The Political Economy of Agricultural Market Reforms in Developing Countries

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Abstract

We study the determinants of agricultural market reforms in developing countries. What prompted the governments in these countries to abruptly begin deregulating their agricultural markets in the late 1980's? We answer this question by constructing a completely new dataset based on agricultural market regulations in 88 developing countries from 1960 to 2003. Our results suggest that the sudden and strong decline in the international price of agricultural commodities played a crucial role in destabilizing the financial equilibrium of marketing boards. In addition, changes in the rural representation in the political arena and government ideology also played significant roles in breaking up the status quo.

KEYWORDS: deregulation, agricultural markets

1. Introduction

We study the determinants of agricultural market deregulation in developing countries from 1960 to today. The trend of agricultural market deregulation began to gather speed during the 1980s, and by the end of the 1990s a majority of developing countries had deregulated their agricultural markets. Reforms were generally designed to reduce or eliminate distortions connected to state intervention and to allow market forces to enter agricultural markets. Even if the extent and types of reforms differed across countries, they typically consisted of the removal of trade restrictions and the devolution or dissolution of marketing boards.

What prompted this abrupt change in commodities regulation in the developing world? The agricultural sector prior to the early 1990s provides an illuminating context within which to study the determinants of product market deregulation for a variety of reasons. First, it represents one of the oldest forms of regulation. Second, the agricultural sector is inherently political as a result of the large quasi-rents associated with it; moreover, state control was the norm until the 1980s. Third, since product market deregulation in other sectors in these countries, especially those in Africa, is almost non-existent during this time, the agricultural sector presents a notable exception.[1]

During most of the 20th century governments around the world, especially in developing countries, intervened in agricultural commodity markets. At the beginning of the 1960s almost all developing countries possessed publicly sanctioned monopoly or monopsony in at least one of the agricultural market segments (production, transportation, marketing, export). In particular, public agencies (marketing boards) were by law sanctioned to serve as the sole buyer of agricultural exports and held monopsony power.[2]

Different rationales for such pervasive state intervention were proposed: stabilizing farmers' income (Dehn 2000), ensuring food security and protecting rural smallholders from noncompetitive marketing practices (Timmer et al. 1983). The state marketing system received support from many development economists in the 1950s. Myrdal (1956) argued for government control in economic management as a way of responding to poorly functioning markets or filling gaps where no markets existed. The stabilization of farmers' income was originally used by the British colonial administration as the main argument for establishing marketing boards. Marketing board prices were not only lower than world prices, but also unresponsive to their changes; for this reason these fixed prices were considered a good way of stabilizing farmers' income. An obvious question in this

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[1] Deregulation in network industries (energy and telecommunications) started in the mid 90's. See among others Zhang et al. (2002) or Fink et al. (2003).

[2] For a detailed historical analysis of marketing boards in tropical Africa, see Bates (1981).

case would be, what actually happens to this revenue after the government gets it? Several investigations have found that these agencies, originally created to stabilize prices and protect farmers, were soon used by governments to collect resources from agriculture and to redistribute them in urban centers in the form of food subsidies, special loans to urban industry[3] (Johnson (1953), Bhagwathi (1958), Bates (1981), Krueger et al. (1992) and World Bank (1983)), and privileges to the urban bureaucracy, while large farmers were compensated with input subsidies and infrastructures. As Bates (1981) found, "commodities were also giving public officials funding for discretionary expenditures, therefore creating opportunities for corruption" (p. 33).[4]

While the existing literature conducts case studies on government intervention in agricultural markets in developing countries, a comprehensive empirical analysis of the deregulation process, dealing with political and economic causes of reforms, is still missing. This is mainly due to the lack of a regulation index across countries and over time, which would be necessary to detect reform episodes.[5]

The contribution of this paper is in the use of a completely new dataset on agricultural market regulation in 88 developing countries from 1960 to 2003, to study the political economy within which reforms in this market occurred.

Our results suggest that the sudden and strong decline in international commodity prices played a crucial role in destabilizing the financial equilibrium of marketing boards (and hence of governments). In other words, governments reformed under crisis conditions. In addition, we find that changes in rural representation in the political arena, and changes in government ideology, played significant roles in breaking up the status quo, while the electoral cycle and participation in IMF programs seem to have had a limited influence on the reform process. Overall, our evidence points to the possibility that regulation in the agricultural market was based on a political equilibrium characterized by the

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[3] In Zambia in 1990 nearly 14 percent of the government budget went to subsidize food prices for urban consumers and inputs (McCulloch et al. 2000). In India, the Food Corporation of India spent about 57% of government subsidy in stock holding (Swaminathan 2002).

[4] Evidence that marketing boards directors diverted surpluses accumulated from farmers to their own pockets also abounds. An inquiry commission in Ghana (Ghana Commission Inquiry, 1967) noted: "…Cocoa Marketing Board used profits obtained from its monopoly cocoa operations to provide funds for the dance band, footballers, actors and actresses, and a whole host of satellite units and individuals…Farmers often referred to the opulence of marketing officials…, who owned cars, trucks, buildings and often supported as many as three wives. We saw the Secretary Receivers owning Mercedes Benz cars, Peugeot cars and Transport trucks."

[5] A lot of single country studies exist (for example, Patel and Cassel 2003). In addition a complete descriptive analysis of the liberalization process across countries has been performed by Akyiama et al. (2001).

exploitation of farmers trough direct and indirect taxation on agricultural activities. The story is also consistent with Becker's theory on the political competition among pressure groups,[6] and with Olson's theory of groups:[7] agriculture has been heavily taxed in countries where it was a large sector, due to the lack of lobbying efficiency of small rural farmers (high costs of coordination and significant free-riding problems) and to their "political marginalism."[8] A vast literature on "urban bias"[9] (i.e., heavy taxation on rural people via marketing boards or other types of regulations in agriculture) has also put forward the idea that the bias against the rural sector in developing countries is deeply embedded in their political structure. Both Bates (1993) and Varshney (1993a, 2005) discuss the importance of the interaction between political structures and urban bias. According to Bates (1993), agriculture is taxed when rural classes are more dispersed, have greater communication difficulties and are less represented in the political arena. Varshney (1993b), studying a large number of international case studies, finds that the bias does not persist across all types of government. In addition, he finds that when rural interests get political representation, the urban bias tends to be reduced. Interestingly, he concludes that "much of these arguments would need to be empirically tested, but that this has not been possible because of the lack of a dataset on market intervention." Our paper therefore helps to fill this gap in the literature.

This paper provides important evidence on the determinants of reforms. Lack of detailed indexes of reforms or regulation, taking into account both the cross sectional and time variability dimensions, is one of the biggest limitations in studying the determinants of reforms. A few exceptions include Abiad and Mody (2005) and Alesina et al. (2006), on financial and stabilization reforms, respectively.[10]

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[6] See Becker (1983)

[7] Olson (1965) tries to determine a connection between a group's size and its function. Comparing group sizes, Olson believes that small groups are more effective than large groups in reaching their goals; when a group or organization has a lot of members, individual members believe that their participation will not affect the group but will still expect to reap the benefits, whether or not they make a contribution. Also, the larger a group becomes, the more organization it will need.

[8] Zablotsky (1995), discussing Becker's theory of competition among pressure groups notes: "Agriculture is often heavily subsidized in industrial countries (e.g., the United States, European Union, Japan) where it is a relatively small sector. By contrast, it is frequently heavily taxed in underdeveloped and developing countries, where it is a large sector. Becker's findings are consistent with this type of evidence, since in his framework politically successful groups tend to be smaller than groups taxed to pay their subsidies."

[9] See the special issue of the Journal of Development Studies, Vol. 29 (4) and the influential work of Lipton (1977 and 2005), Bates (1981) and Varshney (1993a and 1993b).

[10] Abiad and Mody (2006), by constructing a new index of financial liberalization for a large sample of developed and developing countries over the period 1975-2003, find that balance of payment crises, a decline in global interest rates and imitation of neighboring countries are

On structural reforms the evidence is even more scant, especially for developing countries.[11] The only paper including a large number of developing countries is by Henisz et al. (2006), where the authors look at the determinants of market oriented reforms in telecommunication and electricity for a sample of 71 countries over the period from 1977-1999. They find that international pressures of coercion, normative emulation and competitive mimicry strongly influence the domestic adoption of market-oriented reforms. Hoj et al. (2006) also have a time dimension, but their sample includes only 21 OECD countries over the period from 1975-2003. They find that economic crises, exposure to foreign competition, and the length of a government's duration in office are important drivers of reforms in product and labor markets, along with budgetary conditions and spillovers across policy areas. None of these studies, however, includes agriculture as one of the sectors in the analysis. This is a significant limitation for developing countries, as structural reforms in other sectors (especially for Africa) are relatively recent or non-existent.

The rest of the paper is organized as follows: in Section 2 we describe possible determinants of reforms in agricultural markets. Section 3 describes the data and the empirical methodology, and presents the results. Section 4 concludes.

2. Competing hypotheses

In this section we lay out the possible drivers of agricultural market reforms. Theories of regulations and historical analysis[12] point to the following main factors:

Marketing boards ineffectiveness and decline in international commodity prices: According to Bates (1981), governments reformed the agricultural sector when the marketing boards became insolvent.[13] In the majority of cases, the

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important determinants of financial reforms, while ideology and political variables are not relevant. Alesina et al. (2006) concentrate their attention on stabilization reforms in a large sample of developing and developed countries. They find that stabilizations are more likely to occur during periods of crisis, at the beginning of a new government's term of office, in countries with presidential systems when the executive faces less constraints, and under unified governments with a large majority of the party in office.

[11] See Hechman and Pages (2003) for a an analysis of labor market reforms in Latin American countries, and Botero et al. (2004) for an analysis of labor market regulation for a sample of 85 countries. There are some microeconomic studies on the impact of industrial deregulation for both developing and developed countries (for a review see Schiantarelli (2006)). Loyaza et al. (2003) also construct indices of product market deregulation for a large sample of developed and developing countries, but they are time invariant.

[12] See among others Akiyama et al.(2001) and Kherallah et al. (2002).

[13] For example cotton parastatals in Uganda, Tanzania and Zimbabwe became insolvent in the 1990s. See Lundberg (2005). Also in Chad, Cote d'Ivoire and Togo, marketing boards faced financial difficulties forcing governments to take action.

insolvency corresponded to the decline in international commodity prices. In the 1980s prices in international markets for most commodities began to fall. This decline caused serious financial problems for parastatals, which saw their revenues (international export prices) fall sharply. Governments attempted to reduce the budgetary burden by lowering producer prices; however, illegal or parallel markets emerged, since producer prices had already been fixed at the minimum sustainable level, and official monopolies could not be maintained. The collapse in international prices and the governments' inability to further decrease producer prices reduced the rents shared by "status quo" supporting groups (e.g., urban workers, public officials and large farmers) making the political equilibrium based on the exploitation of farmers difficult to sustain.[14] This interpretation is consistent with the "crisis hypothesis," according to which governments are more likely to reform when forced to do so by a sudden crisis event (see Alesina et al. 2006).

International donor pressures: Often the implementation of reforms is a condition to receive loans from international organizations and bilateral donors.

Political variables: Krueger (1993) focuses on the ability of a new government to promote reforms. Incumbents would have an incentive in promoting reforms to get the benefits before the next election cycle. Ideology (right- versus left-wing governments) and the form of government (presidential versus parliamentary systems) have also been proposed as conducive to reforms. In particular, right-wing governments (see Alesina and Roubini 1992) and presidential systems (Alesina et al. 2006) have been considered to be more conducive to reforms.

Structural variables: The degree of trade openness, for example, has been proven to be correlated with the probability of reforming. According to Rajan and Zingales (2003), if economies are more open to international trade, the additional opportunities created by the new markets will partially compensate "insiders" for lost rents, while "outsiders" will favor an even higher degree of liberalization.[15]

Product market reforms can therefore occur under a host of conditions. By using a completely new measure of a specific example of product market regulation, i.e., the case of agricultural commodities, we will be able to draw more precise conclusions on the determinants of reforms and their effects.

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[14] As Bates (1981) notes "between the crop years 1959-1960 and 1961-1962 the world price for cocoa fell approximately $70 a ton. If the resources generated by the marketing agencies were to be used to stabilize prices, then surely this was the time to use funds for this purpose. Instead of stabilizing prices...governments passed on the full burden of the drop in price to the producers." There is evidence that marketing board directors often diverted surpluses accumulated from farmers to their own pockets. Many marketing boards were similarly inefficient and wasteful, drawing enormous resources that could have been employed elsewhere.

[15] Their argument is for financial reforms but could easily be applied to any other type of reforms.

3. Data and empirical strategy

Data

This paper is based on a completely new dataset, describing regulations in the agricultural market for a sample of 88 developing countries during the period from 1960-2003. Overall we collected data on a representative sample of geographical regions and income groups. In particular, our sample includes data on 12 countries from East and South Asia, 23 countries from Eastern Europe and Central Asia, 19 countries from Latin America and the Caribbean and 34 from Africa and the Middle East. In terms of income we do have data on 29 low-income countries, 28 low-middle income countries and 31 upper-middle-income economies.

Our new index aims to capture the degree of government intervention in agricultural markets. We rank government intervention from 1 to 4 for each year, with higher values representing greater regulation We define each number in this index as follows:

4 - Maximum degree of intervention: Indicates the presence of a public monopoly or monopsony in at least one of the market segments (production, transportation or marketing). Producer prices are administratively fixed.

3 - High degree of intervention: Indicates that the government is not directly involved in market activities but prices are administratively fixed.

2 - Moderate degree of intervention: Indicates the presence of public ownership/partnership in relevant producers, concessions systems to enter the market, strong incentives to the production/marketing of a particular commodity (e.g., state marketing credit), and state procurement in competition with private markets.

1- Free market. The marketing chain comprises many private agents, market forces determine prices and the government is not directly involved in marketing the crop.

For each country we analyze the market for the most important commodity in terms of exports. The main crop is defined as the main agricultural export commodity. Weights for agricultural commodities in the total export basket are obtained from the Commodity Unit of the Research Department of the International Monetary Fund. The information on the agricultural market is taken from country specific laws and regulations, from IMF and World Bank country reports and from other institutions' publications and working documents.[16]

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[16] Some of these institutions include the European Bank of Reconstruction and Development, the Asian Development Bank and the Inter American Development Bank. We also double-checked the reliability of our index by comparing our results with specific country studies or sectoral studies from different scholars, when available.

Data on macroeconomic variables (real per capita US$ GDP, nominal exchange rates and the international price for the agricultural commodities) are taken from the International Monetary Fund's Financial Statistics database (IFS). The IMF provided data on their programs directly to us. The political variables employed in the analysis are contained in the Database of Political Institutions (DPI) of the World Bank, compiled by Beck et al. (2001), and were updated in 2008.[17]

Table 1 lists the names of the countries in our dataset, the initial level of regulation, the year of the reform (if it occurred) and the main commodity in terms of exports. As of 1960, most of the countries had state monopolies in at least one of market segments (roughly 70 percent of the sample); furthermore, only 10 countries were characterized by a free market structure. State intervention was pervasive worldwide. By comparison, as of 2003 only 24 percent of the sample maintained some form of state monopoly.

Table 1
Dates of Reforms, Initial Level of Regulation and Main Commodity

Country	Initial Level of Regulation	Dates of Reforms	Main Commodity
Argentina	4	1979, 1992	Wheat
Armenia	4	1991, 1995	Coffee
Azerbaijan	4	1997	Cotton
Bangladesh	2	No reform	Tea
Belarus	4	No reform	Weath
Belize	1	No reform	Sugar
Benin	4	No reform	Cotton
Bhutan	4	No reform	Wheat
Bolivia	1	No reform	Soybeans
Brazil	4	1990	Coffee
Bulgaria	4	1991	Wheat
Burkina Fasu	4	No reform	Cotton
Cameroon	4	1994	Cocoa
Central African Rep	4	2002	Cotton
Chad	4	No reform	Cotton
Chile	2	No reform	Wheat
China	4	No reform	Maize
Colombia	3	No reform	Coffee
Congo	4	No reform	Coffee
Coted'Ivoire	3	1999	Cocoa
Croatia	4	1995, 2001	Sugar
Czech Republic	4	1992, 2001	Sugar

[17] All the information about the political variables can be found at:
htttp://siteresources.worldbank.org/INTRES/Resources/DPI2004_variable-definitions.pdf.

Dominican Republic	4	2000	Sugar
Egypt	1	1961, 1993, 1995	Cotton
El Salvador	1	1980, 1989	Coffee
Estonia	4	1991	Cocoa
Ethiopia	4	1992	Coffee
Gabon	4	1997	Sugar
Gambia	4	No reform	Groundnuts
Georgia	4	1995	Sugar
Ghana	4	1999	Cocoa
Guatemala	1	No reform	Coffee
Guyana	4	No reform	Sugar
Honduras	2	No reform	Coffee
Hungary	4	1991	Maize
India	4	No reform	Rice
Indonesia	1	No reform	Cocoa
Jamaica	4	1991	Sugar
Jordan	2	No reform	Coffee
Kenya	4	1997	Tea
Kyrgiz Republic	4	1995,1997	Cotton
Latvia	4	1992	Wheat
Lebanon	2	No reform	Coffee
Libya	1	No reform	Groundnuts
Lithuania	4	1992	Sugar
Madagascar	4	1988	Coffee
Malawi	4	1987, 1992	Sugar
Malaysia	2	No reform	Rice
Mali	4	No reform	Cotton
Mexico	4	1993	Coffee
Moldova	4	1993	Maize
Mongolia	1	No reform	Wheat
Morocco	4	1996	Wheat
Mozambique	3	No reform	Cotton
Myanmar	4	No reform	Rice
Namibia	2	No reform	Sugar
Nepal	2	No reform	Rice
Nicaragua	2	No reform	Coffee
Niger	4	1987	Groundnuts
Nigeria	4	1986	Cocoa
Oman	2	No reform	Wheat
Peru	4	1992	Coffee
Poland	4	1989	Coffee
Romania	4	1990, 1993	Wheat
Russia	4	No reform	Wheat
Saudi Arabia	2	No reform	Wheat
Sierra Leone	4	No reform	Cocoa

Slovak Republic	4	1991	Coffee
Slovenia	4	1991	Maize
South Africa	4	No reform	Sugar
Sri Lanka	1	1975, 1992	Tea
St Kitts and Nevis	4	No reform	Sugar
Tajikistan	4	1996	Cotton
Tanzania	4	1994	Coffee
Thailand	2	No reform	Rice
Togo	4	No reform	Cotton
Trinidad and Tobago	3	No reform	Sugar
Tunisia	4	No reform	Wheat
Turkey	4	No reform	Wheat
Turkmenistan	4	No reform	Cotton
Uganda	4	1992, 1998	Coffee
Ukraine	4	1996	Wheat
Uruguay	1	No reform	Rice
Uzbekistan	4	No reform	Cotton
Venezuela	3	No reform	Coffee
Vietnam	4	1988	Rice
Zambia	4	1994	Cotton
Zimbabwe	4	1997	Cotton

To draw some broad conclusions on the profile of the liberalization process in agricultural markets, we break up our sample according to income group[18] (Figure 1), geographical area (Figure 2) and commodity (Figures 3). Liberalization waves have been widespread throughout much of the world in the last twenty years. Countries of all income groups liberalized their agricultural markets; low income economies reformed more gradually (the process started in the mid 1980s), whereas the lower-middle and higher-middle income economies reformed more rapidly, but they also started from a lower level of regulation (Figure 1).

The extent of reforms has not been homogeneous across geographical regions: Asian and Middle Eastern countries tended to reform much less, whereas Latin America and Eastern Europe emerged as reform leaders. African countries also witnessed a considerable liberalization process, especially if we take into account the initial high level of regulation in those countries. The timing of reforms, characterized everywhere by long periods of maintenance of the status quo, also shows a regional clustering: Reforms started at the beginning of the 1990s for Eastern Europe and Latin America and were on average more drastic. In Africa the liberalization process began in the mid-1980s and was much

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[18] Income and geographical categories are based on the grouping in the World Bank's 2001 World Development indicators.

more gradual. Asian countries had a very mild liberalization process in the 1990s, but they started from a lower initial level of regulation (Figure 2).

Figure 1
Deregulation Index by Income Group
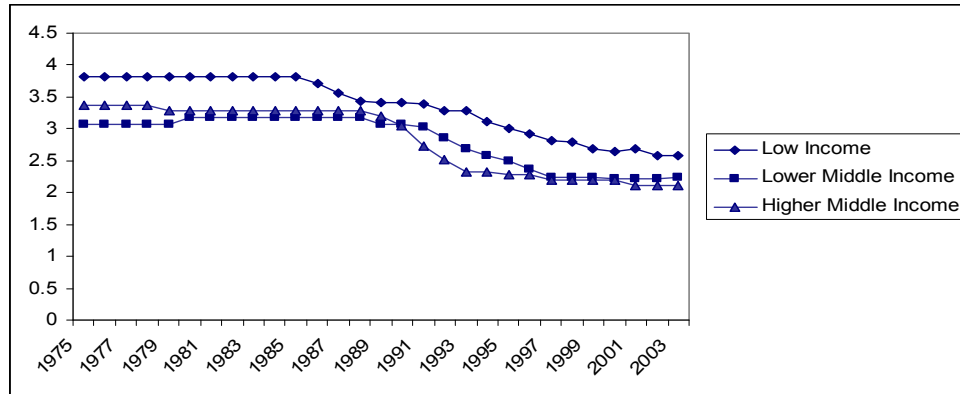
Figure 2
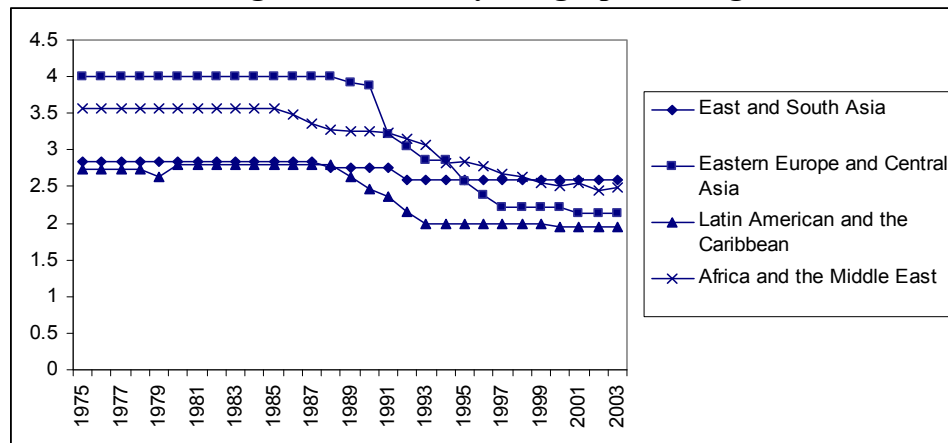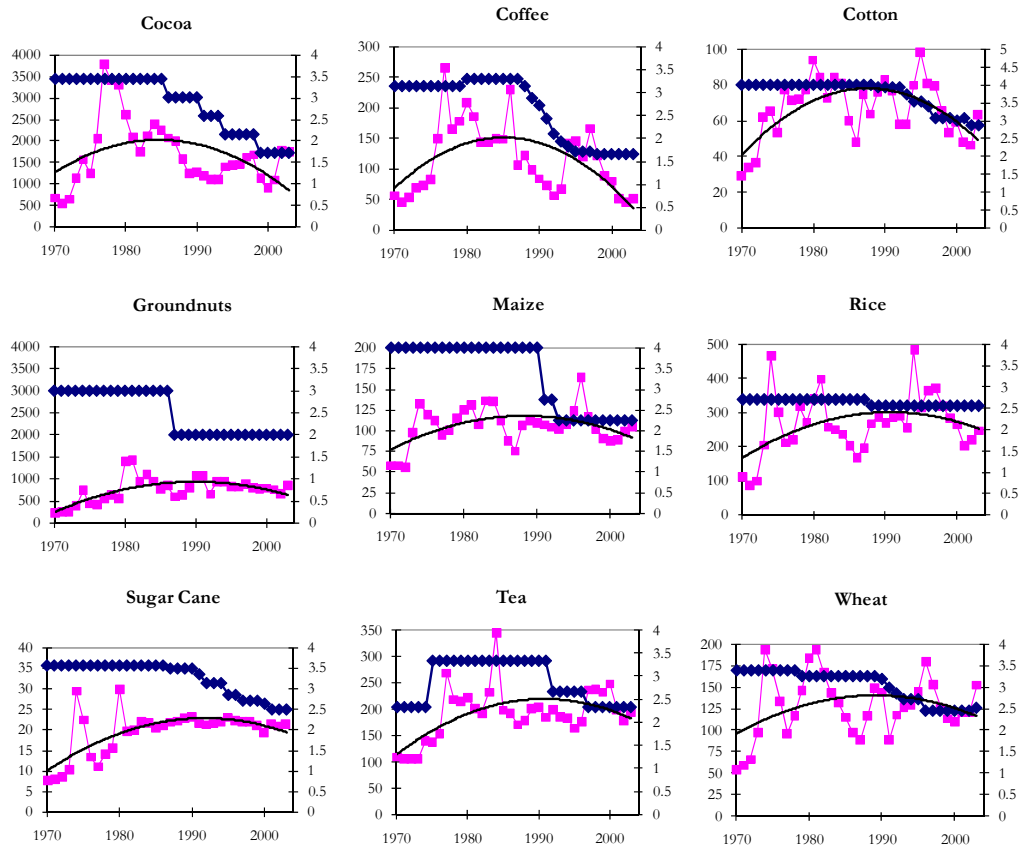**Deregulation Index by Geographical Region**

Figure 3 shows the level of regulation by commodity, together with international commodity prices and their trends. The charts indicate that reform episodes always happened after the international commodity prices started to decline.

Figure 3
Commodity Prices and Deregulation

Each chart represents the price of the commodity, its trend and the index of regulation (a higher number indicates a more regulated market)

Specification

Reforms may be triggered by a wide range of factors. Following the theoretical literature reviewed above, we combine determinants of reforms into four groups.

1. Crisis. Our crisis event will be based on the decline in the international price of the main agricultural commodity in each country.[19] This definition of crisis allows us to study the impact of the collapse in international commodity

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[19] The main agricultural commodity is defined as the main agricultural export commodity. Weights for agricultural commodities in the total export basket are obtained from the Commodity Unit of the Research Department of the International Monetary Fund.

prices through the financial pressure on marketing boards. These prices, expressed in local currency, constituted marketing boards revenues. We define a variety of crisis dummies, combining information on the magnitude of the decline and on the duration of the crisis. In Table 2, Panel A, we report the results for 10 different definitions of crisis. In column 1, we report the results for a crisis variable defined as a dummy equal to 1 if there was a decline in the level of price from the previous year; in column 2, crisis is defined as a dummy equal to one if we observe two consecutive years of price decline, and so on up to 5 consecutive years of price decline. We would expect the impact of the crisis to be larger if the crisis is more long lasting.

To see whether the magnitude of the drop is also relevant we report in Table 2, Panel B a different definition of crisis. In column 1, the dummy is equal to 1 if the price drops by more than 20% from the previous year. In column 2, the crisis is defined as a dummy equal to 1 if we observe two consecutive years of price drop greater than 20% and so on up to 5 years of consecutive price drops higher than 20% from the previous year. As before, we would expect a stronger effect if the drop lasts longer. Moreover the magnitude of the drop should also matter: we would expect that a decline in prices larger than 20% should produce a stronger effect than a simple decline. Similar definitions of crises are common in the finance literature, in particular in empirical studies of currency crises.[20]

2. Political institutions. The political decision-making process can be relevant to a country's ability to implement structural reforms. In particular, reforms may be conditioned by the ideology of the ruling government (Alesina and Roubini 1992), by the form of the government (Persson 2002) and by the numbers of years the current regime has been in office. For our particular case we also look at the importance of rural representation in the government.

a. Ideology. Right-wing governments are normally considered more inclined to market-oriented reforms (Alesina and Rubini 1992). We capture the ideological orientation of the executive with the indicator 1 if the executive belongs to a party of the left, 0 if it belongs to a right wing, centrist or other party.

b. Form of government. Presidential systems are considered in literature a form of government that should facilitate reforms, as they should be more able to overcome the resistance of small interest groups. We define a variable called

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[20] In Kaminsky et al. (2000) a currency crisis is defined as a sharp depreciation of the currency, a large decline in international reserves or a combination of the two. The crisis dummy is equal to 1 when their index is above its means by more than a certain threshold. Frankel and Rose (1996) define a currency crash as "a large change of the nominal exchange rate that is also a substantial increase in the rate of change of nominal depreciation." The depreciation rate is set at 25%, but has to exceed the previous year's depreciation level by at least 10% as well.

presid as a dummy taking the value of 1 if the system is directly presidential and 0 if the president is elected by the assembly or parliament.

c. Government's tenure of office. There is mixed evidence on the relevance of a general election for reforms. On the one hand, newly elected governments should be more inclined to implement reforms in order to obtain all the gains during the legislature (Haggard and Webb 1993 and Williamson 1994). On the other hand, if a general election is approaching, the government may be reluctant to implement structural reforms as they can have very high short-term costs (Pitilik and Wirth 2003). We control for this effect by including a dummy for the government's first year in office, we also control for the presence of a legislative or executive election, and the results do not change.

d. Rural representation. According to Bates (1981), the marketing boards could exploit rural farmers because they were not organized as a political group. In the majority of developing countries, moreover, political leaders drew their support from urban groups and were typically hostile to agricultural interests. If this interpretation were correct we would expect a correlation between the probability of reforming and the extent to which farmers are politically represented. We define a variable called "rural representation" as roughly measuring the political voice of the rural classes. This variable takes the value of 1 if a party, whose name contains the word "rural," is one of three largest government or opposition parties or if it is the largest government or opposition party in a regional administration. If the private interest theory of regulation were true we would expect that it should be easier to implement reforms when a rural party has greater political voice in the government.

3. Structural features of the economy and international influences. These two variables have been proposed as conducive to reforms. Rajan and Zingales (2002) hypothesize that the opposition to liberalization is weaker in countries that are more open to international trade. Haggard and Webb (1993) suggest that supranational constraints, such as the ones coming from the international organizations, could be conducive to reforms.[21] The implementation of reforms is sometimes a condition to receive loans from international organizations; those super-partes bodies could also simply act on behalf of groups lacking political power, therefore helping the implementation of reforms. We control for the aforementioned determinants by including a variable indicating the country's degree of trade openness (*openness*) and a dummy (*IMF*) indicating whether the country participates in an IMF conditionality program.

4. Other crises. As a last step we check the robustness of our results taking into account the influence of other possible crises. In particular, we control for the possibility that the country experienced a recession, (defined as a dummy for

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[21] The authors, however, do not find any evidence for it.

those years in which the GDP growth has been negative), a depression (defined as a dummy for those years in which the GDP growth has been below five percent) or episodes of hyperinflation (a dummy for those years in which the inflation rate has been above 50 percent). Finally we also include a dummy for banking crisis episodes. (For a definition, see Detragiache and Kunt 2005.)

We study the determinants of agricultural market reforms using an unbalanced cross-national panel dataset for 88 developing countries between 1960 and 2003. The unit of analysis is country-year. For each country i at time t, our dependent variable is the change over time in the index, I_{it}, of deregulation ($\Delta I_{it} = I_{it} - I_{it-1}$). Reforms are therefore defined as any change in the index of regulation for the agricultural market. All our regressions control for country and year fixed effects. Standard errors are clustered at the country level.

Our specification is the following:

$$\Delta I_{it} = \alpha_1 crisis_{it} + \alpha_2 left_{it} + \alpha_3 presid_{it} + \alpha_4 fy\_office_{it} +$$
$$+\alpha_5 rural\_rep_{it} + \alpha_6 leg\_elect_{it} + \alpha_7 exec\_elec_{it} + \alpha_8 polity2_{it} +$$
$$+\alpha_9 openness_{it} + \alpha_{10} IMF_{it} + \alpha_{11} other\_crises_{it} + \gamma_i + \delta_t + \varepsilon_t$$

Our independent variables (all defined above) include a crisis variable, political variables as captured by dummies describing the ideology of the executive (*left*), the presence of a presidential system (*presid*), the incumbent executive's first year in office[22] (*fy_office*), the political voice of the rural classes (*rural_rep*), dummies of legislative and executive elections (*leg_elec* and *exec_elec*) and a proxy for democracy (*polity2*). We also control for the influence of international organizations (*IMF*), the degree of trade openness (*openness*), the presence of other crises (*other_crises*)[23], country (γ_i) and year (δ_t) fixed effects. Descriptive statistics of our sample are shown in Table A1.

Results

Table 2 shows panel regressions of the change in the regulation index and different measures of crises (from one to five years of consecutive price decline in Panel A, and from one to five years of consecutive price decline higher than 20% in Panel B). The regressions in Table 2 control for country and year fixed effects to rule out the possibility that our results are driven by country characteristics or a worldwide movement toward reforms. Standard errors are clustered at the country level.

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[22] As an alternative specification we included a dummy for whether the country had an election in one specific year and the results did not change.

[23] These crises may include recessions, depressions, episodes of hyperinflation or banking crises.

Table 2
Agricultural Market Deregulation and Price Decline

	(1) ΔI_t	(2) ΔI_t	(3) ΔI_t	(4) ΔI_t	(5) ΔI_t
PANEL A					
One year of price decline	-0.020 (0.009)**				
Two years of price decline		-0.031 (0.011)***			
Three years of price decline			-0.036 (0.014)**		
Four years of price decline				-0.049 (0.017)***	
Five years of price decline					-0.077 (0.023)***
Observations	3686	3686	3686	3686	3686
R-squared	0.04	0.05	0.05	0.05	0.05
PANEL B	(1) ΔI_t	(2) ΔI_t	(3) ΔI_t	(4) ΔI_t	(5) ΔI_t
One year of more than 20% price decline	-0.034 (0.012)***				
Two years of more than 20% price decline		-0.053 (0.018)***			
Three years of more than 20% price decline			-0.086 (0.029)***		
Four years of more than 20% price decline				-0.111 (0.040)***	
Five years of more than 20% price decline					-0.133 (0.051)**
Observations	3686	3686	3686	3686	3686
R-squared	0.05	0.05	0.05	0.05	0.05

Each regression controls for country and year fixed effects. Standard errors are clustered at the country level.
* significant at 10%; ** significant at 5%; *** significant at 1%

The coefficient on the decline of the commodity price is negative and significant at the 1 percent level in the majority of the specifications (note that a negative sign in our specification means that the variable is conducive to reforms, as our indicator is increasing in the degree of regulation), confirming Bates' story that governments intervened in the agricultural markets when it was possible to obtain profits. Governments started to reform when forced to do so. The decline in international commodity prices caused the decrease in regulation through the aforementioned financial pressures on marketing boards' financial conditions. As expected the pressure on deregulation increases with both the duration and the severity of the crisis. A decline in the price level for five consecutive years has four times the effect of a decline for a single year (a coefficient of 0.08 compared to 0.02). The impact of a decline higher than 20% for 5 years is seven times greater than a simple decline of one year in the price level.

Table 3 includes political determinants of deregulation (presidential systems, the presence of a left-wing government, a dummy for the first year in office, legislative and executive elections, an index of democracy[24] and a variable controlling for rural representation), in addition to other economic variables (openness to trade, a dummy for the existence of an IMF program and four additional definitions of crisis based on episodes of recession, hyperinflation or banking crisis).

Table 3
Determinants of Agricultural Market Deregulation

	(1) ΔI_t	(2) ΔI_t	(3) ΔI_t	(4) ΔI_t	(5) ΔI_t
Five years of price decline	-0.103 (0.034)***	-0.104 (0.035)***	-0.107 (0.035)***	-0.098 (0.037)***	-0.101 (0.034)***
Log (trade)	0.050 (0.033)	0.053 (0.034)	0.056 (0.035)	0.042 (0.040)	0.051 (0.033)
IMF program	0.006 (0.020)	0.007 (0.020)	0.006 (0.020)	0.002 (0.022)	0.005 (0.020)
Presidentialism	-0.047 (0.056)	-0.046 (0.059)	-0.049 (0.059)	-0.062 (0.060)	-0.055 (0.057)
Left	0.052 (0.025)**	0.054 (0.026)**	0.050 (0.026)*	0.051 (0.025)**	0.051 (0.024)**
First year in office	-0.034 (0.027)	-0.033 (0.027)	-0.034 (0.026)	-0.024 (0.026)	-0.032 (0.026)
Rural representation	-0.097 (0.051)*	-0.099 (0.052)*	-0.096 (0.052)*	-0.094 (0.055)*	-0.099 (0.051)*
Legislative election	-0.001 (0.038)	-0.003 (0.038)	-0.002 (0.038)	-0.002 (0.042)	0.002 (0.038)
Executive election	-0.011 (0.048)	-0.008 (0.049)	-0.009 (0.049)	-0.004 (0.053)	-0.011 (0.048)
Polity2	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)
Recession		-0.044 (0.025)*			
Severe Recession			-0.067 (0.043)		
Hyperinflation				-0.065 (0.062)	
Banking crisis					-0.147 (0.150)
Observations	1504	1471	1471	1372	1504
R-squared	0.08	0.08	0.08	0.08	0.08

Each regression controls for country and year fixed effects. Standard errors are clustered at the country level. * significant at 10%; ** significant at 5%; *** significant at 1%

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[24] As an index of democracy we use the standard measure of democracy taken from the Polity IV database. In particular, we use the combined polity2 index ranging from -10 (high autocracy) to 10 (high democracy).

The estimated coefficients on the political variables and economic variables are not significant, with the exception of a left orientation of the government (positive and significant), indicating the known resistance of left governments to the implementation of market reforms. A stronger rural class voice is associated with a lower degree of regulation (the coefficient on *rural_rep* is always negative and significant at the 5 percent level). This result is consistent with the historical evidence presented before: state intervention was harmful for farmers almost everywhere, who were therefore more favorable to reforms.

We also investigate the possibility of an interaction effect between political variables and the price shock variable, to see if the same price shock could have caused deregulation when interacted with such factors. We do not find any significant effect of these interactions.[25] Openness to trade and the presence of IMF programs are not significant drivers of reforms.[26] Finally, columns 2-5 control for other types of crises including episodes of hyperinflation, recession, depression or banking crisis. These other measures of crisis have the expected sign, but are not significant, with the exception of recessions (significant only at the 10 percent level). The price shock variable remains significant at the one percent level even when we include political and economic factors. The results are robust to different definition of price crisis (Table 4).[27]

In the Appendix we report the results of various robustness checks. One possible concern is a possible endogeneity problem in the price drop, especially for those countries that are world-leading producers in a specific agricultural good. To rule out the possibility that the international price drop could be driven by the behavior of big market players, we drop from the sample countries with market power for the relevant crop. Our results are robust to the exclusion of these countries (Table A2).[28]

We consider a more country-specific measure of commodity prices by taking a weighted average of the three main export agricultural commodities. Our results are virtually unchanged with this new definition of price (Table A3).[29]

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[25] The results are available from the authors.

[26] Alesina et al. (2006) find the same result for fiscal adjustments.

[27] We report only the results for five consecutive years of price decline and for five years of more than 20% price decline. The results are robust to the different definition of crisis presented in Table 2.

[28] Main players (defined as percentage of the world production) for each commodity are: Brazil (31), Colombia (10.5) and Venezuela (15.29) for coffee. China (25), India (20) and US (17) for cotton. Cote d'Ivoire (38), Indonesia (13) and Ghana for cocoa. China (27), India (23) and Sri Lanka (9) for tea. China, India and US for Groundnuts. EU (23), Brazil (22) and Australia (11) for Sugar. China (31), India (22) and Indonesia (8.7) for rice. US (26), Canada (20) and EU (16) for wheat.

[29] The magnitude and significance of the drop are very similar to the previous specification, most likely because the weight of the second and third commodity is much smaller than the first (with few exceptions, such as Brazil for coffee and sugar).

Finally, we included lagged political variables to account for the time that the political process takes to react to a possible crisis by implementing a reform, and to limit the endogeneity problem. The results on our price variables are unchanged, although the significance of ideology and rural representation disappear. Consistent with the literature, democracy and presidentialism appear to be conducive to democracy when we use the lagged specification (Table A4).

Table 4
Determinants of Agricultural Market Deregulation
Alternative Definition of Price Crisis

	(1)	(2)	(3)	(4)	(5)
	ΔI_t	ΔI_t	ΔI_t	ΔI_t	ΔI_t
Five years of more than	-0.172	-0.175	-0.176	-0.190	-0.177
20% price decline	(0.078)**	(0.079)**	(0.079)**	(0.094)**	(0.078)**
Log(trade)	0.057	0.060	0.064	0.045	0.059
	(0.037)	(0.039)	(0.039)	(0.044)	(0.037)
IMF program	0.004	0.005	0.004	-0.001	0.003
	(0.020)	(0.020)	(0.020)	(0.021)	(0.020)
Presidentialism	-0.052	-0.051	-0.055	-0.068	-0.061
	(0.060)	(0.062)	(0.062)	(0.064)	(0.060)
Left	0.053	0.054	0.051	0.050	0.051
	(0.027)*	(0.029)*	(0.029)*	(0.027)*	(0.027)*
First year in office	-0.035	-0.033	-0.034	-0.024	-0.033
	(0.027)	(0.027)	(0.026)	(0.026)	(0.026)
Rural representation	-0.093	-0.095	-0.092	-0.090	-0.096
	(0.051)*	(0.052)*	(0.052)*	(0.055)	(0.051)*
Legislative election	0.003	0.002	0.003	0.002	0.007
	(0.038)	(0.038)	(0.038)	(0.042)	(0.038)
Executive election	-0.015	-0.012	-0.013	-0.009	-0.015
	(0.048)	(0.048)	(0.048)	(0.052)	(0.047)
Polity2	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Recession		-0.046			
		(0.025)*			
Severe recession			-0.066		
			(0.043)		
Hyperinflation				-0.071	
				(0.067)	
Banking crisis					-0.166
					(0.145)
Observations	1504	1471	1471	1372	1504
R-squared	0.08	0.08	0.08	0.08	0.08

Each regression controls for country and year fixed effects. Standard errors are clustered at the country level.
*significant at 10%; ** significant at 5%; *** significant at 1%

4. Conclusions

Little is known about the determinants of agricultural market reforms in developing countries. The lack of a comprehensive dataset has prevented

researchers from testing competing arguments to explain differences across countries and over time in the implementation of these reforms.

By using a completely new dataset on agricultural market reforms covering 88 developing countries, we find supporting evidence to the argument that reforms are implemented in bad times. Declining commodity prices appear to be the main determinant of deregulation. This result is consistent with the view of rent-seeking behavior on the part of government, where the decline in commodity prices destroyed the rents available through this over-regulated equilibrium. We also find that ideology and rural representations contributed to the movement toward regulation.

Appendix A

Table A1
Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Regulation index	4091	3.054	1.186	1	4
1 year price decline	3770	0.571	0.495	0	1
2 years price decline	3770	0.378	0.485	0	1
3 years price decline	3770	0.249	0.432	0	1
4 years price decline	3770	0.174	0.379	0	1
5 years price decline	3770	0.119	0.324	0	1
1 year price decline higher than 20%	3770	0.274	0.446	0	1
2 years price decline higher than 20%	3770	0.137	0.344	0	1
3 years price decline higher than 20%	3770	0.079	0.270	0	1
4 years price decline higher than 20%	3770	0.055	0.228	0	1
5 years price decline higher than 20%	3770	0.038	0.192	0	1
Log(trade)	2437	3.763	0.626	1.08	5.48
IMF	3830	0.248	0.432	0	1
Presidentialism	2412	0.833	0.373	0	1
Left wing government	2395	0.334	0.472	0	1
First year in office	4091	0.088	0.283	0	1
Legislative elections	2427	0.184	0.387	0	1
Executive elections	2428	0.111	0.314	0	1
Rural Representation	2108	0.114	0.318	0	1
Polity2	2973	-1.331	6.793	-10	10
Banking crisis	6619	0.007	0.084	0	1
Recession	2793	0.323	0.468	0	1
Depression	2793	0.106	0.308	0	1
Hyperinflation	2299	0.104	0.305	0	1

Table A2
Determinants of Agricultural Market Deregulation
Robustness checks, excluding big market players

	(1)	(2)	(3)	(4)	(5)
	ΔI_t	ΔI_t	ΔI_t	ΔI_t	ΔI_t
Five years of more	-0.181	-0.185	-0.185	-0.202	-0.187
than 20% price decline	(0.089)**	(0.091)**	(0.091)**	(0.103)*	(0.089)**
Log (trade)	0.073	0.081	0.084	0.061	0.075
	(0.038)*	(0.038)**	(0.038)**	(0.042)	(0.039)*
IMF program	0.010	0.010	0.009	0.006	0.008
	(0.022)	(0.022)	(0.022)	(0.023)	(0.022)
Presidentialism	0.011	0.016	0.014	-0.002	0.005
	(0.034)	(0.034)	(0.035)	(0.035)	(0.035)
Left	0.032	0.030	0.029	0.032	0.031
	(0.023)	(0.023)	(0.023)	(0.023)	(0.022)
First year in office	-0.030	-0.031	-0.031	-0.017	-0.030
	(0.031)	(0.031)	(0.030)	(0.030)	(0.031)
Rural representation	-0.082	-0.082	-0.080	-0.080	-0.082
	(0.058)	(0.059)	(0.059)	(0.063)	(0.058)
Legislative election	0.018	0.016	0.018	0.019	0.019
	(0.038)	(0.039)	(0.039)	(0.044)	(0.039)
Executive election	-0.037	-0.032	-0.035	-0.030	-0.037
	(0.052)	(0.052)	(0.052)	(0.056)	(0.051)
Polity 2	0.001	0.001	0.001	0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Recession		-0.041			
		(0.028)			
Severe recession			-0.049		
			(0.041)		
Hyperinflation				-0.071	
				(0.076)	
Banking crisis					-0.116
					(0.166)
Observations	1269	1236	1236	1155	1269
R-squared	0.08	0.08	0.08	0.08	0.08

Each regression controls for country and year fixed effects. Standard errors are clustered at the country level. *significant at 10%; ** significant at 5%; *** significant at 1%

Table A3
Determinants of Agricultural Market Deregulation
Robustness checks, weighted average of prices of the three major export agricultural commodities

	PANEL A				
	(1)	(2)	(3)	(4)	(5)
	ΔI_t	ΔI_t	ΔI_t	ΔI_t	ΔI_t
One year of price decline	-0.022 (0.011)*				
Two years of price decline		-0.036 (0.012)***			
Three years of price decline			-0.055 (0.016)***		
Four years of price decline				-0.070 (0.020)***	
Five years of price decline					-0.059 (0.024)**
Observations	3686	3686	3686	3686	3686
R-squared	0.05	0.05	0.05	0.05	0.05
	PANEL B				
	(1)	(2)	(3)	(4)	(5)
	ΔI_t	ΔI_t	ΔI_t	ΔI_t	ΔI_t
One year of more than 20% price decline	-0.033 (0.014)**				
Two years of more than 20% price decline		-0.040 (0.020)**			
Three years of more than 20% price decline			-0.083 (0.030)***		
Four years of more than 20% price decline				-0.093 (0.039)**	
Five years of more than 20% price decline					-0.106 (0.050)**
Observations	3686	3686	3686	3686	3686
R-squared	0.05	0.05	0.05	0.05	0.05

Each regression controls for country and year fixed effects. Standard errors are clustered at the country level.
*significant at 10%; ** significant at 5%; *** significant at 1%

Table A4
Determinants of Agricultural Market Deregulation
Robustness checks with lagged political variables

	(1) ΔI_t	(2) ΔI_t	(3) ΔI_t	(4) ΔI_t	(5) ΔI_t
Five years of more than 20%	-0.150	-0.161	-0.161	-0.165	-0.154
price decline	(0.068)**	(0.074)**	(0.075)**	(0.092)*	(0.068)**
Presidentialism (t-1)	-0.057	-0.074	-0.074	-0.083	-0.066
	(0.036)	(0.041)*	(0.041)*	(0.048)*	(0.036)*
Left (t-1)	0.003	0.010	0.007	-0.004	0.001
	(0.022)	(0.026)	(0.025)	(0.026)	(0.022)
First year in office (t-1)	-0.026	-0.027	-0.025	-0.022	-0.028
	(0.026)	(0.029)	(0.029)	(0.028)	(0.026)
Rural representation (t-1)	-0.045	-0.066	-0.067	-0.026	-0.048
	(0.053)	(0.060)	(0.060)	(0.057)	(0.053)
Legislative election (t-1)	-0.008	-0.017	-0.018	-0.002	-0.008
	(0.024)	(0.026)	(0.025)	(0.028)	(0.023)
Executive election (t-1)	0.025	0.035	0.034	0.028	0.021
	(0.031)	(0.033)	(0.033)	(0.036)	(0.031)
Polity 2 (t-1)	-0.004	-0.005	-0.005	-0.004	-0.004
	(0.003)	(0.003)*	(0.003)*	(0.004)	(0.003)
Recession		-0.044			
		(0.023)*			
Severe recession			-0.050		
			(0.048)		
Hyperinflation				-0.091	
				(0.065)	
Banking crisis				-0.177	
				(0.147)	
Observations	1744	1553	1553	1437	1744
R-squared	0.07	0.07	0.07	0.07	0.07

Each regression controls for country and year fixed effects. Standard errors are clustered at the country level.
*significant at 10%; ** significant at 5%; *** significant at 1%

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