THE AGGREGATE AND DISTRIBUTIONAL EFFECTS OF FINANCIAL GLOBALIZATION: EVIDENCE FROM MACRO AND SECTORAL DATA•

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Abstract

We take a fresh look at the aggregate and distributional effects of policies to liberalize international capital flows—*financial globalization*. We use large changes in the Chinn-Ito index as the measure policy changes in capital account openness. Both country-level and industry-level results suggest that capital account liberalization has led, *on average*, to limited output gains while contributing to significant increases in inequality—i.e., it poses an equity-efficiency tradeoff. Behind this average lies considerable heterogeneity according to country characteristics. Liberalization increases output in countries with high financial depth and that avoid financial crises (and vice-versa), but distributional effects are more pronounced in countries with low financial depth and inclusion, and whose liberalization is followed by a financial crisis. Difference-in difference estimates using sectoral data suggest that liberalization episodes reduce the share of labor income, the more so for industries with higher external financial dependence, those with a higher natural propensity to use layoffs to adjust to idiosyncratic shocks, and those with a higher elasticity of substitution between capital and labor. These sectoral results underpin a causal interpretation of the findings from the macro data.

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I. INTRODUCTION

This paper takes a fresh look at the aggregate and distributional effects of policies to liberalize international capital flows—*financial globalization*.[1] The motivation is two-fold. First, the efficiency (or output) benefits claimed for capital account liberalization reforms have often proven elusive, i.e., difficult to identify in empirical studies. Second, while the fact that trade generates winners and losers is well-recognized, the distributional impacts of financial globalization have received less scrutiny. Identifying these distributional effects is all the more critical if aggregate benefits are weak or mixed.

As Obstfeld (1998) has noted, "economic theory leaves no doubt about the potential advantages" of capital account liberalization. In the neoclassical model, liberalizing the capital account facilitates a more efficient allocation of international capital. Resources flow from countries where the return of capital is low to countries where the return is high.[2] This flow of resources reduces the cost of capital in the recipient economies, triggering a temporary increase in investment and growth and a permanent effect on the level of output. However, several empirical studies find that the growth benefits of capital account liberalization are uncertain (Eichengreen 2001; Prasad and others 2003; Edison and others 2004; Kose and others 2009). Eichengreen (2001) finds, at best, ambiguous evidence on the effect of capital account liberalization on growth. Edison and others (2004) surveys 10 studies of liberalization and concludes that only three of these provide evidence of positive effects of capital account liberalization. Prasad and others (2003) extend the coverage to 14 studies and find that in only three of these is financial integration positively associated with economic growth. Kose and others (2009) extend further the coverage to 26 studies, and find that in only three there is robust evidence of positive effects.

[1] Some readers will prefer to refer to the process we assess in this paper as external financial liberalization, and the outcome of that process as financial globalization. In what follows, we will show that the effects on output (aggregate and sectoral) and distribution (aggregate and sectoral) depend on the evolution of capital flows that accompanies external liberalization. We thus use the terms interchangeably in what follows and have no issue if readers prefer to think of our results as pertaining more to liberalization than to globalization per se.

[2] As found by Alfaro and others (2008), institutional quality, in addition to capital market-imperfections and differences in returns, are a key factor driving capital flows to emerging and developing economies.

Obstfeld also points to the "genuine hazards" of openness to foreign financial flows and concludes that "this duality of benefits and risks is inescapable in the real world." This indeed turns out to be the case. Since 1980, there have been about 150 episodes of surges in capital inflows in more than 50 emerging market economies; about 20 percent of the time, these episodes end in a financial crisis, and many of these crises are associated with large output declines (Ghosh, Ostry, and Qureshi, 2016). The uncertain aggregate benefits associated with capital account liberalization, and the pervasiveness of booms and busts, have led some observers (e.g., Rodrik and Subramanian (2009)) to conclude that the benefits of an open capital account are unclear.

As discussed by Henry (2007), previous studies examining the macroeconomic effects of capital account liberalization suffer from two main limitations. First, many studies look for permanent growth effects rather than examining the evolution of output in the aftermath of a discrete change in their capital account policy. Second, identifying the causal effect of capital account liberalization is empirically challenging using aggregate macro data, particularly since liberalization episodes often take place alongside other reforms.

This paper takes a fresh look at the macro (output) and distributional (proxied by the Gini coefficient and the labor share of income) impact of capital account liberalization in order to address a number of limitations inherent in previous empirical work. In particular, our contributions are to: (i) identify large and discrete changes in capital account policy that may give rise to aggregate and distributional effects; (ii) trace out the response of the level of output and inequality in the aftermath of these changes; (iii) identify some of the factors that may shape the macro and distributional impact of capital account liberalization; (iv) provide causal evidence on the effect of capital account liberalization, using an IV approach and industry-level data.

Specifically, we apply a difference-in-difference identification strategy à la Rajan and Zingales (1998)—using three alternative identifying assumptions from theory—to examine the effect of liberalization episodes on industry output and labor share. First, following Gupta and Yuan (1999), among others, we exploit the cross-sectoral heterogeneity in external financial dependence. According to theory, the output and distributional effect of capital account

liberalization should be larger in industries with higher external financial dependence. Second, insofar as capital account liberalization reduces the bargaining power of workers (by presenting a credible threat to relocate production abroad), we should expect that liberalization episodes have larger effects on the labor share in industries where the propensity to use layoffs to adjust economic conditions is higher. Finally, by reducing the cost of capital, capital account liberalization would lead to a reduction in the labor share in those industries where the elasticity of substitution between capital and labor is larger than one.

The advantage of using industry-level data—that is, having a three-dimensional (*j* industries, *i* countries and *t* time periods) dataset—and using a difference-in-difference strategy are twofold:

- First, it allows us to control for aggregate and country-sector shocks by including country-time, country-industry and industry-time fixed effects. The inclusion of the country-time fixed effect is particularly important as it absorbs any unobserved cross-country heterogeneity in the macroeconomic shocks that affect countries' output and income distribution. In a pure cross-country analysis, this would not be possible, leaving open the possibility that the impact attributed to capital account liberalization may be due to other unobserved macroeconomic shocks.

- Second, it mitigates concerns about reverse causality. While it is typically difficult to identify the causal effects using macro panel data, it is much more likely that capital account liberalization affects cross-industry differences in output (or labor share) than the other way around; since we control for country-time fixed effects—and therefore for aggregate output (or labor share)—reverse causality in our setup would imply that differences in output (or labor share) across sectors influence the probability of reforms at the aggregate level—which seems implausible. Moreover, our main independent variable is the interaction between capital account liberalization reforms and industry-specific factors and this makes it even less plausible that causality runs from industry-level output (labor share) to this composite variable.

Our main findings based on country-level data suggest that capital account liberalization has had, on average, a limited effect on output but has led to an (economically and statistically) significant increase in inequality. These aggregate and distributional effects vary across countries depending on the strength of financial institutions, and over time depending on whether liberalization episodes are followed by financial crises. In particular, while liberalization episodes increase output in countries with high financial depth, the effects on inequality are magnified in countries with low financial depth and inclusion. Similarly, capital account liberalizations episodes lead to significant output contractions and increases in inequality when followed by financial crises, while these adverse effects are greatly reduced when they are not followed by crises.

The evidence obtained using industry-level data corroborates these findings, and underpins a causal interpretation to them. We find that, while the output gains associated with capital account liberalization are small and short-lived, the distributional (labor share) effects are economically and statistically significant, and long-lasting. In particular, the results suggest that liberalization episodes reduce the share of labor income, the more so for industries with higher external financial dependence, those with a higher natural propensity to use layoffs to adjust to idiosyncratic shocks, and those with a higher elasticity of substitution between capital and labor.

Our paper relates to three streams of the literature. The first is on the macroeconomic effects of capital account liberalizations (Eichengreen 2001; Prasad and others 2003; Edison and others 2004; Kose and others 2009), and how these effects depends on the strength of financial institutions (Ostry and others 2009; Kose and others, 2011, IMF 2012). The second is on the effect of capital account and stock market liberalization on income distribution (Das and Mohapatra 2003; Jayadev 2007; Larrain 2015; Furceri and Loungani forthcoming). The third is on the drivers of the labor share, which has mostly focused on the role of technology and trade but much less on the role of capital account liberalization.

The remainder of the paper is structured as follows. Section 2 presents the data. Section 3 discusses the empirical methodology. Section 4 illustrates and discusses the results. Section 5 concludes with policy implications.

II. DATA

A. Country-level data

Capital account liberalization

The measure of capital account liberalization used in this paper is based on a *de jure* indicator of capital account restrictions. While *de jure* measures are noisy indicators of the true degree of openness of the capital account, they have the advantage of being less sensitive to reverse causality issues in panel regressions (Collins, 2007). Data for capital account openness are taken from the Chinn and Ito (2008) database. While alternative *de jure* measures of capital account openness have been proposed in the literature (e.g. Quinn, 1997; Quinn and Toyoda, 2008), the Chinn and Ito index (Kaopen) provides the largest country and time period coverage. The index measures a country's degree of capital account openness based on binary dummy variables that codify restrictions on cross-border transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)* database.[3] The index is available for an unbalanced panel of 182 countries from 1970 to 2010, and ranges from -1.9 (more restricted capital account) to 2.5 (less restricted) (Table A1). The capital account openness index varies greatly across income groups, with higher restrictions typically recorded in low-income and lower-middle income countries (Table A2).

Examining the behavior of inequality before and after the removal of restrictions on the capital account requires information about the date on which the restrictions were lifted. This information is difficult to obtain for a large set of countries, as ideally it would require information on dates of policy decrees or legislative changes. To infer the timing of major policy changes, we identify capital account liberalization episodes by large changes in the

[3] See Chinn and Ito (2008) for details on the methodology.

Kaopen index, i.e., changes that exceed by two standard deviations the average annual change over all observations (i.e., 0.76). [4] This criterion identifies 224 episodes, with a majority occurring in the last two decades.

Output and inequality

Data on real GDP growth are taken from the IMF's WEO database. We use data for Gini coefficients from the Standardized World Income Inequality Database (SWIID), which combines information from the United Nations World Income Database (UNWIDER) and the Luxembourg Income Study (LIS). SWIID provides comparable estimates of market income inequality for 173 countries for as many years as possible from 1970 to 2010.[5] Gini's are theoretically bounded between 0 (each reference unit receives an equal share of income) and 100 (a single unit receives all income). In our sample, they range from 18 to 78.

B. Industry-level data

Industry-level labor shares are computed using harmonized data on value added and labor compensation as contained in the EUKLEMS database - 2012 Release (for details see O'Mahony and Timmer, 2009).[6]

To identify the effects of capital account reforms on sectoral output, we use data on external financial dependence. The effect of liberalization on industry labor share is identified through data on external financial dependence, "natural" layoff rates and the elasticity of substitution between capital and labor.

[4] A similar strategy has been followed in previous papers to identify episodes of stock market liberalizations (Henry, 2007).

[5] See Solt (2009) for details on the methodology.

[6] The EU KLEMS database provides data on added value and labor compensation in 33 industries, classified according to the ISIC Rev. 4 classification. Next, we define the labor share as the percentage of labor compensation relative to added value. We drop 2 industries from the sample, namely activity of households as employers and activities of extraterritorial organizations and bodies, as for most countries labor compensation and/or added value data is not available. Further, we exclude observations for Ireland and Luxembourg for the years from 1970 to, respectively, 1990 and 1985 since both added value and labor compensation are flat for all industries through these periods.

External financial dependence

The measure of external financial dependence—constructed for each industry as the median across all firms in a given industry—is the ratio of total capital expenditures minus current cash flow to total capital expenditures.[7] Figure A1 presents industry-specific measures of external financial dependence.

Natural layoff rate

As a proxy for job destruction rates we use layoff rates computed by Bassanini, Nunziata and Venn (2009). Bassanini et al. (2009) construct U.S. layoff rates using data contained in the 2004 CPS Displaced Workers Supplement. U.S. Layoff rates data are available for 22 industries classified according to the ISIC Rev. 3 classification. The latest vintage of the EU KLEMS database follows instead the ISIC Rev. 4 classification. Hence, we match the U.S. layoff rates of Bassanini et al. (2009) from the ISIC Rev. 3 to the ISIC Rev. 4 classification using the many-to-one method used by O'Mahony and Timmer (2009) to backcast value-added data. Additionally, since under the ISIC Rev. 3 classification, Post and Telecommunications was categorized as a single industry, whereas it accounts for 2 industries under the ISIC Rev. 4 classification, we impose the same lay-off rate for the Postal & Courier and the Telecommunications industries. After matching, we have layoff data for 21 of the 31 industries in our sample. Figure A2 shows US layoff rates by industry.

Elasticity of substitution between capital and labor

To estimate industry-specific elasticities of substitution, we assume that production in each industry follows a general multiplicative production function featuring capital, labor, and labor- and capital-augmenting technical progress. In this setting, it can be shown that the labor share responds to changes in the capital/output ratio in a way that depends on the elasticity of substitution between labor and capital (Bentolila and Saint-Paul 2003):

$$\frac{ds_i}{dk_i} = -\frac{(1+\sigma_{KL,i})}{(k_i \mu_i)} \qquad (1)$$

[7] Data have been kindly provided by Hui Tong. For details, see Tong and Wei (2011).

where the subscript *i* denote industry, *s* is the share of value added accruing to labor, σ_{KL} is the elasticity of substitution between labor and capital holding the price of inputs constant, *k* is the capital to value added ratio, μ is the elasticity of labor demand with respect to wages—holding capital and the real price of inputs constant. Our approach to derive industry-specific elasticities of substitution consists in estimating the $\frac{ds_i}{dk_i}$ relationship while using external estimates for the elasticity of labor demand.

We define the labor share according to the following multiplicative function (for details, see Bentolila and Saint-Paul 2003):

$$s_{ijt} = A_{ijt}^{\beta_0}(k_{ijt})^{\beta_{1i}}\left((q_{ijt}/p_{ijt})\right)^{\beta_{2i}}\vartheta_{ijt}^{\beta_3} \quad (2)$$

where subscripts *i*, *j* and *t* refer to, respectively, industry, country and time; *s* is the share of value added accruing to labor; *A* is capital-augmenting technical change; *q/p* is the real price of inputs; *k* is the capital to value added ratio; ϑ is a residual term (so that β_3 is 1); and the β_{0-2} are technological parameters. Taking logs, Equation (2) becomes:

$$\ln s_{ijt} = \beta_0 \ln A_{ijt} + \beta_{1i} d_i \ln k_{ijt} + \beta_{2i} d_i \ln(q_{ijt}/p_{ijt}) + \vartheta_{ijt} \quad (3)$$

where the βs are allowed to vary across industries.

In estimating Equation (3), we treat the right-hand side as potentially endogenous. We characterize this potential endogeneity by assuming the following specification for the error term:

$$\vartheta_{ijt} = \gamma_{it} + \delta_{jt} + \theta_{it} + \epsilon_{ijt} \quad (4)$$

where γ, δ, θ are respectively, industry-time, country-time and country-industry effects potentially correlated with the explanatory variables (for instance, they may relate to the

economic cycle and time-invariant institutional factors). Further, ϵ is an industry-country-time shock that we assume to be uncorrelated with the regressors.

Hence, the equation that we estimate becomes:

$$\ln s_{ijt} = \beta_0 \widetilde{A_{\iota jt}} + \beta_{1i} d_i k_{ijt} + \beta_{2i} d_i (q_{ijt}/p_{ijt}) + \gamma_{it} + \delta_{jt} + \theta_{it} + \epsilon_{ijt} \quad (5)$$

where the accent $\breve{}$ denote our proxy for capital-augmenting technical change, that is TFP.

We compute (i) the labor share using labor compensation and value added data from the EUKLEMS Database; (ii) the capital-output ratio using gross capital stock and value added data (both in volumes) from the OECD Stan Database; (iii) the real price of inputs using data for the price deflators of intermediate inputs and gross output, again from the OECD Stan Database. Data for TFP are taken from the EUKLEMS database.

After estimating Equation (5), we derive elasticities of substitution by re-arranging Equation (1) in the following form:

$$-\sigma_{KL.i} = 1 + \frac{ds_i}{dk_i} k_i \mu_i \quad (6)$$

To proceed, however, we need estimates of the elasticity of labor demand with respect to wages holding capital and the price of inputs constant. As in Bentolila and Saint-Paul (2003), we make the further assumption that this does not vary across industries and we rely on the average estimate from the 70 studies reviewed by Hamermesh (1993), that is -0.39. Figure A3 presents industry-specific estimates of the elasticities of substitution between capital and labor.

III. EMPIRICAL METHODOLOGY

This section describes the empirical mythologies used to examine the aggregate and distributional effects of capital account liberalization at the country and the industry level.

A. Country-level approach

Baseline

To assess the impact of capital account liberalization, we estimate the following specification:

$$g_{it} = a_i + \gamma_t + \sum_{j=0}^{l} \delta_k D_{i,t-k} + \sum_{k=0}^{l} \vartheta_k X_{i,t-k} + \varepsilon_{it} \quad (7)$$

where g is the annual change in the log of output (or Gini)[8]; D is a dummy variable which is equal to 1 at the start of a capital account liberalization episode and zero otherwise; a_i are country fixed effects included to control for unobserved cross-country heterogeneity[9]; γ_t are time fixed effects to control for global shocks; X is a vector of control variables including reforms in trade, current account, product market and labor market (employment protection legislation).[10]

As a baseline, Equation (7) is estimated using OLS on an unbalanced panel of annual observations from 1970 to 2010 for 149 advanced and developing economies.[11] The number of lags chosen is 6, to capture the medium-effect of reforms. In addition to regression results, we present the impulse response functions (IRFs) to describe the response of output (inequality) following a capital account liberalization episode. The confidence bands associated with the estimated impulse-response functions are obtained using the standard errors of the estimated coefficients, based on clustered (at country-level) robust standard errors.

8 Data on real GDP are taken from the IMF WEO 2016.

9 In the case of inequality, country-fixed effects also help to control for the fact that in some countries inequality is measured using income data while in other countries using consumption data.

10 Data are from Ostry et al. (2009).

11 See Table A3 for the list of countries.

Accounting for differential and threshold effects

It is commonly argued that the benefits of financial globalization depend on the quality of financial institutions (Ostry and others 2009; Kose, 2011, IMF 2012). Kose et al. (2011), for example, identify certain threshold levels of financial development (proxied by the depth of the credit market) that an economy needs to attain before it can benefit from, and reduce the risks associated with, financial globalization. Capital account liberalization may facilitate consumption smoothing and reduce volatility for countries with strong financial institutions, but where institutions are weak and access to credit is not inclusive, it may result in limited output gains.

We examine this hypothesis by assessing whether the effect of capital account liberalization depends on the strength of financial institutions and whether liberalization episodes are followed by crises. Specifically, we estimate the following equation:

$$g_{it} = a_i + \gamma_t + \sum_{j=0}^{l} \vartheta_j X_{i,t-j} + \sum_{j=0}^{l} \delta_j^{-} D_{i,t-j} G(z_{it}) + \sum_{j=0}^{l} \delta_j^{+} D_{i,t-j}(1 - G(z_{it})) + \varepsilon_{it} \quad (8)$$

with $G(z_{it}) = \frac{\exp(-\gamma z_{it})}{1+\exp(-\gamma z_{it})}, \quad \gamma > 0,$

in which *z* is an indicator of financial development, normalized to have zero mean and unit variance, and $G(z_{it})$ is the corresponding smooth transition function of the degree of financial development (financial liberalization and inclusion). We also check whether the aggregate and distributional effects depend on whether capital account liberalization episodes are followed by crises. In this case, we replace G(z) with a dummy variable.

This approach is equivalent to the smooth transition autoregressive (STAR) model developed by Granger and Teravistra (1993) to assess non-linear effects above/below a given threshold or regime. The main advantage of this approach relative to estimating SVARs for each regime is that it uses a larger number of observations to compute the impulse response functions of only the dependent variables of interest, improving the stability and precision of

the estimates. This estimation strategy can also more easily handle the potential correlation of the standard errors within countries, by clustering at the country level.

B. Industry-level approach

We extend the specification applied to aggregate data using a three-way (industry-country-time) panel. The identification strategy relies on a specific channel through which capital account liberalization may affect sectoral outcomes: (i) dependence on external finance—for output and the labor share; (ii) the rate of job turnover (natural layoff rate)—for the labor share; and (iii) the elasticity of substitutions between capital and labor—for the labor share. In particular, we estimate the following specification:

$$g_{jit} = a_{ij} + \gamma_{it} + \rho_{jt} + \sum_{k=0}^{l} \delta_k S_j D_{i,t-k} + \varepsilon_{jit} \qquad (9)$$

where a_{ij} are country-industry fixed effects which allow one to control for industry-specific factors, including for instance cross-country differences in the growth of certain sectors that could arise from differences in comparative advantage; γ_{it} are country-year fixed effects, included to control for any variation that is common to all sectors of a country's economy, including reforms as well as macroeconomic shocks; ρ_{jt} are industry-time fixed effects which allow one to control for common factors affecting specific-industries—such as factors common across countries driving sectoral reallocation; *S* denotes the sector-specific channels discussed in the previous section.

The specification is estimated for an unbalanced panel of 23 advanced economies and 25 industries over the period 1975-2010.

IV. RESULTS

A. Country-level analysis

Figure 1 shows the estimated dynamic response of output and inequality to major capital account liberalization episodes over the five-year period following reform

implementation, together with the 90% confidence interval around the point estimate. The results suggest that these episodes have not had a significant impact on output, but they have led to a sizeable and statically significant increase in inequality, by about 4 percentage point five years after the liberalization (see also Table 1). This effect is economically significant as it corresponds to about one standard deviation of the average increase in the Gini coefficient in our sample.

Addressing endogeneity

A potential limitation of our approach is that capital account liberalization episodes are not "pure" shocks and therefore could be correlated with unobserved factors (omitted bias). While including reforms in other areas mitigates this issue, it could still be the case that unobserved factors influence the probability of financial liberalization and our outcomes of interest. For example, governments that choose to liberalize the capital account may be more right-wing and less likely to implement redistributive policies. Similarly, capital account liberalization can be associated with more prudent fiscal policies or with the process of development (Obstfeld, 1998). To check the robustness of our results, we expand our set of controls to include: (i) a discrete variable for left-, center-, right-wing government; (ii) changes in the share of redistributive policies—proxied by changes in the difference between gross and net Gini coefficients; (ii) the level and the square of the log of GDP per capita; (iii) changes in the share of government expenditures in GDP; (v) changes in the share of industry and agriculture in value added. The results reported in Figure 2 suggest that the results are not affected by the inclusion of these additional controls.

Another concern is that capital account liberalization reforms are implemented because of concerns regarding future weak economic growth. To address this issue, we also estimate a specification that controls for past growth as well as for the expected growth in $t-1$ of future GDP growth rates (using IMF WEO forecasts) over periods t to $t+5$—that is, the time horizon over which the impulse response functions are computed. The results reported

in Figure 3 are very close to and not statistically different from those obtained in the baseline, suggesting that this issue is not empircally important.

Finally, to further address endogeneity concerns, we implement an instrumental variables (IV) approach using two instruments that capture the scope for reforms and the peer pressure to reform. The scope for capital account liberalization reform is captured by the initial stance of capital account regulation—proxied by the four-year lagged value of the capital account openness indicator (see also Larrain 2015 for an application of this instrument). The idea is that the lower is the indicator of capital account openness, the more scope there is to reform. The second instrument, peer pressure, is proxied by a weighted-average of current and lagged capital account liberalization episodes in other countries, where the weights are determined by the strength of trade linkages between other countries and the country undertaking capital account liberalization. The conjecture is that a country is more likely to implement capital account liberalization when its main trading partners are undertaking or have undertaken capital account liberalization. We use bilateral trade weights given limited data availability to construct bilateral capital flow weights for most of the observations in the sample. For the country-time observations for which bilateral capital flows are available, the correlation between bilateral trade and capital flows linkages is high (about 0.7) and statistically significant. Specifically, the instrument is computed as follows:

$$I_{i,t} = \sum_{j=1,.n\ (j\neq i)} D_{j,t}\, w_{i,j,t} \qquad (10)$$

where $I_{i,t}$ is the instrument of capital account liberalization reform for country *i*, at time *t* ($D_{i,t}$). $D_{j,t}$ is capital account liberalization reform for country *j*, at time *t;* $w_{i,j,t}$ is the share of total export and import between country *i* and country *j* in total exports and imports for country *i*: $\frac{Export_{i,j,t}+Import_{i,j,t}}{Export_{i,t}+Import_{i,t}}$.

First stage estimates of capital account liberalization reforms on these instruments suggest that these are statistically significant and exhibit the expected sign.[12] In addition,

[12] In particular, the estimation results are the following:

both instruments can plausibly be considered as exogenous. For example, reforms in other countries are not driven by outcomes in the country considered, and do not have any effect on the latter other than through pressure on domestic authorities to undertake reform.[13]

The results obtained with this approach are also similar and not statistically different from the baseline (Figure 4).

Liberalization vs flows

Our focus has been on de jure measures of capital account liberalization, to isolate policy changes that are likely to have led to an increase in capital flows. Interesting questions are whether these policy changes are associated with a sizeable increase in capital flows, and whether the output and distributional effects of liberalization depend on the magnitude of capital flows. To address these issues, we re-estimate Equation (8) by interacting our measures of liberalization episodes with the extent of the change in capital flows that occurs in the 5 years after liberalization—the same horizon as our IRFs. The results suggest that the size of flows shape the distributional effects of liberalization (Figure 5). In particular, while the output effects are not statistically significant in both cases, the impact of liberalization on inequality is much stronger and statistically significant in cases of higher flows

Threshold effects

As previously discussed, the existing literature suggest that the output gains from financial globalization depend on the strength of financial institutions (Ostry and others 2009; Kose, 2011, IMF 2012). The results presented in Figure 6 and Table 2 corroborate

$$D_{i,t} = \underset{(5.62)}{0.239} I_{i,t} + \underset{(2.77)}{0.105} I_{i,t-1} - \underset{(-6.28)}{0.010}\, Kaopen_{i,t-4}$$

with t-statics in parenthesis.

[13] The Kleibergen-Paap rk Wald F statistic of weak exogeneity and the Hansen J statistics p-value for over-identification suggest that these variables can be considered as strongly exogenous. In addition, estimates of the effects of these instruments on output are not statistically significant once episodes of capital account liberalizations are controlled for, suggesting that they do not directly affect output.

these findings, but also show that the distributional effects of capital account liberalization are influenced by the strength of financial institutions.

The figure presents the medium-term response of output and inequality for the following cases: (i) high versus low domestic financial liberalization—based on the structural reform indicator in Ostry et al. (2009); (ii) high versus low financial inclusion—identified as the ratio of adults in the population who have borrowed from a formal financial institution in past years (Demirguc-Kunt et al. 2015); and (iii) episodes that have been followed by financial crises in the 5 years following the liberalization—the same time horizon considered in the analysis—versus episodes that have not led to crises.

We find positive output effects in cases where the domestic financial market is highly liberalized and negative (but not significant) effects where it remains largely unliberalized. This suggests that the small overall effects might reflect offsetting effects depend on the extent of domestic financial liberalization. The output effects are also positive (but not statistically significant) in cases where liberalization is not followed by a crisis but these are outweighed by the sharply negative output effects in cases where there is a crisis.

Similarly, we find that the effect of capital account linearization on inequality is magnified in countries with largely unliberalized domestic financial markets and limited financial inclusion, and when liberalizations are followed by crises.

B. Industry-level analysis

The evidence obtained using country-level data is corroborated by the industry-level analysis. In particular, while we find that the output gains associated with capital account liberalization are small and short-lived, the distributional effects (that is, the effects on the labor share of income) are economically and statistically significant, and long-lasting.

Figure 7 and Table 3 present the differential output effect obtained by estimating Equation (9). They show that the short-term output effects of capital account liberalization reforms vary across sectors depending on the degree of dependence on external finance. In

particular, the results suggest that the differential medium-term output gains associated with liberalizing the capital account for an industry with relatively low dependence (at the 25th percentile of the distribution of external financial dependence) compared to an industry with relatively high external financial dependence (at the 75th percentile of the distribution) is about 1 percent. The effect is statistically significant—at the 10 percent confidence level—for up to 2 years after the capital account liberalization reform, but it vanishes in the medium-term. Estimates of the effects on labor productivity and employment are quite imprecise, but point estimates suggest a positive (differential) effect for productivity and a negative one for employment.

Figure 8 and Table 4 present the differential effects of capital account liberalization on the industry-level labor share obtained for the three identification strategies, which rely respectively on industry heterogeneity in: (i) external financial dependence; (ii) natural layoff rate; (iii) elasticity of substitution between capital and labor.

Panel A shows that over the medium term—that is, five years after the reform takes place—capital account liberalization episodes tend to reduce the labor share in industries with higher external financial dependence. The results suggest that the differential medium-term reduction in the labor share between an industry with a relatively external financial dependence (at the 75th percentile of the cross-sector distribution) and one with a relatively low external financial dependence (at the 25th percentile) is about 2 percentage points. This effect is not only statistically but also economically significant. In particular, under the conservative assumption that capital account liberalization episodes did not have any impact on the labor share in sectors with an external financial dependence in the 25th percentile of the distribution, the results suggest that capital account liberalization episodes have, on average, reduced the labor share in a reform country by about 0.6 percentage point.

The results presented in Panel B suggest that capital account liberalization episodes tend to reduce the labor share of income also in those sectors with a higher natural layoff rate. In particular, the differential medium-term reduction in the labor share associated with liberalizing the capital account for an industry with a relatively high natural layoff rate (at the

75th percentile of the distribution of the natural layoff rate) compared to an industry with relatively low layoff rate (at the 25th percentile) is about 2 percentage points.

Finally, we also find that the effect of capital account liberalization on the labor share is higher (in absolute value) in industries with a higher elasticity of substitution between capital and labor (Panel C). The differential medium-term reduction in the labor share between an industry with a relatively high elasticity of substitution (at the 75th percentile of distribution) and one with a relatively low elasticity of substitution (at the 25th percentile) is about 2½ percentage points. Interestingly, and consistent with theory, we find that this effect is only significant in industries with an elasticity of substitution between capital and labor greater than 1 (Panel C1 and C2).

Robustness Checks

A possible concern in estimating Equation (9) is that the results are biased due to the omission of other macroeconomic variables affecting output and the labor share of income through the dependence on external finance (or natural layoff rates or elasticity of substitution) that are at the same time correlated with capital account liberalization episodes.

A first obvious candidate is trade liberalization. However, even if trade costs have continued to decrease in recent decades, in many countries the big push for trade liberalization occurred in the 1970s, well before capital account liberalization (in the 1990s). Moreover, even allowing for the possibility for simultaneous external trade and financial liberalizations, this will lead to a bias in the estimates only if trade opening engenders larger output (or labor share) effects in industries with higher dependence on external finance (natural layoff propensity, elasticity of substitution between capital and labor). To check the robustness of our results, we re-estimate Equation (9) adding the interaction between the index of external finance (natural layoff, elasticity of substitutions) and trade reforms. The results of this exercise are similar to those obtained in the baseline specification (Figure 9).

Another possible omitted variable is current account liberalization. As discussed in Quinn and Toyoda (2008), current and capital account liberalization have proceeded in parallel. However, the results are robust to the inclusion of this variable interacted with the industry-specific channels (Figure 10).

Domestic financial liberalizations tend to increase financial depth and therefore may affect output through sectoral external financial dependence. To check whether the inclusion of this variable alters our results, we augment Equation (9) by interacting domestic financial liberalization with the degree of dependence on external finance. The results are again similar to those in the baseline (Figure 11).

Product market deregulation can also affect output and the labor share of income, the more so for regulations directed at privatization of large public network monopolies (Ciminelli and others, forthcoming). Deregulations in product market would bias our results only if they have larger effects on output and the labor share in industries with higher dependence on external finance (natural layoff propensity, elasticities of substitution). Estimating Equation (9) by adding the interaction between the index of external finance (natural layoff propensity, elasticity of substitution) and the index of product market regulation does not change the results (Figure 12).

Another potential variable that may affect the industrial labor share through the layoff rate and the elasticity of substitution is employment protection legislation, EPL (Ciminelli and others, forthcoming). The results accounting for the differential effect of EPL on the labor share are again similar to those in the baseline (Figure 13).

Finally, technology (proxied by the relative price of investment), by reducing the cost of capital, can increase output and reduce the labor share (IMF WEO, 2017) in industries with an elasticity of substitution between capital and labor greater than one. Estimating Equation (9) by adding the interaction between the index of external financial dependence (natural layoff propensity, elasticity of substitution) and the relative price of investment again does not change the results (Figure 14).

V. Conclusions

This paper takes a fresh look at the economic effects of policies to liberalize international capital flows. It uses aggregate and sector-level data to re-examine the effects of capital account liberalization policies on output and inequality, and how these effects depend on the strength of financial institutions.

The results suggest that capital account liberalization reforms have led, on average, to limited output gains but they have contributed to significant increases in inequality. These average estimates, however, mask differences across countries and over time. In particular, while liberalization episodes have tended to increase output in countries with well-liberalized domestic financial sectors, the macroeconomic effects on output have been adverse in cases where domestic financial markets remain largely unliberalized, or when liberalization episodes have been followed by a crisis. With respect to inequality, our results suggest salient adverse effects on average, the more so when domestic financial liberalization is low and not-inclusive, or when liberalization has been followed by a crisis.[14] The results also suggest that capital account liberalization episodes reduce the share of labor income, the more so for industries with a high level of external financial dependence, or that are characterized by a higher natural propensity to adjust their workforce in response to idiosyncratic shocks, or where the elasticity of substitution between capital and labor is relatively high (and greater than unity).

These findings do not imply that countries should not undertake (or have undertaken) capital account liberalization, but the results with respect to distribution do suggest an additional reason for caution (particularly when set against the weak efficiency gains). In particular, our findings suggest that countries where a reduction in inequality is an important policy goal may need to design liberalization in a manner that balances the equity impact against the other effects. This might require in particular restricting certain types of flows

[14] The analysis controls also for the direct effect of financial crises, which are found to reduce output and increase inequality.

that generate adverse equity-efficiency tradeoffs (such as carry-trade flows, or flows that give rise to unhealthy asset price or credit booms) and encouraging other types of flows (particularly those that give rise to durable increases in investment and growth, such as greenfield investments). Beyond this, our paper highlights a number of areas for attention in trying to mitigate the undesirable consequences of capital account liberalization. Steps to develop domestic financial institutions and depth and inclusion are clearly important in this connection. Fiscal redistribution can also help to mitigate the adverse distributional consequences of financial globalization, and do so without much of a hit to economic efficiency unless such redistribution is extreme (Ostry et al, 2014). Finally, in addition to redistribution, policies could be designed to mitigate some of the anticipated effects in advance—for instance, through increased spending on education and training (so-called pre-distribution policies), in order to foster greater equality of opportunity.

Table 1. The aggregate and distributional effects of capital account liberalization

	(I)	**(II)**
	Output	**Gini**
Capital account reform (t)	-0.223	1.452***
	(-0.62)	(4.45)
Capital account reform (t-1)	0.434	0.944**
	(1.28)	(2.28)
Capital account reform (t-2)	-0.149	0.699*
	(-0.30)	(1.79)
Capital account reform (t-3)	0.312	-0.020
	(0.75)	(-0.05)
Capital account reform (t-4)	0.603	0.414
	(1.51)	(1.01)
Capital account reform (t-5)	0.371	0.529
	(0.988)	(1.13)
Medium-term differential effect	0.665	4.018***
F-test medium-term effect	0.95	9.78
N	2,001	1,789
R2	0.38	0.13

Note: T-statistics based on robust clustered standard errors at country level in parenthesis. ***,**,* denote significance at 1 percent, 5 percent and 10 percent, respectively. Capital account reforms are identified as episodes when, for a given country at a given time, the annual change in the Kaopen indicator exceeds by two standard deviations the average annual change over all observations. Medium-term differential effect denotes the effect of capital account liberalization episodes five years after the reform. Estimates based on equation (7).

Table 2. The aggregate and distributional effects of capital account liberalization—the role of financial institutions and crises

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Output			Gini		
	Financial liberalization	Financial inclusion	Crises	Financial liberalization	Financial inclusion	Crises
Medium-term effect* G(Z)	-2.558	0.666	-3.790*	4.341**	3.959**	4.288***
	(1.95)	(0.09)	(3.42)	(4.47)	(4.34)	(10.21)
Medium-term effect*[1- G(Z)]	3.924*	0.378	2.190	2.769	3.050	1.793
	(3.03)	(0.04)	(2.28)	(1.97)	(2.30)	(0.46)
F-test difference medium-term effect	3.73*	0.01	6.96***	0.25	0.09	0.83
N	2,001	2,001	2,001	1,789	1,789	1,789
R2	0.38	0.38	0.38	0.13	0.13	0.13

Note: F-statistics based on robust clustered standard errors at country level in parenthesis. ***,**,* denote significance at 1 percent, 5 percent and 10 percent, respectively. Capital account reforms are identified as episodes when, for a given country at a given time, the annual change in the Kaopen indicator exceeds by two standard deviations the average annual change over all observations. Medium-term differential effect denotes the effect of capital account liberalization episodes five years after the reform. Estimates based on equation (8). G(Z)=1 (0) for low (high) levels of financial liberalization, financial inclusion and when reforms are (not) followed by crises. Estimates based on equation (8).

Table 3. The effect of capital account liberalization on sectoral output and its components

	(II)	(III)	(IV)
	Output	**Labor productivity**	**Employment**
Capital account reform*RZ (t)	1.802**	5.990	-5.694
	(1.95)	(0.92)	(-0.88)
Capital account reform*RZ (t-1)	0.652	1.331	-1.127
	(0.80)	(0.22)	(-0.18)
Capital account reform *RZ (t-2)	-0.006	2.516	-2.020
	(-0.01)	(0.44)	(-0.35)
Capital account reform *RZ (t-3)	-1.399	0.461	-0.224
	(-1.55)	(0.08)	(-0.04)
Capital account reform *RZ (t-4)	-0.128	-1.004	1.029
	(-0.17)	(-0.20)	(0.20)
Capital account reform *RZ (t-5)	0.886	-0.080	0.213
	(1.18)	(-0.02)	(0.05)
Medium-term differential effect	0.520	5.251	-4.641
F-test medium-term effect	0.21	0.14	0.10
N	16,616	16,616	16,616

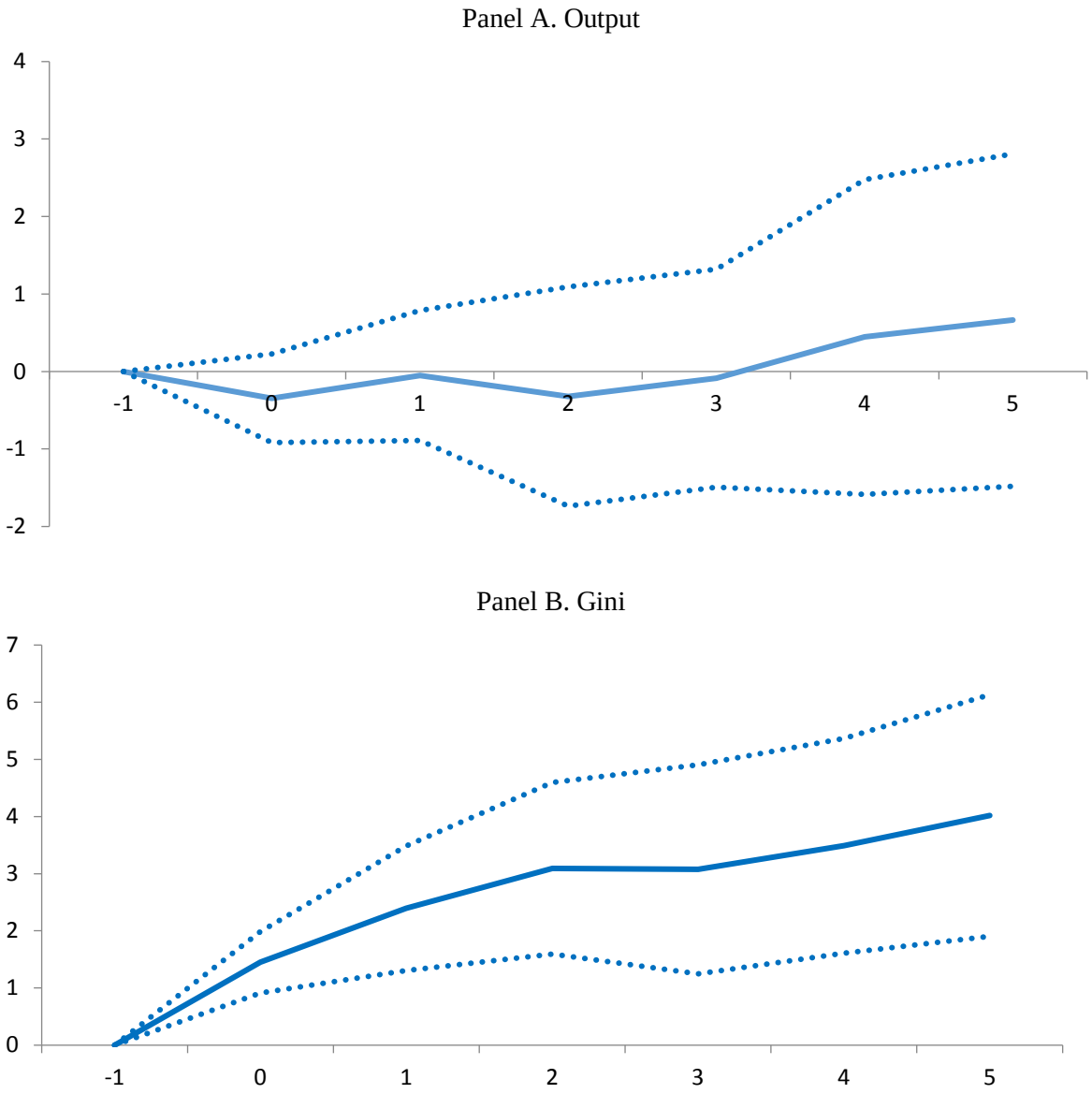
Note: T-statistics based on robust clustered standard errors at country*sector level in parenthesis. ***,**,* denote significance at 1 percent, 5 percent and 10 percent, respectively. Capital account reforms are identified as episodes when, for a given country at a given time, the annual change in the Kaopen indicator exceeds by two standard deviations the average annual change over all observations. Medium-term differential effect denotes the effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). Estimates based on equation (9).

Table 4. The effect of capital account liberalization on sectoral labor share

	(II)	(III)	(IV)
	External financial dependence	**Layoff rate**	**Elasticity of substitution**
Capital account reform *RZ (t)	-1.835***	-0.023	-0.208***
	(-2.82)	(-0.15)	(-3.59)
Capital account reform *RZ (t-1)	-0.223	-0.009	0.034
	(-0.32)	(-0.06)	(0.55)
Capital account reform *RZ (t-2)	0.176	-0.270	-0.103
	(0.22)	(-1.42)	(-1.56)
Capital account reform *RZ (t-3)	-0.266	-0.202	0.117
	(-0.41)	(-1.32)	(0.78)
Capital account reform *RZ (t-4)	-0.788	-0.175	-0.057
	(-1.53)	(-1.32)	(-0.83)
Capital account reform *RZ (t-5)	-1.013*	-0.087	-0.116**
	(-1.89)	(-0.62)	(-1.94)
Medium-term differential effect	-2.230***	-2.078*	-2.580*
F-test medium-term effect	7.31	3.21	2.85
N	16,616	16,616	16,616

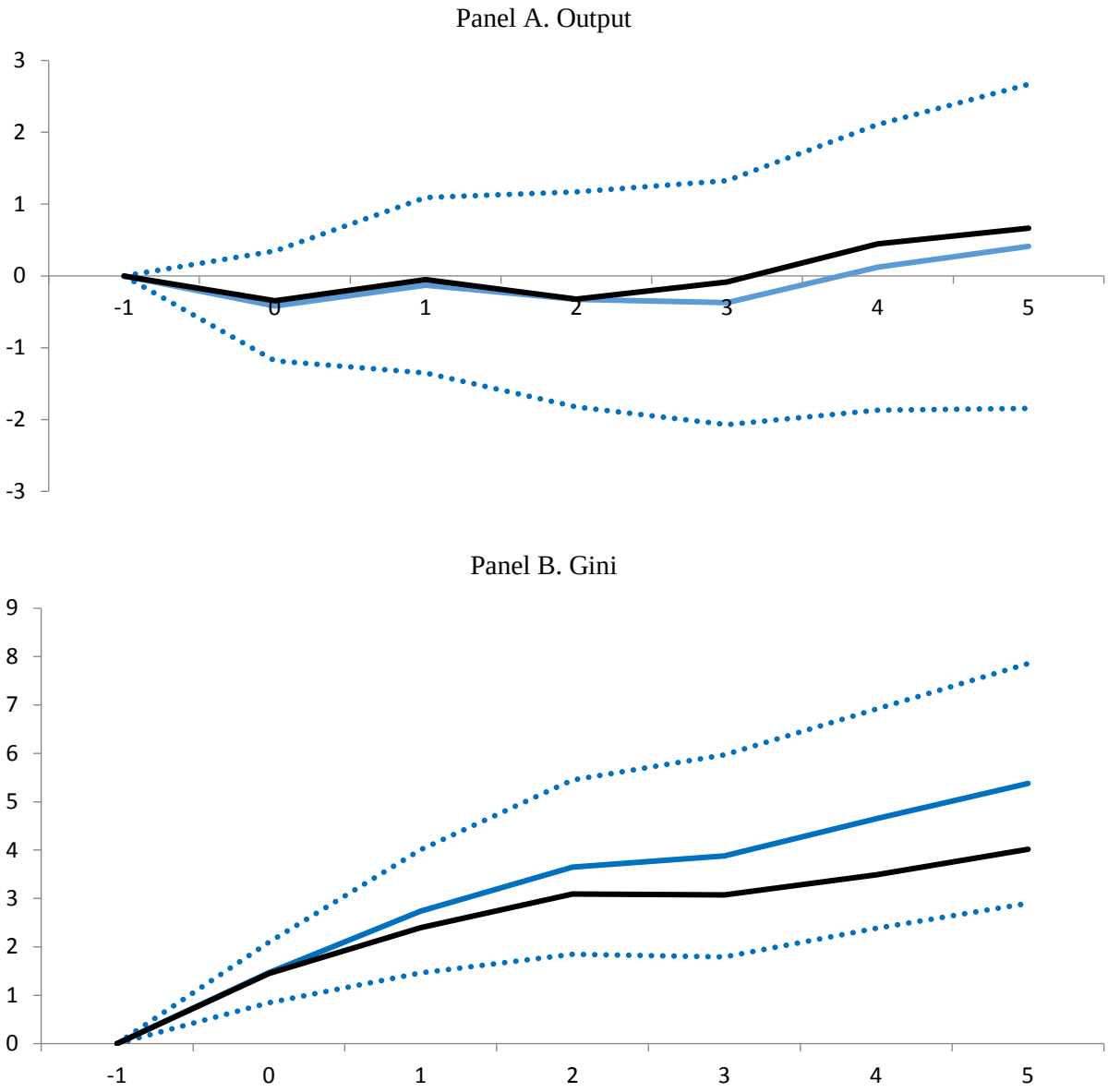
Note: T-statistics based on robust clustered standard errors at country*sector level in parenthesis. ***,**,* denote significance at 1 percent, 5 percent and 10 percent, respectively. Capital account reforms are identified as episodes when, for a given country at a given time, the annual change in the Kaopen indicator exceeds by two standard deviations the average annual change over all observations. Medium-term differential effect denotes the effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). Estimates based on equation (9).

Figure 1. The aggregate and distributional effects of capital account liberalization (%)



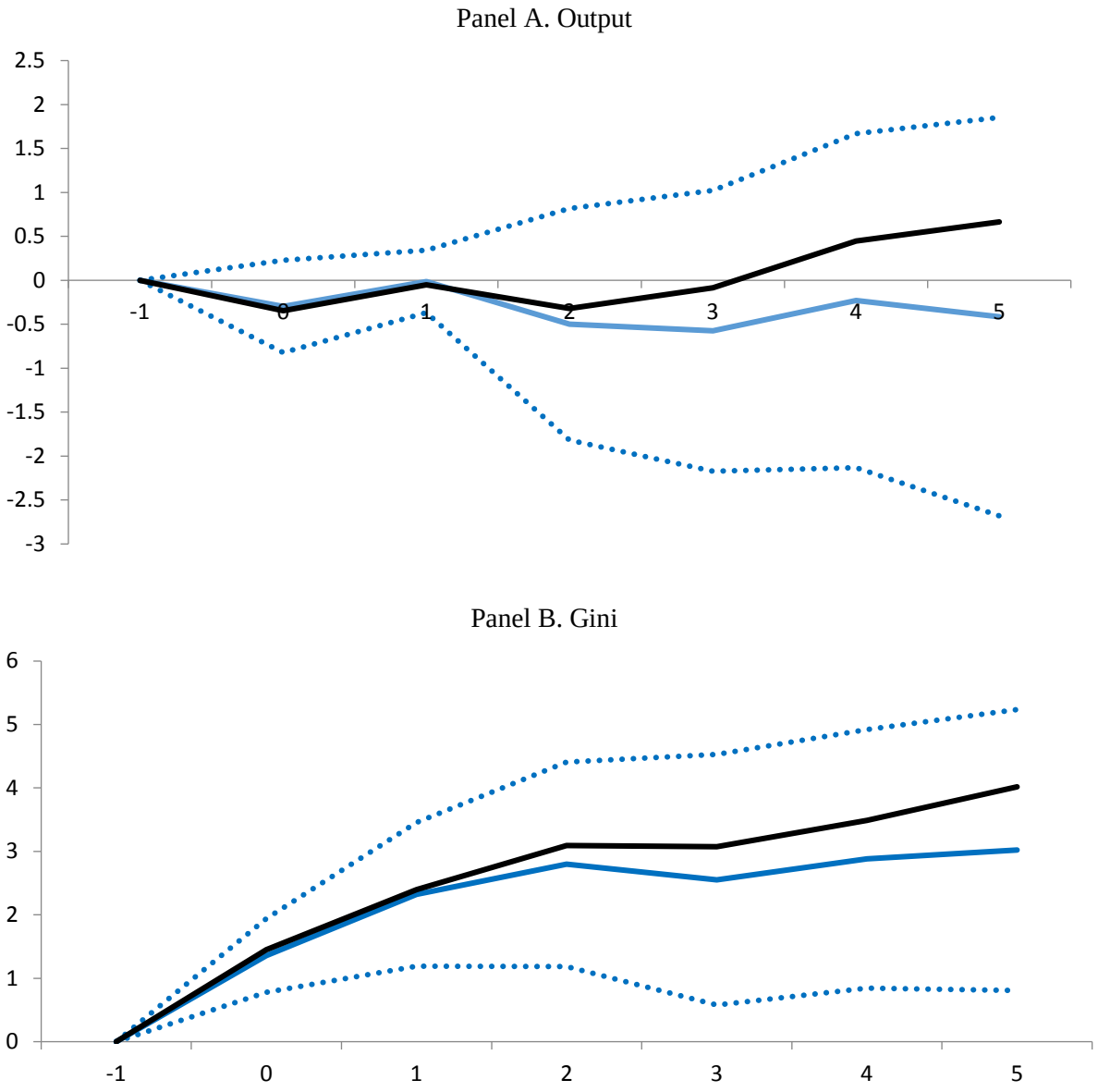
Note: The solid lines indicate the response of output (inequality) to capital account liberalization episode; dotted lines correspond to 90 percent confidence bands. The x-axis denotes time. t=0 is the year of the reform. Estimates based on equation (7).

Figure 2. The aggregate and distributional effects of capital account liberalization (%)—additional controls



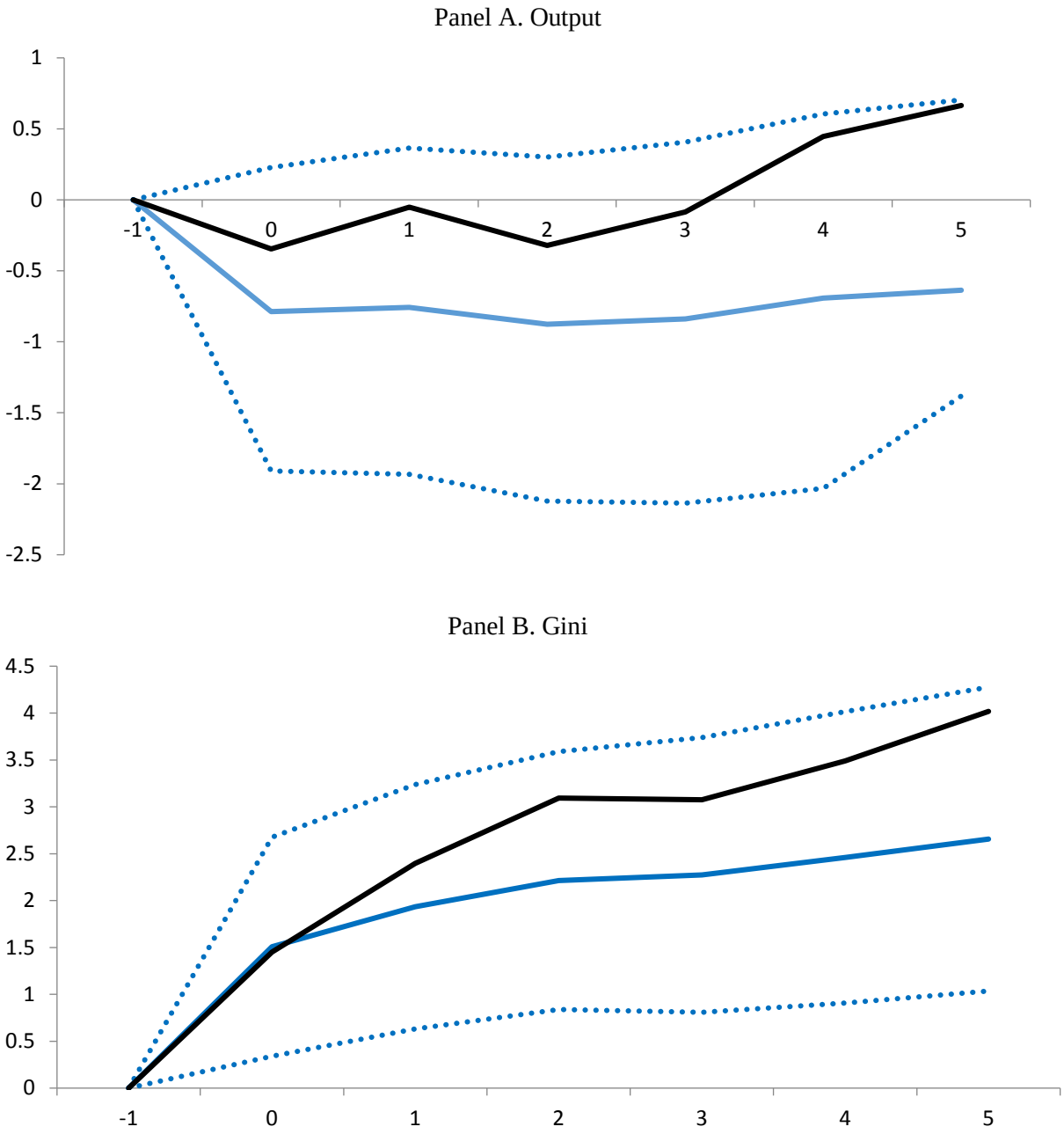
Note: The solid lines indicate the response of output (inequality) to capital account liberalization episode; dotted lines correspond to 90 percent confidence bands. The solid black lines denote the baseline effect reported in Figure 1. The x-axis denotes time. t=0 is the year of the reform. Estimates based on equation (7).

Figure 3. The aggregate and distributional effects of capital account liberalization (%)—controlling for expected future growth



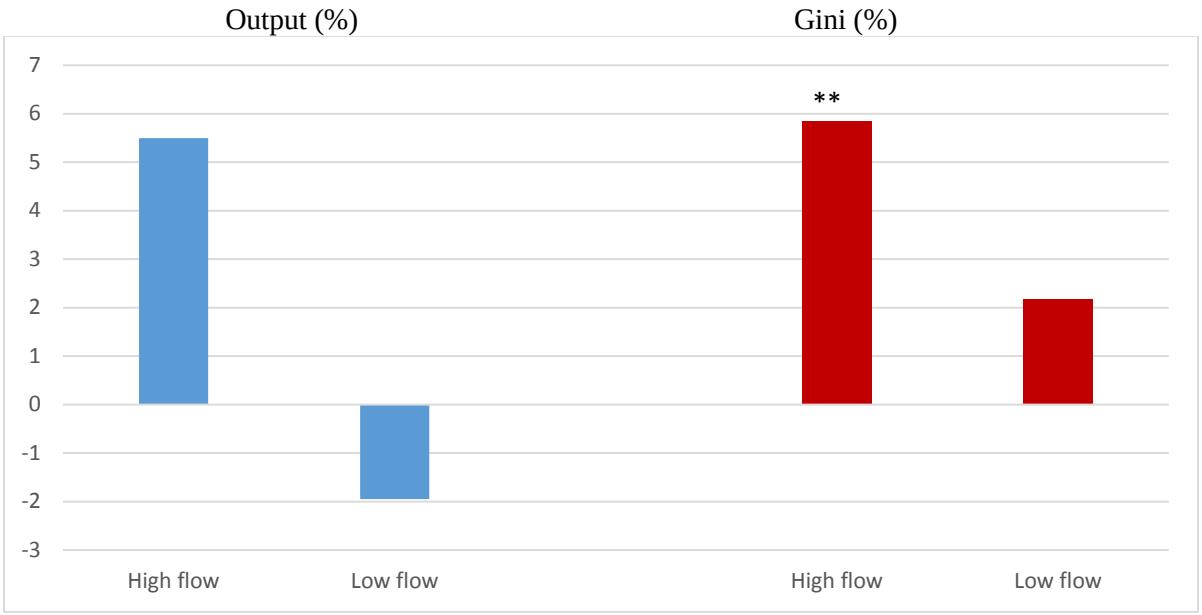
Note: The solid lines indicate the response of output (inequality) to capital account liberalization episode; dotted lines correspond to 90 percent confidence bands. The solid black lines denote the baseline effect reported in Figure 1. The x-axis denotes time. t=0 is the year of the reform. Estimates based on equation (7).

Figure 4. The aggregate and distributional effects of capital account liberalization (%)—IV



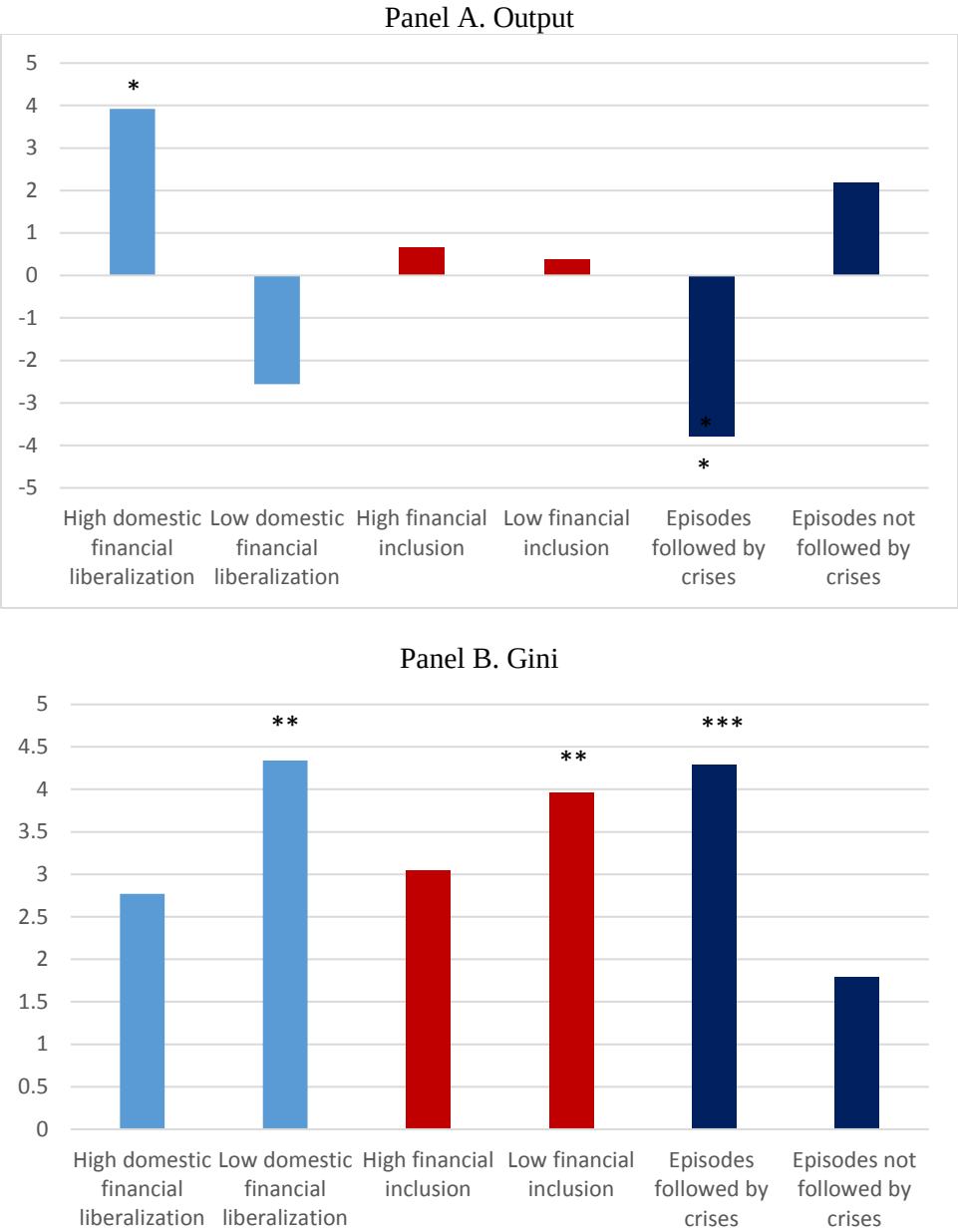
Note: The solid lines indicate the response of output (inequality) to capital account liberalization episode; dotted lines correspond to 90 percent confidence bands. The solid black lines denote the baseline effect reported in Figure 1. The x-axis denotes time. t=0 is the year of the reform. Estimates based on equation (7).

Figure 5. The medium-term aggregate and distributional effects of capital account liberalization (%)—high vs low flows.



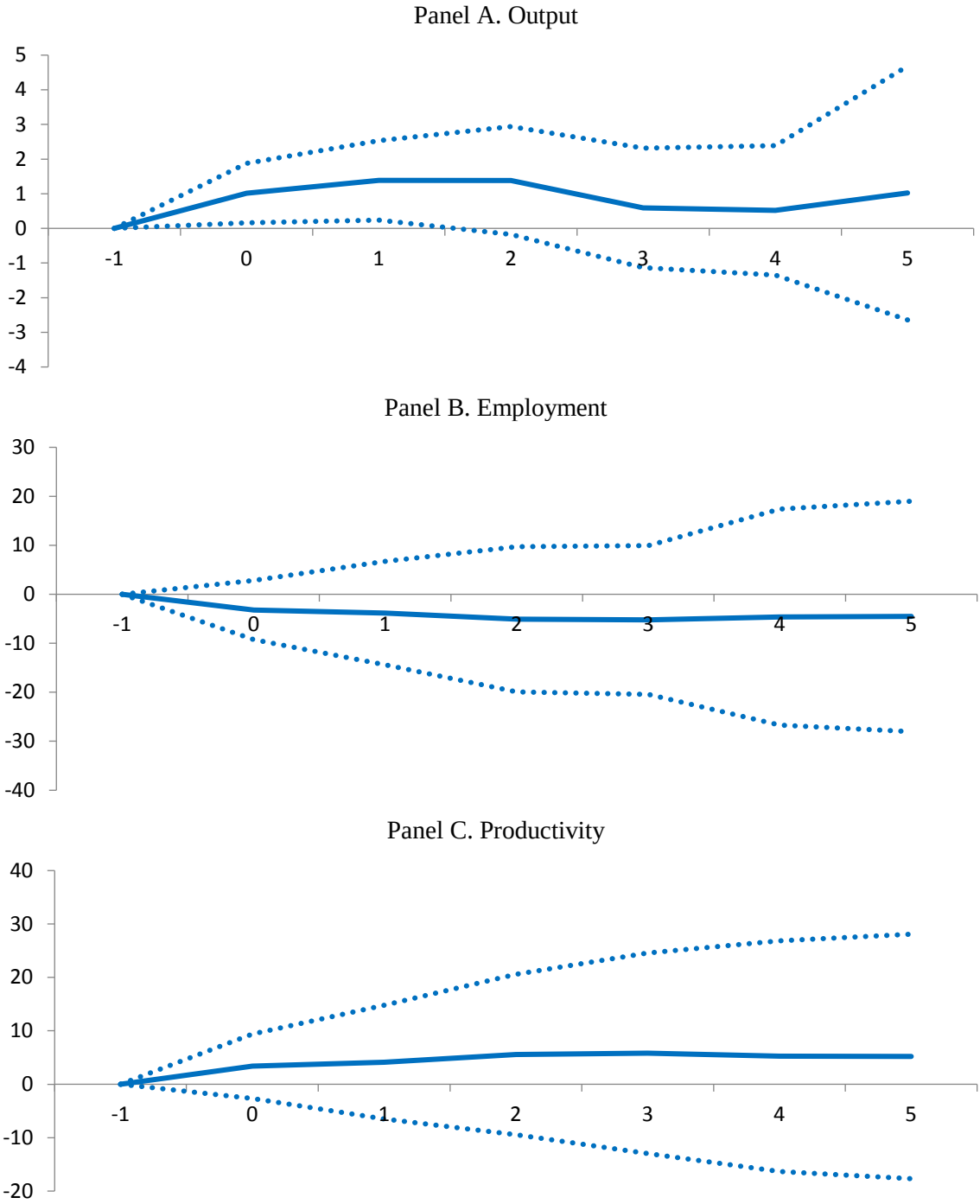
Note: Medium-term effects (that is, after five years of the reform) are estimated as described in equation (8). ***,**,* denote significance at 1 percent, 5 percent and 10 percent, respectively. Blue (red) bars denote the medium-term response (that is, five years after the reform) of output (inequality). Flows defined as the cumulative 5-year change in total asset and liabilities as percent of GDP after the reform.

Figure 6. The medium-term aggregate and distributional effects of capital account liberalization (%)—role of institutions and crises



Note: Medium-term effects (that is, after five years of the reform) are estimated as described in equation (8). ***,**,* denote significance at 1 percent, 5 percent and 10 percent, respectively.

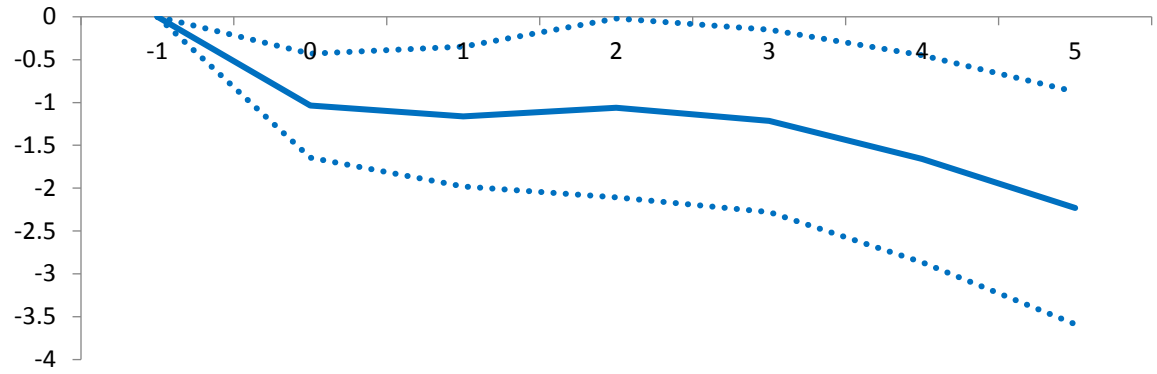
Figure 7. The differential effect of capital account liberalization episodes on sectoral output and its component (%)



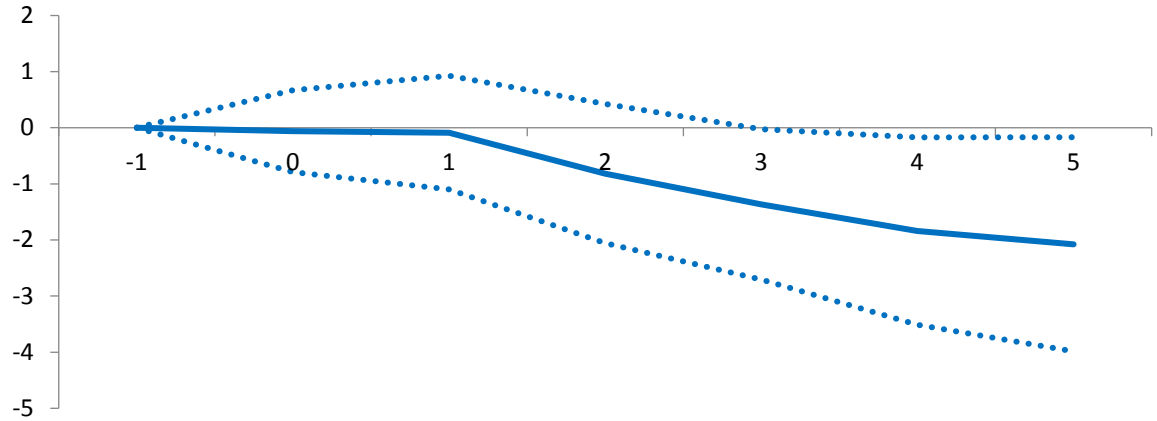
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level.

Figure 8. The differential effect of capital account liberalization episodes on the labor share (percentage points)

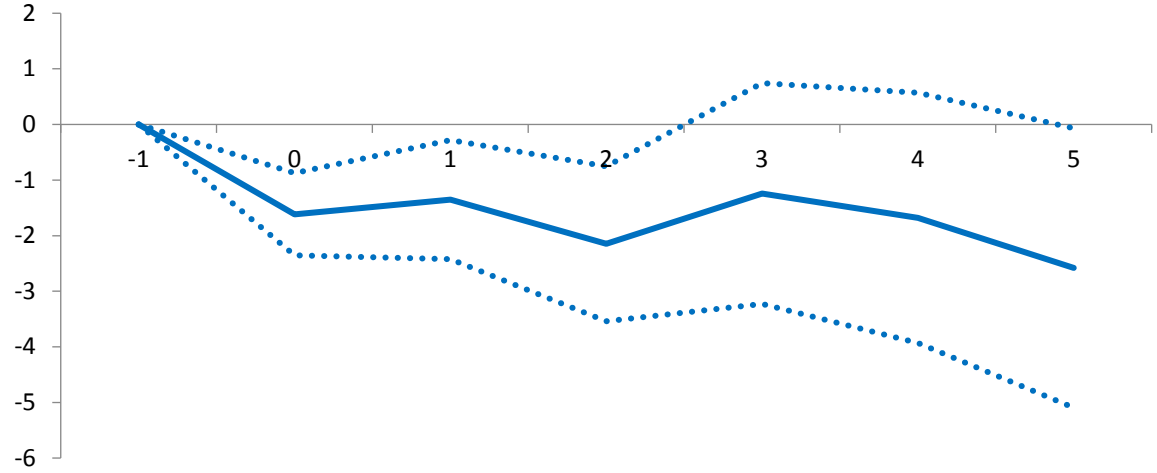
Panel A. Based on external financial dependence



Panel B. Based on the natural layoff rate



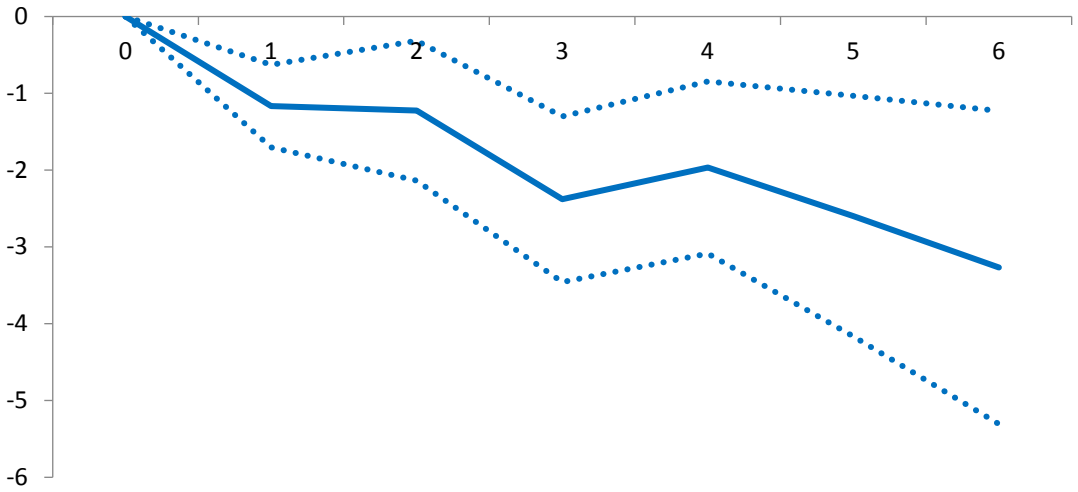
Panel C. Based on the elasticity of substitution



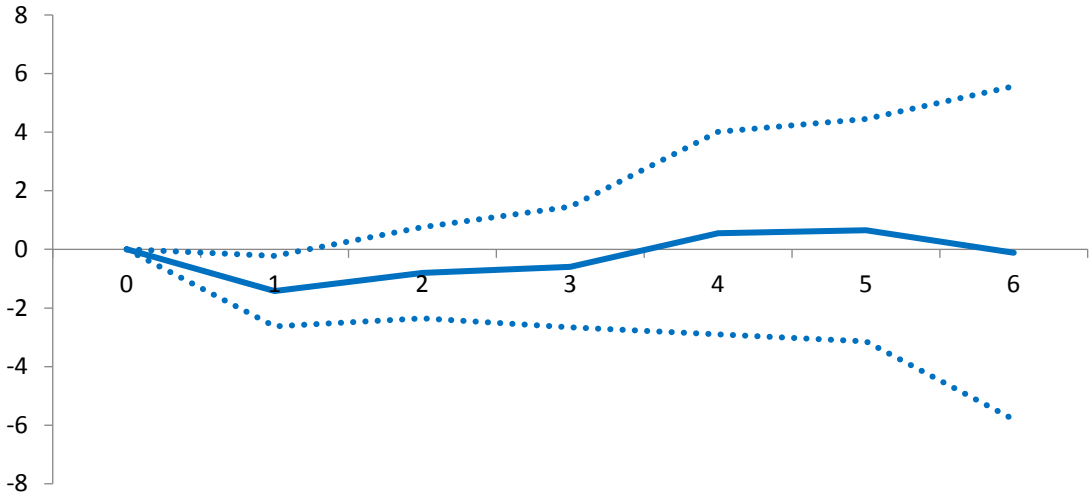
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level.

Figure 8. The differential effect of capital account liberalization episodes on the labor share (percentage points)—continued

Panel C1. Based on the elasticity of substitution for sector with elasticity higher than 1



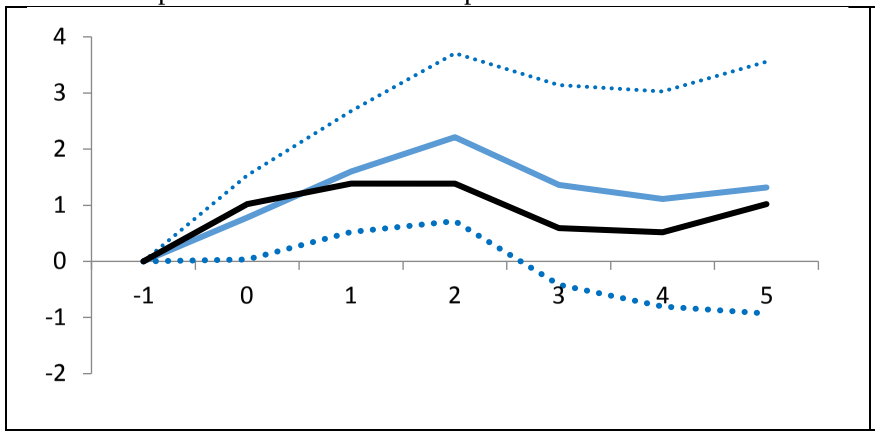
Panel C2. Based on the elasticity of substitution for sector with elasticity lower than 1



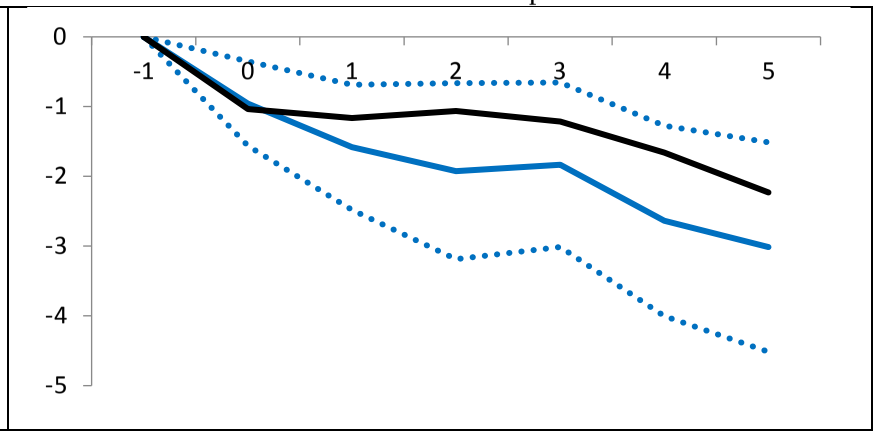
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence/layoff rate/elasticity of substitution (at the 75th percentile of the distribution) and a sector with a high external financial dependence/layoff rate/elasticity of substitution (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level.

Figure 9. The differential effect of capital account liberalization episodes on sectoral output (%) and labor share (percentage points)—controlling for trade reforms

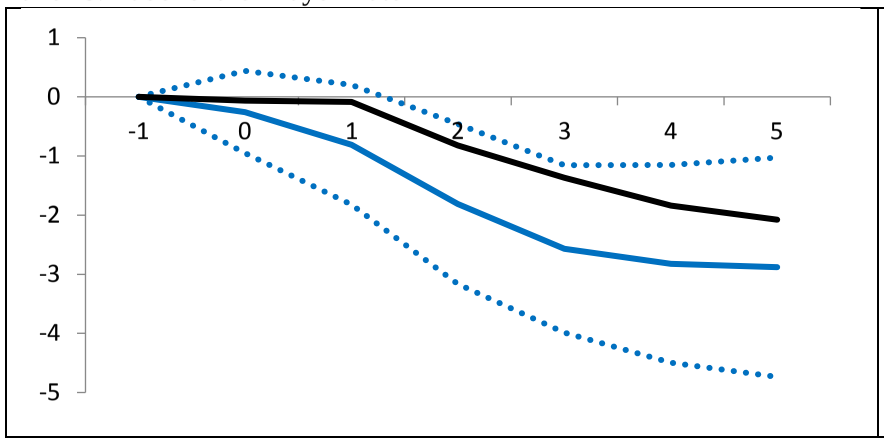
Panel A. Output—external financial dependence



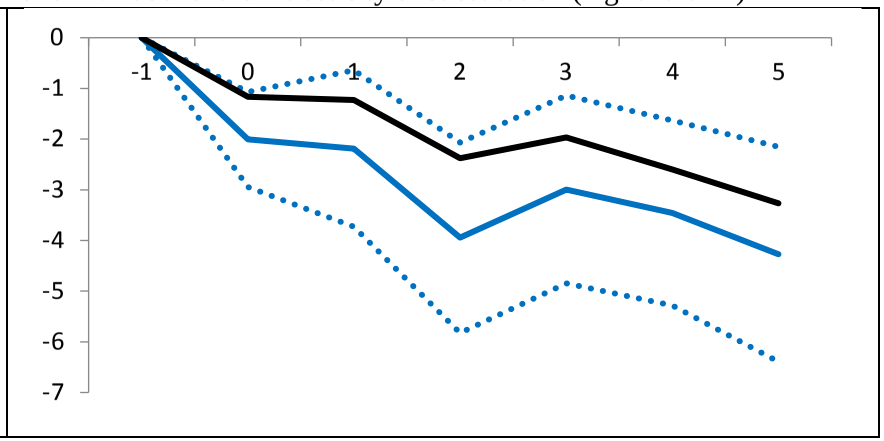
Panel B. Labor share—external financial dependence



Panel C. Labor share—layoff rate



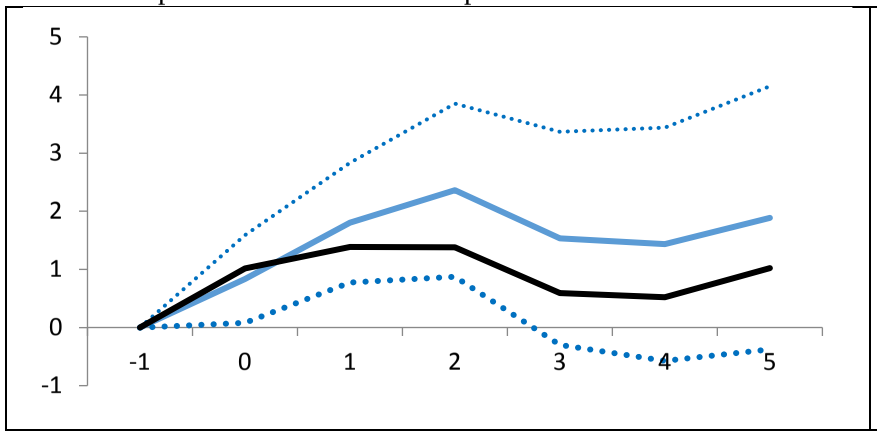
Panel D. Labor share—elasticity of substitution (higher than 1)



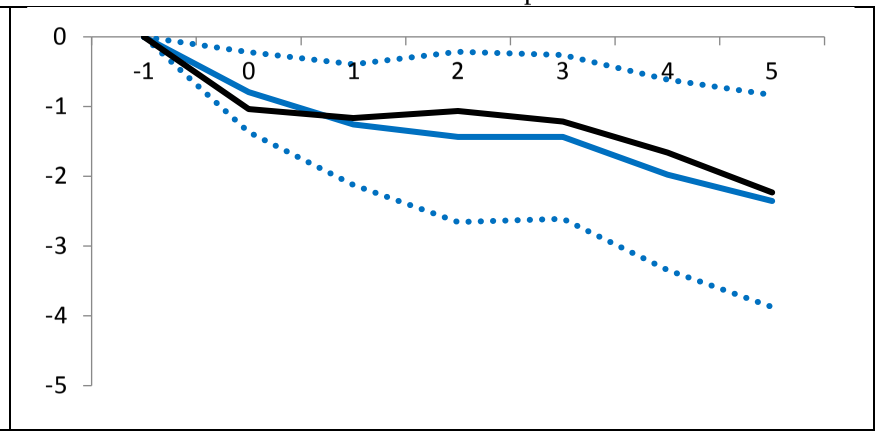
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level. Black lines denote the baseline effects reported in Figure 7 and 8.

Figure 10. The differential effect of capital account liberalization episodes on sectoral output (%) and labor share (percentage points)—controlling for current account reforms

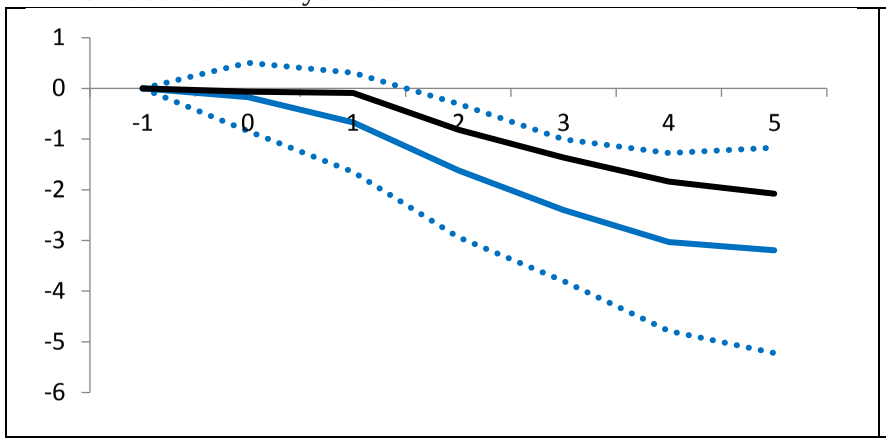
Panel A. Output—external financial dependence



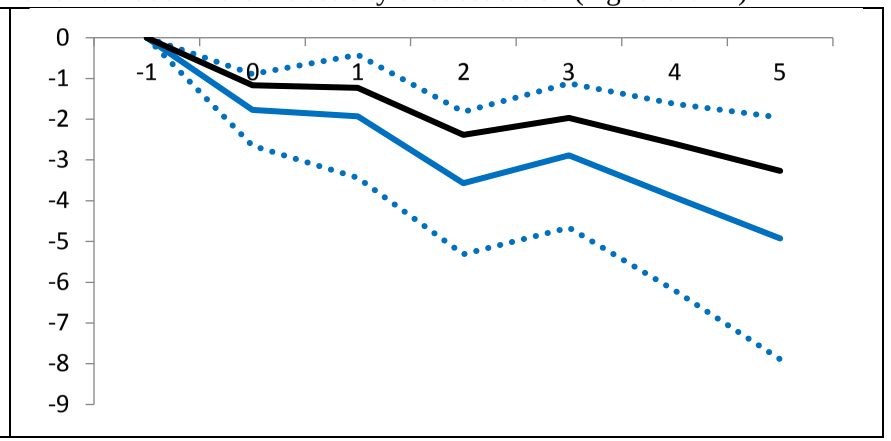
Panel B. Labor share—external financial dependence



Panel C. Labor share—layoff rate



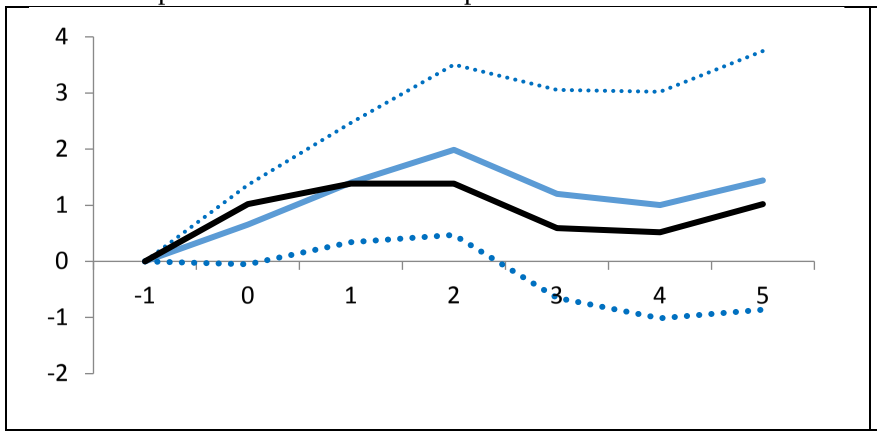
Panel D. Labor share—elasticity of substitution (higher than 1)



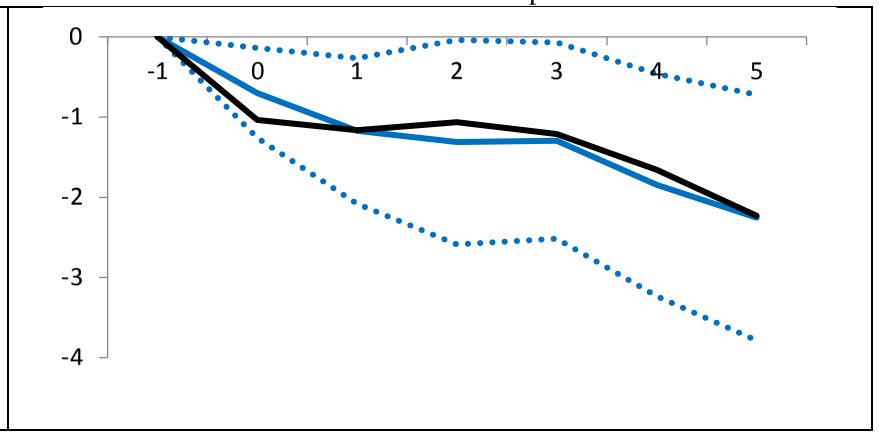
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level. Black lines denote the baseline effects reported in Figure 7 and 8.

Figure 11. The differential effect of capital account liberalization episodes on sectoral output (%) and labor share (percentage points)—controlling for domestic financial liberalization reforms

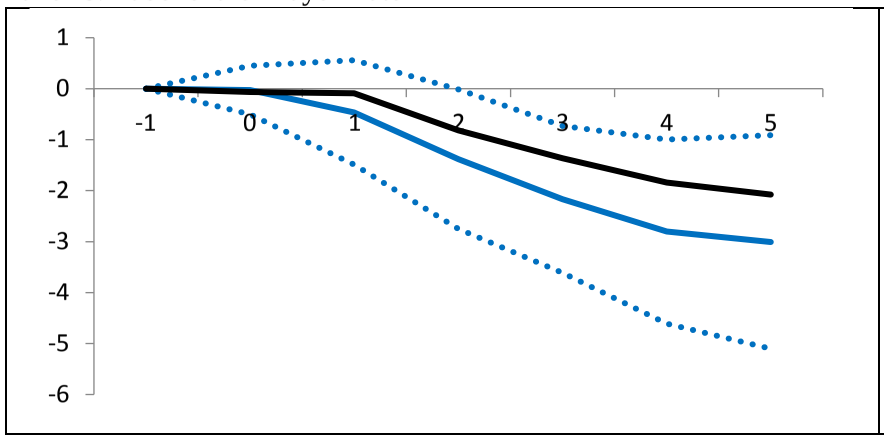
Panel A. Output—external financial dependence



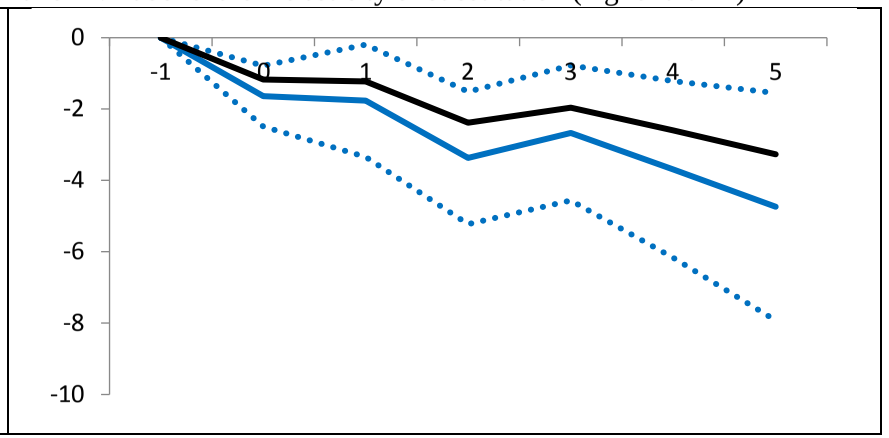
Panel B. Labor share—external financial dependence



Panel C. Labor share—layoff rate



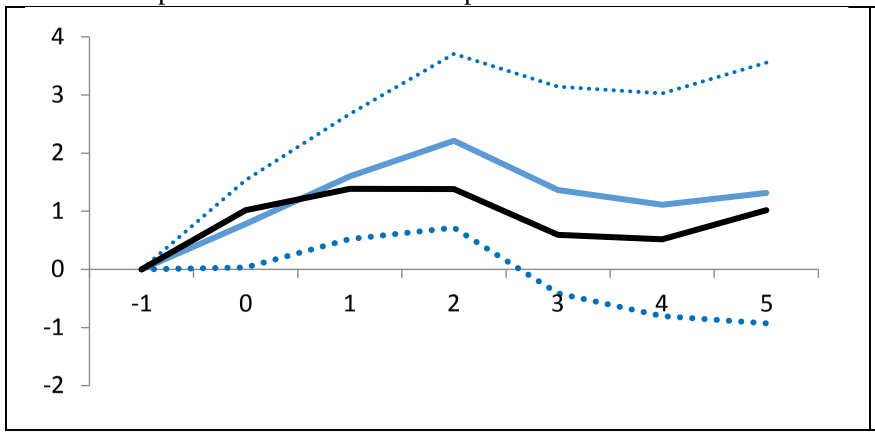
Panel D. Labor share—elasticity of substitution (higher than 1)



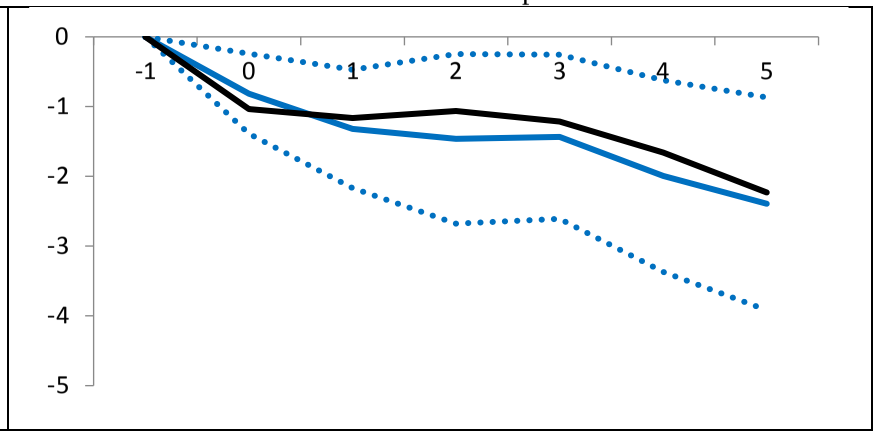
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level. Black lines denote the baseline effects reported in Figure 7 and 8.

Figure 12. The differential effect of capital account liberalization episodes on sectoral output (%) and labor share (percentage points)—controlling for product market reforms

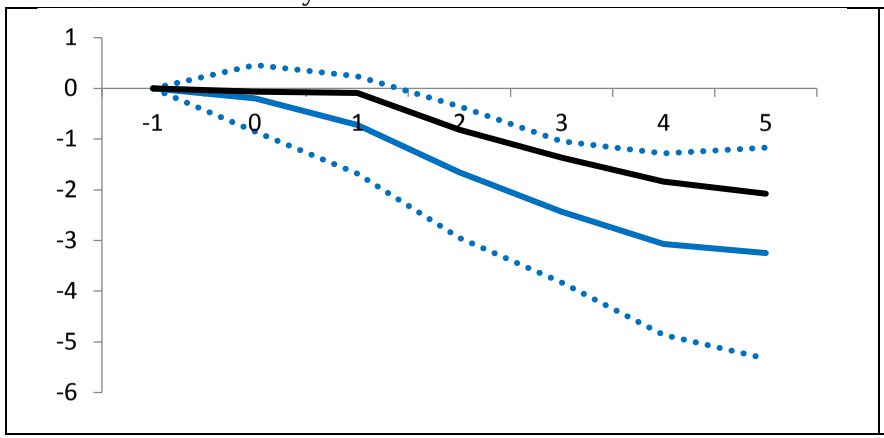
Panel A. Output—external financial dependence



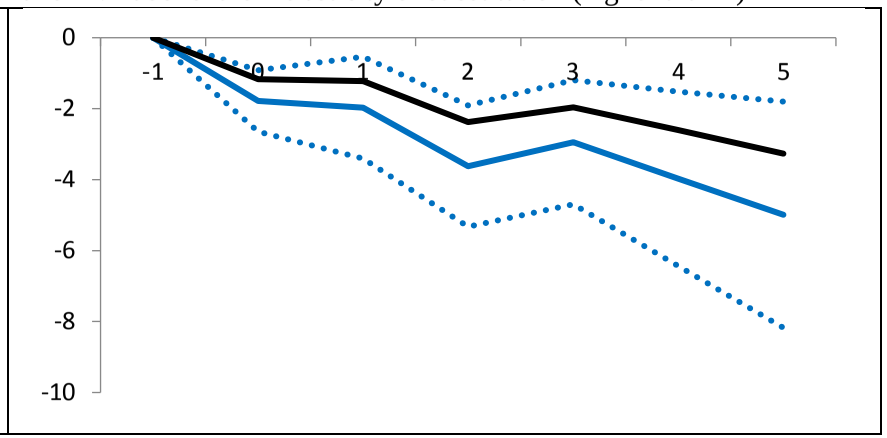
Panel B. Labor share—external financial dependence



Panel C. Labor share—layoff rate



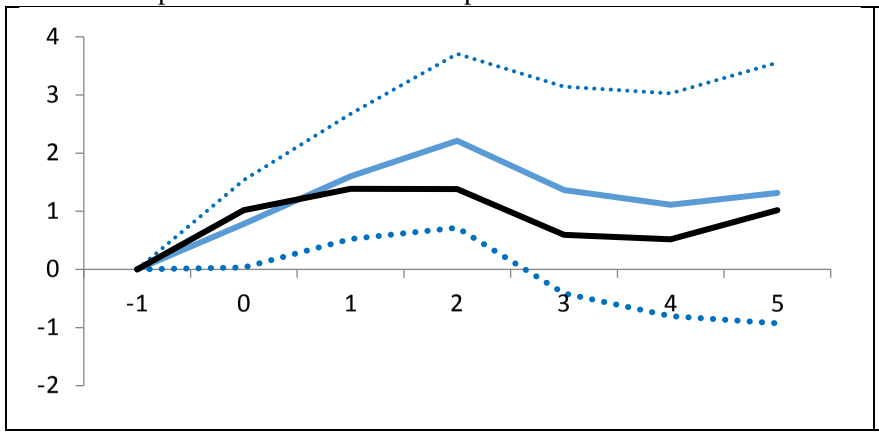
Panel D. Labor share—elasticity of substitution (higher than 1)



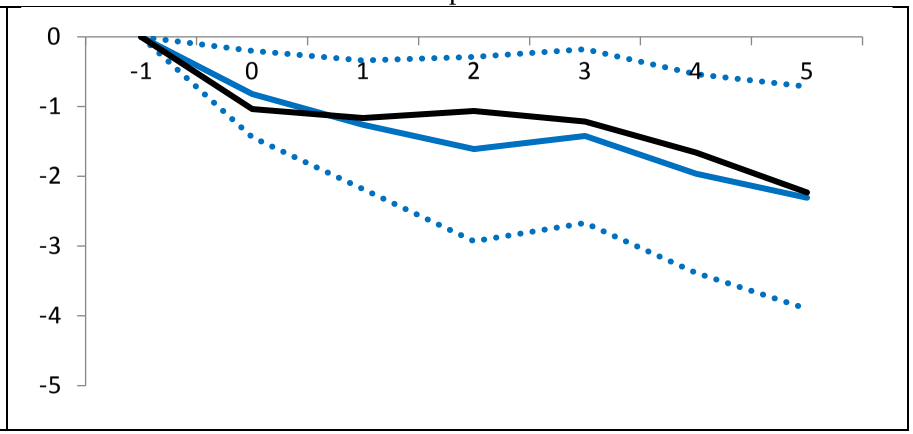
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level. Black lines denote the baseline effects reported in Figure 7 and 8.

Figure 13. The differential effect of capital account liberalization episodes on sectoral output (%) and labor share (percentage points)—controlling for labor market (EPL) reforms

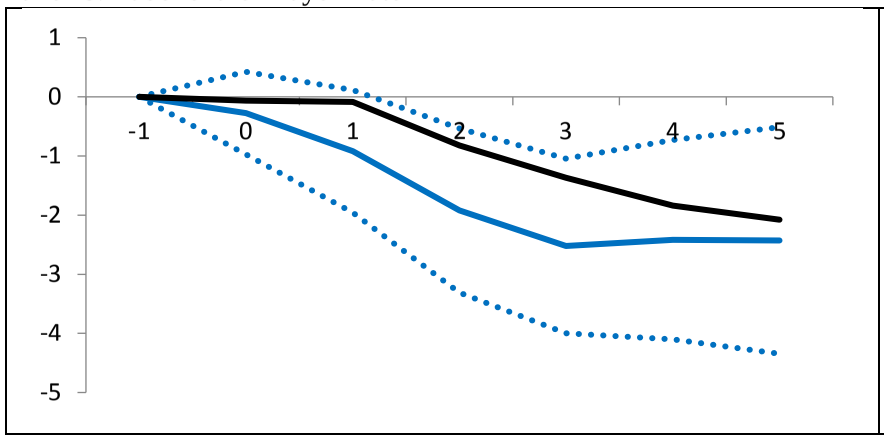
Panel A. Output—external financial dependence



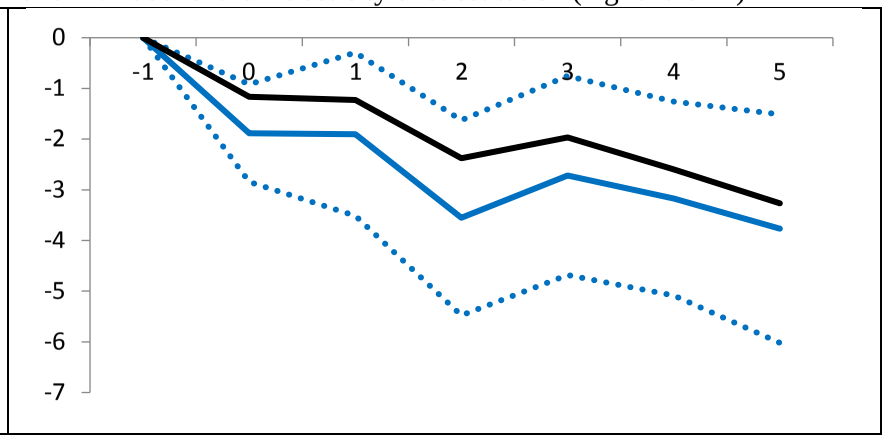
Panel B. Labor share—external financial dependence



Panel C. Labor share—layoff rate



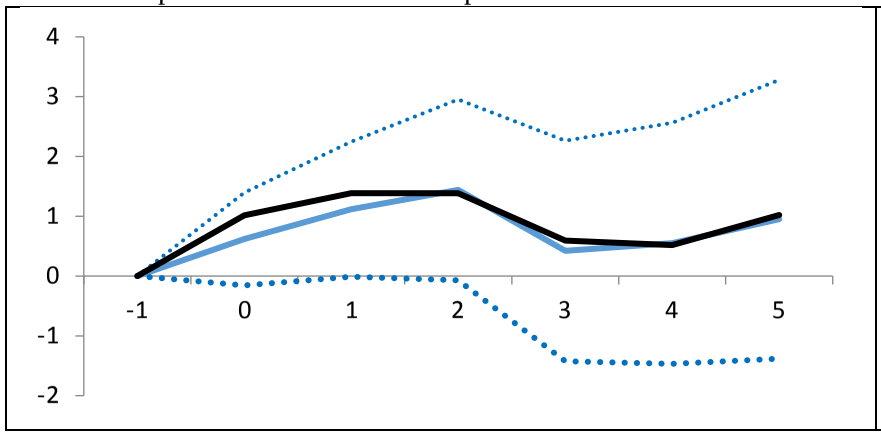
Panel D. Labor share—elasticity of substitution (higher than 1)



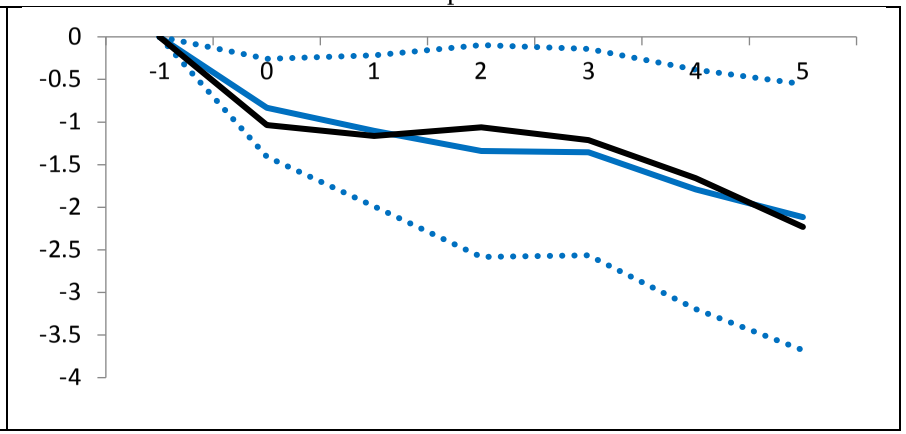
Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level. Black lines denote the baseline effects reported in Figure 7 and 8.

Figure 14. The differential effect of capital account liberalization episodes on sectoral output (%) and labor share (percentage points)—controlling for technology (relative price of investment)

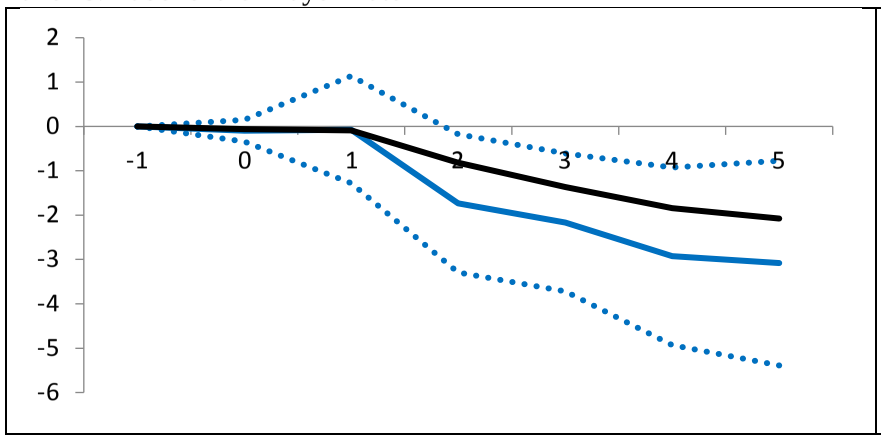
Panel A. Output—external financial dependence



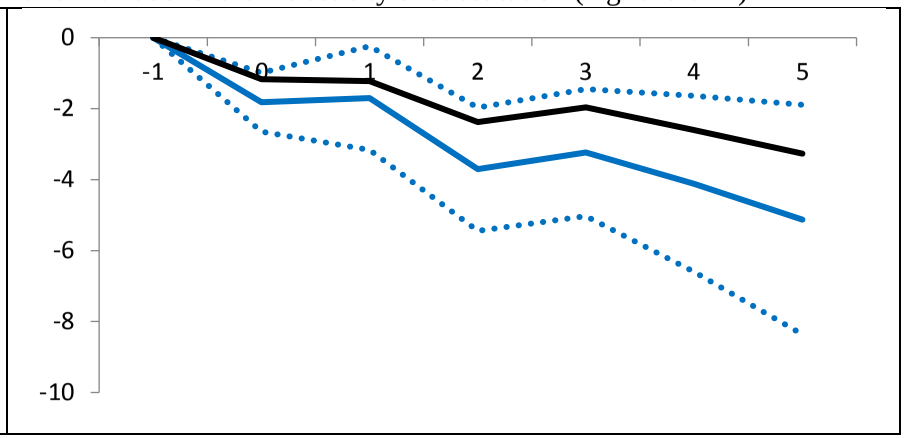
Panel B. Labor share—external financial dependence



Panel C. Labor share—layoff rate



Panel D. Labor share—elasticity of substitution (higher than 1)



Note: estimates based on equation (9). Solid line denotes the differential effect of capital account liberalization episodes between a sector with a high external financial dependence (at the 75th percentile of the distribution) and a sector with a high external financial dependence (at the 25th percentile of the distribution). Dotted lines indicate 90 percent confidence interval based on standard errors clustered at country-sector level. Black lines denote the baseline effects reported in Figure 7 and 8.

Appendix

Table A1. Descriptive statistics by income groups

Panel A. All countries

	N	Average	SD	Min	Max
Kaopen	6023	-0.002	1.529	-1.856	2.456
D.Kaopen	5829	0.024	0.370	-3.253	3.253

Panel B. High income

	N	Average	SD	Min	Max
Kaopen	1667	1.036	1.516	-1.856	2.456
D.Kaopen	1618	0.044	0.299	-2.292	2.292

Panel C. Upper middle income

	N	Average	SD	Min	Max
Kaopen	1538	-0.138	1.470	-1.856	2.456
D.Kaopen	1488	0.023	0.449	-3.253	2.556

Panel D. Lower middle income

	N	Average	SD	Min	Max
Kaopen	1606	-0.352	1.342	-1.856	2.456
D.Kaopen	1551	0.014	0.384	-3.253	3.253

Panel D. Low income

	N	Average	SD	Min	Max
Kaopen	1212	-0.793	1.017	-1.856	2.456
D.Kaopen	1172	0.011	0.323	-1.935	2.988

Note: Income groups based on World Bank classification.

Table A2. Number of capital account liberalization reforms

	70s	80s	90s	2000s	1970-2010
All	38	25	100	61	224
High income	15	7	23	14	58
Upper middle income	11	9	28	31	79
Lower middle income	5	6	31	12	54
Lower income	7	3	18	5	33

Note: Income groups based on World Bank classification.

Table A3. Country Coverage

Income Group	Country	Kaopen Range
High Income	Australia	1970 - 2010
	Austria	1970 - 2010
	Bahamas, The	1977 - 2010
	Barbados	1974 - 2010
	Belgium	1970 - 2010
	Canada	1970 - 2010
	Croatia	1996 - 2010
	Cyprus	1970 - 2010
	Czech Republic	1996 - 2010
	Denmark	1970 - 2010
	Estonia	1996 - 2010
	Finland	1970 - 2010
	France	1970 - 2010
	Germany	1970 - 2010
	Greece	1970 - 2010
	Hong Kong SAR, China	1970 - 2010
	Hungary	1986 - 2010
	Iceland	1970 - 2010
	Ireland	1970 - 2010
	Israel	1970 - 2010
	Italy	1970 - 2010
	Japan	1970 - 2010
	Korea, Rep.	1970 - 2010
	Malta	1972 - 2010
	Netherlands	1981 - 2010
	New Zealand	1970 - 2010
	Norway	1970 - 2010
	Poland	1986 - 2010
	Portugal	1970 - 2010
	Singapore	1970 - 2010
	Slovak Republic	1996 - 2010
	Slovenia	1996 - 2010
	Spain	1970 - 2010
	Sweden	1970 - 2010
	Switzerland	1996 - 2010
	Trinidad and Tobago	1970 - 2010
	United Kingdom	1970 - 2010
	United States	1970 - 2010
Middle Income	Albania	1995 - 2010
	Algeria	1970 - 2010

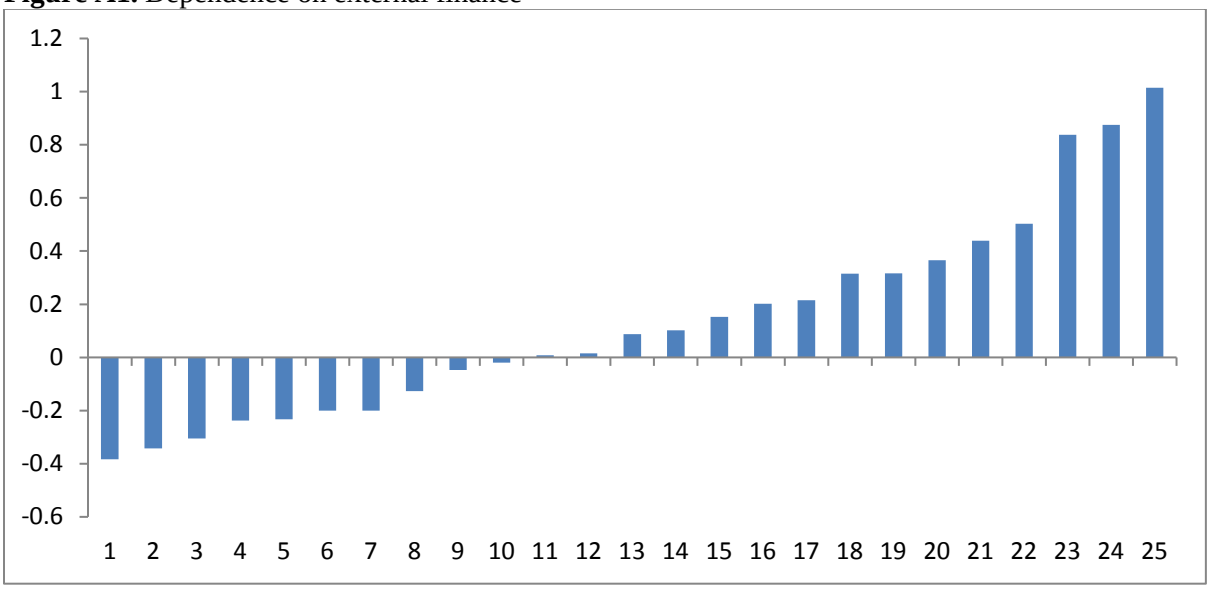
Angola	1993 - 2010
Argentina	1970 - 2010
Armenia	1996 - 2010
Azerbaijan	1996 - 2010
Belarus	1996 - 2010
Belize	1985 - 2010
Bhutan	1985 - 2010
Bolivia	1970 - 2010
Bosnia and Herzegovina	1999 - 2010
Botswana	1972 - 2010
Brazil	1970 - 2010
Bulgaria	1994 - 2010
Cameroon	1970 - 2010
Cape Verde	1982 - 2010
Chile	1970 - 2010
China	1984 - 2010
Colombia	1970 - 2010
Congo, Rep.	1970 - 2010
Costa Rica	1970 - 2010
Cote d'Ivoire	1970 - 2010
Djibouti	1982 - 2010
Dominican Republic	1970 - 2010
Ecuador	1970 - 2010
Egypt, Arab Rep.	1970 - 2010
El Salvador	1970 - 2010
Fiji	1975 - 2010
Gabon	1970 - 2010
Georgia	1996 - 2010
Ghana	1970 - 2010
Guatemala	1970 - 2010
Guyana	1970 - 2010
Honduras	1970 - 2010
India	1970 - 2010
Indonesia	1970 - 2010
Iran, Islamic Rep.	1970 - 2010
Iraq	1970 - 1994
Jamaica	1970 - 2010
Jordan	1970 - 2010
Kazakhstan	1996 - 2010
Lao PDR	1981 - 2010
Latvia	1996 - 2010
Lebanon	1970 - 2010

	Lesotho	1972 - 2010
	Lithuania	1996 - 2010
	Macedonia, FYR	1997 - 2010
	Malaysia	1970 - 2010
	Mauritius	1972 - 2010
	Mexico	1970 - 2010
	Moldova	1996 - 2010
	Mongolia	1995 - 2010
	Morocco	1970 - 2010
	Namibia	1994 - 2010
	Nicaragua	1970 - 2010
	Nigeria	1970 - 2010
	Pakistan	1970 - 2010
	Panama	1970 - 2010
	Papua New Guinea	1979 - 2010
	Paraguay	1970 - 2010
	Peru	1970 - 2010
	Philippines	1970 - 2010
	Romania	1976 - 2010
	Russian Federation	1996 - 2010
	Senegal	1970 - 2010
	South Africa	1970 - 2010
	Sri Lanka	1970 - 2010
	St. Lucia	1983 - 2010
	Sudan	1970 - 2007
	Suriname	1982 - 2010
	Swaziland	1973 - 2010
	Thailand	1970 - 2010
	Tunisia	1970 - 2010
	Turkey	1970 - 2010
	Turkmenistan	1996 - 2010
	Ukraine	1996 - 2010
	Uruguay	1970 - 2010
	Uzbekistan	1996 - 2010
	Venezuela, RB	1970 - 2010
	Vietnam	1980 - 2010
	Yemen, Rep.	2002 - 2010
	Zambia	1970 - 2010
Low Income	Bangladesh	1976 - 2010
	Benin	1979 - 2010
	Burkina Faso	1988 - 2010
	Burundi	1970 - 2010

	Cambodia	1995 - 2010
	Central African Republic	1970 - 2010
	Chad	1970 - 2010
	Comoros	1981 - 2010
	Congo, Dem. Rep.	1970 - 2000
	Ethiopia	1970 - 2010
	Gambia, The	1971 - 2010
	Guinea	1970 - 2010
	Guinea-Bissau	1981 - 2010
	Haiti	1984 - 2010
	Kenya	1970 - 2010
	Kyrgyz Republic	1997 - 2010
	Liberia	1970 - 2010
	Madagascar	1970 - 2010
	Malawi	1970 - 2010
	Mali	1970 - 2010
	Mauritania	1970 - 2010
	Mozambique	1988 - 2010
	Nepal	1970 - 2010
	Niger	1970 - 2010
	Rwanda	1970 - 2010
	Sierra Leone	1970 - 2010
	Tajikistan	1997 - 2010
	Tanzania	1970 - 2010
	Togo	1970 - 2010
	Uganda	1970 - 2010
	Zimbabwe	1984 - 2010

Note: Income groups based on World Bank classification.

Figure A1. Dependence on external finance



Notes: 1= Transport Equipment; 2= Food Products, Beverages and Tobacco; 3= Chemicals and chemical Products; 4= Textiles, Wearing Apparel, Leather and Related Products; 5= Wood and Paper Products; Printing and Reproduction of Recorded Media; 6=Education; 7= Financial and Insurance Activities; 8= Rubber and Plastics Products, and Mineral Products; 9= Basic Metals and Fabricated Metal Products, Except Machinery and Equipment; 10= Electrical and Optical Equipment; 11= Agriculture, Forestry and Fishing; 12= Machinery and Equipment N.E.C.; 13= Electricity, Gas and Water Supply; 14= Accommodation and Food Service Activities; 15= Professional, Scientific, Technical, Administrative and Support Service Activities; 16= Transport and Storage; 17= Retail Trade, Except Of Motor Vehicles and Motorcycles; 18= Arts, Entertainment, Recreation and Other Service Activities; 19= Wholesale and Retail Trade and Repair of Motor Vehicles and Motorcycles; 20= Wholesale Trade, Except Of Motor Vehicles and Motorcycles; 21= Health and Social Work; 22= Real Estate Activities; 23= Construction; 24= Mining and Quarrying; 25= Postal and Courier Activities.

Figure A2. Dependence on layoff rates

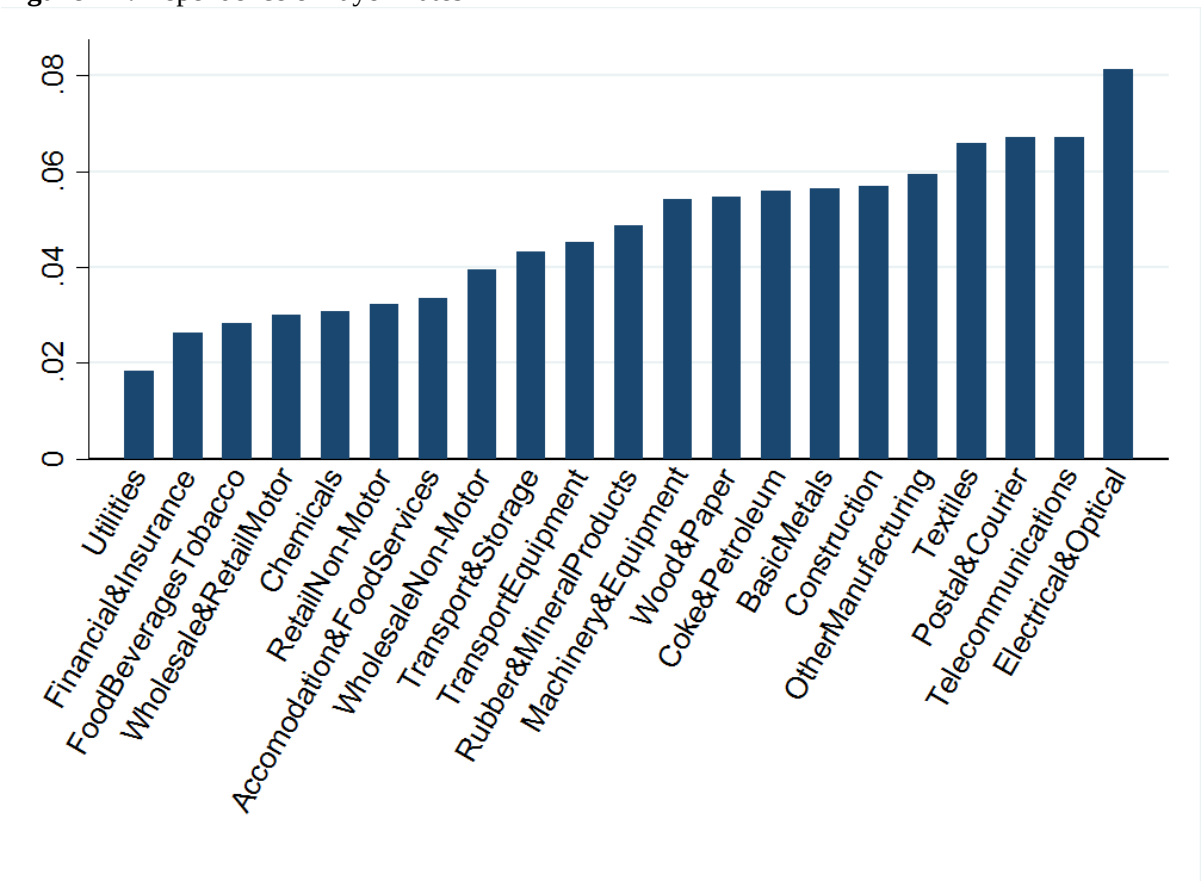
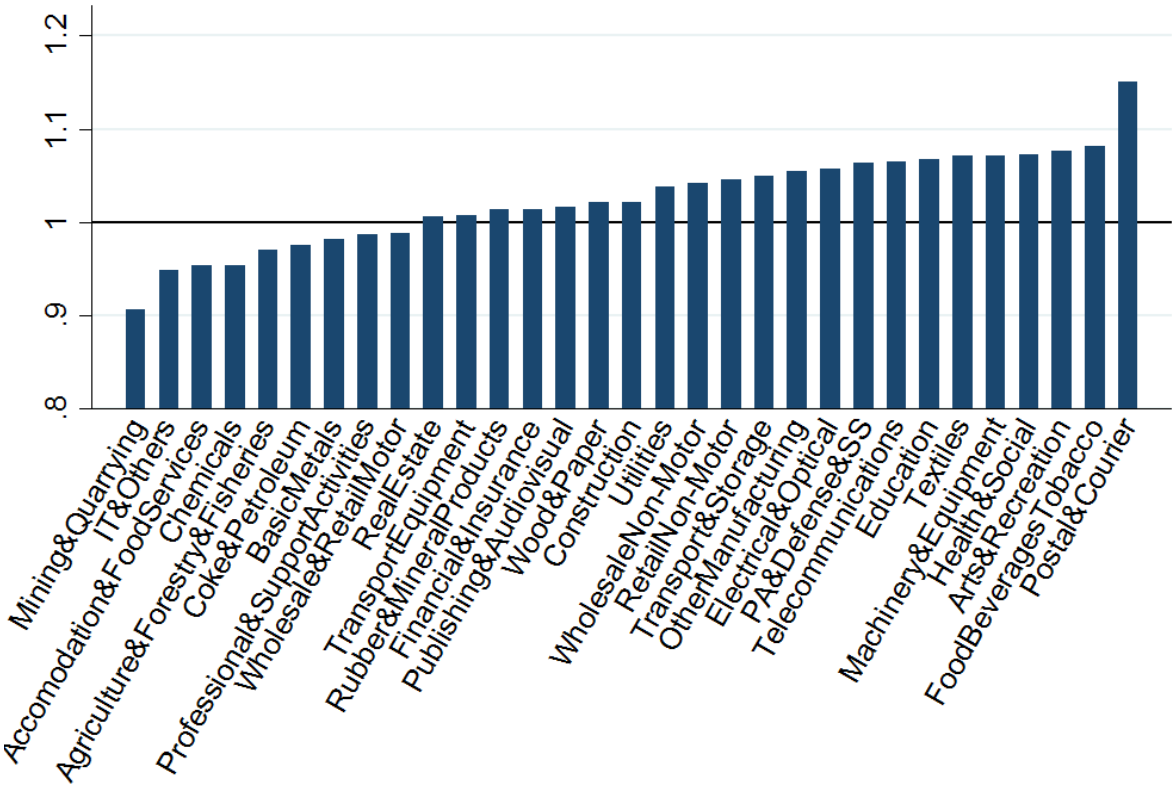


Figure A3. Dependence on the elasticity of substitution



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