interactions between sector and year effects account for the possibility of global reform waves across all countries (specification 3). Specification 4 is the most demanding because it includes all the individual fixed effects and possible two-way interactions. Notice that we cannot control for country-time effects, since the main variable of interest, which is democracy, is country-time varying. The results are very similar across specifications. The magnitude of the coefficients on the democracy variable ranges from 0.02 to 0.03 in columns 2–4.

To have a sense of the magnitude of the effects, we can compare China and the United States, using the coefficient of $\frac{\beta}{\alpha}$ (0.22) of Table 3 (column 1). If China, which

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[8] We also test the robustness of our results by clustering the error terms at the country-reform and country level. See Section IIID for details.

[9] In specifications (2) and (4), we allow the serial correlation coefficients in the error term to be country-sector specific. In specifications (1) and (3), the serial correlation coefficients are country-specific.

TABLE 4—REFORMS AND DEMOCRACY: ROBUSTNESS TO CONTROLS

Dependent variable: reform in (country, sector, year)

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged democracy	0.11*** [0.004]	0.014** [0.006]	0.048*** [0.014]	0.011*** [0.003]	0.014*** [0.004]	0.045*** [0.016]
Lagged level of index	−0.149*** [0.004]	−0.205*** [0.006]	−0.401*** [0.011]	−0.135*** [0.004]	−0.173*** [0.005]	−0.412*** [0.012]
Lagged crisis (inflation > 40)	−0.005* [0.003]					−0.003 [0.006]
Lagged real devaluation		0.007 [0.005]				−0.009 [0.008]
Lagged public expenditure to GDP		−0.000 [0.000]				−0.001* [0.001]
Lagged bureaucratic quality			0.003 [0.003]			0.006* [0.003]
Lagged tertiary enrollment			0.006 [0.028]			−0.003 [0.029]
Lagged reforms in geographical neighbors				0.055*** [0.021]		0.044 [0.054]
Lagged dummy for left					0.003 [0.002]	−0.004 [0.004]
Lagged dummy for presidential					−0.001 [0.004]	0.006 [0.017]
Observations	17,235	10,128	6,111	18,400	14,776	5,252

Notes: The estimators are within estimators and allow for a first-order autoregressive disturbance term. All regressions control for country sector, year fixed effects, and country × sector and sector × year interactions. Standard errors are denoted in parentheses.

　***Significant at the 1 percent level.
　 **Significant at the 5 percent level.
　　 *Significant at the 10 percent level.

had a polity2 index of 0.15 in 2000, were to increase its level of democracy to that of the United States in the long-run (1 on the polity2 index in 2000), its financial sector regulation index would increase by 0.20 points ($= 0.22 \times 0.85$) (the higher level of democracy would reduce the gap in the financial sector index between the two countries by 20 percent, the gap being equal to 1 in 2000, with China at 0 and United States at 1 on the financial sector regulation index). The increase in democracy would have completely closed the regulation gap in the trade sector (the trade regulation index is equal to 0.93 in the United States and 0.72 in China in 2000). The impact would also be sizeable in the other sectors (the gap would have been reduced by 30 to 37 percent).

The results in Table 3 show that the correlation between (lagged) democracy level and the adoption of reforms is not driven by country or sector-fixed characteristics or by the fact that there was a worldwide movement toward reforms and democracy, or any interactions between country-sector and sector-time fixed characteristics.

If the correlation between economic reforms and democracy is not due to spurious correlation owing to a common trend, could it be driven by other country-time varying omitted variables? The next subsection checks whether this correlation is robust to the inclusion of several variables, which (current theories suggest) may explain both economic reforms and democracy, i.e., the possible bias deriving from country-sector-time varying omitted variables.

A. *Additional Controls*

Reforms may be triggered by a wide range of factors other than democracy. Following the theoretical literature reviewed above, in Table 4, we control for the following possible determinants of reforms: measures of crisis (a dummy equal to 1 if the country experiences inflation larger than 40 percent, we include alternative measures of crisis in Table 9), public expenditure/GDP and real devaluation, human capital and bureaucratic quality, reforms in neighbors, and political variables (columns 1–5). Column 6 includes all the controls simultaneously. The results on the coefficients of our controls go in the expected direction but are often not significant. For example, episodes of hyperinflation appear to reduce the probability of reforming (column 1), but the effect disappears when all the other controls are added to the specification. Reforms in neighboring countries appear to spur domestic reforms. This result, which extends the results of International Monetary Fund (IMF 2004) on OECD countries, is also in line with Buera, Monge-Naranjo, and Primiceri (2011), who find a spillover effect from beliefs in neighboring countries. The variable, however, also loses significance when all the controls are included.[10]

Democracy is the only variable that remains consistently significant across all specifications. We also look at the standardized beta coefficients for democracy across the different regressions and find them to be remarkably similar.

The inclusion of the different controls changes the sample size in each column of Table 4. To check that our results are not driven by the specific sample, we also estimate the basic specification (Table 3, column 4) for each column of Table 4. The results shown in Table 4 do not appear to be driven by sample selection. The results on the various restricted samples of Table 4 are reported in online Appendix Table 3.

B. *Endogeneity*

Another source of bias derives from the fact that reforms themselves may have an effect on democracy. In order to deal with this issue we have two approaches: we use instrumental variables, and we check if reforms cause democracy (in the final section of the paper).

While an ideal source of exogenous variation of democracy is difficult to find, we use democracy in neighboring countries as an instrument. Democracy in neighboring countries is calculated as the average level of democracy in neighboring countries, where neighbors are defined by countries that are part of a common alliance (the variable is taken from the Correlates of War Database).[11] The idea behind this instrument is that democracy in political allies has influence on domestic democracy

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[10] In additional robustness checks, we also include dummies for WTO, EU, and OECD accessions (= 1 in years following the accession) and for the existence of an IMF program. The coefficient on democracy remains positive and statistically significant at the 1 percent level. The coefficients on EU, OECD, and IMF program dummies are significant in the specification without any controls, but lose their significance when included along with other controls in Table 4, column 6.

[11] The dataset records all formal alliances among states, including mutual defense pacts, nonaggression treaties, and ententes.

Table 5—Reforms and Democracy: Instrumental Variables Second Stage

Dependent variable: reform in (country, sector, year)

	(1a)	(1b)	(1c)	(1d)
Lagged democracy	0.078*** [0.016]	0.151** [0.043]	0.19 [0.124]	0.141 [0.090]
Lagged level of index	−0.135*** [0.007]	−0.180*** [0.012]	−0.281*** [0.024]	−0.281*** [0.024]
Lagged crisis (inflation > 40)		−0.005 [0.005]	−0.010 [0.008]	
Lagged real devaluation		0.008 [0.006]	0.003 [0.010]	
Lagged public expenditure to GDP		0.000 [0.000]	−0.001 [0.001]	
Lagged bureaucratic quality			0.004 [0.003]	
Lagged tertiary enrollment			0.023 [0.033]	
Lagged reforms in geographical neighbors		0.056 [0.045]	0.053 [0.078]	
Lagged dummy for left		−0.001 [0.002]	−0.001 [0.003]	
Lagged dummy for presidential		0.029** [0.013]	0.049 [0.035]	
Observations	18,970	10,007	5,252	5,252
First stage F-stat	764.59	229.09	36.47	50.77
p-value of F-test	0.000	0.000	0.000	0.000

Notes: Lagged democracy is instrumented by (lagged) democracy in neighboring countries. All regressions control for country sector, year fixed effects, and country × sector and sector × year interactions. Standard errors are denoted in parentheses.

   ***Significant at the 1 percent level.
    **Significant at the 5 percent level.
     *Significant at the 10 percent level.

but no direct impact on a country's ability/willingness to reform. For instance, the political alliance between the United States and Western Europe had surely an effect on democracy in Western Europe but not a direct effect on the reform level in Europe. The idea underlying this instrument is based on Persson and Tabellini (2009), who use democracy in neighboring countries as a proxy for democratic capital. In addition, building on this concept, we also tried different measures of distance, including geographical distance between countries and commercial distance defined as the (inverse of) trading flows between countries. These measures, which are highly correlated, confirm the result of political distance reported here.

Table 5 shows the regressions using lagged democracy in political neighbors as an instrumental variable. The coefficient of lagged democracy in the first stage (Table 6) confirms the relevance of democracy in neighbors in promoting the democratic process in the domestic economy. The results in our second stage show that, consistent with the OLS specification, there is evidence for a strong and positive effect of democracy on reforms. The estimated effect is not statistically significant in the specification that includes all the controls (column 1c). The magnitude of the estimated effect is, however, not significantly different from column 1b, which uses a larger

TABLE 6—REFORMS AND DEMOCRACY: INSTRUMENTAL VARIABLES FIRST STAGE

Dependent variable: reform in (country, sector, year)

	(1a)	(1b)	(1c)	(1d)
Lagged democracy in neighboring countries	0.014*** [0.002]	0.009*** [0.001]	0.005*** [0.001]	0.006*** [0.001]
Lagged level of index	0.022 [0.028]	−0.016 [0.028]	−0.008 [0.020]	−0.005 [0.021]
Lagged crisis (inflation > 40)		−0.015 [0.014]	0.013 [0.008]	
Lagged real devaluation		−0.011 [0.009]	0.020** [0.009]	
Lagged public expenditure to GDP		0.001 [0.002]	−0.002 [0.002]	
Lagged bureaucratic quality			−0.003 [0.007]	
Lagged tertiary enrollment			−0.199*** [0.045]	
Lagged reforms in geographical neighbors		0.052 [0.064]	0.198*** [0.060]	
Lagged dummy for left		0.001 [0.010]	−0.009* [0.005]	
Lagged dummy for presidential		−0.226*** [0.029]	−0.238*** [0.037]	
Observations	18,970	10,007	5,252	5,252

Notes: All regressions control for country sector, year fixed effects, and country × sector and sector × year interactions. Standard errors are denoted in parentheses.
     ***Significant at the 1 percent level.
      **Significant at the 5 percent level.
       *Significant at the 10 percent level.

sample and a restricted set of controls suggesting that the statistical insignificance in specification 1c is likely to be driven by the large standard errors from the smaller sample. The regression in column 1d, where the sample is the same as column 1c, but without the inclusion of controls, indeed confirms that this is the case.

C. *Regressions by Sector*

Does democracy have a differential effect across sectors? Alternatively, are the results presented above driven by a particular sector? We explore this possibility by looking at the impact of democracy on reforms in different sectors. Table 7 presents one specification without any control except country and year fixed effects (this is analogous to the specification in Table 3) and one specification with control variables, including indicators of crisis, devaluation, public expenditure as a share of GDP, bureaucratic expenditure, tertiary enrollment, reforms in neighboring countries, dummy for parties for the left in power, and dummy for presidential form of government (this is analogous to column 6 in Table 4).

The results in Table 7 show that democracy promotes reforms in all sectors, with the exception of product markets in the specification with controls. In most cases

TABLE 7—REFORMS AND DEMOCRACY: BY REFORM

Dependent variable: reform in (country, sector, year)						
	Finance (1)	Cap. acc. (2)	Prod. mkt (3)	Agricult. (4)	Trade (5)	Curr. acc. (6)
Panel A. No controls						
Lagged democracy	0.001	0.025	0.008**	0.023***	0.013*	0.017*
	[0.007]	[0.018]	[0.004]	[0.007]	[0.008]	[0.009]
Lagged level of index	−0.188***	−0.258***	−0.044***	−0.074***	−0.179***	−0.157***
	[0.012]	[0.014]	[0.006]	[0.007]	[0.009]	[0.011]
Observations	2,437	2,437	5,092	3,853	3,664	2,640
Panel B. With controls						
Lagged democracy	0.067***	0.182***	−0.26	0.202***	0.075***	0.179***
	[0.024]	[0.060]	[0.033]	[0.041]	[0.022]	[0.046]
Lagged level of index	−0.379***	−0.521***	−0.278***	−0.558***	−0.420***	−0.554***
	[0.028]	[0.031]	[0.026]	[0.030]	[0.029]	[0.038]
Observations	861	861	975	887	946	722

Notes: The estimators are within estimators and allow for a first-order autoregressive disturbance term. All regressions control for country and year fixed effects. All regressions in panel B control for one year lags of the following: indicators of crisis, real devaluation, public expenditure as a ratio of GDP, bureaucratic quality, tertiary enrollment, reforms in geographical neighbors, dummies for party of the executive being left, and dummy for presidential form of government. Standard errors are denoted in parentheses.

   ***Significant at the 1 percent level.
    **Significant at the 5 percent level.
     *Significant at the 10 percent level.

the coefficient on democracy is significant at the 1 percent level despite the reduced number of observations.

We prefer the general specification that encompasses all sectors in order to maximize the number of observations so that we can control for country, reform, and year fixed effects, and (most importantly) their interactions, as shown in Table 3.

D. *Other Robustness Checks*

Structural reforms and democratization sometimes come in waves. For instance, several countries in Central and Eastern Europe became more democratic and implemented economic reforms in the few years after 1989. In this section, we control to which extent the inclusion of a group of countries in our sample drives the results. The results are reported in Table 8. In columns 1a–1b and 2a–2b, the sample is restricted to noncommunist and developing countries, respectively (we estimate two regressions for each subsample with and without the inclusion of controls).[12]

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[12] We also check the robustness of the results to the exclusion of transition economies, since most reforms happened in those countries. The coefficients when transition countries are excluded are equal to 0.008 and 0.050 (without and with the inclusion of controls, respectively) and significant at the 5 and 1 percent level, respectively. The results are very similar to the ones obtained when excluding from the sample the communist countries.

TABLE 8—REFORMS AND DEMOCRACY: ROBUSTNESS CHECKS

Dependent variable: reform in (country, sector, year)							
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(3c)
Lagged democracy	0.007**	0.070***	0.014***	0.063***			
	[0.003]	[0.016]	[0.004]	[0.020]			
Lagged level of index	−0.130***	−0.463***	−0.149***	−0.565***	−0.135***	−0.495***	−0.497***
	[0.004]	[0.013]	[0.005]	[0.016]	[0.004]	[0.013]	[0.013]
Democracy dummy (polity2 > 0)					0.010***	0.013	0.009
					[0.002]	[0.010]	[0.009]
Lagged crisis (inflation > 40)		−0.002		−0.002		−0.002	
		[0.007]		[0.008]		[0.007]	
Lagged real devaluation		−0.006		−0.009		−0.009	
		[0.008]		[0.013]		[0.008]	
Lagged public expenditure to GDP		0.000		−0.001		−0.001	
		[0.001]		[0.001]		[0.001]	
Lagged bureaucratic quality		0.009**		0.007		0.010**	
		[0.004]		[0.005]		[0.004]	
Lagged tertiary enrollment		−0.022		0.024		0.011	
		[0.033]		[0.059]		[0.032]	
Lagged reforms in geographical neighbors		0.063		0.012		0.025	
		[0.055]		[0.065]		[0.052]	
Lagged dummy for left		−0.005		−0.003		−0.004	
		[0.005]		[0.008]		[0.005]	
Lagged dummy for presidential		0.010		0.023		−0.007	
		[0.017]		[0.020]		[0.017]	
Observations	17,301	4,751	15,666	3,683	20,123	5,252	5,252

Notes: In columns 1a–1b and 2a–2b, the sample is restricted to noncommunist and developing countries, respectively. In columns 3a–3c, we use a zero-one definition of democracy (as in Giavazzi and Tabellini 2005), where democracy = 1 if polity 2 has positive values. The estimators are within estimators and allow for first-order autoregressive disturbance term. All regressions control for country, and year fixed effects, and country × sector and sector × year interactions. Standard errors are denoted in parentheses.

   ***Significant at the 1 percent level.
    **Significant at the 5 percent level.
     *Significant at the 10 percent level.

Giavazzi and Tabellini (2005) use a zero-one definition of democracy (where democracy = 1 if polity2 has positive values) because the degree of democracy can be difficult to quantify using a cardinal measure. Following this line, we repeat our baseline regression using a zero-one definition of democracy. Columns 3a–3b of Table 8 report the results. The results do not change in the baseline regression, but are weaker when we include all the controls because the sample size is much smaller. In column 3c we indeed show that the impact of democracy on reforms on the restricted sample but without the inclusion of controls is also not significant. For each specification with controls in Table 8, we also estimate the basic specification (Table 3, column 4) without any controls on the restricted sample (not shown). We do this to analyze the effect of adding controls on a consistent sample. The results in Table 8 are not driven by sample selection.

Assumptions on the error terms are key to evaluate the significance of the coefficients. So far we have allowed for an AR(1) term in the model. Column 1 in Table 9 presents the basic specification without controls in which the standard errors are clustered at the country-reform level. The results are similar if we cluster at the country rather than country-reform level.

Table 9—Reforms and Democracy: Additional Robustness Checks

Dependent variable: Reform in (country, sector, year)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged democracy	0.016***	0.065***	0.062***	0.061***	0.066***	0.066***	0.069***	0.011***
	[0.004]	[0.017]	[0.017]	[0.017]	[0.017]	[0.023]	[0.023]	[0.003]
Lagged level of index	−0.125***	−0.495***	−0.510***	−0.479***	−0.494***	−0.523***	−0.520***	
	[0.007]	[0.013]	[0.013]	[0.012]	[0.013]	[0.014]	[0.014]	
Lagged crisis (inflation > 40)		−0.003	−0.001					
		[0.007]	[0.007]					
Lagged real devaluation		−0.009	−0.008	−0.007	−0.009	−0.011	−0.01	
		[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.009]	
Lagged public expenditure to GDP		−0.001	−0.001	0.000	−0.001	−0.001	−0.001	
		[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	
Lagged bureaucratic quality		0.010**	0.009**	0.010***	0.010**	0.007*	0.008**	
		[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	
Lagged tertiary enrollment		0.006	0.011	0.000	0.007	0.01	0.01	
		[0.032]	[0.032]	[0.032]	[0.032]	[0.033]	[0.033]	
Lagged reforms in geographical neighbors		0.038	0.029	0.036	0.026	0.063	0.058	
		[0.054]	[0.052]	[0.053]	[0.052]	[0.056]	[0.056]	
Lagged dummy for left		−0.004	−0.004	−0.005	−0.005	−0.007	−0.008	
		[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	
Lagged dummy for presidential		0.000	0.002	0.001	0.002	−0.001	0.003	
		[0.017]	[0.017]	[0.017]	[0.017]	[0.021]	[0.021]	
Lagged reform in trade neighbors	−0.043							
	[0.054]							
Lagged average reform in other sectors			0.122***					
			[0.034]					
Lagged crisis (growth < 0)				−0.007**				
				[0.003]				
Terms of trade shocks					−0.004			
					[0.014]			
Lagged crisis (debt)						0.01		
						[0.011]		
Lagged crisis (bank)							−0.016***	
							[0.006]	
Observations	20,123	5,252	5,252	5,234	5,252	4,679	4,679	20,123

Notes: The estimators in all columns except column 1 are within estimators and allow for first-order autoregressive disturbance term. In column 1, instead of explicitly allowing for an AR(1) term in the model, the standard errors are clustered at the country-reform level. The definition of bank and debt crises are based on Reinhart and Rogoff (2008). All regressions control for country and year fixed effects, and country × sector, and sector × year interactions. Standard errors are denoted in parentheses.
   ***Significant at the 1 percent level.
   **Significant at the 5 percent level.
   *Significant at the 10 percent level.

Reforms in trading partners (column 2 of Table 9) and reforms in other sectors (column 3 of Table 9) also do not alter our main conclusion, and the results are also robust to a variety of crisis definitions (negative per capita GDP growth, banking and debt crises, and terms-of-trade shocks, columns 4–7 of Table 9).

By including the lagged level of reforms, the specifications so far have assumed that there is (conditional) convergence in the reform adoption. By including country fixed effects, we assume a country-specific, long-run level of reforms. However, unlike growth regressions, there is no theoretical reason why we should expect convergence in the level of regulation. In order to test if our results depend on this

TABLE 10—REFORMS AND DEMOCRACY: FLEXIBLE FUNCTIONAL FORM

Dependent variable: reform in (country, sector, year)				
	(1)	(2)	(3)	(4)
Lagged democracy (polity2 < 0.15)	0.014 [0.040]	0.011 [0.044]	−0.005 [0.042]	0.014 [0.044]
Lagged democracy (0.15 ≤ polity2 < 0.75)	0.012** [0.006]	0.009 [0.006]	0.036*** [0.006]	0.010 [0.006]
Lagged democracy (polity2 ≥ 0.75)	0.015*** [0.003]	0.016*** [0.003]	0.038*** [0.003]	0.016*** [0.003]
Lagged level of index	−0.073*** [0.003]	−0.129*** [0.004]	−0.036*** [0.002]	−0.135*** [0.004]
Country FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country × sector FE		Yes		Yes
Sector × year FE			Yes	Yes
Observations	20,123	20,123	20,123	20,123

Notes: The estimators are within estimators and allow for first-order autoregressive disturbance term. Standard errors are denoted in parentheses.

 ***Significant at the 1 percent level.
  **Significant at the 5 percent level.
  *Significant at the 10 percent level.

assumption, we replicate the specification in Table 3 without the lagged reform index using the following specification:

$$(2) \quad \Delta Index_{s,c,t,} = \beta democracy_{c,t-1} + \delta_s + \gamma_c + \chi_t + \delta_s \times \gamma_c + \delta_s \times \chi_t + \varepsilon_{s,c,t}.$$

Column 8 in Table 9 reports the results from estimating equation (2). The estimated coefficient on lagged (democracy) is positive and statistically significant at the 1 percent level. The magnitude of the estimated coefficient ($\beta = 0.011$) is smaller than in Table 3. This is consistent with a positive correlation between (lagged) democracy and the lagged reform index, and a negative relationship between reform and the lagged reform index. This coefficient, however, is not comparable to the coefficient in the previous regressions in Table 3 given that the magnitude of the estimated coefficient on democracy in this regression can be interpreted only as the effect of democracy on the rate of adoption of structural reforms rather than on the steady-state *level*. Unlike equation (1), the specification in equation (2) has the drawback that the steady-state level of the index is undefined; hence the long-run effect of democracy on the reform index cannot be estimated. In effect, we are assuming that a certain level of democracy is associated only with a rate of growth of the reform index.

Democracy could have a nonlinear effect on reforms if reforms start only when a certain level of democracy is reached. To check this hypothesis, we replicate our baseline regression (with different combinations of fixed effects) for different levels of democracy. These regressions reported in Table 10 show some evidence for nonlinear effects of democracy on reforms—the more democratic the country is initially, the easier it is to reform.

TABLE 11—REFORMS AND DEMOCRACY: FEEDBACK EFFECTS (A)

Dependent variable: reform in (country, sector, year)

	No controls (1)	With controls (2)	No controls/sample (3)
Lagged democracy	−0.132***	−0.303***	−0.273***
	[0.007]	[0.019]	[0.018]
Lagged reform in (country, year)	−0.001	0.056	0.061*
	[0.023]	[0.034]	[0.035]
Observations	5,431	1,550	1,550

Notes: The estimators are within estimators and allow for first-order autoregressive disturbance term. All regressions include country and year fixed effects. The reform variable is measured by averaging across all sectors at the country-year level. All regressions control for one-year lags of the following: indicators of crisis, real devaluation, tertiary enrollment, democracy in political neighbors, and log of per capita income.

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

We also explore whether democracy affects the probability of reversal in reforms (defined as a decrease in the level of index). Reform reversals constitute 8 percent of the observations in our sample. We do not find any evidence for this hypothesis (see online Appendix Table 4).

E. *The Feedback Effect*

In this section, we check whether economic reforms foster democracy. We test for the possibility of a feedback effect from reforms to democracy by estimating the following regression:

$$(3) \quad \Delta democracy_{c,t,} = \alpha\, democracy_{c,t-1} + \beta\, average\, reform_{c,t-1} + \gamma_c + \chi_t + \varepsilon_{c,t}.$$

In order to estimate the feedback effect, we need to collapse our data at the country level. The term "average reform" in equation (3) now refers to the arithmetic average of the reform indices.

Overall, we find little evidence that reforms promote the democratic process (Table 11).[13] Our results therefore do not support a reverse causality story. Since income is considered an important determinant of democratization, we also test robustness to include per capita income in the regressions (results available upon request). Including the lagged level of the index rather than the change, as in Table 11, also does not alter the findings in Table 11. We also repeat the same exercise reform by reform (Table 12), and find little evidence of feedback (we find evidence of a feedback effect for the agricultural sector but only in the specification in which all controls are included).

[13] The results are similar when we use longer lags.

TABLE 12—REFORMS AND DEMOCRACY: FEEDBACK EFFECTS (B)

Dependent variable: reform in (country, sector, year)						
	Finance (1)	Cap. acc. (2)	Prod. mkt (3)	Agricult. (4)	Trade (5)	Curr. acc. (6)
Panel A. No controls						
Lagged democracy	−0.181***	−0.180***	−0.131***	−0.136***	−0.193***	−0.166***
	[0.012]	[0.012]	[0.007]	[0.009]	[0.010]	[0.011]
Lagged reform in (country, year)	−0.085**	−0.015	−0.001	0.008	0.013	−0.036
	[0.035]	[0.012]	[0.028]	[0.018]	[0.019]	[0.022]
Observations	2,257	2,257	4,864	3,765	3,399	2,501
Panel B. With controls						
Lagged democracy	−0.259***	−0.259***	−0.284***	−0.289***	−0.322***	−0.238***
	[0.021]	[0.021]	[0.020]	[0.022]	[0.021]	[0.023]
Lagged reform in (country, year)	−0.043	0.012	−0.015	0.075***	−0.012	0.037
	[0.037]	[0.013]	[0.029]	[0.021]	[0.026]	[0.027]
Observations	1,090	1,090	1,381	1,313	1,382	935

Notes: The estimators are within estimators and allow for first-order autoregressive disturbance term. All regressions include country and year fixed effects. All regressions in panel B control for one-year lags of the following: indicators of crisis, real devaluation, tertiary enrollment, democracy in political neighbors, and log of per capita income. Standard errors are denoted in parentheses.

  ***Significant at the 1 percent level.
  **Significant at the 5 percent level.
  *Significant at the 10 percent level.

F. *Difference-in-Differences Approach*

In this section, we use a different empirical strategy to test for the presence of a feedback effect. Giavazzi and Tabellini (2005) look at the relationship between political and economic liberalizations in the trade sector using a difference-in-differences approach. In particular, the authors run two regressions. In the first specification, the dependent variable is economic liberalization, the "treatment" is democratization, and the "control" group is given by countries that never changed their political regime. In the second specification, the dependent variable is political liberalization and the "treatment" is defined as economic liberalization, whereas the "control" group includes all the countries that never changed their economic regime.[14]

Based on these two regressions, they find that the causality is more likely to run from political to economic liberalization. Their approach is a useful alternative way to check both directions of causality from democratization to introduction of economic reforms and vice versa. In Table 13, we report the results repeating their

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[14] More specifically, the explanatory variable in the first regression is political liberalization, which is defined as a dummy variable taking a value of one in the years after democratization. Democratization is defined as the event of becoming a democracy (defined by discrete jumps in polity2 around zero), given that a country was not a democracy in the previous year. The dependent variable in the first regression is becoming economically open (defined by Wacziarg and Welch (2008) 0/1 openness index). Similarly, in their second regression, the explanatory variable is economic liberalization, defined as a dummy taking a value of one in the years after becoming economically open (defined by the openness index). The dependent variable in the second regression is polity2 (redefined as 0/1 based on negative/positive values). Note that they call the discrete jumps in polity2/openness index as political and economic liberalizations. Since they are looking at the jump in the indices this would be an alternative way of defining a process of "reform."

TABLE 13—REFORMS AND DEMOCRACY: DIFFERENCE-IN-DIFFERENCES ESTIMATOR

	All	Finance (1)	Cap. acc. (2)	Prod. mkt (3)	Agricult. (4)	Trade (5)	Curr. acc. (6)
Dependent variable: Becoming economically open in country-sector-year country-year							
Democratization	0.045***	0.051*	0.011	0.017	0.57***	0.62**	0.018
	[0.011]	[0.030]	[0.036]	[0.018]	[0.015]	[0.030]	[0.033]
Observations	22,565	2,671	2,671	5,863	4,355	4,148	2,857
Dependent variable: Polity2 in (country, year)							
Economic	0.480	0.214	0.054	−0.128	0.321	0.326	0.309
liberalization	[0.310]	[0.223]	[0.219]	[0.186]	[0.304]	[0.235]	[0.284]
Observations	5,715	2,437	2,437	5,095	3,950	3,681	2,641

Notes: The estimators are within estimators and allow for first-order autoregressive disturbance term. All regressions control for country and year fixed effects. Democratization is a dummy variable taking a value of one in the years after democratization. Democratization is defined as the event of becoming a democracy (and staying as a democracy for at least four years), given that a country was not a democracy in the previous year. The economic liberalization variable in the bottom panel, column 1, is measured at the country-year level, by averaging across all sectors. Standard errors are denoted in parentheses.

   ***Significant at the 1 percent level.
   **Significant at the 5 percent level.
    *Significant at the 10 percent level.

methodology on our dataset.[15] All regressions control for time and country fixed effects. Democratization has a positive effect on all economic liberalization indices with a significant effect on finance, agriculture, and trade. However, there is little evidence of the opposite (i.e., economic liberalization does not precede political liberalization).[16] We view our results as broadly in line with those of Giavazzi and Tabellini (2005).

G. *Factor Analysis*

In this section, we implement a different approach from the panel analysis presented above. To take into account the possibility that the reform process is one unique process common to all sectors, we undertake a factor analysis of our measures of reforms in the six sectors. In particular, we extract the first principal component from the whole dataset with all the data on reforms for each sector.[17] The results are reported in Table 14. The impact of democracy seems to be relevant for the overall tendency of a country to reform (the coefficient on the lagged level of democracy is significant at the 1 percent level). Moving to a complete democracy in the long-run is associated with a 0.03 increase in the index of reform (the magnitude doubles

[15] The top panel shows the effect of becoming a democracy. In the bottom panel, the treatment is defined as a jump toward more deregulation in each one of our indices.
[16] Giavazzi and Tabellini (2005) find a coefficient of −0.16 when regressing democracy on trade liberalization (table 4, column 1 in their paper). Their coefficient, like ours, is not significant. To make our results as comparable as possible to their strategy, we first replicate their estimation on their sample, and their political and economic liberalization measures. The coefficient is very close to the original paper and equal to −0.06. We then use our trade index measure on their sample and use their empirical strategy. The coefficient is, in this case, equal to 0.39, but is also statistically indistinguishable from zero. Therefore, even using our trade index on exactly their sample, and replicating their methodology, we fail to find any significant feedback effect.
[17] The variable is then normalized between zero and one to make the results comparable to the remaining part of the paper.

Table 14—Reforms and Democracy: Principal Component

	Dependent variable: change in reform index (country, year)		Dependent variable: change in democracy (country, year)
	OLS (1)	IV (2)	(3)
Lagged democracy	0.001*** [0.000]	0.006*** [0.002]	−0.218*** [0.017]
Lagged level of index (country, year)	−0.029*** [0.004]	−0.096*** [0.018]	
Lagged reform in (country, year)			−1.775 [1.220]
Observations	1,418	1,418	1,361
First stage F-stat		41	
p-value of F-stat		0.000	

Notes: The estimators are within estimators and allow for first-order autoregressive disturbance term. All regressions include country and year fixed effects. Standard errors are denoted in parentheses. In column 2, lagged democracy is instrumented by (lagged) democracy in neighboring countries.

  ***Significant at the 1 percent level.
   **Significant at the 5 percent level.
    *Significant at the 10 percent level.

when we instrument for lagged democracy using lagged democracy in neighboring countries). On the other hand, we do not find any evidence of a feedback effect from the impact of the overall tendency of a country to reform on democracy.

IV. Conclusions

The question of whether democratic countries favor economic reforms is central to the political economy literature. Political economists study why apparently welfare-enhancing reforms are postponed or adopted with long delays, and the presence (or the absence) of democracy is one of the main causes investigated. Unfortunately, despite the vast theoretical literature and limited empirical evidence (restricted to some countries, to some reforms, and to some periods), the answer to this question has been tentative because of data limitations, which has also limited the techniques that can be used.

This paper answers this question using a novel dataset on structural reforms, which encompasses several sectors and many countries for several years. This dataset allows us to control for a set of possible omitted variables, including country and reform fixed effects, possible two-way interactions between the fixed effects and waves of reforms.

The main conclusions of the papers are that (i) democracy and economic reforms are positively correlated (after controlling for country and reform-specific characteristics, any interaction between country and reform characteristics, and global reform waves); (ii) this correlation is robust even after we control for standard factors, which are usually correlated with reforms and democracy, including bureaucratic quality and education, and political stability; (iii) the correlation is also robust to the

variables that are usually associated with reforms (but not necessarily with democracy), such as crises, neighboring country effects, and compensation schemes; and (iv) there is no evidence that economic reforms pave the way for political reforms.

The strong correlation between (lagged) democracy and the adoption of economic reforms, even controlling for many possible factors as well as the finding that (lagged) economic reforms are not associated with the adoption of democracy, point to the fact there is probably a causal link from democracy to reforms.

These strong results call for an effort to study the precise mechanisms through which democracy has an impact on economic reforms.

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