



IMF Working Paper

Growth and Structural Reforms: A New Assessment

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Research Department

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Abstract

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This paper presents a simultaneous assessment of the relationship between economic performance and three groups of economic reforms: domestic finance, trade, and the capital account. Among these, domestic financial reforms, and trade reforms, are robustly associated with economic growth, but only in middle-income countries. In contrast, we do not find any systematic positive relationship between capital account liberalization and economic growth. Moreover, the effect of domestic financial reforms on economic growth in middle-income countries is explained by improvements in measured aggregate TFP growth, not by higher aggregate investment. We present evidence that variation in the quality of property rights helps explain the heterogeneity of the effectiveness of financial and trade reforms in developing countries. The evidence suggests that sufficiently developed property rights are a precondition for reaping the benefits of economic reform. Our results are robust to endogeneity bias and a number of alternative specifications.

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I. INTRODUCTION

Over the past decades, the global economy has become increasingly liberalized in a number of dimensions: domestic financial systems have deepened and become less regulated, trade regimes have become more open, and capital accounts have become less restricted. The trend towards less regulated markets has been observed in all regions and in most countries. But to what extent have these liberalization efforts contributed to improved economic outcomes, as measured by per-capita income levels and growth?

The recent experience highlights the importance of deepening our understanding of the benefits of structural reforms. As discussions about financial (re)regulation of financial systems indicate, the answer to the above question is, even at a theoretical level, not obvious: in the context of the recent global financial crisis, there have been claims that some regulation (of the right sort) may help rather than hinder growth and macroeconomic stability.

A large literature exists on the economic benefits of reforms, but with some exceptions, existing studies have typically focused on individual reforms only, and have covered different country samples and measures of reforms, making comparisons across studies and types of reforms difficult. Moreover, empirical studies have often relied on de facto measures to proxy for liberalization, such as financial development as a proxy for financial liberalization, and openness to trade as a proxy for trade reforms. While de facto measures are likely to be useful indicators of the success of reforms, they are outcome measures that are influenced by a variety of macroeconomic conditions beyond the reform considered.

The main contribution of this paper is to test the joint growth effects of various types of de jure reforms, and to do so within a unified empirical framework, thus allowing for better comparability across reforms. To our knowledge, it is the first one that simultaneously considers domestic financial reforms, trade reforms, and capital account reforms. The aim is to provide answers to the following key questions: (i) what do growth regressions tell us on the joint effects of these reforms on economic performance; (ii) are the effects of reforms persistent; (iii) is there heterogeneity of the effects of reforms across countries (if yes, are the growth effects constrained by political institutions?); and (iv) what are the main channels through which reforms affect

economic performance—do reforms affect economic performance by increasing aggregate investment or by improving aggregate economic efficiency?

To answer these questions, we draw on a newly developed database of de jure indicators of structural reform in the areas of finance, trade and the capital account. The new database has several advantages with respect to previous studies. First, some indicators used in previous research, especially regarding domestic finance and capital account, were sometimes crude, binary indicators. In our analysis, we rely on more refined measures. Second, by providing a wide country and year coverage across all three indicators, the new database allows for better comparability of the effects of reforms in these different areas—previous research has typically focused on only a small subset of these reform areas, making comparisons difficult to interpret. Finally, we focus exclusively on de jure indicators, that is, those reflecting legal and policy restrictions, rather than de facto measures which reflect outcomes, as done in much of the existing literature. While there is significant value in analyzing the correlations between de facto measures and economic outcomes, de jure indicators are the more appropriate measures from a policy perspective, as they are under the policymaker's (direct) control.

To give an overview of our results, we find that among the three groups of reforms, domestic financial reforms, and to some extent trade reforms, are most robustly associated with economic growth; in contrast, we do not find any systematic positive relationship between capital account liberalization and economic growth. Moreover, the positive effects of financial and trade reforms are almost exclusively driven by the group of middle-income countries, and the effect of domestic financial reforms on economic growth in these countries is predominantly explained by improvements in measured aggregate TFP growth, not by higher aggregate investment. Also, the growth effects of domestic financial and trade reforms are somewhat persistent, raising growth at a horizon of up to 6 years, but become insignificant at a longer horizon.

We also present some tentative evidence on the interactions of political institutions (the quality of property rights) and economic reforms. In particular, the heterogeneity of the effectiveness of financial and trade reforms in developing countries seems to be explained by a complementarity between economic reforms and political reforms: financial and trade reforms are effective in developing countries with good protection of property rights. This evidence suggests that sufficiently developed property rights may be a precondition for reaping the growth benefits of

reforms, a finding that is consistent with part of the recent literature in this area. Our results are robust to a variety of robustness tests and, in particular, to endogeneity bias.

The remainder of the paper proceeds as follows. Section II provides an overview of the related literature; section III presents the empirical model; section IV describes the data; section V presents the main results; section VI discusses robustness tests and addresses endogeneity issues; section VII examines the interactions of economic and political reforms; and section VIII concludes.

II. RELATED LITERATURE

This paper examines the effects of economic reforms, specifically domestic financial development, trade openness and capital account openness, on economic growth, with a focus on how reforms in different areas interact in their effects on growth. While the literature on reform interactions and sequencing is relatively sparse, the literature on the effects of individual reforms is large. In the following, we discuss a subset of this literature.²

Levine (1997, 2005) provides a survey of the large literature on the growth benefits of domestic financial reform. Empirical applications in this literature typically employ *de facto* measures of domestic financial development (or depth), such as the ratio of private domestic credit, M2, or liquid liabilities to GDP. This literature broadly provides strong evidence that a higher initial level of financial development is associated with higher subsequent rates of economic growth, and economic efficiency improvements even after controlling for a wide variety of economic factors (Beck et al., 2000a and 2000b, Aghion et al., 2005). Using *de jure* measures, Bekaert et al. (2005) and Henry (2005) find that stock market liberalizations are positively correlated with economic growth and investment. Furthermore, Rajan and Zingales (1998), Galindo et al. (2005), Abiad et al. (2008), and Tressel (2008) provide evidence suggesting that a more

² The literature review in this section is highly selective. For example, a broader empirical literature exists on the sequencing of product and labor market reforms in OECD countries (e.g., Fiori and others, 2007), and their effect on economic outcomes (Scarpetta and Tressel, 2002) but these are two reform areas that we do not focus on. Also outside the remit of this paper is the analysis of the appropriate sequencing between macroeconomic stabilization and structural reforms; Zaldueño (2005) provides an analysis. Bhattacharya (1997) provides additional references to the earlier theoretical literature.

developed financial system may lead to a more efficient allocation of capital across firms and industries.

Another strand of the literature has examined the effects of financial liberalization on financial development. In their seminal work, MacKinnon (1973) and Shaw (1973) argue that financial repression in developing countries may prevent an efficient allocation of capital, and that financial liberalization, by unifying domestic capital markets, would boost financial development and economic growth. Recent papers, including Chinn and Ito (2006) and Tressel and Detragiache (2008), find that financial deregulation indeed leads to a deepening of financial systems, but also find that sufficiently developed institutions are a pre-condition for this deepening to take place.

The relationship between trade liberalization and economic growth is somewhat less clearly established, although a consensus appears to be emerging that reducing trade barriers is, indeed, supportive of growth. Representative of this consensus view are Sachs and Warner (1995), Dollar and Kraay (2004) and Wacziarg and Welch (2008). Rodríguez and Rodrik (2000) and Subramanian, Trebbi and Rodrik (2004) present a divergent and more skeptical view about the benefits of trade liberalization.

There exists less empirical clarity on the benefits of liberalizing cross-border financial transactions, counter to a compelling theoretical case for a positive link between free capital flows and economic growth (Kose et al., 2009, and Dell’Ariccia et al., 2008). A variety of explanations have been posited to reconcile theory and empirics. For example, it may be the case that specific capital account liberalizations matter more than others. In this vein, studies focusing on equity market liberalizations typically find stronger effects (e.g., Henry 2000a, 2000b; Bekaert et al., 2003). Kose et al. (2009) and Bonfiglioli (2008) find that financial integration affects growth outcomes mainly through improvements in productivity (TFP) growth, with little effect on capital accumulation. Kose et al. (2009) also argue that the positive effects from capital account liberalizations are felt only if institutional thresholds are met.³ Klein and Olivei (2008) find that developed countries with more open capital accounts experienced greater financial

³ As discussed below, we fail to confirm this finding.

deepening and higher economic long-run growth, but they do not find such a relationship among developing countries.

Several authors argue that the gap between theory and empirics may be more apparent than real. According to Henry (2007), theory predicts only temporary growth effects, helping to understand why regressions that aim to explain long-term growth differences typically find only weak results. Quinn (1997) argues that the absence of a strong empirical relationship is due to poor measurement of countries' degree of capital account restrictiveness—he develops a more refined *de jure* index of capital controls (that we have also used in this paper) and finds a more robust relationship with growth. Finally, Rodrik and Subramanian (2009) and Prasad et al. (2007) argue that the absence of a strong correlation between long-run economic growth and capital inflows may be due to real exchange rate appreciation hurting investment opportunities in the traded goods sector.

Most of these studies consider one broad type of reform in isolation. There exists a smaller literature that jointly assesses effects of reforms as well as complementarities with broader institutional characteristics. Acemoglu and Johnson (2005) show that the quality of property rights may constrain the effects of economic reforms. Much of this literature focuses on interactions between (subsets of) reforms in the areas of international trade, capital account and domestic finance. Rajan and Zingales (2003) propose an interest group theory of financial development where incumbents oppose financial development because the increased competition would weaken their market power. Their model predicts that incumbents' opposition will be weaker when an economy allows both cross-border trade and capital flows, and their argument helps understand why trade reform is more likely to precede domestic financial sector reform than vice-versa. Hauner and Prati (2008) focus on the sequencing of capital account, trade and domestic finance reforms and find that trade is a leading indicator of domestic finance and capital account reforms, but they cannot detect a clear sequencing pattern between the latter two. However, neither Rajan and Zingales (2003) nor Hauner and Prati (2008) provide normative

assessments of reform sequences. Ostry et al. (2009) provide additional discussion and results on these issues.⁴

In an early contribution, McKinnon (1993) argued that trade liberalization and domestic financial reforms should precede capital account liberalization, as capital account liberalizations may exacerbate existing trade distortions or destabilize highly regulated domestic financial markets. Indeed, Dell’Ariccia et al. (2008) provides some evidence that capital account liberalizations in countries with insufficiently developed financial markets may lead to increased volatility. In a panel setting, Braun and Raddatz (2007) find that domestic financial development has a smaller effect on growth in countries that are open to trade and capital flows than among countries that are closed in both dimensions. Based on sectoral data, they argue that this finding is explained by the fact that domestic financial development is less important for tradable sectors in more open countries. Giavazzi and Tabellini (2005) examine a broader set of reforms, including the role of (political) institutions. They study how alternative sequencing of economic (trade) and political (becoming democratic) reforms affect growth outcomes and find that countries where economic liberalization preceded democratization experienced better growth outcomes, a conclusion opposite to our findings.⁵

III. THE EMPIRICAL MODEL

A. Standard Growth Regressions

As a starting point for assessing the relationship between reforms and economic performance, we consider a standard panel growth regression set-up:

$$\Delta y_{it} = \theta \cdot y_{it-1} + \alpha \cdot Liberalization_{it-1} + \beta \cdot X_{it-1} + f_i + d_t + \varepsilon_{it} \quad (1)$$

⁴ In a panel of 26 transition countries, Eicher and Schreiber (2010) examine the short-term effects of structural policies on annual growth; rather than examining different reform areas separately, as we do, they collapse various measures on price, trade, financial reforms and others into a single structural policy index.

⁵ Campos and Coricelli (2009) find a U-shaped relationship between the level of democratization and financial development, where regimes of “partial democracies” exhibit the lowest level of financial reform. As a result, starting from low levels, democratization may in fact lead to financial reform reversals.

where y_{it} is the log of real GDP per capita of country i at date t , $Liberalization_{it}$ is an index of liberalization (capital account, domestic financial sector, or trade), X_{it} is a set of control variables, f_i is a set of country fixed effects, d_t is a set of year dummies and ε_{it} is the error-term. The dependent and explanatory variables are averaged over periods of 3 years.

The inclusion of country fixed effects implies that we are testing whether periods of reforms are associated with an acceleration of economic growth *relative to* the long-run (sample) average for the country considered. However, the standard growth regression specification (1) does not, in theory, allow to infer whether the effect of liberalization as measured by a liberalization index affects the steady-state level of output per capita and temporarily impacts growth during the transition to a steady-state, or whether it also affects long-term productivity growth.⁶

Basic growth accounting implies that per-capita GDP growth can be decomposed into total factor productivity growth and growth of capital intensity. The growth literature has indeed focused on whether differences in capital accumulation or TFP explain cross-country differences in GDP growth rates (Hall and Jones, 1999). Structural reforms in particular may affect growth outcomes through different channels. Thus, we also consider specifications with investment and TFP growth as dependent variables:

$$\begin{aligned} \frac{Inv_{it}}{GDP_{it}} &= \theta \cdot y_{it-1} + \alpha \cdot Liberalization_{it-1} + \beta \cdot X_{it-1} + f_i + d_t + \varepsilon_{it} \\ SR_{it} &= \theta \cdot y_{it-1} + \alpha \cdot Liberalization_{it-1} + \beta \cdot X_{it-1} + f_i + d_t + \varepsilon_{it} \end{aligned} \quad (2)$$

where Inv_{it} / GDP_{it} and SR_{it} represent gross capital formation in percent of GDP and the Solow residual of a growth accounting decomposition, respectively.

B. Dynamic Effects of Reforms

Specification (1) does not allow to analyze the dynamics of the impact of a reform on economic performance, and the persistence of the effect of a reform on growth. It does not allow to assess how long it takes for the effect of the reform to materialize, and whether a reform has permanent or temporary effects on growth. To assess the dynamic effect of a reform episode on economic

⁶ In the Solow model, linearization around a steady-state gives the growth of output or capital intensity as a function of initial output (convergence term) and steady state output growth which grows at the same rate as TFP. Hence, specification (1) can imply, in theory, that liberalization affects the steady-state level of output or the steady-state growth rate of TFP. In a Schumpeterian model, financial development is usually seen as speeding the convergence to the leader TFP growth (Aghion et al., 2005).

performance, we define as *reform episodes* those periods during which the liberalization indicator increases:

$$Reform_{it} = 1 \Leftrightarrow \Delta I_{it} > 0 \quad (3)$$

Analogously, *reversals* are periods with negative changes in the liberalization indicator.

To uncover non-linear effects of reform episodes on economic performance, we also consider episodes of large changes in the liberalization index. Specifically, an episode of a *large reform* is defined as a period during which the liberalization indicator increases by more than one standard deviation (Z_t):

$$Large_Reform_{it} = 1 \Leftrightarrow \Delta I_{it} > Z_t > 0 \quad (4)$$

To analyze the extent to which episodes of reforms lead to changes in economic performance within countries and how sustained the effects are, we consider the following specification:

$$\begin{aligned} \Delta y_{it} = & \theta \cdot y_{it-1} + \sum_{\tau \in Z} \alpha_{\tau} \cdot Reform_{i,t-\tau} + \sum_{\tau \in Z} \delta_{\tau} \cdot Large_Reform_{i,t-\tau} \\ & + \beta \cdot X_{it-1} + f_i + d_t + \varepsilon_{it} \end{aligned} \quad (5)$$

where Z is a set of time periods. To control for possible anticipatory effects whereby economic activity would increase before a reform actually takes place, our specification always includes leads of reform episodes as control variables. In other words, for each of the reforms considered, we include $Reform_{it+1}$ and $Large_Reform_{it+1}$ as right hand side variables. The inclusion of leads more broadly allows us to assess the extent to which reforms may occur after a good economic performance. Finally, we also include indicators of reform reversals to test whether growth effects of changes in liberalization index are symmetric.

IV. DATA DESCRIPTION

A. Data

We draw on a range of novel data sets containing de jure indicators of domestic financial liberalization, trade liberalization, and capital account liberalization. The financial reform index

is from Abiad et al. (2008) who construct indicators of domestic financial liberalization and of capital account liberalization.⁷ The indicator of domestic financial liberalization is constructed as the average of six sub-indices. Five of them relate to banking: (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. The sixth sub-index of liberalization 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 sub-indices are aggregated with equal weights. Each sub-index is coded from zero (fully repressed) to three (fully liberalized). In our analysis, we only consider the aggregate index, which we normalize to the unit interval.

The second main reform area we consider relates to the capital account. In our main regressions, we use a subcomponent from Abiad et al. (2008) which covers restrictions on financial credits and personal capital transactions of residents and financial credits to nonresidents, as well as the use of multiple exchange rates. The index is coded from zero (fully repressed) to three (fully liberalized) in the original Abiad et al. data set, but as before, we renormalized to the unit interval.⁸

⁷ See Abiad, Detragiache and Tressel (2009) for a comparison with other existing financial reform database.

⁸ In specifications not reported here, we also experimented with the broader index developed by Quinn (1997), a summary measure of all types of cross-border financial transactions as reflected in the IMF's AREAER. The index measures the intensity of legal restrictions on residents' respectively nonresidents' ability to move capital into and out of a country. However, we did not find it to have a significant correlation with growth in most cases and so dropped it from our analysis. More recently, Schindler (2009) has proposed an alternative index on capital account restrictions based on the IMF AREAER database that provides more disaggregated information than most other available indices, including by asset categories and by the direction of capital flows. However, due to its short time coverage (1995-2005), we did not use it in this paper's analysis.

The third main reform area is in international trade. A variety of de jure trade restrictions indices are available. In this paper, we used two alternative indicators. The first is a (continuous) average tariff index constructed in Ostry et al. (2009), with missing values extrapolated using implicit weighted tariff rates. The index is normalized to the unit interval, where it takes a value of zero if average tariff rates are 60 percent or higher, a value of one if tariff rates are zero, and varies linearly for intermediate average tariff rates. The index is based on various sources, including data provided by the IMF, the World Bank, WTO, UN, and the academic literature (particularly Clemens and Williamson, 2004).

We also use in some specifications the index of economic liberalizations developed by Wacziarg and Welch (2008). This binary index dates economic liberalizations based on the criteria listed in Sachs and Warner (1995), including the level of average tariff rates, the extent of nontariff barriers, the existence and extent of a black market exchange rate, the existence of a state monopoly on major exports, and whether the economy is a transition country.

B. Descriptive Statistics

The baseline regression sample covers 90 countries over the period 1974-2004 (Table 1). The sample of countries ranges from low-income countries to high income countries and covers most emerging markets. Summary statistics reported in Table 2 show that real per capita GDP growth averaged 2 percent annually over the sample period, while investment to GDP averaged 17 percent over the period considered.

As shown in Table 3, real per capita growth is significantly and positively correlated with the 3 main indices of structural reforms, in particular the domestic financial reform index, the Wacziarg and Welch index of trade and economic reforms, and the indicator of liberalization of cross-border financial credit (the capital account index). The correlation with the broader measure of capital account liberalization by Quinn (1997) is, however, not significant. Moreover, per-capita real GDP growth is also positively and significantly correlated with macroeconomic indicators (such as low inflation or the fiscal balance), but there is no significant correlation with the private credit to GDP ratio, or with indicators of institutional development (such as the constraint on the executive index, or the ICRG index of property rights development).

As an additional initial exploration of the relationship between economic performance and indicators of reforms, we examine the evolution of per-capita real GDP growth during episodes

of reforms. For this purpose, and for each of the indicators of reforms (domestic finance, trade and the capital account), we define episodes of significant reforms as changes in the index corresponding to the top quartile of the distribution of the changes. We then plot the median per capita real GDP growth in the years surrounding the reform. The results are shown in Figure 1. Reforms of the domestic financial system seem to be associated with an acceleration of economic growth in the five years following the reform. In contrast, no clear changes in economic growth take place in the years following trade or capital account reforms.

We next explore the relationship between economic performance and reforms more rigorously using our various empirical specifications.

V. MAIN RESULTS

A. Standard growth regressions

Table 4 reports estimation results for the standard growth regression specification described in section III, in which all three liberalization indices are included simultaneously. The first column reports the estimation on the complete sample of countries, while columns 2-4 report estimation results by income groups. Control variables in all regressions include the log of initial real per capita GDP, and the initial inflation rate. All specifications also include an interaction of each liberalization index with a dummy variable for transition countries to account for potentially different growth dynamics in these countries.

Estimation results show that, among the three dimensions of liberalization considered, only domestic financial liberalization is significantly and positively associated with per capita GDP growth. In contrast, capital account and trade liberalization are not significantly associated with growth. Furthermore, the association between domestic financial liberalization and economic growth is strongly significant only for middle-income countries, and even more so for transition countries (column 3). In high income countries (column 2), the positive association is driven entirely by two transition countries (the Czech Republic and Estonia). In low income countries (column 4), the association between domestic finance and economic growth is weakly statistically significant. Finally, trade reforms seem positively associated with economic growth

in high income countries while the coefficient on capital account liberalization is either not significant, or negatively associated with economic growth.⁹

In Table 5 we explore the channels through which liberalization is associated with better economic performance and test whether liberalizations affect the growth of total factor productivity and capital accumulation. For this purpose, we compute the Solow residual from a growth accounting exercise as a proxy for the growth of aggregate total factor productivity, which many papers have shown to be a main driver of long-term growth (see, e.g., Hall and Jones, 1999, and Beck et al., 2000).¹⁰ As a proxy for capital accumulation, we consider the ratio of gross capital formation to GDP. We find that domestic financial liberalization is positively and significantly associated both with TFP growth and aggregate investment in middle-income countries, and is positively associated with TFP growth in low-income countries. Hence, in developing economies structural reforms appear to be associated with both faster TFP growth and higher capital accumulation.

General Method of Moment regressions, reported in Table 6, show that our results are robust to addressing endogeneity of domestic financial liberalization, capital account liberalization and trade liberalization. Following the technique developed by Arrelano and Bond (1991) and Blundell and Bond (1998), we use a GMM estimator to correct two biases: (i) the bias arising in a dynamic panel with fixed effects; and (ii) endogeneity bias. The table reports estimations based on the two-step system-GMM estimator corrected for heteroscedasticity and small sample bias (Windmeijer, 2004).¹¹ Identification is based on the assumption that lags of the first difference of right-hand side (RHS) variables are valid instruments for levels of the RHS variables, and that lags of the levels of the RHS variables are valid instruments for the first difference of the RHS variables.¹² We find that the positive association between domestic financial reforms and

⁹ The group of low-income transition countries—for which the coefficient on capital account liberalization is positive and significant—includes only 3 countries (the Kyrgyz Republic, Uzbekistan and Vietnam).

¹⁰ In the growth accounting exercise, we follow the approach in Bosworth and Collins (2003) by updating their data set based on the latest Penn World Tables.

¹¹ The system GMM estimator is more appropriate than the difference GMM estimator when the country dimension is small. We report the first-step Sargan test of overidentifying restrictions, and autocorrelation tests of order 1, 2 and 3.

¹² In the real GDP growth and TFP growth regression, we rely on the first lag of the first difference of RHS variables and third and fourth lags of the levels of the RHS variables as instruments. In the investment regression, we use respectively the second lag of the level, and the third and fourth lags of the first difference as instruments.

economic performance remains significant both in the real GDP per capita growth regression and in the TFP growth regression. However, significance falls below 10 percent in the investment regression.

Overall, this analysis shows that, among three sets of reforms – domestic financial reforms, trade reforms and capital account reforms – domestic financial reforms are more robustly associated with improved economic performance (in particular TFP growth). Moreover, this association obtained in a standard growth setting is mainly driven by middle-income countries.

B. Dynamic Effects of Reforms

As discussed in section III, the standard growth regression specification does not allow us to test for more complex dynamics in the growth effects of reforms. The standard regressions shown so far assume a growth effect starting in the period after the liberalization index changes as well as linearity of growth effects in changes in the index; it does not allow to test for how persistent the effects of liberalizations on growth are. To analyze more complex patterns and the extent to which the effects of liberalizations on growth are persistent, we consider the specification described in equation (6) above.

We consider episodes of reforms that occur during the period considered and reform episodes of the previous period, so we assess the effect of reforms over a maximum time span of 6 years. Our specification also includes indicators for reform reversals to test whether such events are associated with worsened economic performance. In robustness tests, we also include reform episodes that occurred two periods earlier, hence allowing us to test whether a reform has a lasting effect on economic growth 6 to 9 years after it occurred. Another advantage of this specification is that multi-collinearity across liberalizations—which may result in large standard errors—is less likely to be a concern. Indeed, while levels of the liberalization indices are quite strongly correlated with each other (Table 3), potentially as a result of country-specific trends, reform episodes rarely occur simultaneously during a three years period, and as a result, our reform episode indicators are not correlated.¹³

¹³ The correlations between domestic financial, trade and capital account reform episodes are between 0.05 and 0.13. Frequencies of domestic finance, trade and capital account reform episodes are respectively 8.3 percent, 7.8 percent and 16.2 percent. For large domestic finance and trade reform episodes, frequencies are 1.7 percent and 4.5 percent.

An additional concern in a standard growth regression is that reforms may occur after an improvement in economic performance (anticipatory effects, reverse causality). To capture such effects, we also include leads of reform episodes (i.e., indicator variables for periods that precede reform episodes). Lastly, in addition to the initial level of real GDP per capita and inflation, we also include dummies for banking crises, conflicts and episodes of hyperinflation as additional control variables.

Estimation results are reported in Table 7. We find that in the complete sample of countries, neither domestic finance nor capital account reforms are significantly associated with faster economic growth. In contrast, trade reforms seem to be associated with higher economic growth both in the contemporaneous period and in the following period. Moreover, the coefficient on the lead of large trade reforms is significant and positive. This finding suggests that the estimated relationship between trade reforms and economic growth may reflect reverse causality: growth accelerates *before* trade reforms are actually implemented. An alternative interpretation is that economic agents anticipate reforms, and that these reform expectations affect economic performance positively. This interpretation is consistent with the fact that the lead-effect only holds for large reforms, which may be more likely to be anticipated. Lastly, reversals of capital account liberalization are significantly and negatively associated with contemporaneous economic growth, while capital account *reforms* are not symmetrically related to growth improvements, perhaps because reform reversals act as a (stronger) negative signal to investors. The finding also leaves room for interpretations in the reverse direction along the lines of Abiad and Mody (2005) who found that crises may cause reversals.¹⁴

Again, the significant association between reforms and economic performance is driven by the sub-sample of middle-income countries (column 3). We confirm that in this sub-sample of countries, trade reforms are positively and significantly associated with faster economic growth, and the effect is persistent at a six-year horizon. Large trade reforms, however, are not associated with higher economic growth than are small trade reforms, a finding that is potentially consistent with a reverse-causality explanation.

In middle-income countries, episodes of domestic financial reforms are significantly associated with faster economic growth. The estimated effect of domestic financial reforms is economically

¹⁴ More precisely, Abiad and Mody (2005) find that balance-of-payments crises spurred reforms, while banking crises set liberalization back.

large: economic growth increases by 1.2 to 1.4 percentage points on average in the 3 to 6 years following a reform episode. Moreover, the estimated effect is even stronger for episodes of large domestic financial reforms, as economic growth increases by an additional 1.2 percentage points.

Table 8 explores the channels underlying the association (or the lack thereof) between economic growth and reform episodes. The effect of domestic financial reforms on economic growth in middle-income countries seems to be explained mostly by a better use of factors of production rather than higher aggregate investment which increases only temporarily, and less significantly (columns 2 and 5). Interestingly, domestic finance reversals seem to be preceded by higher aggregate investment in these countries (column 5), which may be explained by an anticipation effect, with investors accelerating their projects before the expected reversal, or more broadly because reversals may be preceded by economic booms. Moreover, trade reforms are preceded by both faster TFP growth and aggregate investment in middle-income countries, and are associated with faster TFP growth, as well as higher aggregate investment in the case of large trade reforms. Finally, we mostly confirm the lack of a clear pattern between reform episodes and performance in high income and low income countries.

VI. ROBUSTNESS TESTS AND ENDOGENEITY

In this section, we conduct robustness tests on the estimated relationship between indicators of economic performance and structural reforms. First, we add controls for various factors that could affect economic performance. Second, we develop an instrumental variable strategy to further address endogeneity concerns.

A. Robustness tests

In Table 9, we investigate the robustness of the association between economic growth and financial reforms in middle-income countries, by adding one by one a number of additional control variables. We begin by adding an indicator of the quality of property rights, which has been found to matter for long-run economic performance (Acemoglu and Johnson, 2005; Easterly and Levine, 2003). Following this literature, we add the Polity IV “constraint on the executive” index in column 1, in addition to our previous set of basic control variables. We also include additional measures of the quality of macroeconomic management (in addition to the previously included inflation rate) in columns 2 and 3: the fiscal balance, and a measure of real exchange rate overvaluation (Fisher et al., 1996; Easterly and Levine, 2003). Our main conclusions remain unchanged.

Next, in column 4 we test for whether the effect of domestic financial liberalization on economic growth is through a deepening of the banking system by controlling for the ratio of private credit to GDP (Levine, 1997, 2005). The effect of domestic financial reforms on economic growth remains significant even after controlling for the stock of private credit to GDP during the period considered, suggesting that financial reforms affect economic growth independently of the volume of credit intermediated by the banking system. This finding is consistent with the hypothesis that financial reforms affect growth not necessarily through a higher aggregate volume of credit, but also through a better allocation of credit.

In column 5, we control for the quality of education—proxied by school enrolment rates—which has been shown to matter for long-run economic performance (Mankiw, Romer and Weil, 1992). Moreover, using a broader measure of trade and economic liberalization (due to Sachs and Warner and extended and refined by Wacziarg and Welch, 2009) instead of an average tariff index only slightly reduces the significance of the coefficient on lags of domestic financial reform episodes (column 6).

Finally, we explore the persistence of the impact of domestic financial reform on economic growth by adding reform episode dummies for reforms undertaken 6 to 9 years before the period of observation (column 7). We find no persistent effect at this horizon, suggesting that domestic financial reforms may not have *direct* long-run effects on economic growth, but only lasting effects on the level of output on the order of 10 percent for a full liberalization after 6 years. This finding does not preclude the possibility that financial reforms may also have *indirect* long-run effects on economic performance by deepening domestic financial systems (Tressel and Detragiache, 2008).

In table 10 we perform similar robustness tests for the channel regressions on TFP growth (panel A) and aggregate investment (panel B). We confirm that aggregate TFP growth – rather than the aggregate accumulation of capital – is the most robust channel through which domestic financial and trade reforms are associated with higher economic growth.

B. Endogeneity

So far, our analysis has focused on establishing a robust association between economic performance and indicators of structural reforms in middle-income countries, in the three areas

of domestic finance, trade and the capital account. As highlighted in the discussions of our results, endogeneity is likely to be an important concern. In this section, we present an approach to address such concerns, and to show that our main findings remain intact when implementing an instrumental variable (IV) approach.

GMM regressions reported earlier already tackle endogeneity bias. Moreover, some aspects of reverse causality are addressed by the inclusion of leads of the reform episode dummies. Indeed, if reforms took place in countries that are experiencing growth accelerations, we would observe that growth accelerates before the reforms are implemented. We find some evidence consistent with this reverse causality for trade reforms, but no such evidence for domestic financial reforms. However, it could be the case that reforms are implemented when the economy is expected to perform well. More generally, omitted factors that are not observable may bias the estimates.

To further address these endogeneity concerns, we develop an IV strategy. The hypothesis for the choice of instruments is that economic reforms diffuse across countries with close political ties as a result of a learning or an imitation process. The conjecture is that, all else being equal, a country is more likely to reform when political allies have already successfully implemented similar policies, or are in the process of undertaking reforms. Thus, we use as an instrument for reform episodes in a particular country the process of reform (in the same sector) of political allies weighted by the “Entente Alliances” index. This index takes the value of 0 or 1 whenever two countries are common members of, or signatories to, an entente or alliance in any given period.¹⁵

Formally, for each sector S (domestic finance, capital account, and trade), we consider as instruments for a reform episode $Reform_{it}^S$, or large reform episode $Large_Reform_{it}^S$, the levels of the index $I_{pol,t-u}^S|_{u=0,1,2,3}$ and change in the index of political allies $\Delta I_{pol,t-u}^S|_{u=0,1,2,3}$, of the same period t and previous periods, with maximum of 3 lags. Furthermore, for the domestic financial reform index, we use all the 6 components of the index instead of the aggregate index. The exclusion restrictions – tested in the empirical analysis – are the following:

¹⁵ The index is from Rajan and Subramanian (2005). The original source is the Correlates of War Database.

$$\begin{cases} E\left[\Delta y_{it} \cdot I_{pol,t-u}^S \mid X_{it}, Reform_{it}, Large_Reform_{it}\right] = 0 \\ E\left[\Delta y_{it} \cdot \Delta I_{pol,t-u}^S \mid X_{it}, Reform_{it}, Large_Reform_{it}\right] = 0 \end{cases} \quad \text{for all } u = 0,1,2,3.$$

Hence, identification is based on the exclusion restrictions that levels and changes of the liberalization index of political allies are uncorrelated with unobserved factors affecting economic performance, conditional on the country reform process and control variables.

Tables 11a and b report 2SLS regression results for real GDP growth, TFP growth and investment. Second stage regressions (Table 11a) confirm the result obtained with OLS for domestic financial reforms. The coefficient on the domestic financial reform variables is significant for real GDP growth and TFP growth, both for contemporaneous and previous period reform episodes. Moreover, there is evidence of stronger effects on TFP growth of large reforms in the previous period. In contrast, coefficients on trade reform variables become insignificant in 2SLS regressions, suggesting that the positive correlation obtained in our previously estimated OLS regressions may reflect endogeneity bias. Finally, coefficients on capital account liberalization remain insignificant.

Specification tests confirm the validity of the instruments. The null hypothesis of joint validity of the instruments (Hansen J test) is not rejected at the 22 percent level, 15 percent level and 15 percent level respectively in the real per capita GDP growth, TFP growth and investment equations. Moreover, the F tests of the first stage (Table 11b) confirm that our instruments are, in general, reasonably strong.¹⁶

VII. REFORM SEQUENCING AND ECONOMIC PERFORMANCE

By splitting countries by income groups, we have established that structural reforms – in particular financial and to some extent trade reforms – have a discernable effect on real GDP growth mainly in middle-income countries. In this section, we explore whether the sequencing between various reforms may be a valid explanation for this finding. In particular, we focus on the sequencing between economic reforms on the one hand and political reforms on the other.

¹⁶ Stock and Yogo (2005) recommend a threshold of about 10 for the first stage F test to ensure that the results are not affected by weak instrument bias, under the criteria that the bias of the IV is less than 10 percent of the OLS bias.

A recent literature has shown that the effectiveness of economic reforms may depend on the broad institutional environment, in particular on political institutions and the protection of property rights (Acemoglu and Johnson, 2005; Acemoglu et al., 2008; Giavazzi and Tabellini, 2005; Levine, 2005; Tressel and Detragiache, 2008). This approach is also related to the literature trying to identify the constraints on growth (Rodrik, 2006; Hausman et al., 2005). We take a first step in testing whether a complementarity between economic reforms and the political environment may explain the lack of growth effects of reforms in some countries. For this purpose, we exclude advanced economies—as the previous results have shown, the reforms we are considering generally matter more for growth in developing economies, and the development of political institutions in particular was likely to be less relevant for most advanced economies in recent decades.

We split the sample based on the median value of the constraint on the executive variable. This sample does not exactly correspond to the income group sample, even though middle-income countries are disproportionately represented in the sample of countries above the median, accounting for 80 percent of the countries with above-median developed political institutions. In the sample of below-median countries, middle-income countries account for roughly half (53 percent) of the sample, including middle-income countries such as Indonesia, Morocco and Tunisia.

Table 12 reports growth regressions on the two-subsamples and robustness tests on the subsample of good property rights countries. Columns (1) and (2) show the baseline regressions on the good property rights sample, and on the bad property rights sample. We find that in countries with good property rights, domestic financial reforms seem to be associated with faster economic growth at a 6 years horizon. In contrast, we find no significant association in countries with bad property rights. Turning to trade and capital account reforms, we find some positive association between economic growth and trade reforms in the good property right sample, but continue to find no significant impact of capital account reforms in both sub-samples of countries. The results for domestic financial reforms (and to some extent trade reforms) are robust to the inclusion of various control variables (columns 3 to 7). Finally, we confirm the previous finding of a lack of a sustained impact of domestic financial reforms on economic growth beyond a 6 year horizon (column 7).¹⁷ Overall, the results suggest that sufficiently developed political institutions are a precondition for reaping the benefits of economic

¹⁷ Instrumental variable regressions reported in the appendix tend to support a causal interpretation of these findings.

reforms.¹⁸This finding is consistent with the finding of Acemoglu and Johnson (2005), but seems at odds with Giavazzi and Tabellini (2005)'s results.

The positive relationship between domestic financial and trade reforms and economic growth in countries with good property rights again is explained by improvements in measured aggregate TFP growth, not by higher aggregate investment rates (results not reported). This finding is robust to the inclusion of various controls, and to endogeneity bias (appendix table).

VIII. CONCLUSION

In this paper, we have presented a new assessment of the growth benefits of various economic reforms. While a large literature already exists on this topic, this paper adds to it by simultaneously examining the effects of different types of economic reforms, as well as their interactions with the quality of political institutions. Consistent with previous studies, we find that domestic financial reforms are robustly associated with positive growth for up to 6 years after the reform is implemented. Similar growth benefits arise from trade reforms, while capital account reforms are not associated with faster growth. Interestingly, though, reversals of capital account reforms are associated with slower growth. Lastly, we present evidence suggesting that sufficiently developed property rights may be a necessary condition for reforms to be effective and to stimulate economic performance. This finding may help explain the lack of reform effects in some countries.

Most of our results are driven by middle-income countries. Understanding why this is the case is an important area for future research. For example, do different reforms matter in high- and low-income countries compared to middle-income countries? Our results on the importance of property rights in developing economies go some way of answering this, but more work may be needed in this direction. Also, while we have considered the sequencing between economic and (a particular type of) political reforms, understanding whether other sequences among economic

¹⁸ These results are in contrast to those by Giavazzi and Tabellini (2005) who found that implementing economic (trade) reform before political reform is the reform sequence that would lead to better growth outcome.

reforms matter is another important question from a policy perspective. These issues are the subject of ongoing research.¹⁹

¹⁹ Ostry et al. (2009) provide some initial results in this area.

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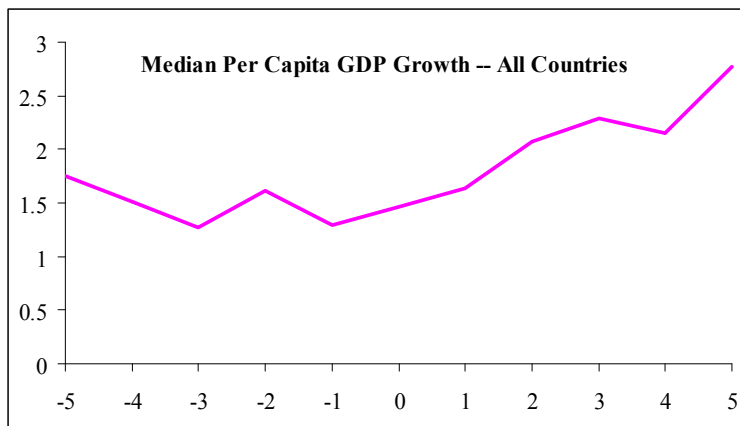
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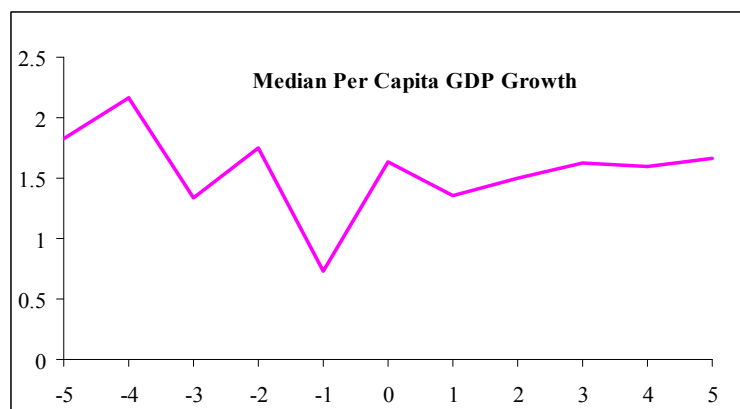
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Figure 1: Reform episodes
(a) Domestic Financial Reforms



(b) Trade Reforms (Average Tariff Index)



(c) Capital Account Liberalization

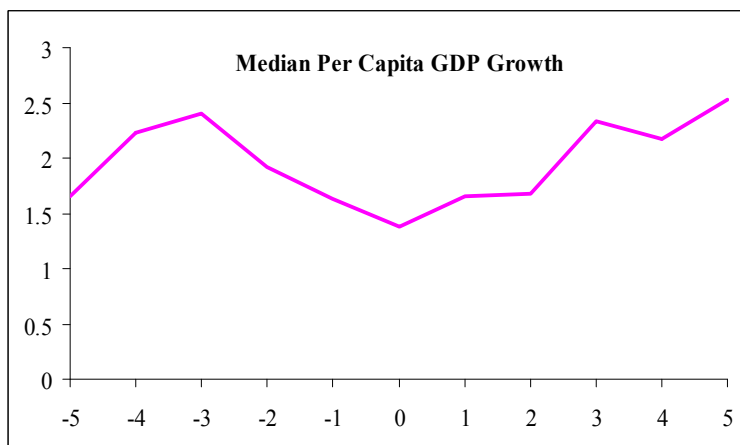


Table 1. Country Sample

High Income	Middle Income		Low Income
Australia	Albania	Mexico	Bangladesh
Austria	Algeria	Morocco	Burkina Faso
Belgium	Argentina	Nicaragua	Cote D'Ivoire
Canada	Azerbaijan	Paraguay	Ethiopia
Czech Rep	Belarus	Peru	Ghana
Denmark	Bolivia	Philippines	India
Estonia	Brazil	Poland	Kenya
Finland	Bulgaria	Romania	Kyrgyz Rep
France	Cameroon	Russia	Madagascar
Germany	Chile	South Africa	Mozambique
Greece	China	Sri Lanka	Nepal
Hong Kong	Colombia	Thailand	Nigeria
Ireland	Costa Rica	Tunisia	Pakistan
Israel	Dominican Rep	Turkey	Senegal
Italy	Ecuador	Ukraine	Taiwan
Japan	Egypt	Uruguay	Tanzania
Korea	El Salvador	Venezuela	Uganda
Netherlands	Georgia		Viet Nam
New Zealand	Guatemala		Zimbabwe
Norway	Hungary		
Portugal	Indonesia		
Singapore	Jamaica		
Spain	Jordan		
Sweden	Kazakhstan		
Switzerland	Latvia		
UK	Lithuania		
USA	Malaysia		

Table 2. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Real per capita GDP growth	590	0.02	0.03	-0.13	0.17
TFP growth	534	0.02	0.03	-0.10	0.10
Investment / GDP	579	0.17	0.08	0.02	0.46
Trade liberalization Index	584	0.72	0.22	0	1
Domestic Financial Lib Index	590	0.51	0.29	0	1
Capital Account Lib Index	590	0.59	0.37	0	1
Inflation	589	41%	282%	-10%	4770%
Fiscal balance / GDP	517	-3.42	4.48	-25.11	13.81
Banking crisis dummy	590	0.16	0.32	0	1
External conflict dummy	590	0.07	0.23	0	1
Private credit / GDP	533	0.41	0.35	0.01	1.97
Constraint on the Executive	583	5.04	2.16	0	7
Dummy inflation > 100 percent	590	0.03	0.18	0	1
Domestic financial reform (Freq.)	590	0.37	0.48	0	1
Large domestic financial reform (Freq.)	590	0.20	0.40	0	1
Reversal of domestic financial reform (Freq.)	590	0.05	0.22	0	1
Trade reform (Freq.)	590	0.21	0.41	0	1
Large trade reform (Freq.)	590	0.05	0.22	0	1
Reversal of trade reform (Freq.)	590	0.10	0.30	0	1
Capital account reform (Freq.)	590	0.19	0.40	0	1
Reversal of capital account reform (Freq.)	590	0.05	0.23	0	1
RER overvaluation	590	-0.05	40.43	-153.84	160.50

Note: Summary statistics based on the sample of column 1, Table 7.

Table 3. Bivariate Correlations

Correlations	Average annual growth	Inflation	Domestic finance	Trade (average tariff)	Trade (Wacziarg and Welch)	Capital account	Capital account (Quinn)	Private credit/GDP	Perception property rights (ICRG-IRIS)	Constraint on the executive power	Central gov. balance	Average annual investment to GDP ratio
Average annual growth	1											
Inflation	-0.2306	1										
Domestic finance	0.1484	-0.1243	1									
Trade (average tariff)	0.0385	-0.0655	0.6014	1								
Trade (Wacziarg and Welch)	0.1831	-0.1503	0.585	0.5525	1							
Capital account	0.1065	-0.1158	0.7097	0.5534	0.5265	1						
Capital account (Quinn)	0.0526	-0.0954	0.6389	0.567	0.5256	0.699	1					
Private credit/GDP	0.0273	-0.0928	0.4665	0.3903	0.3656	0.4478	0.4048	1				
Perception property rights (ICRG-IRIS)	-0.0186	-0.003	-0.2336	-0.0803	-0.0696	-0.1161	-0.0427	0.0603	1			
Constraint on the executive power	0.007	-0.0196	0.4222	0.3979	0.4121	0.3682	0.4434	0.3317	0.0758	1		
Central gov. balance	0.2083	-0.0545	0.3034	0.1732	0.1788	0.2236	0.2428	0.1905	-0.0641	0.0241	1	
Average annual investment to GDP ratio	0.2735	-0.0624	0.2267	0.2904	0.3808	0.2944	0.2763	0.5661	0.2336	0.3873	0.1396	1

Table 4. Standard Growth Regressions

Dependent variable: GDP per capita growth	(1) All countries	Income groups		
		(2) High	(3) Middle	(4) Low
Log(initial real GDP per capita)	-0.0246*** [0.0064]	-0.0303*** [0.0100]	-0.0275*** [0.0100]	-0.0059 [0.0278]
Initial inflation	-0.0004*** [0.0001]	-0.0015 [0.0043]	-0.0003*** [0.0001]	-0.0237*** [0.0051]
Domestic financial reform:				
Domestic finance	0.0291* [0.0147]	0.0004 [0.0126]	0.0529** [0.0243]	0.0535* [0.0295]
Domestic finance * socialist legal origin	0.1629*** [0.0418]	0.1423*** [0.0399]	0.1644*** [0.0573]	-0.0319 [0.0482]
Trade reform:				
Trade	0.0050 [0.0100]	0.0268* [0.0148]	0.0015 [0.0142]	-0.0014 [0.0159]
Trade * socialist legal origin	0.0351 [0.0659]	0.0546 [0.3752]	0.0431 [0.0636]	-0.3610*** [0.1216]
Capital account reform:				
Capital account	0.0073 [0.0060]	-0.0012 [0.0071]	0.0119 [0.0098]	-0.0242** [0.0112]
Capital account * socialist legal origin	-0.0248 [0.0158]	-0.0101 [0.0087]	-0.0254 [0.0223]	0.3662** [0.1494]
Observations	792	270	359	156
R-squared	0.40	0.45	0.48	0.40

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. All regressors indicate the value in the first year of the three-year period. Country and year fixed effects are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Table 5. The Channels of the Effects of Liberalizations

Income group:	TFP growth			Investment / GDP		
	High	Middle	Low	High	Middle	Low
Log(initial real GDP per capita)	-0.0172 (0.0107)	-0.0341*** (0.0110)	-0.0152 (0.0231)	0.1001*** (0.0228)	0.0350 (0.0282)	0.0099 (0.0339)
Initial inflation	0.0022 (0.0043)	-0.0004*** (0.0001)	-0.0254** (0.0090)	-0.0171*** (0.0043)	0.0002** (0.0001)	0.0007 (0.0079)
Domestic financial reform:						
Domestic finance	-0.0098 (0.0117)	0.0489** (0.0236)	0.0681** (0.0268)	0.0261 (0.0309)	0.0560** (0.0259)	0.0006 (0.0244)
Domestic finance * socialist legal origin	0.0000 (0.0000)	0.3723*** (0.0510)	0.0000 (0.0000)	-0.0121 (0.0460)	0.0508 (0.0600)	-0.9448*** (0.3012)
Trade reform:						
Trade	0.0243** (0.0094)	-0.0046 (0.0136)	0.0266 (0.0225)	-0.0060 (0.0587)	-0.0129 (0.0194)	0.0112 (0.0169)
Trade * socialist legal origin	0.0000 (0.0000)	-0.1798*** (0.0261)	0.0000 (0.0000)	0.0428 (0.2399)	0.0631 (0.0450)	-0.5380*** (0.1276)
Capital account reform:						
Capital account	0.0015 (0.0052)	0.0097 (0.0114)	-0.0330* (0.0173)	-0.0150 (0.0181)	0.0195 (0.0161)	-0.0013 (0.0121)
Capital account * socialist legal origin	0.0000 (0.0000)	0.0602** (0.0255)	0.0000 (0.0000)	0.0078 (0.0214)	0.0369* (0.0198)	0.0000 (0.0000)
Observations	230	280	115	230	317	138
R-squared	0.41	0.35	0.48	0.77	0.83	0.86

Note: The dependent variable is computed as a non-overlapping three-year average. All regressors indicate the value in the first year of the three-year period. Country and year fixed effects are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Table 6. System GMM Regressions

	(1)	(2)	(3)
Dependent variable:	Real per capita GDP growth	TFP growth	Investment / GDP
Log(initial real GDP per capita)	-0.0127 (0.0083)	-0.0136* (0.0080)	0.0123 (0.0199)
Initial inflation	-0.0005 (0.0003)	-0.0005* (0.0003)	0.0001 (0.0003)
Domestic financial reform:			
Domestic finance	0.0566** (0.0288)	0.0494** (0.0250)	0.0001 (0.0343)
Domestic finance * socialist legal origin	-0.0492 (0.0578)	0.1977*** (0.0614)	-0.1803 (0.1400)
Trade reform:			
Trade	-0.0402 (0.0250)	-0.0367* (0.0215)	-0.1156** (0.0533)
Trade * socialist legal origin	0.0905** (0.0429)	-0.0265 (0.0367)	0.1631 (0.1069)
Capital account reform:			
Capital account	0.0134 (0.0109)	0.0002 (0.0095)	0.0356 (0.0221)
Capital account * socialist legal origin	0.0059 (0.0224)	0.0212 (0.0230)	0.0636 (0.0507)
Observations	359	280	317
Number of countries	44	31	44
Sargan test (p-value)	0.11	0.96	0.99
ar1	-2.76	-3.08	-2.78
ar2	0.55	1.04	0.66
ar3	-1.78	-1.17	-1.20

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Baseline: Dynamic Effect of Reforms

Dep. variable: GDP per capita growth	(1) All countries	Income groups		
		(2) Low	(3) Middle	(4) High
Domestic financial reform:				
Contemporaneous reform	0.0017 [0.0032]	0.0039 [0.0091]	0.0122** [0.0060]	-0.0079** [0.0038]
Large contemporaneous reform	-0.0015 [0.0033]	-0.0214* [0.0112]	0.0078 [0.0058]	-0.0046 [0.0042]
Contemporaneous reform reversal	-0.0073 [0.0064]	0.0022 [0.0201]	-0.0031 [0.0094]	0.0019 [0.0081]
Reform (previous period)	0.0026 [0.0029]	-0.0065 [0.0076]	0.0143** [0.0058]	-0.0004 [0.0035]
Large reform (previous period)	0.0045 [0.0037]	0.0020 [0.0147]	0.0115* [0.0063]	0.0015 [0.0038]
Reform reversal (previous period)	0.0047 [0.0061]	-0.0207 [0.0245]	0.0105 [0.0087]	0.0101 [0.0063]
<i>Reform (following period)</i>	<i>-0.0036</i> <i>[0.0031]</i>	<i>-0.0001</i> <i>[0.0098]</i>	<i>-0.0050</i> <i>[0.0056]</i>	<i>-0.0050</i> <i>[0.0032]</i>
<i>Large reform (following period)</i>	<i>-0.0031</i> <i>[0.0041]</i>	<i>-0.0099</i> <i>[0.0124]</i>	<i>-0.0037</i> <i>[0.0067]</i>	<i>-0.0009</i> <i>[0.0046]</i>
<i>Reversal (following period)</i>	<i>0.0061</i> <i>[0.0067]</i>	<i>0.0258</i> <i>[0.0196]</i>	<i>0.0060</i> <i>[0.0092]</i>	<i>0.0116*</i> <i>[0.0066]</i>
Trade reform:				
Contemporaneous reform	0.0081** [0.0034]	-0.0033 [0.0101]	0.0165*** [0.0059]	0.0063 [0.0056]
Large contemporaneous reform	0.0014 [0.0067]	-0.0176 [0.0199]	0.0064 [0.0087]	-0.0022 [0.0159]
Contemporaneous reform reversal	-0.0063 [0.0060]	-0.0139 [0.0148]	-0.0068 [0.0072]	0.0052 [0.0126]
Reform (previous period)	0.0101*** [0.0034]	-0.0026 [0.0102]	0.0154*** [0.0055]	0.0060 [0.0046]
Large reform (previous period)	-0.0053 [0.0065]	-0.0309** [0.0147]	0.0049 [0.0087]	0.0104 [0.0136]
Reform reversal (previous period)	-0.0022 [0.0044]	-0.0115 [0.0109]	0.0090 [0.0063]	0.0013 [0.0100]
<i>Reform (following period)</i>	<i>0.0055</i> <i>[0.0039]</i>	<i>0.0081</i> <i>[0.0104]</i>	<i>0.0101*</i> <i>[0.0057]</i>	<i>-0.0008</i> <i>[0.0075]</i>
<i>Large reform (following period)</i>	<i>0.0187***</i> <i>[0.0067]</i>	<i>0.0227</i> <i>[0.0169]</i>	<i>0.0189**</i> <i>[0.0089]</i>	<i>0.0000</i> <i>[0.0000]</i>
<i>Reversal (following period)</i>	<i>-0.0032</i> <i>[0.0055]</i>	<i>-0.0022</i> <i>[0.0104]</i>	<i>0.0011</i> <i>[0.0085]</i>	<i>-0.0056</i> <i>[0.0072]</i>

Table 7. Baseline: Dynamic Effect of Reforms (concluded)

Dep. variable: GDP per capita growth	(1) All countries	Income groups		
		(2) Low	(3) Middle	(4) High
Capital account reform:				
Contemporaneous reform	-0.0034 [0.0030]	-0.0019 [0.0090]	-0.0019 [0.0055]	-0.0012 [0.0051]
Contemporaneous reform reversal	-0.0173** [0.0067]	-0.0087 [0.0201]	-0.0234*** [0.0079]	0.0000 [0.0000]
Reform (previous period)	0.0011 [0.0034]	0.0104 [0.0104]	-0.0023 [0.0051]	0.0012 [0.0042]
Reform reversal (previous period)	0.0010 [0.0060]	0.0159 [0.0169]	-0.0100 [0.0076]	-0.1388 [0.0843]
<i>Reform (following period)</i>	<i>0.0004</i> <i>[0.0030]</i>	<i>-0.0007</i> <i>[0.0082]</i>	<i>0.0018</i> <i>[0.0049]</i>	<i>0.0090**</i> <i>[0.0043]</i>
<i>Reversal (following period)</i>	<i>-0.0053</i> <i>[0.0065]</i>	<i>-0.0199</i> <i>[0.0186]</i>	<i>-0.0123</i> <i>[0.0083]</i>	<i>0.0000</i> <i>[0.0000]</i>
Controls:				
Log (initial real GDP per capita)	-0.0180 [0.0118]	0.0066 [0.0415]	-0.0085 [0.0198]	-0.0357* [0.0215]
Log(initial inflation)	-0.0044 [0.0046]	0.0184 [0.0529]	-0.0020 [0.0056]	-0.1500** [0.0725]
Banking crisis	-0.0213*** [0.0046]	0.0026 [0.0112]	-0.0312*** [0.0069]	-0.0196** [0.0093]
Conflict	-0.0174** [0.0069]	-0.0331 [0.0238]	-0.0146** [0.0065]	.
Hyperinflation (beginning of period)	-0.0389*** [0.0090]	-0.0405 [0.0263]	-0.0374*** [0.0138]	.
Observations	590	125	267	198
R-squared	0.53	0.51	0.69	0.55

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. A reform is a strictly positive change in the liberalization index over the 3-year period, a large reform is a change greater or equal to the third quartile of the distribution of the change in the index, and a reversal is a strictly negative change in the index. The regression includes contemporaneous, previous period and following period reform episodes. Control variables include initial log real GDP per capita, initial log inflation, and dummy variables for banking crisis, internal conflicts and hyperinflation (defined as inflation exceeding 100 percent). Country and year fixed effects, and interactions terms of reform/reversal dummies with a dummy for transition countries are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Table 8. Channels Dynamic Effects of Reforms

	Total factor productivity			Investment		
	(1) Low	(2) Middle	(3) High	(4) Low	(5) Middle	(6) High
Domestic financial reform:						
Contemporaneous reform	0.0090 [0.0091]	0.0151*** [0.0057]	-0.0092** [0.0036]	0.0029 [0.0054]	0.0127** [0.0059]	-0.0028 [0.0051]
Large contemporaneous reform	-0.0011 [0.0121]	0.0111* [0.0058]	-0.0052 [0.0039]	0.0081 [0.0068]	0.0008 [0.0075]	-0.0056 [0.0054]
Contemporaneous reform reversal	-0.0035 [0.0208]	-0.0061 [0.0085]	0.0001 [0.0071]	-0.0233 [0.0146]	0.0053 [0.0080]	-0.0103 [0.0108]
Reform (previous period)	-0.0049 [0.0094]	0.0113** [0.0053]	0.0002 [0.0033]	-0.0001 [0.0054]	0.0087 [0.0062]	-0.0017 [0.0046]
Large reform (previous period)	0.0000 [0.0126]	0.0107* [0.0058]	0.0021 [0.0038]	0.0028 [0.0088]	-0.0049 [0.0071]	-0.0001 [0.0051]
Reform reversal (previous period)	0.0045 [0.0223]	0.0078 [0.0072]	0.0112* [0.0060]	-0.0055 [0.0151]	-0.0018 [0.0058]	-0.0098 [0.0105]
<i>Reform (following period)</i>	<i>-0.0148*</i> <i>[0.0082]</i>	<i>-0.0016</i> <i>[0.0048]</i>	<i>-0.0052</i> <i>[0.0032]</i>	<i>-0.0102**</i> <i>[0.0046]</i>	<i>0.0088</i> <i>[0.0056]</i>	<i>0.0038</i> <i>[0.0046]</i>
<i>Large reform (following period)</i>	<i>-0.0188*</i> <i>[0.0110]</i>	<i>0.0035</i> <i>[0.0060]</i>	<i>-0.0001</i> <i>[0.0043]</i>	<i>-0.0045</i> <i>[0.0062]</i>	<i>-0.0023</i> <i>[0.0060]</i>	<i>-0.0037</i> <i>[0.0063]</i>
<i>Reversal (following period)</i>	<i>-0.0123</i> <i>[0.0209]</i>	<i>0.0037</i> <i>[0.0079]</i>	<i>0.0085</i> <i>[0.0060]</i>	<i>-0.0285**</i> <i>[0.0140]</i>	<i>0.0221***</i> <i>[0.0080]</i>	<i>-0.0017</i> <i>[0.0092]</i>
Trade reform:						
Contemporaneous reform	0.0057 [0.0085]	0.0177*** [0.0049]	0.0055 [0.0049]	-0.0022 [0.0054]	0.0019 [0.0061]	0.0002 [0.0060]
Large contemporaneous reform	-0.0138 [0.0159]	0.0095 [0.0076]	-0.0002 [0.0146]	-0.0125 [0.0116]	0.0299*** [0.0091]	0.0058 [0.0165]
Contemporaneous reform reversal	-0.0020 [0.0115]	-0.0000 [0.0071]	0.0109 [0.0112]	0.0045 [0.0066]	0.0006 [0.0074]	-0.0222 [0.0226]
Reform (previous period)	0.0153* [0.0087]	0.0100** [0.0047]	0.0031 [0.0040]	0.0028 [0.0058]	0.0012 [0.0054]	0.0083 [0.0060]
Large reform (previous period)	-0.0186 [0.0162]	0.0024 [0.0080]	0.0051 [0.0140]	-0.0125 [0.0077]	-0.0031 [0.0081]	0.0167 [0.0147]
Reform reversal (previous period)	-0.0016 [0.0114]	0.0048 [0.0056]	0.0025 [0.0106]	0.0125 [0.0082]	-0.0005 [0.0065]	-0.0025 [0.0106]
<i>Reform (following period)</i>	<i>0.0245**</i> <i>[0.0094]</i>	<i>0.0128**</i> <i>[0.0053]</i>	<i>0.0043</i> <i>[0.0067]</i>	<i>-0.0005</i> <i>[0.0049]</i>	<i>-0.0099*</i> <i>[0.0057]</i>	<i>-0.0027</i> <i>[0.0083]</i>
<i>Large reform (following period)</i>	<i>0.0204</i> <i>[0.0168]</i>	<i>0.0112</i> <i>[0.0080]</i>	<i>0.0000</i> <i>[0.0000]</i>	<i>-0.0141*</i> <i>[0.0071]</i>	<i>0.0238**</i> <i>[0.0109]</i>	<i>0.0000</i> <i>[0.0000]</i>
<i>Reversal (following period)</i>	<i>0.0132</i> <i>[0.0085]</i>	<i>0.0016</i> <i>[0.0076]</i>	<i>-0.0045</i> <i>[0.0055]</i>	<i>-0.0018</i> <i>[0.0060]</i>	<i>-0.0078</i> <i>[0.0084]</i>	<i>-0.0386**</i> <i>[0.0186]</i>

Table 8. Channels Dynamic Effects of Reforms (concluded)

	Total factor productivity			Investment		
	(1) Low	(2) Middle	(3) High	(4) Low	(5) Middle	(6) High
Capital account reform:						
Contemporaneous reform	0.0072 [0.0115]	0.0001 [0.0046]	0.0000 [0.0043]	-0.0067 [0.0058]	-0.0063 [0.0054]	0.0089 [0.0057]
Contemporaneous reform reversal	-0.0071 [0.0168]	-0.0169** [0.0074]	0.0000 [0.0000]	-0.0183 [0.0117]	-0.0222** [0.0092]	-0.1714* [0.1009]
Reform (previous period)	0.0087 [0.0113]	-0.0041 [0.0044]	0.0020 [0.0036]	-0.0192*** [0.0069]	-0.0002 [0.0061]	0.0090* [0.0047]
Reform reversal (previous period)	0.0130 [0.0194]	-0.0060 [0.0065]	-0.1717** [0.0799]	-0.0228* [0.0122]	-0.0196** [0.0079]	0.0000 [0.0000]
<i>Reform (following period)</i>	0.0024 [0.0094]	0.0030 [0.0050]	0.0066* [0.0037]	-0.0117* [0.0059]	0.0045 [0.0048]	0.0152** [0.0063]
<i>Reversal (following period)</i>	-0.0177 [0.0163]	-0.0019 [0.0073]	0.0000 [0.0000]	-0.0019 [0.0111]	-0.0097 [0.0086]	0.0000 [0.0000]
Controls:						
Log (initial real GDP per capita)	-0.0250 [0.0345]	-0.0272* [0.0161]	-0.0190 [0.0199]	0.0227 [0.0221]	0.0143 [0.0204]	0.0655*** [0.0245]
Log(initial inflation)	-0.0094 [0.0397]	-0.0040 [0.0035]	-0.1346* [0.0697]	-0.0211 [0.0243]	0.0030 [0.0045]	0.1323 [0.0837]
Banking crisis	0.0124 [0.0078]	-0.0247*** [0.0060]	-0.0150** [0.0076]	-0.0046 [0.0058]	-0.0255*** [0.0069]	-0.0249*** [0.0074]
Conflict	-0.0152 [0.0136]	-0.0122* [0.0067]	.	0.0078 [0.0056]	-0.0229*** [0.0066]	.
Hyperinflation (beginning of period)	-0.0524** [0.0226]	-0.0278** [0.0119]	.	-0.0122 [0.0116]	-0.0112 [0.0145]	.
Observations	105	242	187	125	267	187
R-squared	0.67	0.56	0.54	0.92	0.90	0.86

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. A reform is a strictly positive change in the liberalization index over the 3-year period, a large reform is a change greater or equal to the third quartile of the distribution of the change in the index, and a reversal is a strictly negative change in the index. The regression includes contemporaneous, previous period and following period reform episodes. Control variables include initial log real GDP per capita, initial log inflation, and dummy variables for banking crisis, internal conflicts and hyperinflation (defined as inflation exceeding 100 percent). Country and year fixed effects, and interactions terms of reform/reversal dummies with a dummy for transition countries are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Table 9. Robustness Tests Dynamic Effect of Reforms

Sample: Middle Income countries	Control variable						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. variable: GDP per capita growth	Property rights	Fiscal balance	Overvalued RER	Private credit to GDP	Education	Economic liberalization (Wacziarg and Welch)	Long lags
Domestic financial reform:							
Contemporaneous reform	0.0121** [0.0061]	0.0096 [0.0066]	0.0118* [0.0062]	0.0100 [0.0062]	0.0130* [0.0067]	0.0059 [0.0067]	0.0095 [0.0064]
Large contemporaneous reform	0.0079 [0.0057]	0.0033 [0.0060]	0.0072 [0.0058]	0.0052 [0.0056]	0.0109 [0.0075]	0.0021 [0.0076]	0.0043 [0.0058]
Contemporaneous reform reversal	-0.0025 [0.0095]	-0.0057 [0.0106]	-0.0033 [0.0094]	-0.0054 [0.0100]	-0.0012 [0.0101]	-0.0065 [0.0109]	0.0008 [0.0098]
Reform (previous period)	0.0137** [0.0059]	0.0132** [0.0065]	0.0144** [0.0058]	0.0137** [0.0068]	0.0144** [0.0065]	0.0114* [0.0059]	0.0133** [0.0066]
Large reform (previous period)	0.0119* [0.0063]	0.0047 [0.0064]	0.0114* [0.0062]	0.0075 [0.0066]	0.0133* [0.0068]	0.0116 [0.0070]	0.0082 [0.0067]
Reform reversal (previous period)	0.0105 [0.0088]	0.0079 [0.0070]	0.0112 [0.0086]	0.0077 [0.0070]	0.0044 [0.0088]	0.0084 [0.0082]	0.0171* [0.0096]
<i>Reform (following period)</i>	-0.0049 [0.0056]	-0.0039 [0.0058]	-0.0053 [0.0056]	-0.0020 [0.0054]	-0.0032 [0.0062]	-0.0044 [0.0051]	-0.0109** [0.0055]
<i>Large reform (following period)</i>	-0.0032 [0.0068]	-0.0087 [0.0071]	-0.0042 [0.0067]	-0.0023 [0.0068]	-0.0036 [0.0071]	-0.0038 [0.0087]	-0.0093 [0.0069]
<i>Reversal (following period)</i>	0.0068 [0.0093]	-0.0047 [0.0095]	0.0059 [0.0091]	0.0011 [0.0091]	0.0035 [0.0095]	-0.0077 [0.0134]	-0.0037 [0.0100]
Trade reform:							
Contemporaneous reform	0.0161*** [0.0060]	0.0183*** [0.0062]	0.0166*** [0.0059]	0.0202*** [0.0059]	0.0185*** [0.0067]	0.0021 [0.0063]	0.0138** [0.0064]
Large contemporaneous reform	0.0062 [0.0087]	0.0066 [0.0084]	0.0070 [0.0089]	0.0100 [0.0082]	0.0113 [0.0097]		0.0015 [0.0088]
Contemporaneous reform reversal	-0.0079 [0.0075]	-0.0132** [0.0064]	-0.0064 [0.0073]	-0.0141** [0.0064]	-0.0057 [0.0075]		-0.0041 [0.0081]
Reform (previous period)	0.0150*** [0.0055]	0.0154*** [0.0050]	0.0154*** [0.0054]	0.0153*** [0.0049]	0.0145** [0.0066]	0.0052 [0.0062]	0.0174*** [0.0055]
Large reform (previous period)	0.0047 [0.0087]	0.0107 [0.0091]	0.0048 [0.0087]	0.0092 [0.0090]	-0.0021 [0.0088]		0.0069 [0.0092]
Reform reversal (previous period)	0.0080 [0.0064]	0.0054 [0.0062]	0.0087 [0.0062]	0.0035 [0.0058]	0.0093 [0.0068]		0.0135* [0.0069]
<i>Reform (following period)</i>	0.0097* [0.0056]	0.0070 [0.0055]	0.0097* [0.0059]	0.0123** [0.0057]	0.0105* [0.0058]	-0.0048 [0.0076]	0.0062 [0.0061]
<i>Large reform (following period)</i>	0.0183** [0.0088]	0.0136 [0.0085]	0.0200** [0.0087]	0.0217*** [0.0074]	0.0122 [0.0099]		0.0097 [0.0110]
<i>Reversal (following period)</i>	-0.0002 [0.0084]	-0.0149 [0.0093]	0.0008 [0.0084]	-0.0117 [0.0089]	0.0013 [0.0094]		0.0048 [0.0087]
Capital account reform:							
Contemporaneous reform	-0.0017 [0.0056]	0.0024 [0.0061]	-0.0018 [0.0054]	0.0026 [0.0055]	-0.0002 [0.0061]	0.0013 [0.0064]	-0.0004 [0.0058]
Contemporaneous reform reversal	-0.0229*** [0.0080]	-0.0164* [0.0085]	-0.0244*** [0.0082]	-0.0165*** [0.0080]	-0.0248*** [0.0091]	-0.0110 [0.0115]	-0.0264*** [0.0093]
Reform (previous period)	-0.0023 [0.0052]	0.0010 [0.0054]	-0.0022 [0.0051]	0.0011 [0.0051]	0.0026 [0.0057]	-0.0017 [0.0063]	-0.0035 [0.0054]

Table 9. Robustness Tests Dynamic Effect of Reforms (concluded)

Sample: Middle Income countries	Control variable						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. variable: GDP per capita growth	Property rights	Fiscal balance	Overvalued RER	Private credit to GDP	Education	Economic liberalization (Wacziarg and Welch)	Long lags
Reform reversal (previous period)	-0.0091 [0.0078]	-0.0071 [0.0079]	-0.0106 [0.0078]	-0.0081 [0.0068]	-0.0108 [0.0086]	-0.0065 [0.0064]	-0.0090 [0.0068]
<i>Reform (following period)</i>	0.0018 [0.0050]	0.0064 [0.0050]	0.0023 [0.0049]	0.0060 [0.0046]	0.0057 [0.0057]	0.0017 [0.0055]	0.0025 [0.0050]
<i>Reversal (following period)</i>	-0.0115 [0.0085]	-0.0108 [0.0089]	-0.0123 [0.0084]	-0.0130 [0.0080]	-0.0084 [0.0092]	0.0054 [0.0098]	-0.0087 [0.0087]
Control:							
Constraint on the executive	0.0014 [0.0015]						
Central government balance to GDP		0.0009 [0.0006]					
Overvaluation (Penn World Table)			-0.0001 [0.0001]				
Private credit to GDP				-0.0146 [0.0206]			
Primary school enrolment					-0.0194 [0.0321]		
Secondary school enrolment					-0.0827** [0.0372]		
Tertiary school enrolment					0.0020 [0.0652]		
Financial reform (two periods before)							0.0034 [0.0055]
Large financial reform (two periods before)							-0.0024 [0.0052]
Financial reform reversal (two periods before)							0.0029 [0.0078]
Observations	267	230	267	233	242	198	225
R-squared	0.69	0.73	0.69	0.67	0.73	0.71	0.70

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. A reform is a strictly positive change in the liberalization index over the 3-year period, a large reform is a change greater or equal to the third quartile of the distribution of the change in the index, and a reversal is a strictly negative change in the index. The regression includes contemporaneous, previous period and following period reform episodes. Control variables include initial log real GDP per capita, initial log inflation, and dummy variables for banking crisis, internal conflicts and hyperinflation (defined as inflation exceeding 100 percent). Country and year fixed effects, and interactions terms of reform/reversal dummies with a dummy for transition countries are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Table 10. Dynamic Effect of Reforms on TFP and Investment Robustness

Dependent variable:	Panel A: TFP growth				Panel B: Investment / GDP			
	Property rights	Fiscal balance	Private credit to GDP	Overvalued RER	Property rights	Fiscal balance	Private credit to GDP	Overvalued RER
Sample: Middle-Income countries								
Domestic financial reform:								
Contemporaneous reform	0.0149*** [0.0056]	0.0134** [0.0059]	0.0150** [0.0061]	0.0146** [0.0059]	0.0125** [0.0059]	0.0089 [0.0058]	0.0081 [0.0059]	0.0142** [0.0057]
Large contemporaneous reform	0.0112* [0.0058]	0.0094 [0.0057]	0.0095 [0.0058]	0.0104* [0.0059]	0.0009 [0.0076]	0.0034 [0.0084]	0.0024 [0.0085]	0.0029 [0.0074]
Contemporaneous reform reversal	-0.0053 [0.0087]	-0.0067 [0.0092]	-0.0079 [0.0088]	-0.0063 [0.0085]	0.0057 [0.0080]	0.0120 [0.0078]	0.0081 [0.0079]	0.0060 [0.0079]
Reform (previous period)	0.0104** [0.0053]	0.0109* [0.0057]	0.0120** [0.0060]	0.0114** [0.0052]	0.0083 [0.0061]	0.0069 [0.0064]	0.0055 [0.0062]	0.0082 [0.0060]
Large reform (previous period)	0.0112* [0.0057]	0.0072 [0.0059]	0.0073 [0.0059]	0.0106* [0.0057]	-0.0046 [0.0071]	-0.0034 [0.0074]	-0.0049 [0.0076]	-0.0045 [0.0070]
Reform reversal (previous period)	0.0078 [0.0073]	0.0093 [0.0068]	0.0086 [0.0065]	0.0086 [0.0071]	-0.0018 [0.0059]	-0.0029 [0.0073]	-0.0039 [0.0068]	-0.0042 [0.0058]
Reform (following period)	-0.0015 [0.0048]	-0.0014 [0.0051]	0.0010 [0.0049]	-0.0020 [0.0049]	0.0089 [0.0056]	0.0082 [0.0058]	0.0076 [0.0056]	0.0100* [0.0053]
Large reform (following period)	0.0042 [0.0061]	-0.0014 [0.0059]	0.0028 [0.0058]	0.0029 [0.0062]	-0.0019 [0.0061]	-0.0026 [0.0070]	-0.0016 [0.0068]	-0.0002 [0.0060]
Reversal (following period)	0.0049 [0.0080]	-0.0066 [0.0078]	-0.0021 [0.0079]	0.0036 [0.0078]	0.0227*** [0.0080]	0.0236** [0.0092]	0.0220** [0.0086]	0.0223*** [0.0080]
Trade reform:								
Contemporaneous reform	0.0170*** [0.0049]	0.0190*** [0.0051]	0.0211*** [0.0050]	0.0178*** [0.0049]	0.0016 [0.0061]	0.0002 [0.0064]	-0.0010 [0.0063]	0.0017 [0.0061]
Large contemporaneous reform	0.0092 [0.0075]	0.0132 [0.0081]	0.0149** [0.0074]	0.0101 [0.0078]	0.0297*** [0.0090]	0.0267** [0.0110]	0.0258** [0.0104]	0.0279*** [0.0091]
Contemporaneous reform reversal	-0.0017 [0.0073]	-0.0101 [0.0063]	-0.0099 [0.0062]	0.0006 [0.0071]	-0.0003 [0.0076]	0.0020 [0.0088]	0.0012 [0.0082]	-0.0011 [0.0071]
Reform (previous period)	0.0093** [0.0047]	0.0096** [0.0045]	0.0098** [0.0044]	0.0099** [0.0047]	0.0008 [0.0054]	0.0012 [0.0058]	-0.0011 [0.0053]	0.0014 [0.0053]
Large reform (previous period)	0.0020 [0.0081]	0.0090 [0.0085]	0.0077 [0.0082]	0.0022 [0.0081]	-0.0034 [0.0080]	-0.0035 [0.0088]	-0.0070 [0.0087]	-0.0025 [0.0080]
Reform reversal (previous period)	0.0033 [0.0056]	0.0019 [0.0057]	0.0011 [0.0051]	0.0045 [0.0056]	-0.0013 [0.0069]	0.0002 [0.0077]	0.0000 [0.0070]	0.0006 [0.0064]
Reform (following period)	0.0122** [0.0052]	0.0105** [0.0049]	0.0156*** [0.0055]	0.0124** [0.0055]	-0.0102* [0.0058]	-0.0129** [0.0064]	-0.0094 [0.0062]	-0.0086 [0.0057]
Large reform (following period)	0.0102 [0.0080]	0.0042 [0.0077]	0.0105 [0.0078]	0.0125 [0.0078]	0.0233** [0.0108]	0.0192 [0.0126]	0.0162 [0.0114]	0.0198* [0.0106]
Reversal (following period)	-0.0005 [0.0075]	-0.0116 [0.0084]	-0.0084 [0.0081]	0.0012 [0.0076]	-0.0090 [0.0087]	-0.0097 [0.0095]	-0.0099 [0.0094]	-0.0065 [0.0085]

Table 10. Dynamic effect of reforms on TFP and Investment Robustness (concluded)

Dependent variable:	Panel A: TFP growth				Panel B: Investment / GDP			
Sample: Middle-Income countries	Property rights	Fiscal balance	Private credit to GDP	Overvalued RER	Property rights	Fiscal balance	Private credit to GDP	Overvalued RER
Capital account reform:								
Contemporaneous reform	0.0005 [0.0047]	0.0033 [0.0050]	0.0040 [0.0044]	0.0003 [0.0046]	-0.0061 [0.0055]	-0.0057 [0.0059]	-0.0053 [0.0056]	-0.0067 [0.0054]
Contemporaneous reform reversal	-0.0160** [0.0075]	-0.0109 [0.0078]	-0.0085 [0.0075]	-0.0180** [0.0076]	-0.0217** [0.0090]	-0.0177* [0.0099]	-0.0177** [0.0088]	-0.0189** [0.0090]
Reform (previous period)	-0.0041 [0.0045]	-0.0013 [0.0046]	-0.0003 [0.0044]	-0.0040 [0.0044]	-0.0002 [0.0061]	-0.0032 [0.0063]	-0.0026 [0.0065]	-0.0005 [0.0059]
Reform reversal (previous period)	-0.0046 [0.0066]	-0.0031 [0.0074]	-0.0016 [0.0063]	-0.0067 [0.0067]	-0.0188** [0.0080]	-0.0206** [0.0099]	-0.0214** [0.0084]	-0.0173** [0.0076]
<i>Reform (following period)</i>	0.0030 [0.0051]	0.0082 [0.0054]	0.0080 [0.0049]	0.0036 [0.0052]	0.0045 [0.0048]	0.0029 [0.0057]	0.0032 [0.0053]	0.0027 [0.0049]
<i>Reversal (following period)</i>	-0.0007 [0.0075]	-0.0005 [0.0080]	-0.0018 [0.0073]	-0.0019 [0.0073]	-0.0091 [0.0087]	-0.0079 [0.0098]	-0.0068 [0.0089]	-0.0097 [0.0084]
Constraint on the executive	0.0021 [0.0014]				0.0011 [0.0016]			
Central government balance / GDP		0.0000 [0.0004]				-0.0008 [0.0007]		
Private credit to GDP			-0.0234 [0.0186]				-0.0113 [0.0240]	
Overvaluation (Penn World Table)				-0.0001 [0.0001]				0.0002*** [0.0001]
Observations	242	211	214	242	267	230	233	267
R-squared	0.56	0.59	0.58	0.56	0.90	0.91	0.91	0.91

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. A reform is a strictly positive change in the liberalization index over the 3-year period, a large reform is a change greater or equal to the third quartile of the distribution of the change in the index, and a reversal is a strictly negative change in the index. The regression includes contemporaneous, previous period and following period reform episodes. Control variables include initial log real GDP per capita, initial log inflation, and dummy variables for banking crisis, internal conflicts and hyperinflation (defined as inflation exceeding 100 percent). Country and year fixed effects, and interactions terms of reform/reversal dummies with a dummy for transition countries are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Table 11a. Instrumental Variables Regressions
Second Stage

	Dependent variable is: Real per capita		
	GDP growth	TFP growth	Investment /GDP
Domestic financial reform:			
Contemporaneous reform	0.0179** [0.0083]	0.0326*** [0.0085]	-0.0054 [0.0097]
Large contemporaneous reform	0.0092 [0.0095]	0.0133 [0.0106]	-0.0136 [0.0137]
Contemporaneous reform reversal	-0.0284 [0.0198]	-0.0114 [0.0206]	-0.0198 [0.0202]
Reform (previous period)	0.0300*** [0.0099]	0.0274*** [0.0106]	0.0182* [0.0108]
Large reform (previous period)	0.0132 [0.0102]	0.0228** [0.0102]	-0.0187 [0.0118]
Reform reversal (previous period)	-0.0089 [0.0187]	0.0173 [0.0167]	-0.0217 [0.0183]
<i>Reform (following period)</i>	<i>0.0098</i> <i>[0.0086]</i>	<i>0.0164*</i> <i>[0.0091]</i>	<i>-0.0080</i> <i>[0.0101]</i>
<i>Large reform (following period)</i>	<i>-0.0028</i> <i>[0.0119]</i>	<i>0.0090</i> <i>[0.0110]</i>	<i>-0.0025</i> <i>[0.0118]</i>
<i>Reversal (following period)</i>	<i>0.0203</i> <i>[0.0192]</i>	<i>0.0121</i> <i>[0.0177]</i>	<i>-0.0015</i> <i>[0.0204]</i>
Trade reform:			
Contemporaneous reform	0.0134 [0.0093]	0.0148 [0.0092]	-0.0081 [0.0092]
Large contemporaneous reform	-0.0191 [0.0167]	-0.0003 [0.0160]	0.0110 [0.0204]
Contemporaneous reform reversal	-0.0100 [0.0121]	-0.0009 [0.0115]	0.0043 [0.0148]
Reform (previous period)	0.0144* [0.0087]	0.0068 [0.0093]	-0.0017 [0.0108]
Large reform (previous period)	0.0087 [0.0159]	-0.0125 [0.0155]	0.0034 [0.0169]
Reform reversal (previous period)	0.0259** [0.0117]	0.0016 [0.0113]	0.0267** [0.0120]
<i>Reform (following period)</i>	<i>0.0129</i> <i>[0.0094]</i>	<i>0.0128</i> <i>[0.0089]</i>	<i>-0.0130</i> <i>[0.0097]</i>
<i>Large reform (following period)</i>	<i>0.0214</i> <i>[0.0167]</i>	<i>-0.0013</i> <i>[0.0149]</i>	<i>0.0210</i> <i>[0.0194]</i>
<i>Reversal (following period)</i>	<i>-0.0047</i> <i>[0.0167]</i>	<i>-0.0152</i> <i>[0.0149]</i>	<i>-0.0133</i> <i>[0.0170]</i>

Table 11a. Instrumental Variables Regressions (concluded)
Second Stage

	Dependent variable is: Real per capita		
	GDP growth	TFP growth	Investment /GDP
Capital account reform:			
Contemporaneous reform	0.0047 [0.0102]	0.0082 [0.0097]	-0.0270** [0.0123]
Contemporaneous reform reversal	-0.0077 [0.0160]	0.0065 [0.0157]	-0.0351* [0.0185]
Reform (previous period)	-0.0010 [0.0082]	-0.0033 [0.0071]	-0.0051 [0.0092]
Reform reversal (previous period)	-0.0130 [0.0117]	0.0016 [0.0117]	-0.0175 [0.0134]
<i>Reform (following period)</i>	<i>-0.0017</i> <i>[0.0081]</i>	<i>-0.0026</i> <i>[0.0087]</i>	<i>-0.0099</i> <i>[0.0096]</i>
<i>Reversal (following period)</i>	<i>-0.0140</i> <i>[0.0201]</i>	<i>0.0137</i> <i>[0.0189]</i>	<i>-0.0200</i> <i>[0.0226]</i>
Observations	229	229	229
R-squared	0.29	0.27	0.78
Hansen J test	0.22	0.15	0.15

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. A reform is a strictly positive change in the liberalization index over the 3-year period, a large reform is a change greater or equal to the third quartile of the distribution of the change in the index, and a reversal is a strictly negative change in the index. The regression includes contemporaneous, previous period and following period reform episodes. Control variables include initial log real GDP per capita, initial log inflation, and dummy variables for banking crisis, internal conflicts and hyperinflation (defined as inflation exceeding 100 percent). Country and year fixed effects are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Table 11b. Instrumental Variable Regressions
First stage

Endogenous variable	Partial R2	F test F(61, 125)
Domestic financial reform:		
Contemporaneous reform	0.40	8.0
Large contemporaneous reform	0.35	10.2
Contemporaneous reform reversal	0.24	0.7
Reform (previous period)	0.35	10.4
Large reform (previous period)	0.49	7.1
Reform reversal (previous period)	0.23	0.8
Reform (following period)	0.35	6.6
Large reform (following period)	0.39	10.3
Reversal (following period)	0.18	0.4
Trade reform:		
Contemporaneous reform	0.34	11.3
Large contemporaneous reform	0.36	2.0
Contemporaneous reform reversal	0.42	8.2
Reform (previous period)	0.35	5.8
Large reform (previous period)	0.31	4.7
Reform reversal (previous period)	0.44	14.1
Reform (following period)	0.43	13.0
Large reform (following period)	0.36	7.3
Reversal (following period)	0.36	9.3
Capital account reform:		
Contemporaneous reform	0.48	7.5
Contemporaneous reform reversal	0.45	23.5
Reform (previous period)	0.47	14.3
Reform reversal (previous period)	0.46	10.9
Reform (following period)	0.37	9.7
Reversal (following period)	0.26	5.7

Table 12. Sequencing Economic and Political Reforms

	Developing countries		Control variables (good property rights sample)					
	Good property rights sample	Bad property rights sample	Property rights	Fiscal balance	Private credit to GDP	Overvalued RER	long lags	Economic liberalization (Wacziarg and Welch)
Domestic financial reform:								
Contemporaneous reform	0.0067 [0.0095]	0.0264 [0.0526]	0.0068 [0.0090]	0.0006 [0.0099]	-0.0011 [0.0085]	0.0048 [0.0095]	0.0030 [0.0086]	0.0028 [0.0096]
Contemporaneous reversal	-0.0066 [0.0112]	0.0239 [0.1301]	-0.0096 [0.0107]	-0.0125 [0.0098]	-0.0175* [0.0098]	-0.0038 [0.0109]	-0.0126 [0.0111]	-0.0172 [0.0111]
Contemporaneous large reform	0.0111 [0.0102]	-0.0586 [0.0449]	0.0111 [0.0097]	0.0008 [0.0105]	0.0013 [0.0089]	0.0102 [0.0101]	0.0104 [0.0090]	0.0079 [0.0097]
reform lagged 3 years	0.0133* [0.0078]	0.0072 [0.0319]	0.0122* [0.0072]	0.0140* [0.0079]	0.0131* [0.0074]	0.0118 [0.0074]	0.0113 [0.0069]	0.0139* [0.0083]
reversal lagged 3 years	0.0072 [0.0086]	0.0309 [0.0500]	0.0080 [0.0085]	0.0109 [0.0080]	0.0096 [0.0085]	0.0105 [0.0079]	0.0044 [0.0091]	0.0160 [0.0099]
large reform lagged 3 years	0.0254** [0.0098]	0.0289 [0.0586]	0.0266*** [0.0097]	0.0206** [0.0086]	0.0216** [0.0091]	0.0233** [0.0094]	0.0260*** [0.0093]	0.0274*** [0.0095]
reform 3 years before	-0.0036 [0.0060]	0.0111 [0.0394]	-0.0044 [0.0056]	-0.0053 [0.0062]	-0.0040 [0.0055]	-0.0049 [0.0062]	-0.0053 [0.0059]	-0.0050 [0.0064]
reversal 3 years before	-0.0025 [0.0126]	0.0075 [0.1499]	-0.0036 [0.0125]	-0.0133 [0.0135]	-0.0108 [0.0124]	-0.0038 [0.0122]	-0.0073 [0.0128]	-0.0116 [0.0131]
large reform 3 years before	0.0029 [0.0074]	-0.0291 [0.0367]	0.0042 [0.0072]	-0.0045 [0.0085]	-0.0013 [0.0077]	-0.0003 [0.0078]	0.0031 [0.0076]	0.0032 [0.0084]
Trade reform:								
Contemporaneous reform	0.0085 [0.0063]	0.0522 [0.0376]	0.0073 [0.0062]	0.0115* [0.0061]	0.0129** [0.0057]	0.0085 [0.0061]	0.0088 [0.0056]	-0.0019 [0.0069]
reform lagged 3 years	0.0108** [0.0051]	-0.0012 [0.0358]	0.0119** [0.0052]	0.0098* [0.0052]	0.0091* [0.0046]	0.0106** [0.0050]	0.0085* [0.0050]	0.0037 [0.0060]
reform 3 years before	0.0066 [0.0062]	0.0294 [0.0274]	0.0094 [0.0066]	0.0004 [0.0055]	0.0019 [0.0052]	0.0055 [0.0062]	0.0051 [0.0054]	0.0018 [0.0074]
large reform	0.0022 [0.0085]	0.0340 [0.0500]	-0.0030 [0.0090]	-0.0024 [0.0103]	-0.0000 [0.0087]	0.0030 [0.0086]	0.0040 [0.0090]	
large reform lagged 3 years	0.0033 [0.0090]	-0.0470 [0.0817]	0.0006 [0.0082]	0.0067 [0.0083]	0.0055 [0.0084]	0.0033 [0.0088]	0.0009 [0.0087]	
large reform 3 years before	0.0176 [0.0113]	0.0802 [0.0640]	0.0200* [0.0114]	0.0054 [0.0098]	0.0121 [0.0091]	0.0207* [0.0106]	0.0154 [0.0110]	
Contemporaneous reversal	0.0041 [0.0119]	-0.0633* [0.0343]	0.0036 [0.0111]	0.0086 [0.0095]	0.0063 [0.0088]	0.0029 [0.0115]	0.0121 [0.0109]	
reversal lagged 3 years	0.0021 [0.0094]	-0.0538 [0.0313]	0.0035 [0.0088]	0.0088 [0.0083]	0.0060 [0.0081]	0.0026 [0.0091]	0.0076 [0.0088]	
reversal 3 years before	0.0179 [0.0121]	-0.0128 [0.0436]	0.0241** [0.0120]	-0.0013 [0.0113]	0.0018 [0.0104]	0.0165 [0.0115]	0.0083 [0.0103]	

Table 12. Sequencing Economic and Political Reforms A6 (concluded)

	Developing countries		Control variables (good property rights sample)					
	Good property rights sample	Bad property rights sample	Property rights	Fiscal balance	Private credit to GDP	Overvalued RER	long lags	Economic liberalization (Wacziarg and Welch)
Capital account reform:								
Contemporaneous reform	-0.0111*	-0.0761	-0.0123**	-0.0050	-0.0057	-0.0123**	-0.0090	
	[0.0057]	[0.0626]	[0.0057]	[0.0058]	[0.0053]	[0.0055]	[0.0055]	
Contemporaneous reversal	-0.0299***	-0.0345	-0.0309***	-0.0274***	-0.0234***	-0.0303***	-0.0307***	
	[0.0104]	[0.0897]	[0.0105]	[0.0096]	[0.0085]	[0.0100]	[0.0100]	
reform lagged 3 years	-0.0094	0.0316	-0.0086	-0.0063	-0.0059	-0.0093	-0.0088	-0.0111*
	[0.0064]	[0.0464]	[0.0064]	[0.0061]	[0.0060]	[0.0060]	[0.0063]	[0.0066]
reversal lagged 3 years	-0.0140*	0.0207	-0.0176**	-0.0159**	-0.0137*	-0.0155*	-0.0139*	-0.0091
	[0.0084]	[0.0568]	[0.0088]	[0.0070]	[0.0071]	[0.0085]	[0.0080]	[0.0078]
reform 3 years before	-0.0019	-0.0185	-0.0039	0.0063	0.0035	-0.0006	-0.0007	-0.0024
	[0.0053]	[0.0620]	[0.0055]	[0.0063]	[0.0054]	[0.0054]	[0.0053]	[0.0054]
reversal 3 years before	-0.0168*	0.0066	-0.0148	-0.0093	-0.0127	-0.0169*	-0.0125	-0.0044
	[0.0098]	[0.0949]	[0.0098]	[0.0102]	[0.0093]	[0.0099]	[0.0094]	[0.0111]
Constraint on the executive			0.0140**					
			[0.0065]					
Central government balance / GDP				0.0007				
				[0.0009]				
Private credit to GDP					-0.0284			
					[0.0383]			
overvaluation (Penn World Table)						-0.0003**		
						[0.0001]		
Domestic finance reform lagged 6 years							-0.0046	
							[0.0056]	
Domestic finance reversal lagged 6 years							-0.0100	
							[0.0088]	
Domestic finance large reform lagged 6 y							0.0099	
							[0.0065]	
Observations	193	84	193	164	179	193	169	154
R-squared	0.71	0.90	0.73	0.78	0.77	0.73	0.76	0.71

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. A reform is a strictly positive change in the liberalization index over the 3-year period, a large reform is a change greater or equal to the third quartile of the distribution of the change in the index, and a reversal is a strictly negative change in the index. The regression includes contemporaneous, previous period and following period reform episodes. Control variables include initial log real GDP per capita, initial log inflation, and dummy variables for banking crisis, internal conflicts and hyperinflation (defined as inflation exceeding 100 percent). Country and year fixed effects, and interactions terms of reform/reversal dummies with a dummy for transition countries are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.

Appendix table. 2 SLS regressions
Good property rights sub-sample

	Real per capita GDP growth	TFP growth	Investment / GDP
Domestic financial reform:			
Contemporaneous reform	-0.0036 [0.0086]	0.0115 [0.0077]	0.0013 [0.0075]
Contemporaneous reversal	-0.0333** [0.0142]	-0.0256** [0.0122]	0.0101 [0.0099]
Contemporaneous large reform	-0.0081 [0.0113]	0.0080 [0.0095]	0.0026 [0.0075]
reform lagged 3 years	0.0194*** [0.0074]	0.0109* [0.0065]	0.0185*** [0.0065]
reversal lagged 3 years	0.0227* [0.0134]	0.0131 [0.0121]	0.0269** [0.0114]
large reform lagged 3 years	0.0279** [0.0109]	0.0192** [0.0089]	0.0091 [0.0076]
reform 3 years before	-0.0153** [0.0077]	-0.0034 [0.0065]	-0.0033 [0.0064]
reversal 3 years before	-0.0101 [0.0155]	-0.0110 [0.0122]	-0.0011 [0.0118]
large reform 3 years before	-0.0066 [0.0096]	0.0003 [0.0073]	-0.0061 [0.0066]
Trade reform:			
Contemporaneous reform	0.0083 [0.0069]	0.0085 [0.0053]	0.0007 [0.0048]
reform lagged 3 years	0.0120* [0.0066]	0.0100* [0.0052]	0.0012 [0.0055]
reform 3 years before	0.0140** [0.0063]	0.0133** [0.0060]	-0.0060 [0.0053]
large reform	-0.0068 [0.0099]	-0.0032 [0.0090]	0.0161** [0.0070]
large reform lagged 3 years	-0.0017 [0.0095]	-0.0129 [0.0096]	0.0205** [0.0090]
large reform 3 years before	0.0164 [0.0117]	0.0024 [0.0119]	0.0130 [0.0093]
Contemporaneous reversal	0.0108 [0.0122]	0.0045 [0.0115]	0.0013 [0.0101]
reversal lagged 3 years	0.0258** [0.0120]	0.0143 [0.0103]	0.0091 [0.0089]
reversal 3 years before	0.0408*** [0.0144]	0.0152 [0.0130]	0.0047 [0.0117]

Capital account reform:

Contemporaneous reform	-0.0073 [0.0072]	-0.0048 [0.0067]	-0.0116** [0.0058]
Contemporaneous reversal	-0.0216* [0.0115]	-0.0083 [0.0105]	-0.0367*** [0.0085]
reform lagged 3 years	-0.0132* [0.0070]	-0.0156*** [0.0053]	-0.0043 [0.0045]
reversal lagged 3 years	-0.0290** [0.0126]	-0.0128 [0.0109]	-0.0204** [0.0099]
reform 3 years before	-0.0077 [0.0059]	-0.0029 [0.0060]	-0.0002 [0.0053]
reversal 3 years before	-0.0140 [0.0117]	0.0011 [0.0110]	-0.0168* [0.0089]
Observations	163	159	163
R-squared	0.52	0.58	0.90
J test	0.23	0.14	0.28

Note: The dependent variable is computed as non-overlapping three-year averages of growth in real GDP per capita. A reform is a strictly positive change in the liberalization index over the 3-year period, a large reform is a change greater or equal to the third quartile of the distribution of the change in the index, and a reversal is a strictly negative change in the index. The regression includes contemporaneous, previous period and following period reform episodes. Control variables include initial log real GDP per capita, initial log inflation, and dummy variables for banking crisis, internal conflicts and hyperinflation (defined as inflation exceeding 100 percent). Country and year fixed effects are included in all specifications. The time period is 1974-2004. Robust standard errors (in brackets). ***, **, * indicate significance at the one, five, and ten percent levels, respectively.