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*. Both country- and industry-level results suggest that such policies have led on average to limited output gains while contributing to significant increases in inequality—that is, they pose an equity–efficiency trade-off. Behind this average lies considerable heterogeneity in effects depending on country characteristics. Liberalization increases output in countries with high financial depth and those that avoid financial crises, while distributional effects are more pronounced in countries with low financial depth and inclusion and where liberalization is followed by a crisis. Difference-in-difference estimates using sectoral data suggest that liberalization episodes reduce the share of labor income, particularly 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. The sectoral results underpin a causal interpretation of the findings using 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 twofold. First, the efficiency (or output) benefits claimed for capital account liberalization reforms have often proven elusive, that is, 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 the aggregate benefits are weak or mixed.

As Obstfeld (1998) notes, "economic theory leaves no doubt about the potential advantages" of capital account liberalization. In the neoclassical model, liberalizing the capital account facilitates 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 et al. 2003; Edison et al. 2004; Kose et al. 2009). Eichengreen (2001) finds at best ambiguous evidence on the effect of capital account liberalization on growth. Edison et al. (2004) survey 10 studies of liberalization and conclude that only three of these provide evidence of positive effects of capital account liberalization. Prasad et al. (2003) extend the coverage to 14 studies and find that in only three of these is financial integration positively associated with economic growth. Kose et al. (2009) further extend the coverage to 26 studies and find that in only three is there robust evidence of positive effects.

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[1] Some readers will prefer to refer to the process that we assess in this paper as external financial liberalization and the outcome of that process as financial globalization. In the following 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 and have no issue with readers preferring to think of our results as pertaining more to liberalization than to globalization per se.

[2] As Alfaro, Kalemli-Ozcan, and Volosovych (2008) find, institutional quality, in addition to capital market imperfections and differences in returns, is 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 about 150 episodes of surges in capital inflows have taken place in more than 50 emerging market economies; about 20% of these episodes ended in a financial crisis, and many of them are associated with large output declines (Ghosh, Ostry, and Qureshi 2016). The uncertain aggregate benefits related to 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), the 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 the 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 (using the Gini coefficient and the labor share of income as proxies) impacts of capital account liberalization to address a number of limitations inherent in previous empirical work. In particular, our contributions are: (i) to identify large and discrete changes in capital account policy that may give rise to aggregate and distributional effects; (ii) to trace the response of the level of output and inequality in the aftermath of these changes; (iii) to identify some of the factors that may shape the macro and distributional impacts of capital account liberalization; and (iv) to 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 identification strategies 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 effects 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 liberalization episodes to have larger effects on the labor share in industries in which the propensity to use layoffs to adjust to 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 in which 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) data set—and using a difference-in-difference strategy is 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 will affect the 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 set-up would imply that differences in the output (or labor share) across sectors influence the probability of reforms at the aggregate level—which seems to be 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 the industry-level output (labor share) to this composite variable.

Our main findings based on country-level data suggest that capital account liberalization on average has had 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 lower levels of financial depth and inclusion. Similarly, capital account liberalization 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 of 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, particularly for industries with higher levels of 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. [3]

Our paper relates to three streams of the literature. The first is related to the macroeconomic effects of capital account liberalization (Eichengreen 2001; Prasad et al. 2003; Edison et al. 2004; Kose et al. 2009) and the way in which these effects depend on the strength of financial institutions (Ostry, Prati, and Spilimbergo 2009; Kose, Prasad, and Taylor 2011; IMF 2012). The second relates to the effect of capital account and stock market

[3] Whether the elasticity of substitution at the aggregate level is above or below one is a debated issue. As discussed by Karabarbounis and Neiman (2014), while the range of estimates in previous studies is quite wide, these estimates typically refer to short-term elasticities and not long ones. In contrast, exploiting cross-sectional variation focusing on long-term term trends, Karabarbounis and Neiman (2014) find estimates of the elasticity of substitution significantly larger than 1. Importantly in the context of our paper, their estimates at the aggregate level based on KLEMS sectoral data (as used in our paper) range between 1.17 and 1.49.

liberalization on income distribution (Das and Mohapatra 2003; Jayadev 2007; Larrain 2015; De Haan and Sturm forthcoming; Furceri and Loungani 2018). The third is on the drivers of the labor share, which mostly focused on the roles of technological progress in equipment goods and implied substitution of capital for routine labor tasks (Karabarbounis and Neiman, 2013; Alvarez-Cuadrado *et al.*, 2015; Eden and Gaggl, 2015; Acemoglu and Restrepo, 2016; Dao *et al.*, 2017); rising concentration and pricing power across markets (Autor *et al.*, 2017; Barkai, 2017); globalization of trade and production (Elsby *et al.* 2013; Boehm *et al.*, 2017; Dao *et al.*, 2017; measurement issues (Rognlie, 2015; Koh *et al.*, 2016; Bridgman, 2017); and labor market institutions (Bentolila and Saint-Paul, 2003; Ciminelli *et al*. 2018); but much less so 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 describes and discusses the results. Section 5 concludes and provides policy implications.

II. DATA

A. Country-Level Data

1. 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). The data for capital account openness are taken from the Chinn and Ito (2008) database. While the literature proposes alternative *de jure* measures of capital account openness (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 the restrictions on cross-border transactions that the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)* database reports.[4] The index is available for an unbalanced panel of 182 countries from 1970

[4] See Chinn and Ito (2008) for the details of the methodology.

to 2010 and ranges from -1.9 (a more restricted capital account) to 2.5 (a less restricted one) (Table A1). The capital account openness index varies greatly across income groups, with stronger 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 country lifted the restrictions. This information is difficult to obtain for a large set of countries, as ideally the study would require information on the 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 Kaopen index, specifically changes that exceed by two standard deviations the average annual change over all the observations (i.e. 0.76).[5] This criterion identifies 224 episodes, the majority of which occurred in the last two decades.

2. Output and Inequality

We obtain data on real GDP growth 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). The SWIID provides comparable estimates of market income inequality for 173 countries for as many years as possible from 1970 to 2010.[6] The Gini coefficients theoretically fall between 0 (each reference unit receives an equal share of the income) and 100 (a single unit receives all the income). In our sample they range from 18 to 78.

[5] Previous papers follow a similar strategy to identify episodes of stock market liberalization (Henry 2007).

[6] See Solt (2016) for the details of the methodology. Details on the country coverage are provided in Table (A3).

B. Industry-Level Data

We compute the industry-level labor shares using the harmonized data on value added and labor compensation contained in the 2012 release of the EUKLEMS database (for details see O'Mahony and Timmer 2009).[7]

To identify the effects of capital account reforms on sectoral output, we use data on external financial dependence. We analyze the effect of liberalization on the industry labor share through data on external financial dependence, "natural" layoff rates, and the elasticity of substitution between capital and labor. Importantly, these industry-specific factors are weakly correlated among each other (Table A4), suggesting that the channels through which we identify the effect of capital account liberalization on the labor share can be considered as independent.

1. External Financial Dependence

The measure of external financial dependence—constructed for each industry as the median across all the firms in a given industry—is the ratio of total capital expenditures minus current cash flow to total capital expenditures.[8] Figure A1 presents the industry-specific measures of external financial dependence.

2. Natural Layoff Rate

As a proxy for job destruction rates, we use layoff rates computed by Bassanini, Nunziata and Venn (2009) using US layoff rates data from the 2004 CPS Displaced Workers Supplement. US layoff rate data are available for 22 industries categorized according to the ISIC Rev. 3 classification. The latest vintage of the EU KLEMS database instead follows the

[7] 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 the added value. We drop two industries from the sample, namely the activity of households as employers and the activities of extraterritorial organizations and bodies, as for most countries labor compensation and/or added value data are 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 the industries during these periods.

[8] Hui Tong kindly provided the data. For details, see Tong and Wei (2011).

ISIC Rev. 4 classification. Hence, we match the US layoff rates of Bassanini, Nunziata, and Venn (2009) from the ISIC Rev. 3 to the ISIC Rev. 4 classification using the many-to-one method that O'Mahony and Timmer (2009) use to backcast value-added data. Additionally, since post and telecommunications were categorized as a single industry under the ISIC Rev. 3 classification, whereas they account for two industries under the ISIC Rev. 4 classification, we impose the same lay-off rate for the postal and courier industry and the telecommunications industry. After matching, we have layoff data for 21 of the 31 industries in our sample. Figure A2 shows the US layoff rates by industry.

3. Elasticity of Substitution between Capital and Labor

To estimate the 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):

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

where the subscript *i* denotes 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, and μ is the elasticity of the 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 of estimating the $\frac{ds_i}{dk_i}$ relationship while using external estimates for the elasticity of the 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, respectively, to 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 the 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 we allow the βs 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, and θ are, respectively, industry–time, country–time, and country–industry effects that are 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:

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

where the accent $\widetilde{\ }$ denotes 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; and (iii) the real price of inputs using data for the price deflators of intermediate inputs and gross output, again from the OECD STAN database. We obtain the data for TFP from the EUKLEMS database.

After estimating Equation (5), we derive elasticities of substitution by rearranging 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 the labor demand with respect to wages, holding capital and the price of inputs constant. Following Bentolila and Saint-Paul (2003), we make the further assumption that this does not vary across industries and rely on the average estimate from the 70 studies that Hamermesh (1993) reviews, 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 methodologies used to examine the aggregate and distributional effects of capital account liberalization at the country and the industry level.

A. Country-Level Approach

1. 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)[9]; D is a dummy variable that is equal to one 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[10]; γ_t are time fixed effects to control for global shocks; and X is a vector of control variables including reforms in trade, the current account, the product market and the labor market (employment protection legislation).[11]

As a baseline, we estimate Equation (7) using OLS on an unbalanced panel of annual observations from 1970 to 2010 for 149 advanced and developing economies.[12] The number of lags that we choose to capture the medium effect of reforms is 5. In addition to the regression results, we present the impulse response functions (IRFs) to describe the response of output (inequality) following a capital account liberalization episode. We obtain the confidence bands associated with the estimated impulse response functions using the standard errors of the estimated coefficients based on clustered (at the country level) robust standard errors.

2. Accounting for Differential and Threshold Effects

It is commonly argued that the benefits of financial globalization depend on the quality of financial institutions (Ostry, Prati, and Spilimbergo 2009; Kose, Prasad, and Taylor 2011; IMF 2012). Kose, Prasad, and Taylor (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.

[9] The data on real GDP are from the IMF WEO 2016.

[10] 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.

[11] The data are from Ostry, Prati, and Spilimbergo (2009).

[12] See Table A3 for the list of countries.

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:

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

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), which takes the value 1 (0) when z goes to minus (plus) infinity. 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. M_{it} is the same set of control variables used in the baseline specification but now also including $G(z_{it})$

The use of the smooth transition function is equivalent to the smooth transition autoregressive (STAR) model developed by Granger and Teravirta (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, improving the stability and precision of the estimates. In addition, this estimation strategy can also handle the potential correlation of the standard errors within countries more easily by clustering at the country level.

B. Industry-Level Approach

We extend the specification applied to the 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 substitution 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 us 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 advantages; γ_{it} are country–year fixed effects, included to control for any variation that is common to all the sectors of a country's economy, including reforms as well as macroeconomic shocks; ρ_{jt} are industry–time fixed effects, which allow us to control for common factors affecting specific industries—such as factors that are common across countries driving sectoral reallocation; and *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.[13]

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 have led to a sizeable and statistically significant increase in inequality of about 4 percentage points five years after the liberalization (see also Table 1). This effect is economically significant, as it

[13] It is important to note that this specification allows us to estimate the impact of capital account liberalization on output and labor shares *within* industries and therefore ignores potential effects due to changes in industrial composition (*between* effects). However, as discussed by Dao *et al.* 2017 and Ciminelli *et al.* 2018, within-industry changes are more important than changes in industrial composition to explain movements of the labor share at the country level.

corresponds to about one standard deviation of the average increase in the Gini coefficient in our sample.

1. 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-, and right-wing governments; (ii) changes in the share of redistributive policies—using changes in the difference between gross and net Gini coefficients as a proxy; (iii) the level and the square of the log of GDP per capita; (iv) changes in the share of government expenditures in GDP; and (v) changes in the share of industry and agriculture in value added. Figure 2 suggests that the inclusion of these additional controls does not affect the results.

Another possible concern is that countries implement capital account liberalization reforms 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 at *t-1* of the future GDP growth rates (using the IMF WEO forecasts) over periods *t* to *t+5*—that is, the time horizon over which we compute the impulse response functions. The results reported in Figure 3 are very close to and not statistically different from those that we obtained for the baseline, suggesting that this issue is not empirically important.

Another potential concern is that inequality (as well as GDP growth) may start to increase before the occurrence of major liberalization episodes. While inspection of the data suggests that, on average, this is not the case, we check the robustness of the results to the

inclusion of (two) lags of the dependent variables.[14] The results that we obtain following this approach (Figure 4) are similar to and not statistically different from the baseline.

Finally, to address the endogeneity concerns further, we implement an instrumental variable (IV) approach using two instruments that capture the scope of reforms and the peer pressure to reform. We capture the scope of capital account liberalization reform using the initial stance of capital account regulation—with the four-year lagged value of the capital account openness indicator as a proxy (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 the 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 flow 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 the capital account liberalization reform for country *j* at time *t*; and $w_{i,j,t}$ is the share of total exports and imports between country *i* and country *j* in the total exports and imports for country *i*: $\frac{Export_{i,j,t}+Import_{i,j,t}}{Export_{i,t}+Import_{i,t}}$.

[14] Looking at the Gini coefficient before and after the beginning of capital account liberalization episodes suggests that, on average, the Gini coefficient has remained broadly stable up to 5 years before the liberalization, while it has increased by about 0.8 percentage point five years after (see Furceri and Loungani, 2018). The results are robust to different lag parametrization.

The first-stage estimates of capital account liberalization reforms using these instruments suggest that these are statistically significant and exhibit the expected sign.[15] In addition, we can plausibly consider both instruments to be exogenous. For example, reforms in other countries do not drive the reforms in the country considered and do not have any effect on the latter other than through pressure on domestic authorities to undertake reforms.[16]

The results that we obtain following this approach are also similar to and not statistically different from the baseline (Figure 5).

2. Liberalization vs Flows

We have focused 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 occurred in the five years after liberalization—the same horizon as our IRFs. The results suggest that the size of the flows shapes the distributional effects of liberalization (Figure 6). 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.

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

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

with t-statistics in parentheses.

[16] The Kleibergen–Paap rk Wald F statistic of weak exogeneity and the Hansen J statistic p-value for overidentification suggest that we can consider these variables to be strongly exogenous. In addition, the estimates of the effects of these instruments on output are not statistically significant once we have controlled for episodes of capital account liberalization, suggesting that they do not directly affect the output.

3. Threshold Effects

As previously discussed, the existing literature suggests that the output gains from financial globalization depend on the strength of financial institutions (Ostry, Prati, and Spilimbergo 2009; Kose, Prasad, and Taylor 2011; IMF 2012). The results that we present in Figure 7 and Table 2 corroborate these findings but also show that the strength of financial institutions influences the distributional effects of capital account liberalization.

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 of Ostry, Prati, and Spilimbergo (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 financial crises have followed in the five years after liberalization—the same time horizon considered in the analysis—versus episodes that have not led to crises.

We find positive output effects in cases in which the domestic financial market is highly liberalized and negative (but not significant) effects when it remains largely restricted. This suggests that the small overall effects might reflect offsetting effects that 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 in which a crisis occurs.

Similarly, we find that the effect of capital account linearization on inequality is magnified in countries with largely restricted domestic financial markets and limited financial inclusion and when a crisis follows liberalization.

B. Industry-Level Analysis

The industry-level analysis corroborates the evidence that we obtained using country-level data. 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 8 and Table 3 present the differential output effect resulting from the estimation of 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 gain associated with liberalizing the capital account for an industry with relatively low dependence (at the 25th percentile of the distribution of external financial dependence—such as transport equipment) compared with an industry with relatively high external financial dependence (at the 75th percentile of the distribution—such as construction) is about 1%. The effect is statistically significant—at the 10% confidence level—for up to 2 years after the capital account liberalization reform, but it vanishes in the medium term. The estimates of the effects on labor productivity and employment are quite imprecise, but the point estimates suggest a positive (differential) effect for productivity and a negative one for employment.

Figure 9 and Table 4 present the differential effects of capital account liberalization on the industry-level labor share that we obtained for the three identification strategies, which rely respectively on industry heterogeneity in: (i) external financial dependence; (ii) the natural layoff rate; and (iii) the 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 relatively high external financial dependence (at the 75th percentile of the cross-sector distribution) and one with 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 external financial dependence in the 25th percentile of the distribution, the results suggest that capital account liberalization episodes have on average reduced through

the external dependence channel the labor share in a reform country by about 1¾ percentage points.[17]

The results presented in Panel B suggest that capital account liberalization episodes also tend to reduce the labor share of income 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—such as textiles) compared with an industry with a relatively low layoff rate (at the 25th percentile—such as chemicals) is about 2 percentage points. Under similar assumptions made for the external financial dependence, we find that the medium-term reduction in the labor share in a reform country through the natural layoff rate is about 1½ percentage points.

Finally, we also find that the effect of capital account liberalization on the labor share is higher (in absolute values) in industries with higher elasticity of substitution between capital and labor (Panel C). The differential medium-term reduction in the labor share between an industry with relatively high elasticity of substitution (at the 75th percentile of distribution—such as machinery and equipment) and one with relatively low elasticity of substitution (at the 25th percentile—such as accommodation) is about 2.5 percentage points. Interestingly, and consistent with theory, we find that this effect is only significant in industries with elasticity of substitution between capital and labor greater than 1 (Panels C1 and C2). Using the medium-term estimates of the differential effect in these figures—that is, -3.3 (0) for industries with elasticity of substitution above (below) 1, the results suggest that capital account liberalization episodes have on average reduced the labor share in a reform country by about 2½ percentage points.

[17] This effect is computed as $\sum_i \delta_5 I_i w_i$, where δ_5 is the medium-term coefficient estimates in equation (9), I_i is an indicator variable which takes value 1 for industries with a level of external financial dependence above the 25th percentile of distribution, w_i is average (across countries and time) share of value added in total value added for industry *i*.

1. 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.

The first obvious candidate is trade liberalization. However, even though 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 of simultaneous external trade and financial liberalization, this will lead to a bias in the estimates only if trade opening engenders larger output (or labor share) effects in industries with greater 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 that we obtained in the baseline specification (Figure 10).

Another possible omitted variable is current account liberalization. As Quinn and Toyoda (2008) discuss, 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 11).

Domestic financial liberalization tends 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 12).

Product market deregulation can also affect output and the labor share of income, particularly for regulations directed at the privatization of large public network monopolies

(Ciminelli et al. forthcoming). Deregulations in product markets would bias our results only if they have larger effects on the output and the labor share in industries with greater 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 13).

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 et al. forthcoming). The results accounting for the differential effect of EPL on the labor share are again similar to those in the baseline (Figure 14).

Union density can affect the labor share by influencing the bargaining power of workers and be correlated with capital account liberalization (see Scruggs and Lange 2002, for a review).[18] Estimating Equation (9) by adding the interaction between the index of external finance (natural layoff propensity, elasticity of substitution) and the union density variable does not change the results (Figure 15). Interestingly, we find that union density has a positive effect and statistically significant effect on the labor share through the natural layoff rate.

Technology (using the relative price of investment as a proxy), by reducing the cost of capital, can increase output and reduce the labor share (IMF WEO 2017) in industries with 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 16).

[18] Indeed, we estimate that union density in advanced economies has, on average, declined following major capital account liberalization episodes (see Figure C in the Annex).

Finally, since the labor share is typically countercyclical (Kehrig and Vincent 2017), we check whether the effect on the labor share is robust when controlling for sectoral growth. While the results based on this analysis should not be interpreted as the overall effect of capital account liberalization on the labor share, since part of this effect may materialize through growth effects, they are still statistically significant and close to those obtained in the baseline (Figure 17).

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 to determine how these effects depend on the strength of financial institutions.

The results suggest that capital account liberalization reforms on average have led to limited output gains but 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 the output in countries with well-liberalized domestic financial sectors, the macroeconomic effects on output have been adverse in cases in which domestic financial markets remain largely restricted or when liberalization episodes have been followed by a crisis. With respect to inequality, our results suggest salient adverse effects on average, particularly when domestic financial liberalization is low and not-inclusive or when a crisis follows liberalization.[19] The results also suggest that capital account liberalization episodes reduce the share of labor income, especially for industries that have 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 when the elasticity of substitution between capital and labor is relatively high (and greater than unity).

[19] The analysis also controls for the direct effect of financial crises, which we find to reduce output and increase inequality.

These findings do not imply that countries should not undertake (or have undertaken) capital account liberalization, but the results regarding 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 specifically the restriction of certain types of flows that generate adverse equity–efficiency trade-offs (such as carry-trade flows or flows that give rise to unhealthy asset price or credit booms) and the encouragement of other types of flows (particularly those that give rise to durable increases in investment and growth, such as greenfield investments)—Ostry (et al., 2012). Beyond this, our paper highlights a number of areas requiring attention in trying to mitigate the undesirable consequences of capital account liberalization. Steps to develop domestic financial institutions as well as depth and inclusion are clearly important in this connection. Fiscal redistribution can also help to mitigate the adverse distributional consequences of financial globalization without exerting much of an effect on 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) to foster greater equality of opportunity.

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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 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 the country level are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. We identify capital account reforms 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 the observations. The medium-term differential effect denotes the effect of capital account liberalization episodes five years after the reform. The estimates are 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 the country level are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. We identify capital account reforms 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 the observations. The medium-term differential effect denotes the effect of capital account liberalization episodes five years after the reform. The estimates are based on equation (8). G(Z)=1 (0) for low (high) levels of financial liberalization and financial inclusion and when reforms are (not) followed by crises. The estimates are 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$_{it}$*S$_j$	1.802**	5.990	-5.694
	(1.95)	(0.92)	(-0.88)
Capital account reform$_{it-1}$*S$_j$	0.652	1.331	-1.127
	(0.80)	(0.22)	(-0.18)
Capital account reform$_{it-2}$*S$_j$	-0.006	2.516	-2.020
	(-0.01)	(0.44)	(-0.35)
Capital account reform$_{it-3}$*S$_j$	-1.399	0.461	-0.224
	(-1.55)	(0.08)	(-0.04)
Capital account reform$_{it-4}$*S$_j$	-0.128	-1.004	1.029
	(-0.17)	(-0.20)	(0.20)
Capital account reform$_{it-5}$*S$_j$	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 the country*sector level are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. We identify capital account reforms 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 the observations. The 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). The estimates are based on equation (9).

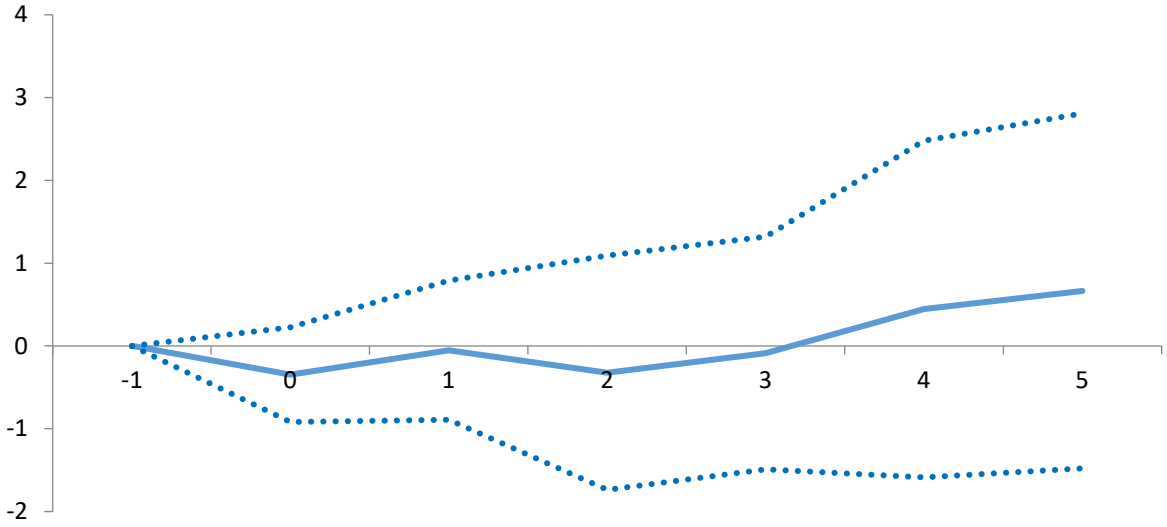
Table 4. The Effect of Capital Account Liberalization on Sectoral Labor Share

	(II)	(III)	(IV)
	External Financial Dependence	**Layoff Rate**	**Elasticity of Substitution**
Capital account reform$_{it}$*S$_j$	-1.835***	-0.023	-0.208***
	(-2.82)	(-0.15)	(-3.59)
Capital account reform$_{it-1}$*S$_j$	-0.223	-0.009	0.034
	(-0.32)	(-0.06)	(0.55)
Capital account reform$_{it-2}$*S$_j$	0.176	-0.270	-0.103
	(0.22)	(-1.42)	(-1.56)
Capital account reform$_{it-3}$*S$_j$	-0.266	-0.202	0.117
	(-0.41)	(-1.32)	(0.78)
Capital account reform$_{it-4}$*S$_j$	-0.788	-0.175	-0.057
	(-1.53)	(-1.32)	(-0.83)
Capital account reform$_{it-5}$*S$_j$	-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

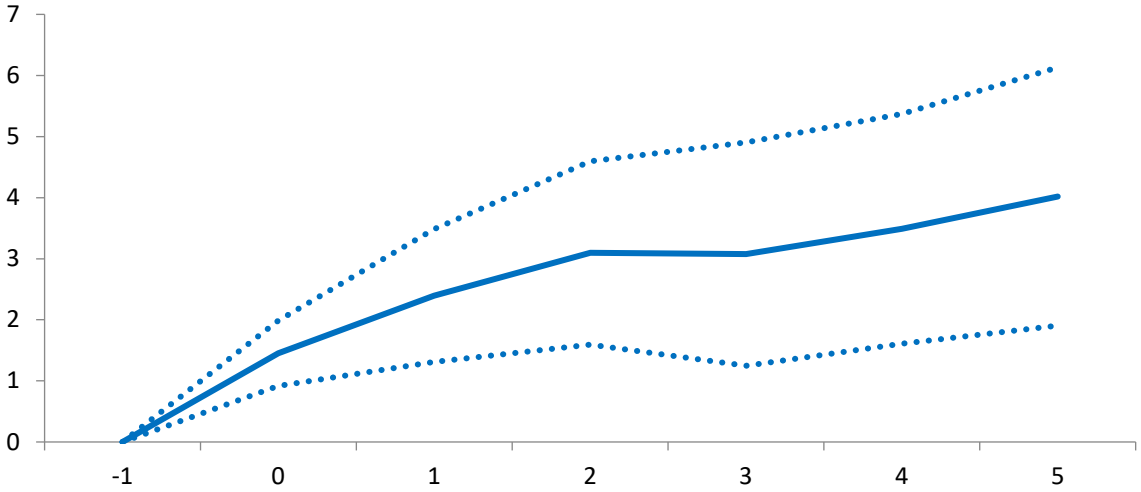
Note: T-statistics based on robust clustered standard errors at the country*sector level are in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. We identify capital account reforms as episodes when, for a given country at a given time, the annual change in the Kaopen indicator exceeds by two standard deviations the average annual change over all the observations. The 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). The estimates are based on equation (9).

Figure 1. The Aggregate and Distributional Effects of Capital Account Liberalization
(%)

Panel A. Output



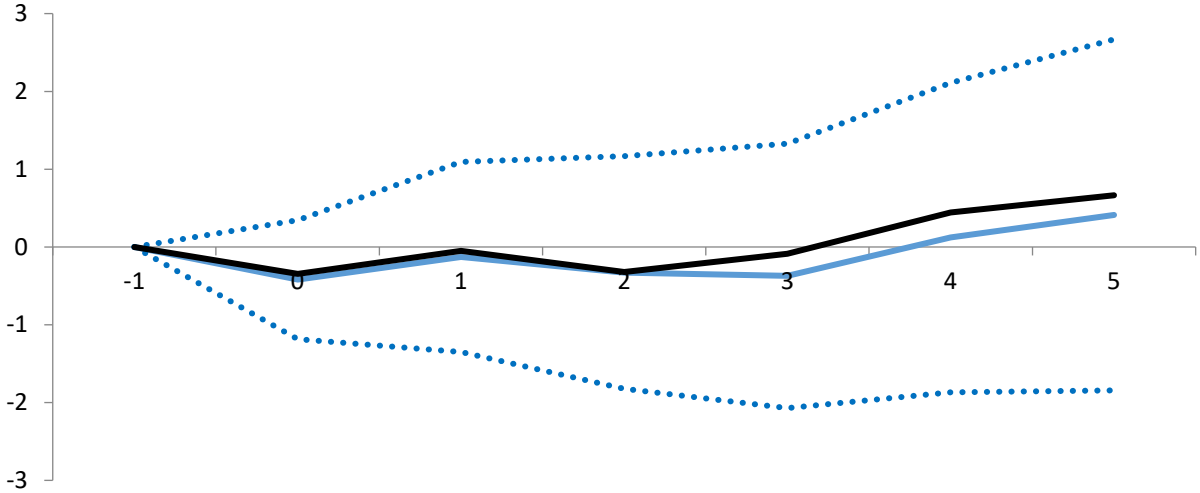
Panel B. Gini



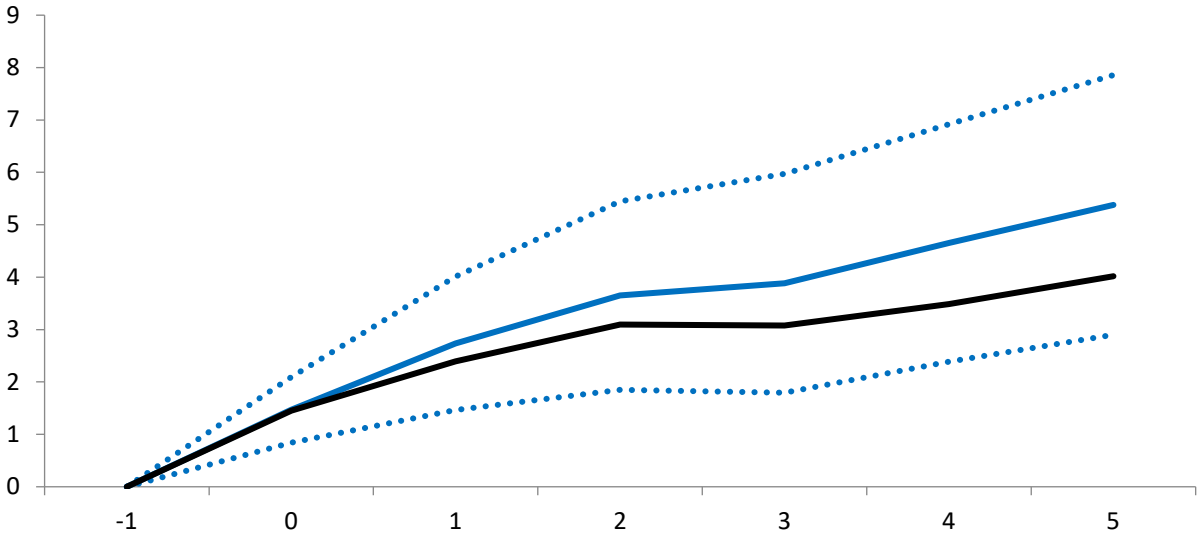
Note: The solid lines indicate the response of output (inequality) to a capital account liberalization episode; the dotted lines correspond to 90% confidence bands. The x-axis denotes time. t=0 is the year of the reform. The estimates are based on equation (7).

Figure 2. The Aggregate and Distributional Effects of Capital Account Liberalization—Additional Controls
(%)

Panel A. Output

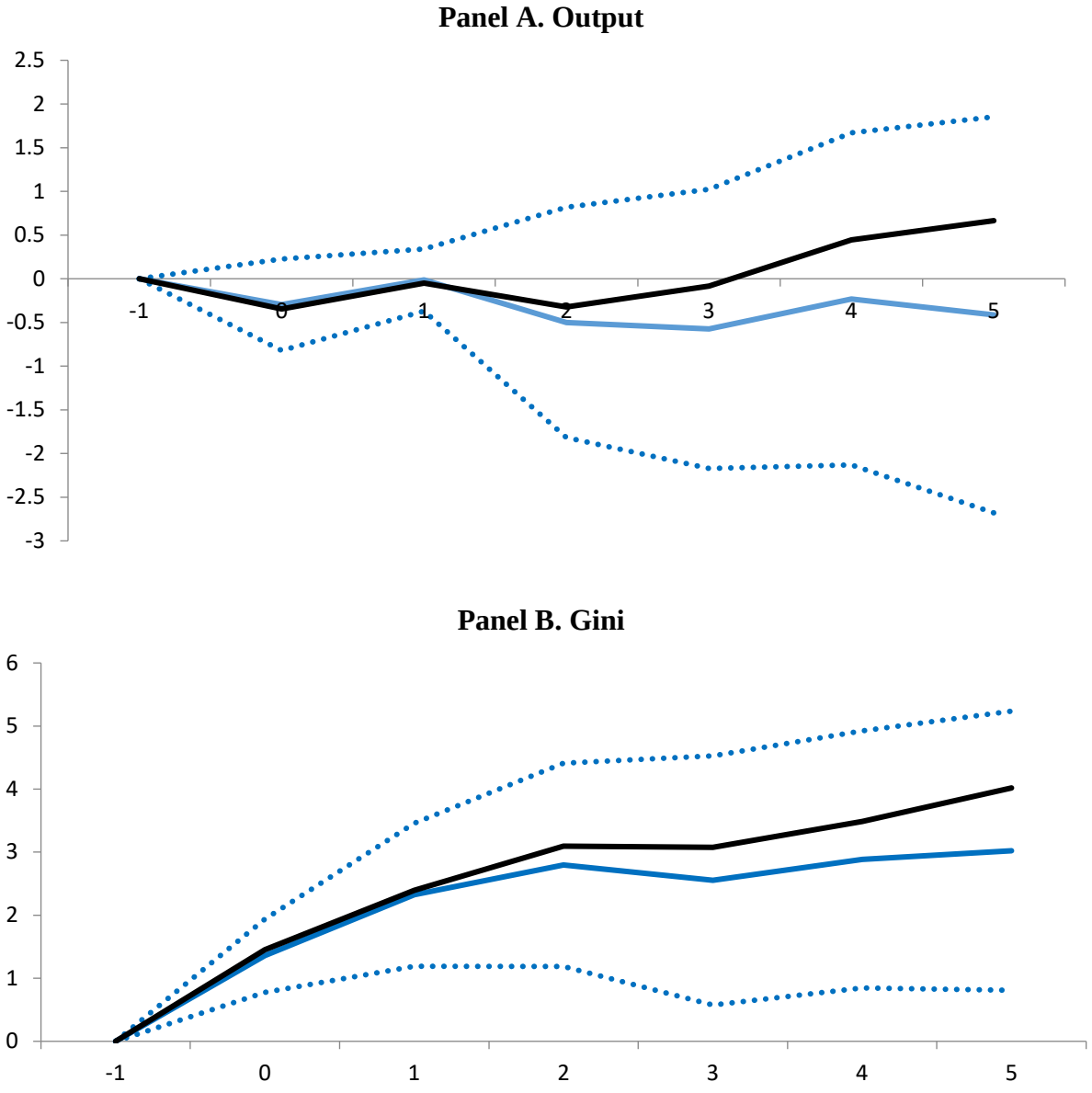


Panel B. Gini



Note: The solid lines indicate the response of output (inequality) to a capital account liberalization episode; the dotted lines correspond to 90% 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. The estimates are based on equation (7).

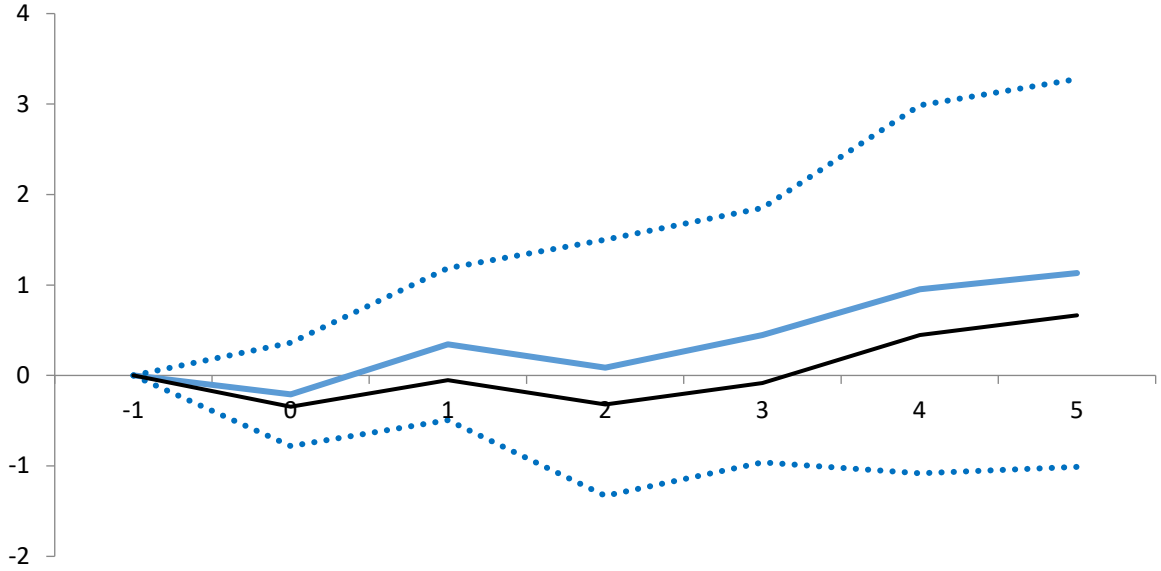
Figure 3. The Aggregate and Distributional Effects of Capital Account Liberalization—Controlling for Expected Future Growth
(%)



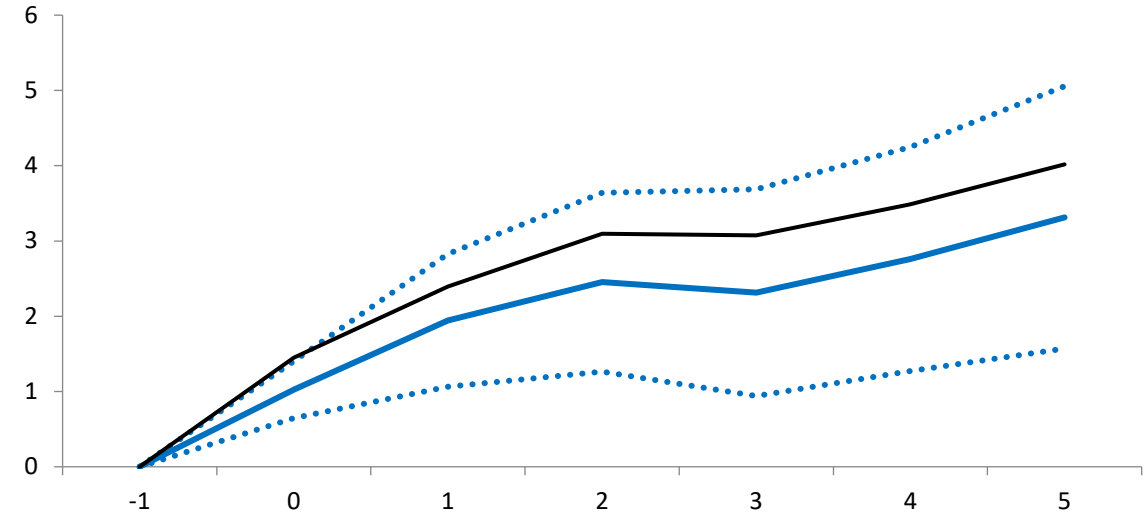
Note: The solid lines indicate the response of output (inequality) to a capital account liberalization episode; the dotted lines correspond to 90% confidence bands. The solid black lines denote the baseline effect reported in Figure 1. The x-axis denotes time. t=0 is the year of the reform. The estimates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

Figure 4. The Aggregate and Distributional Effects of Capital Account Liberalization—Controlling for Two Lags of the Dependent Variables
(%)

Panel A. Output

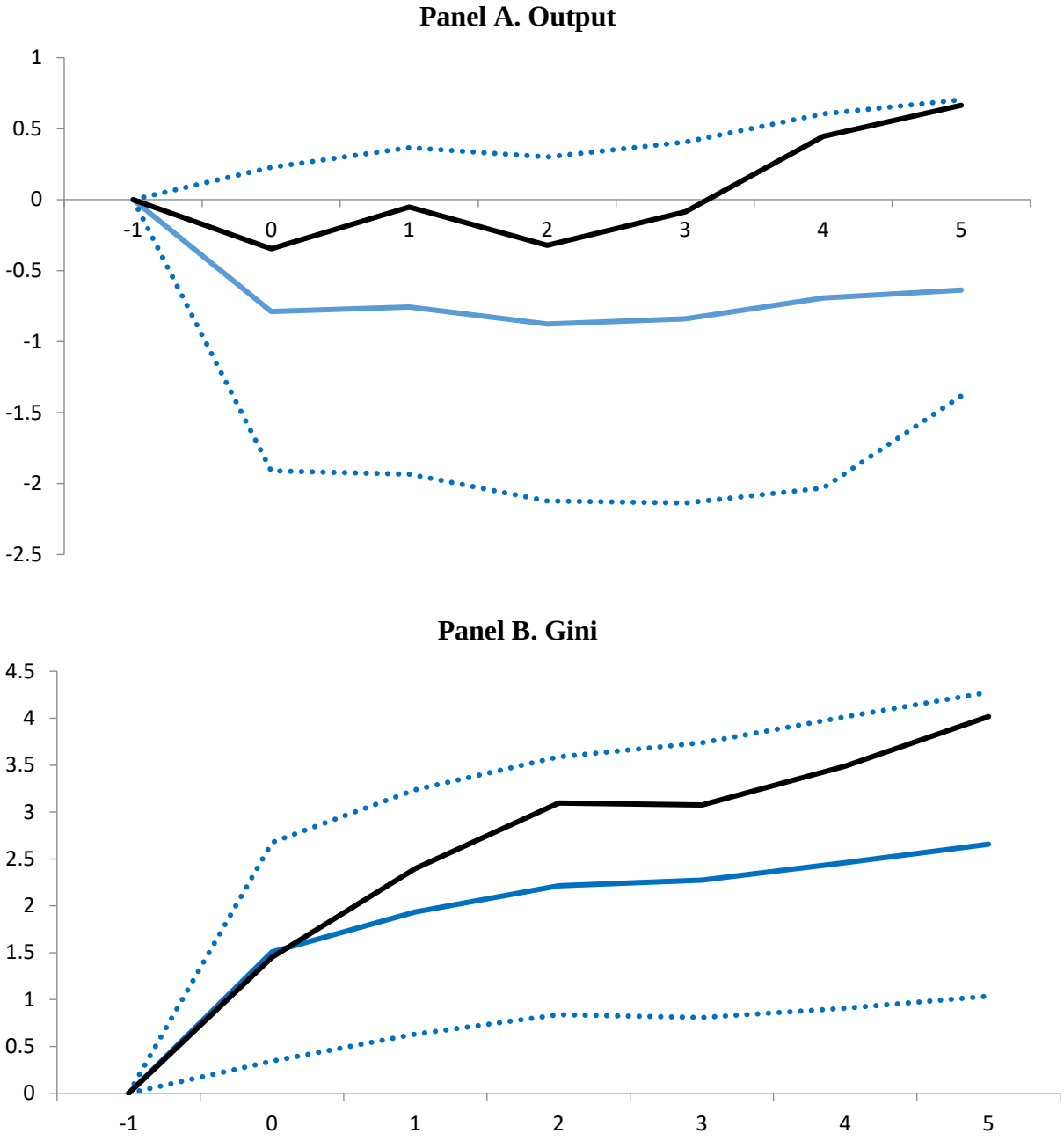


Panel B. Gini



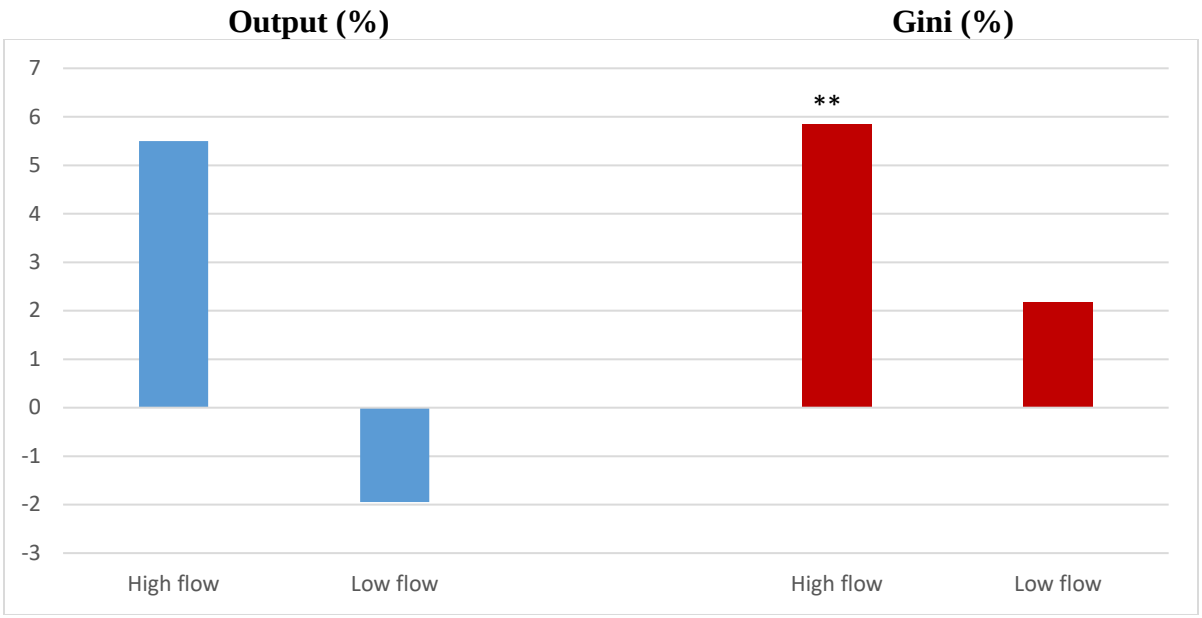
Note: The solid lines indicate the response of output (inequality) to a capital account liberalization episode; the dotted lines correspond to 90% confidence bands. The solid black lines denote the baseline effect reported in Figure 1. The x-axis denotes time. t=0 is the year of the reform. The estimates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

Figure 5. The Aggregate and Distributional Effects of Capital Account Liberalization—IV
(%)



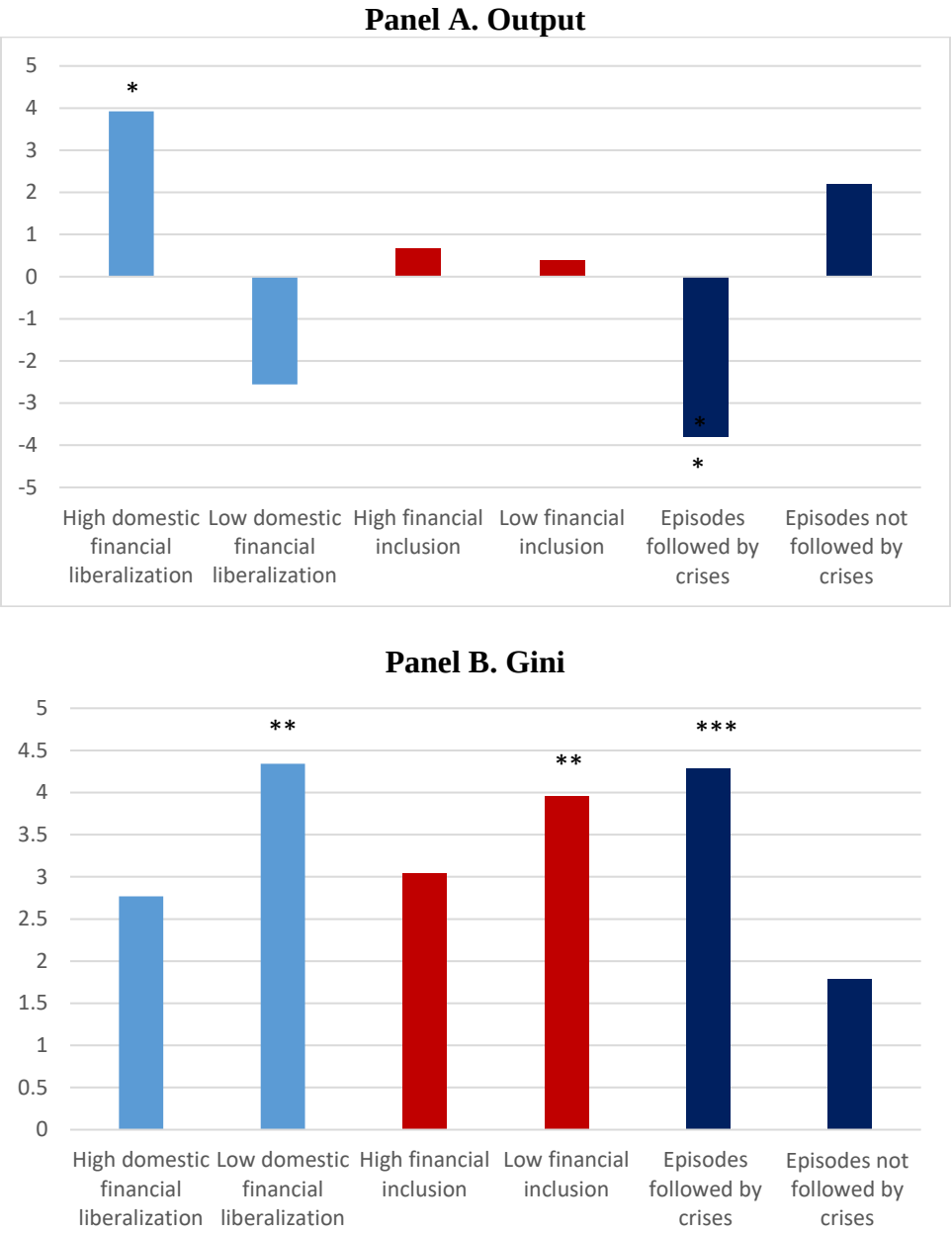
Note: The solid lines indicate the response of output (inequality) to a capital account liberalization episode; the dotted lines correspond to 90% confidence bands. The solid black lines denote the baseline effect reported in Figure 1. The x-axis denotes time. t=0 is the year of the reform. The estimates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

Figure 6. The Medium-Term Aggregate and Distributional Effects of Capital Account Liberalization—High vs Low Flows
(%)



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

Figure 7. The Medium-Term Aggregate and Distributional Effects of Capital Account Liberalization—The Role of Institutions and Crises
(%)

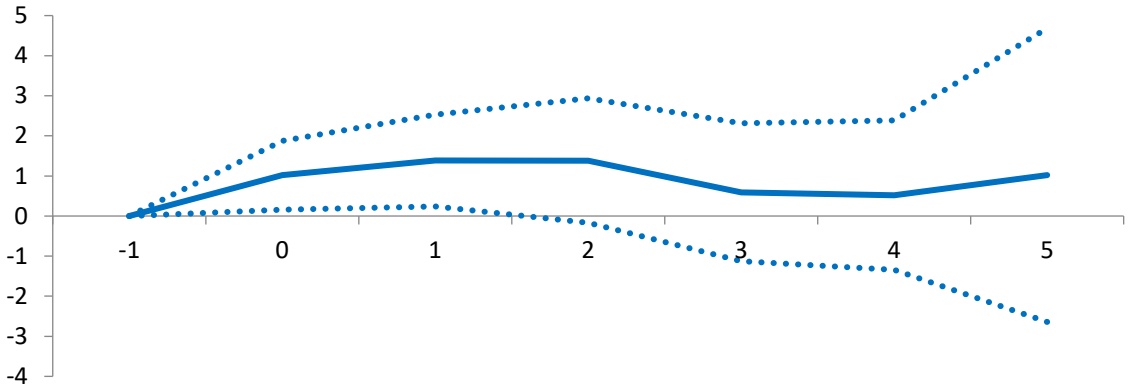


Note: We estimate medium-term effects (that is, five years after the reform) as described in equation (8). ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

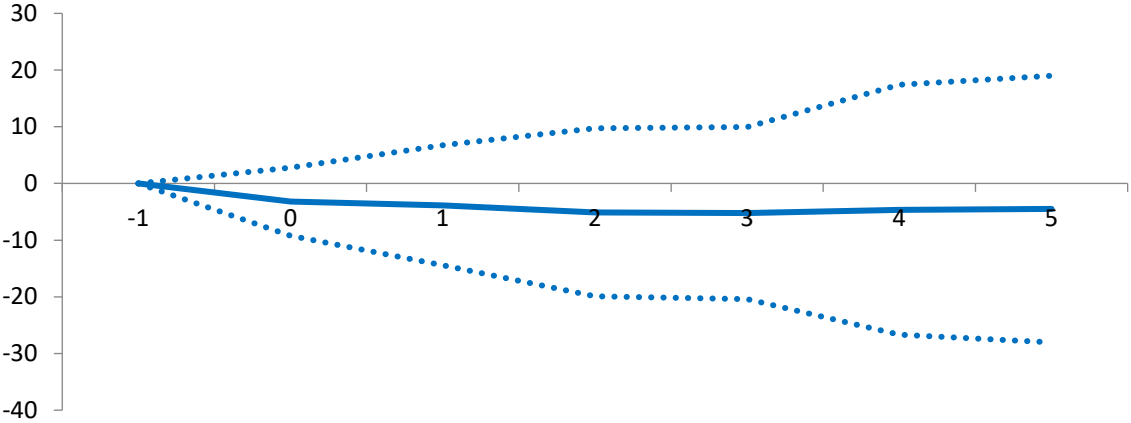
Figure 8. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output and its Components

(%)

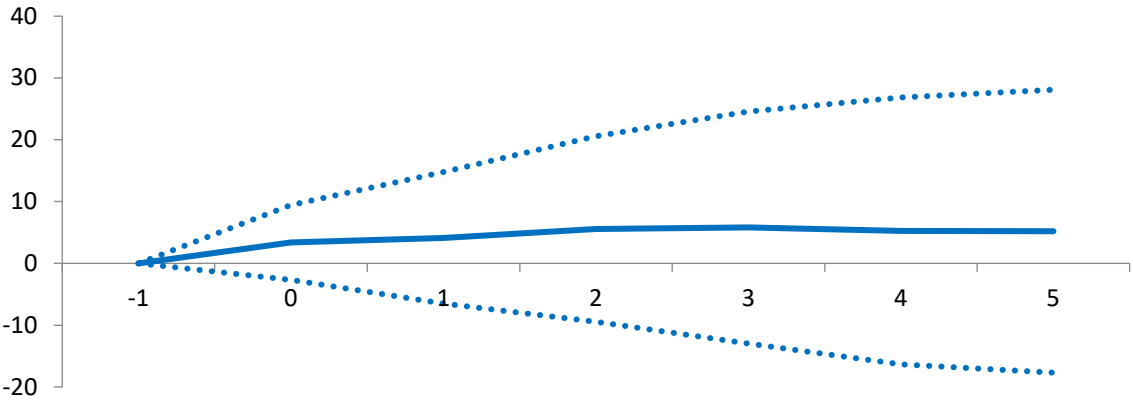
Panel A. Output



Panel B. Employment



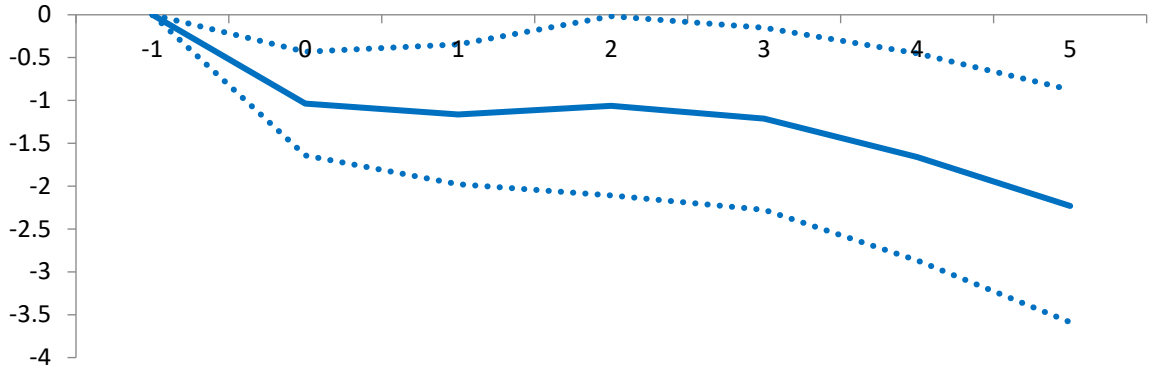
Panel C. Productivity



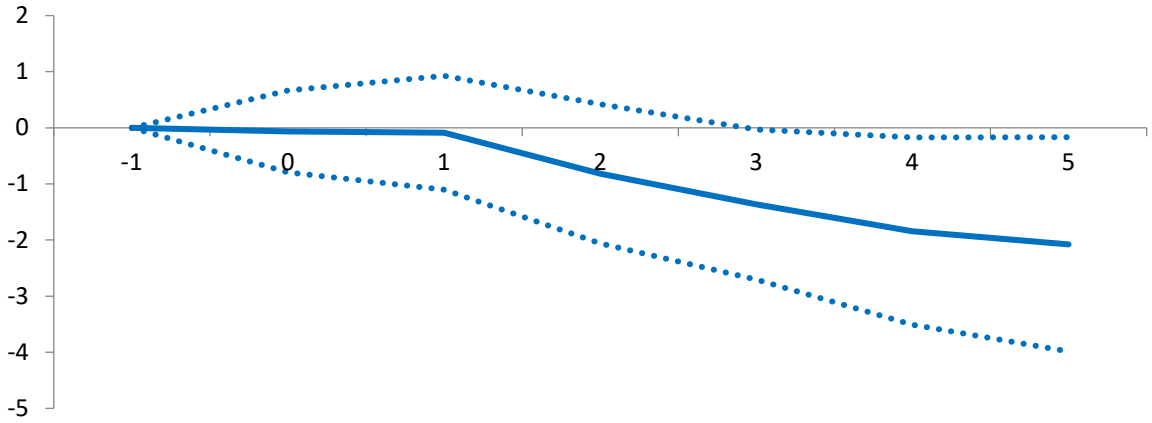
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th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

Figure 9. The Differential Effect of Capital Account Liberalization Episodes on the Labor Share (Percentage Points)

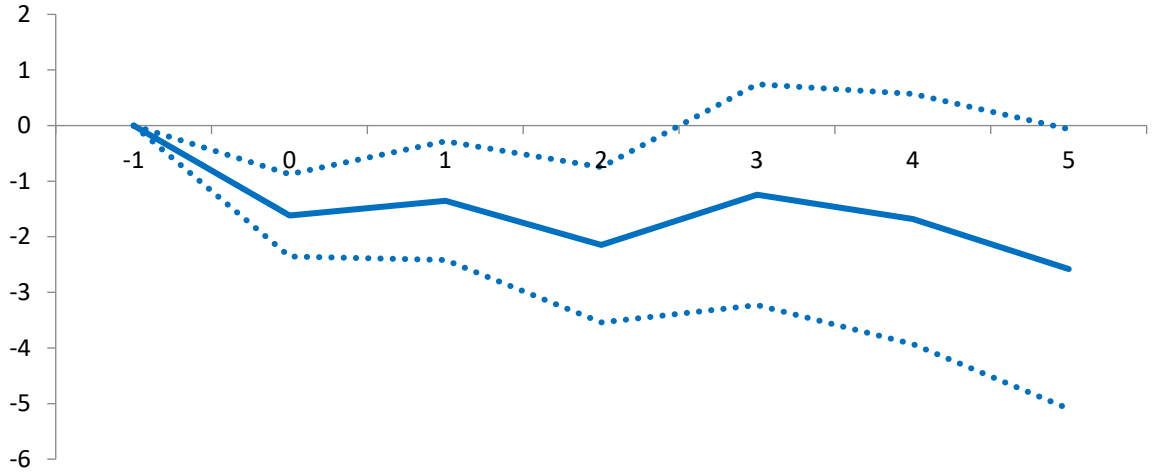
Panel A. Based on External Financial Dependence



Panel B. Based on the Natural Layoff Rate



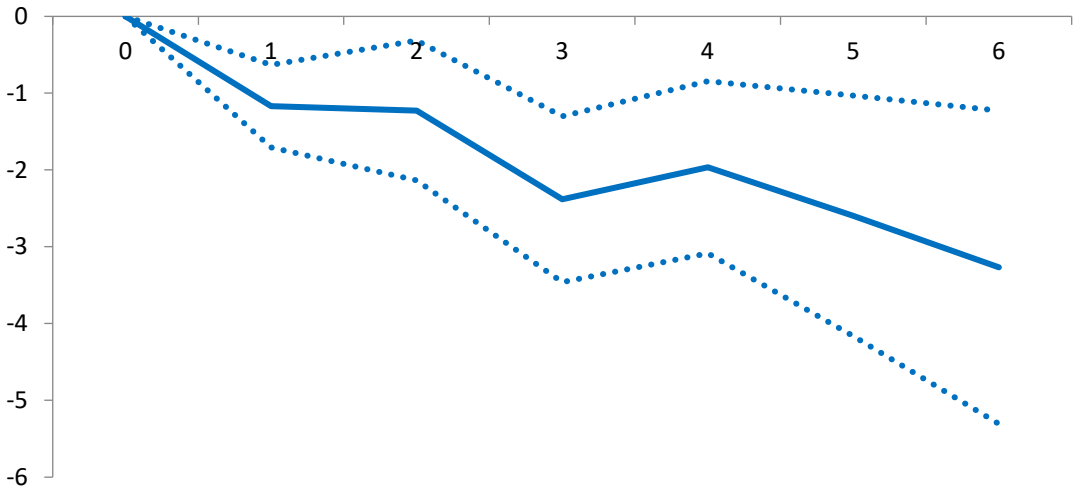
Panel C. Based on the Elasticity of Substitution



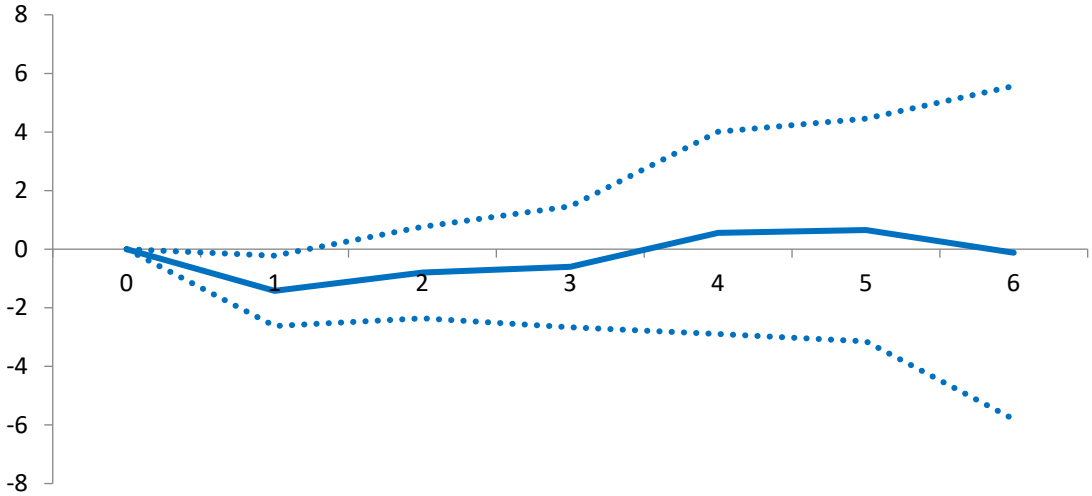
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th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

Figure 9. The Differential Effect of Capital Account Liberalization Episodes on the Labor Share (Percentage Points)—Continued

Panel C1. Based on the Elasticity of Substitution for Sectors with Elasticity Higher than 1



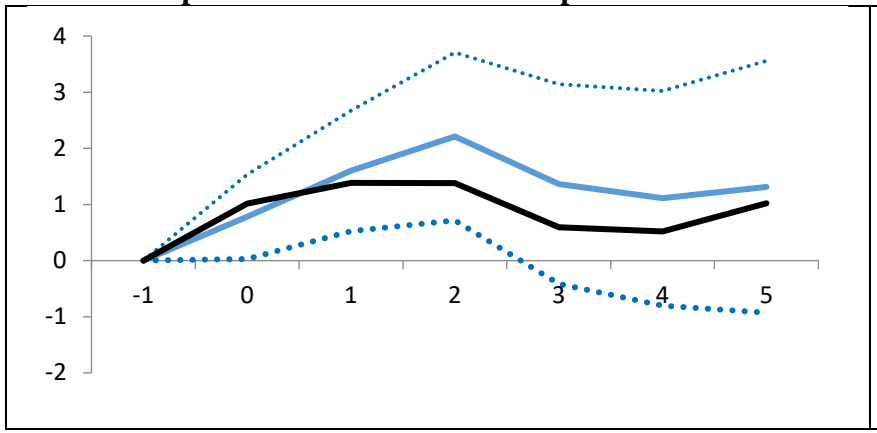
Panel C2. Based on the Elasticity of Substitution for Sectors with Elasticity Lower than 1



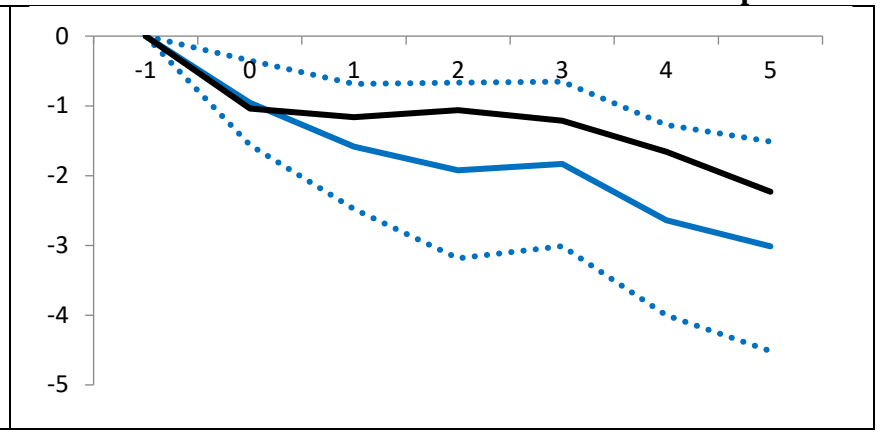
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence/layoff rate/elasticity of substitution (at the 75th percentile of the distribution) and a sector with low external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

Figure 10. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output (%) and Labor Share (Percentage Points)—Controlling for Trade Reforms

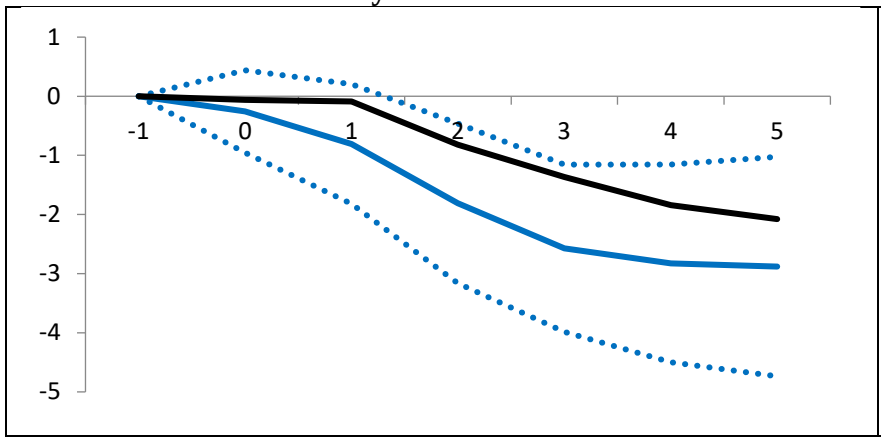
Panel A. Output—External Financial Dependence



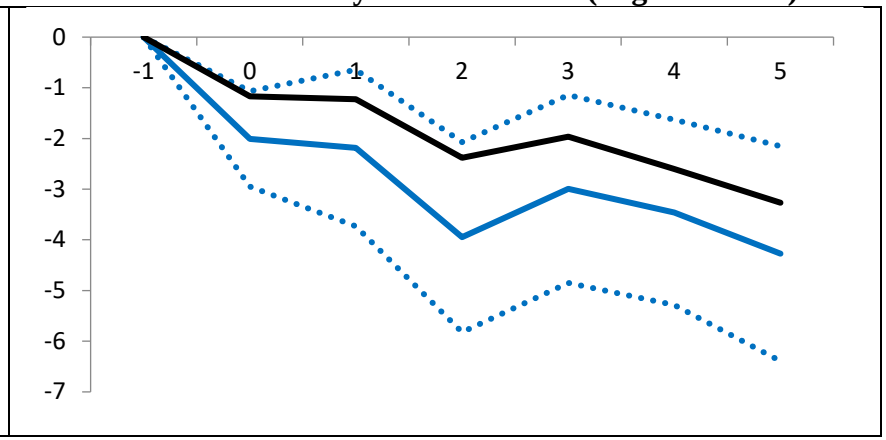
Panel B. Labor Share—External Financial Dependence



Panel C. Labor Share—Layoff Rate



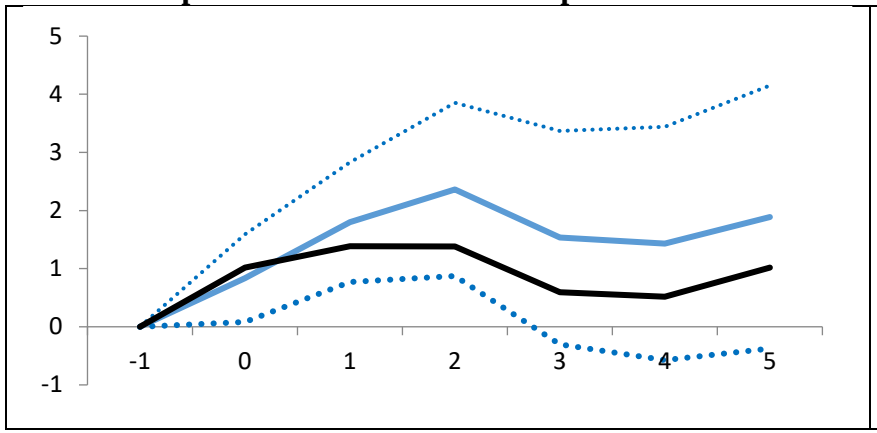
Panel D. Labor Share—Elasticity of Substitution (Higher than 1)



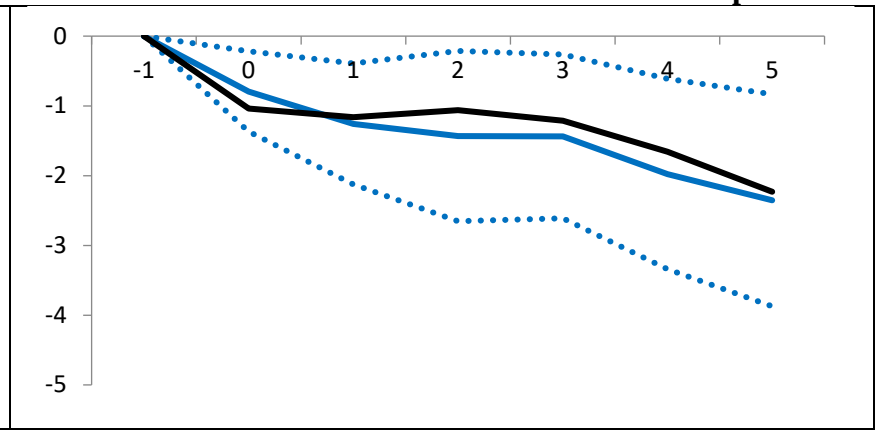
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th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

Figure 11. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output (%) and Labor Share (Percentage Points)—Controlling for Current Account Reforms

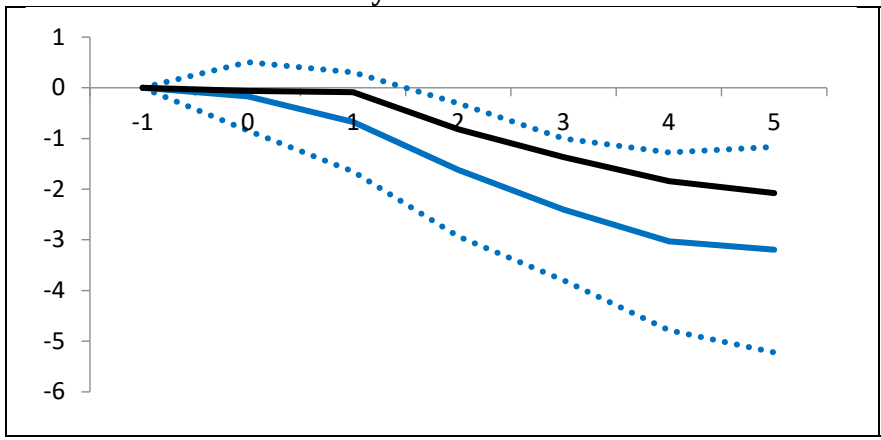
Panel A. Output—External Financial Dependence



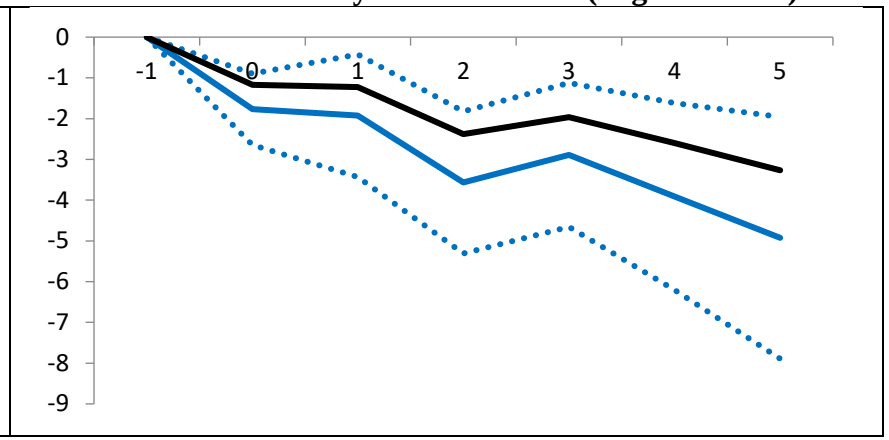
Panel B. Labor Share—External Financial Dependence



Panel C. Labor Share—Layoff Rate



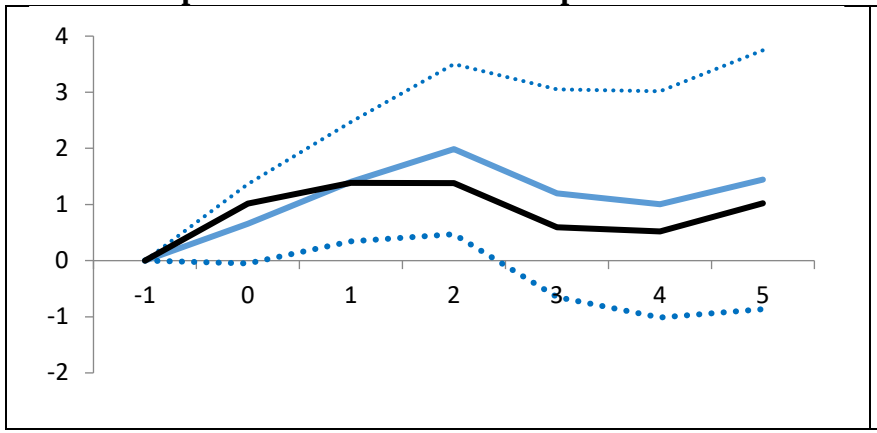
Panel D. Labor Share—Elasticity of Substitution (Higher than 1)



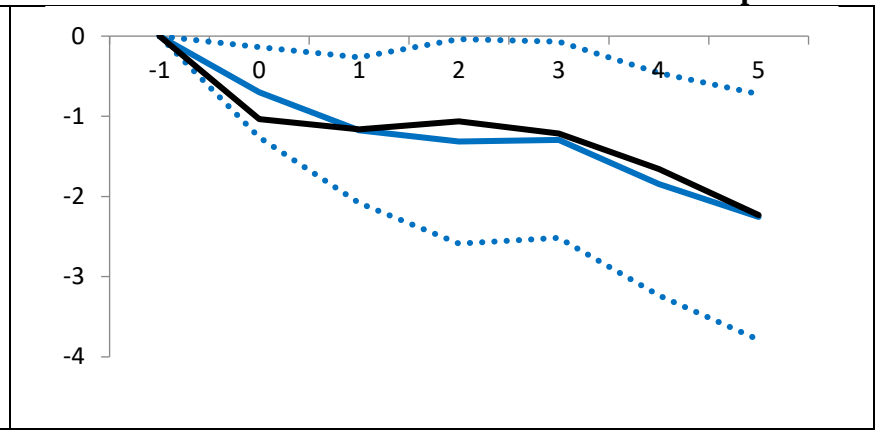
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). The dotted lines indicate the 90% confidence interval based on standard errors clustered at the country–sector level. The black lines denote the baseline effects reported in Figures 7 and 8.

Figure 12. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output (%) and Labor Share (Percentage Points)—Controlling for Domestic Financial Liberalization Reforms

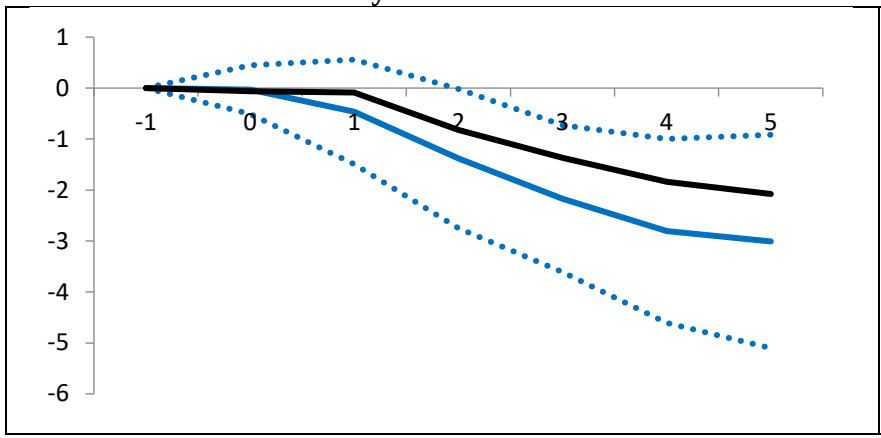
Panel A. Output—External Financial Dependence



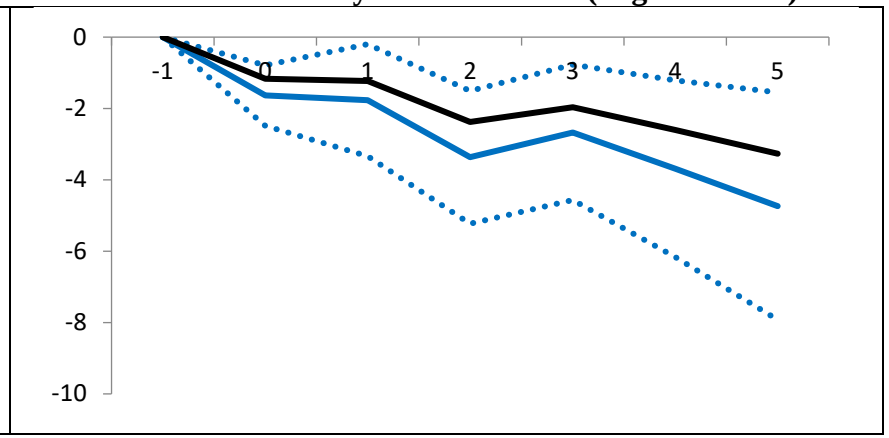
Panel B. Labor Share—External Financial Dependence



Panel C. Labor Share—Layoff Rate



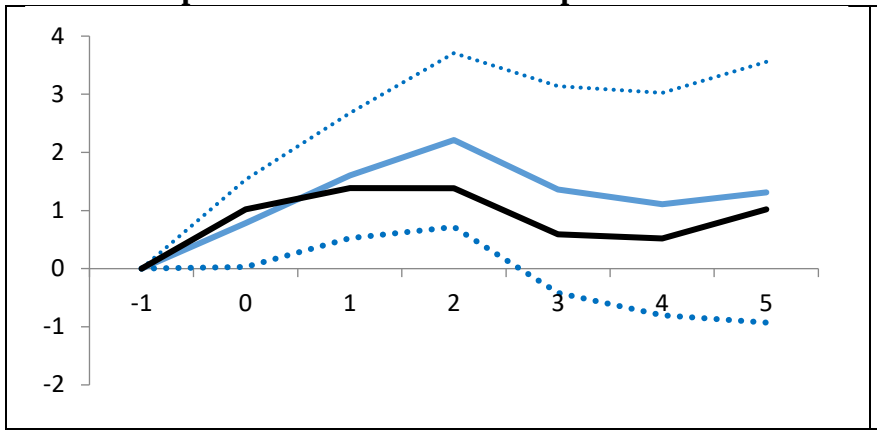
Panel D. Labor Share—Elasticity of Substitution (Higher than 1)



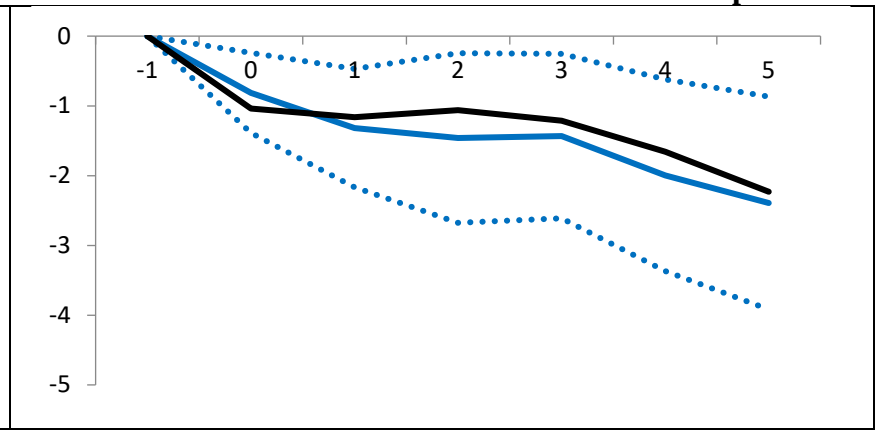
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). The dotted lines indicate the 90% confidence interval based on standard errors clustered at the country–sector level. The black lines denote the baseline effects reported in Figures 7 and 8.

Figure 13. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output (%) and Labor Share (Percentage Points)—Controlling for Product Market Reforms

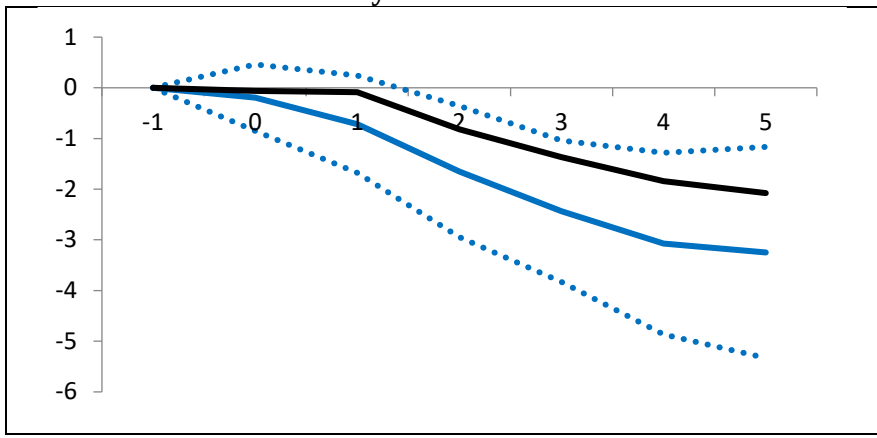
Panel A. Output—External Financial Dependence



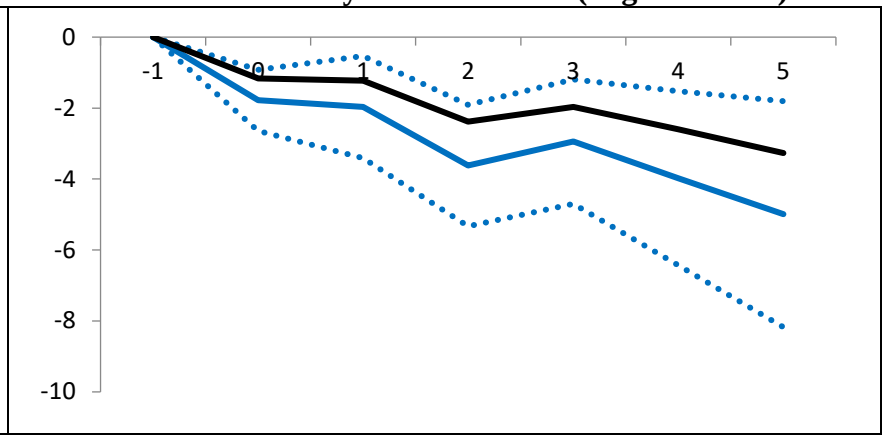
Panel B. Labor Share—External Financial Dependence



Panel C. Labor Share—Layoff Rate



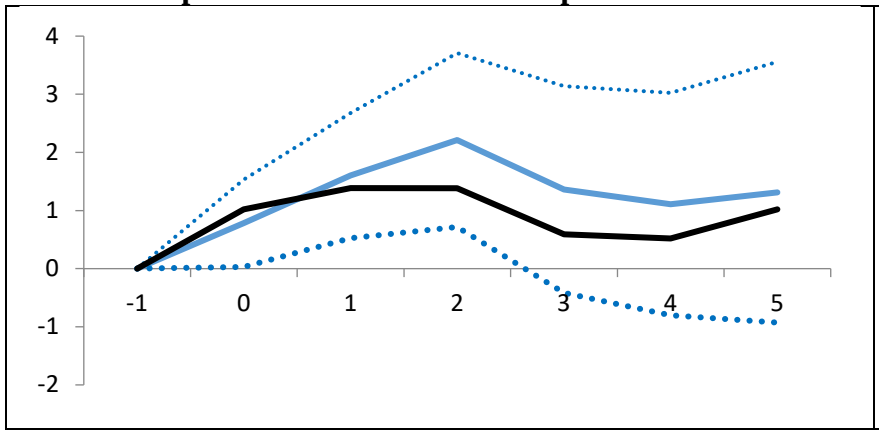
Panel D. Labor Share—Elasticity of Substitution (Higher than 1)



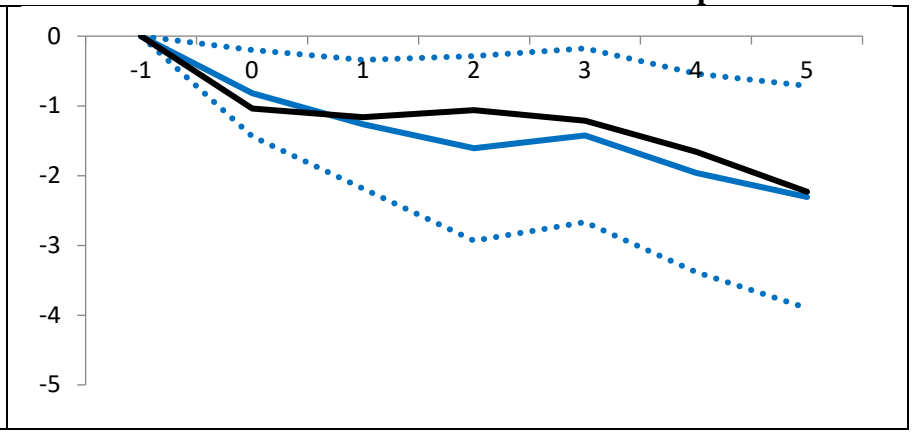
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). The dotted lines indicate the 90% confidence interval based on standard errors clustered at the country–sector level. The black lines denote the baseline effects reported in Figures 7 and 8.

Figure 14. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output (%) and Labor Share (Percentage Points)—Controlling for Labor Market (EPL) Reforms

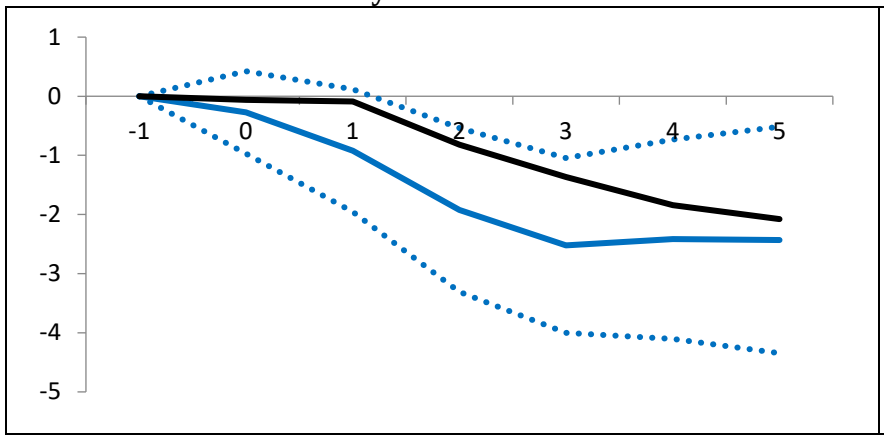
Panel A. Output—External Financial Dependence



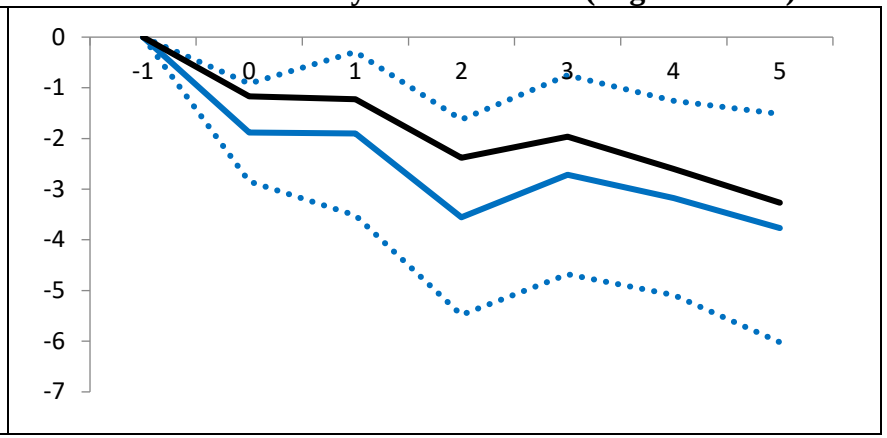
Panel B. Labor Share—External Financial Dependence



Panel C. Labor Share—Layoff Rate



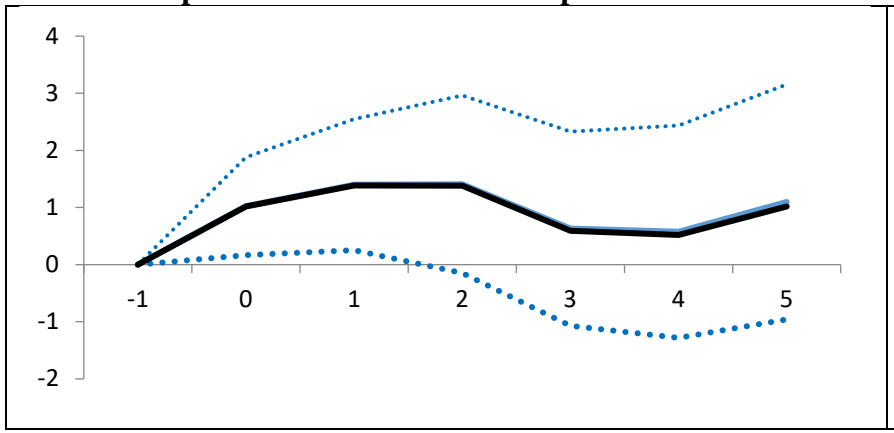
Panel D. Labor Share—Elasticity of Substitution (Higher than 1)



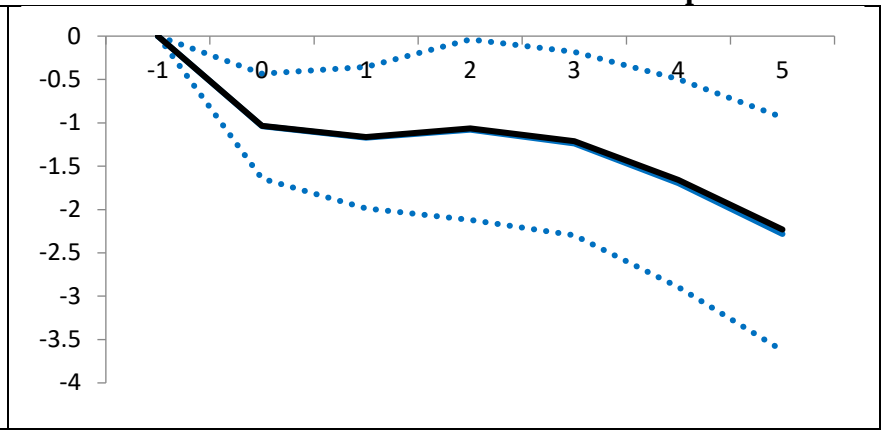
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). The dotted lines indicate the 90% confidence interval based on standard errors clustered at the country–sector level. The black lines denote the baseline effects reported in Figures 7 and 8.

Figure 15. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output (%) and Labor Share (Percentage Points)—Controlling for Union Density

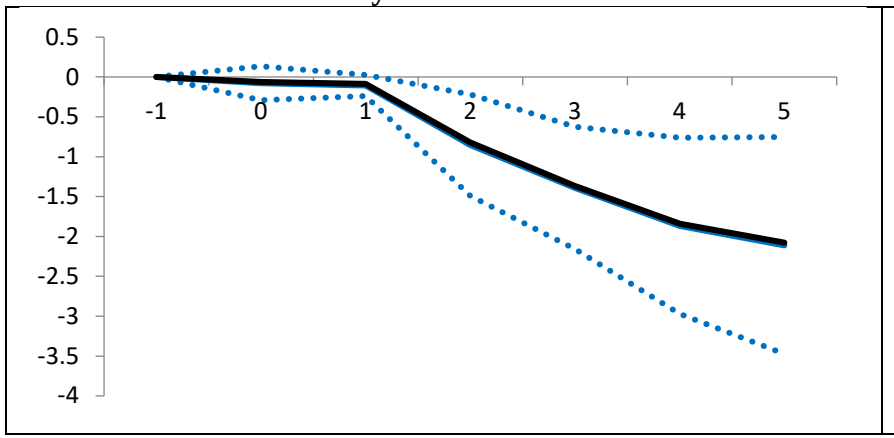
Panel A. Output—External Financial Dependence



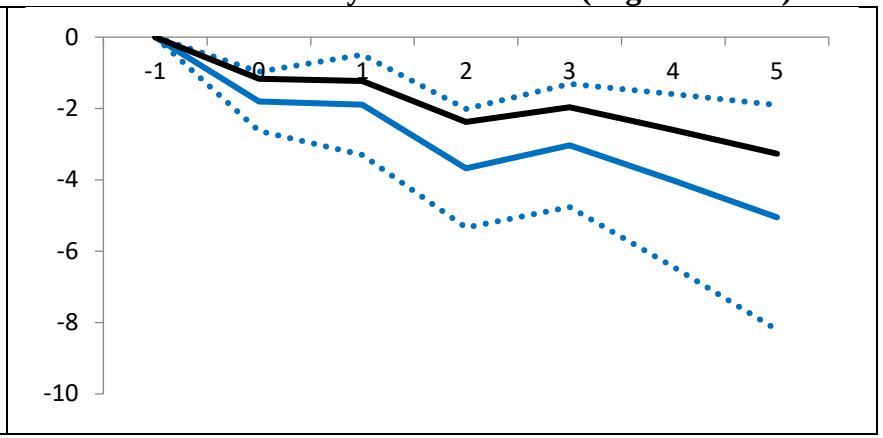
Panel B. Labor Share—External Financial Dependence



Panel C. Labor Share—Layoff Rate



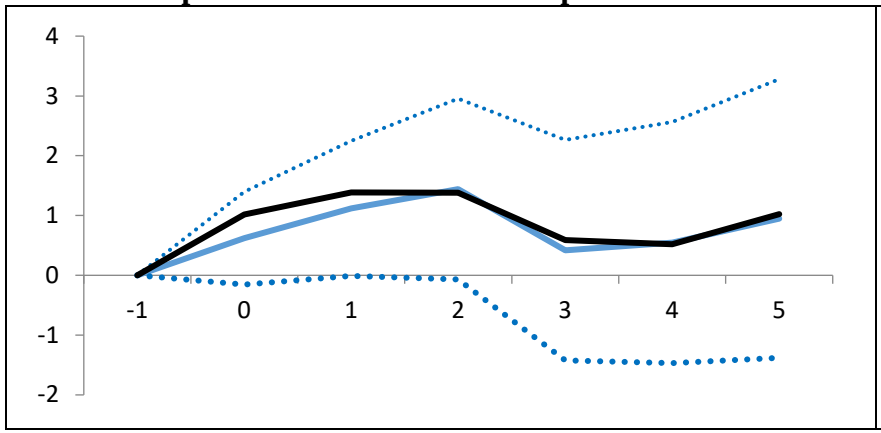
Panel D. Labor Share—Elasticity of Substitution (Higher than 1)



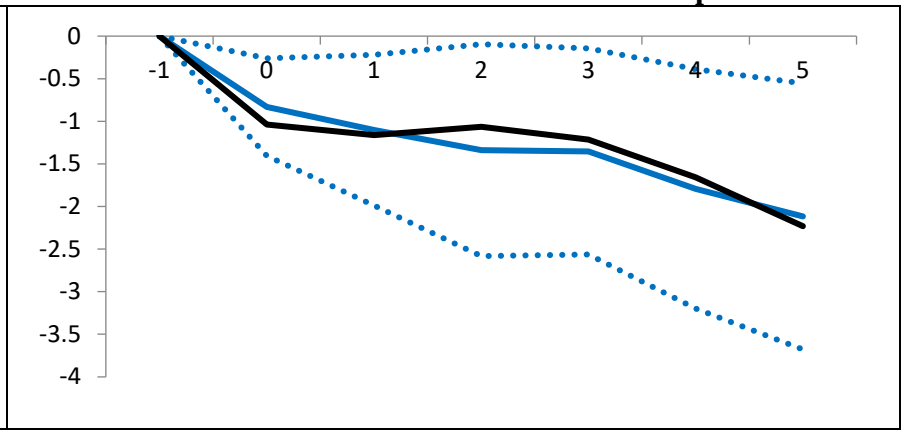
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). The dotted lines indicate the 90% confidence interval based on standard errors clustered at the country–sector level. The black lines denote the baseline effects reported in Figures 7 and 8.

Figure 16. The Differential Effect of Capital Account Liberalization Episodes on Sectoral Output (%) and Labor Share (Percentage Points)—Controlling for Technology (Relative Price of Investment)

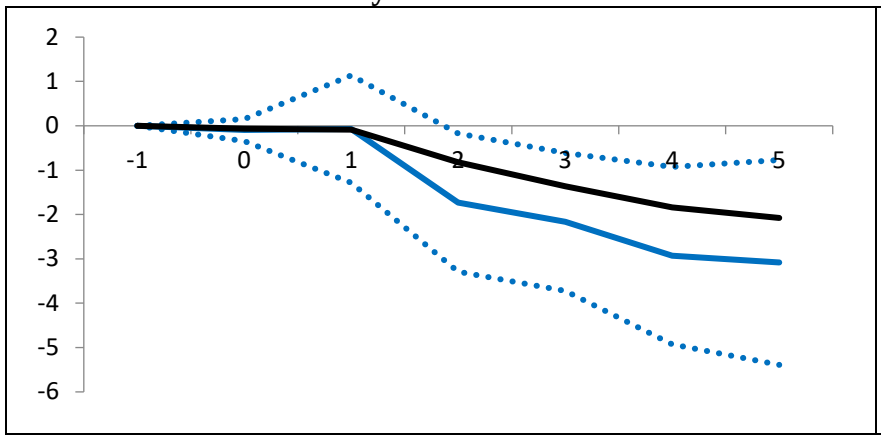
Panel A. Output—External Financial Dependence



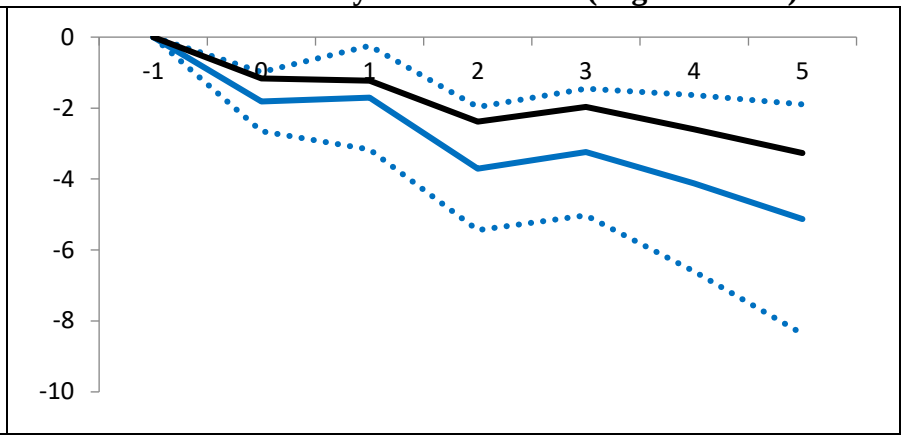
Panel B. Labor Share—External Financial Dependence



Panel C. Labor Share—Layoff Rate



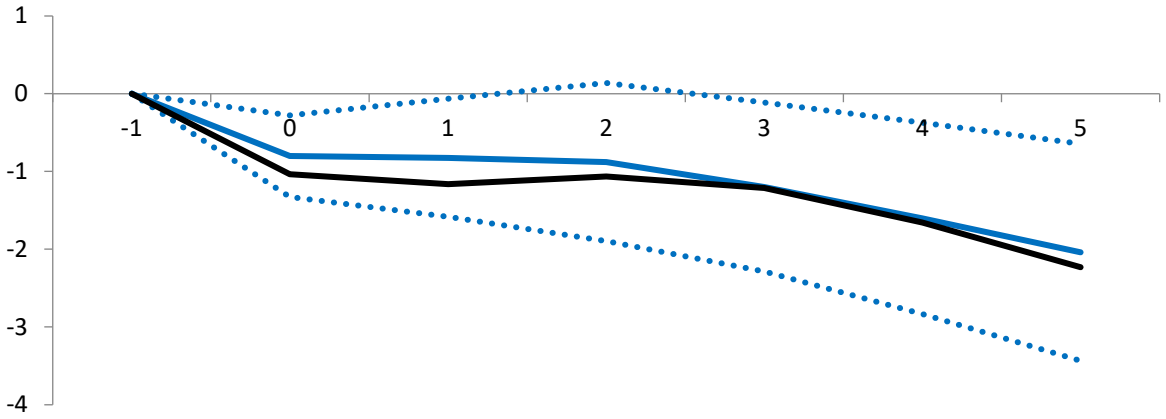
Panel D. Labor Share—Elasticity of Substitution (Higher than 1)



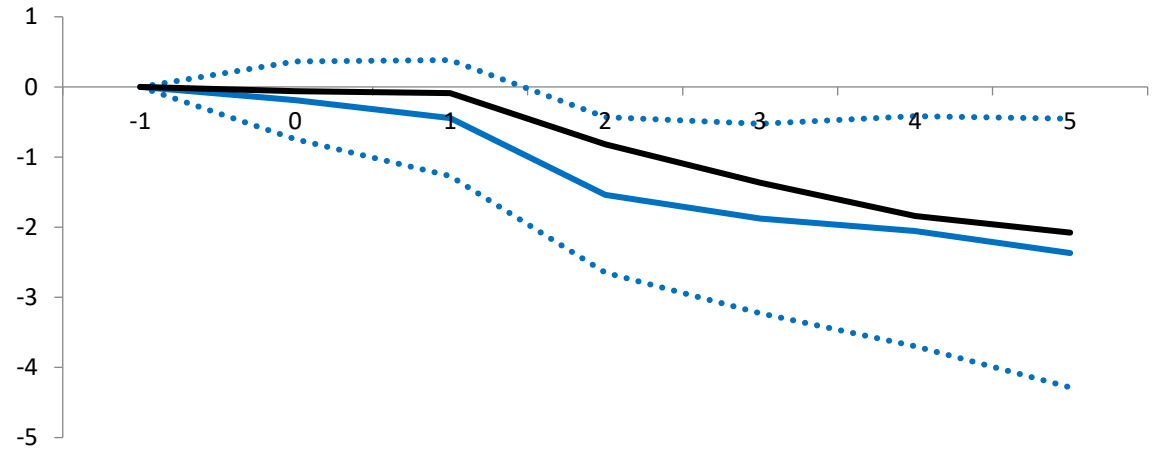
Note: The estimates are based on equation (9). The solid line denotes the differential effect of capital account liberalization episodes between a sector with high external financial dependence (at the 75th percentile of the distribution) and a sector with low external financial dependence (at the 25th percentile of the distribution). The dotted lines indicate the 90% confidence interval based on standard errors clustered at the country–sector level. The black lines denote the baseline effects reported in Figures 7 and 8.

Figure 17. The Differential Effect of Capital Account Liberalization Episodes on the Labor Share—Controlling for Sectoral Growth (Percentage Points)

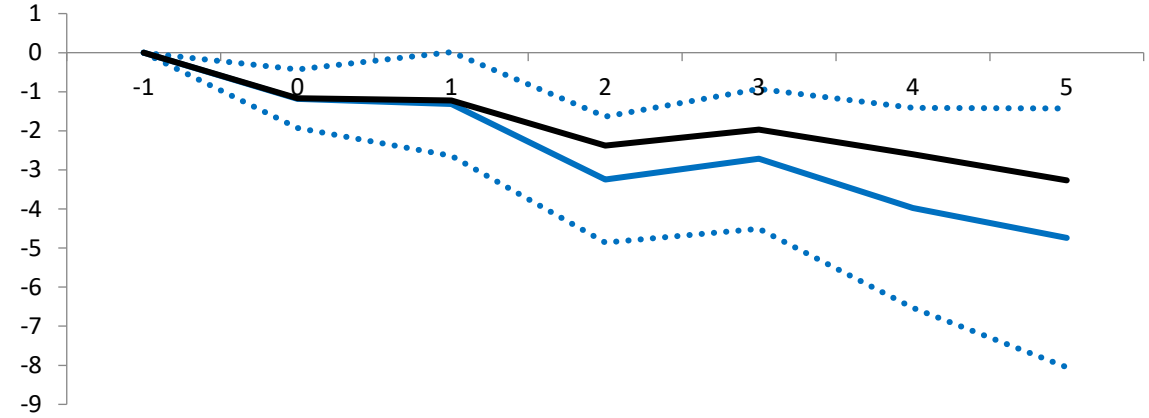
Panel A. Based on External Financial Dependence



Panel B. Based on the Natural Layoff Rate



Panel C. Based on the Elasticity of Substitution



Note: The estimates are based on equation (9). The solid line denotes the differential 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). The dotted lines indicate the 90% confidence interval based on standard errors clustered at the country–sector level.

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: The income groups are based on the World Bank classification.

Table A2. Number of Capital Account Liberalization Reforms

	1970s	1980s	1990s	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: The income groups are based on the 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
People’s Republic of 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
	Viet Nam	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

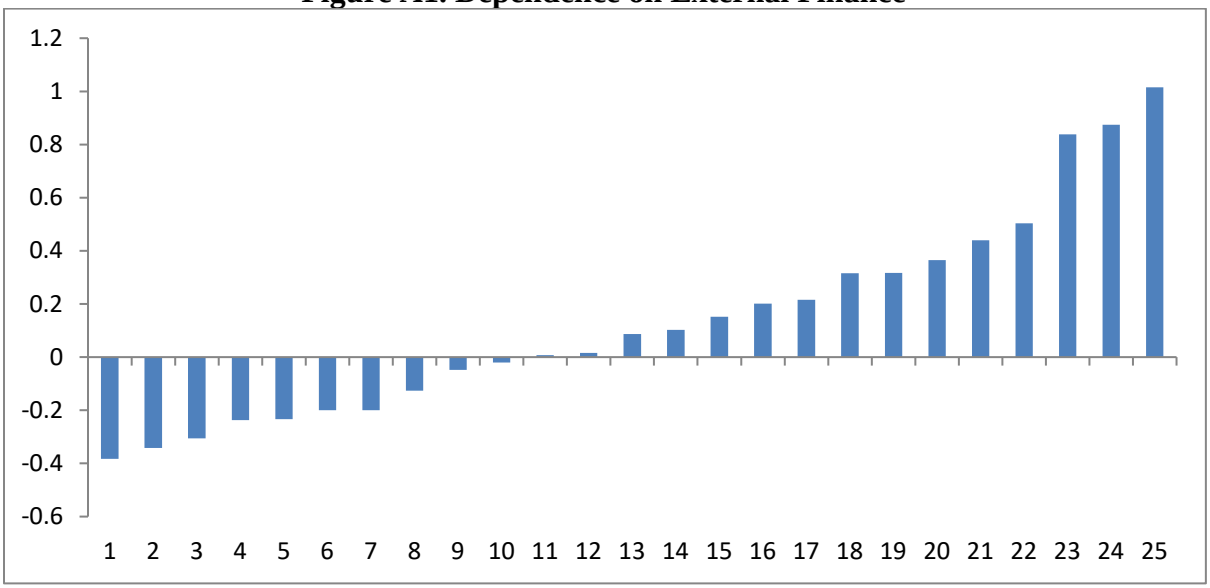
Chad	1970–2010
Comoros	1981–2010
Congo, Dem. Rep.	1970–2000
Ethiopia	1970–2010
Gambia, The	1971–2010
Guinea	1970–2010
Guinea-Bissau	1981–2010
Haiti	1984–2010
Kenya	1970–2010
Kyrgyz Republic	1997–2010
Liberia	1970–2010
Madagascar	1970–2010
Malawi	1970–2010
Mali	1970–2010
Mauritania	1970–2010
Mozambique	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: The income groups are based on the World Bank classification.

Table A4. Correlation Between the Industry-Specific Factors

	External Financial Dependence	**Layoff Rate**	**Elasticity of Substitution**
External Financial Dependence	1		
Layoff Rate	0.08	1	
Elasticity of Substitution	0.00	-0.36	1

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 Plastic 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; and 25 = Postal and Courier Activities.

Figure A2. Dependence on Layoff Rates

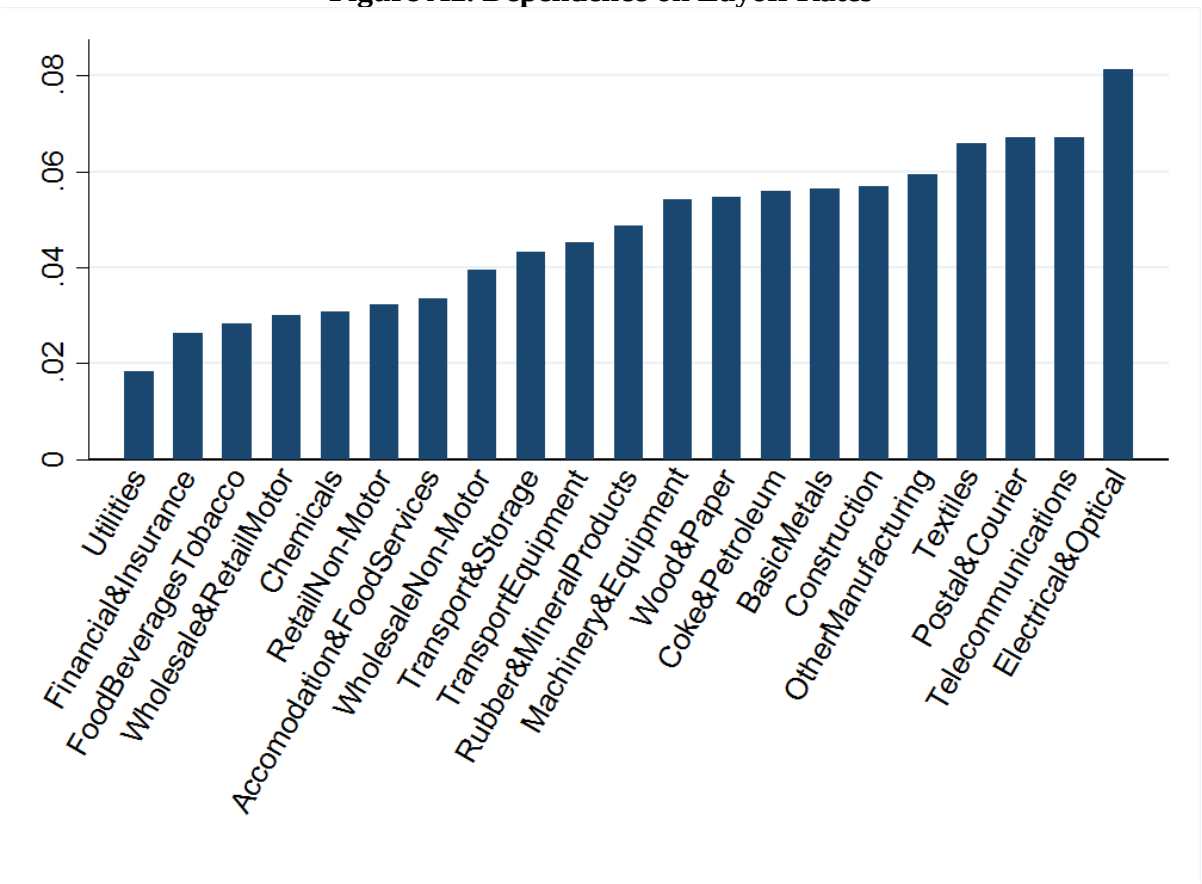


Figure A3. Dependence on the Elasticity of Substitution

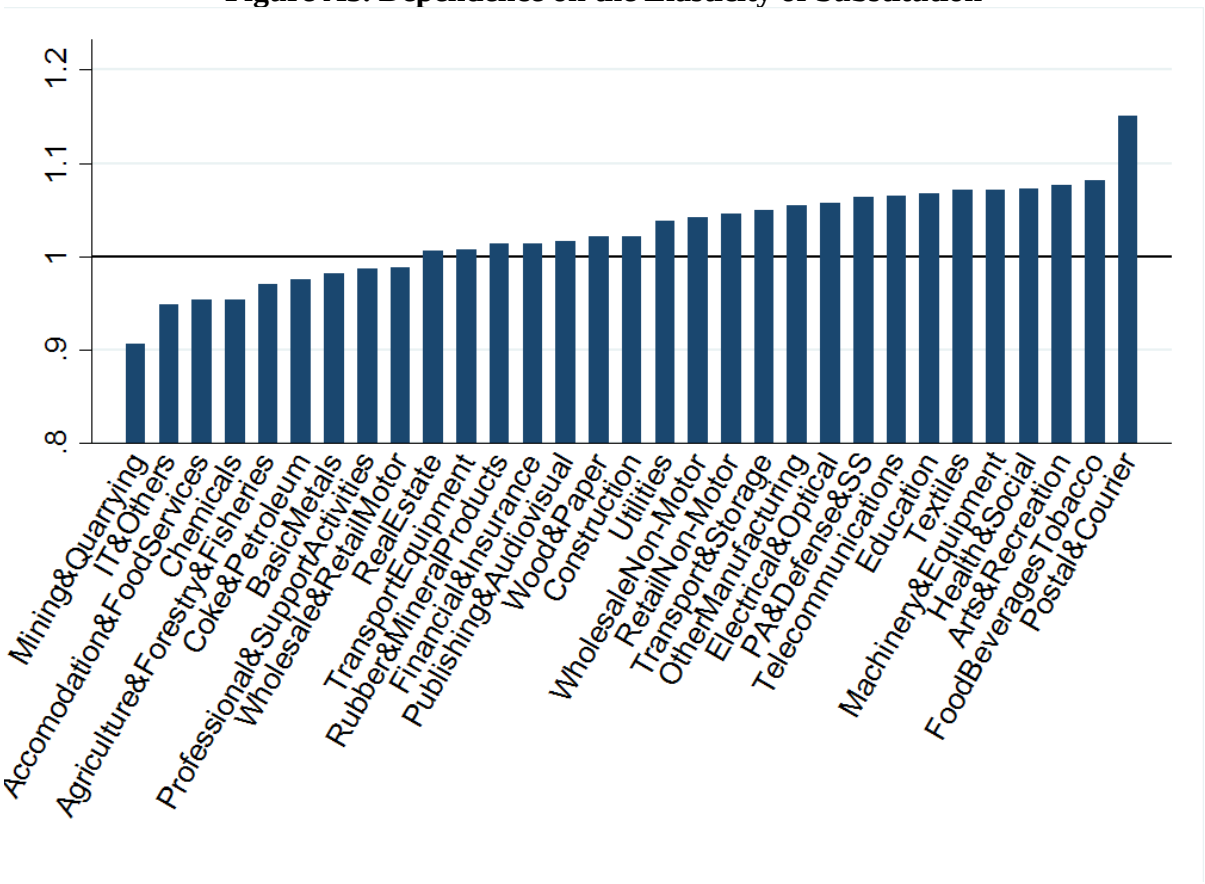
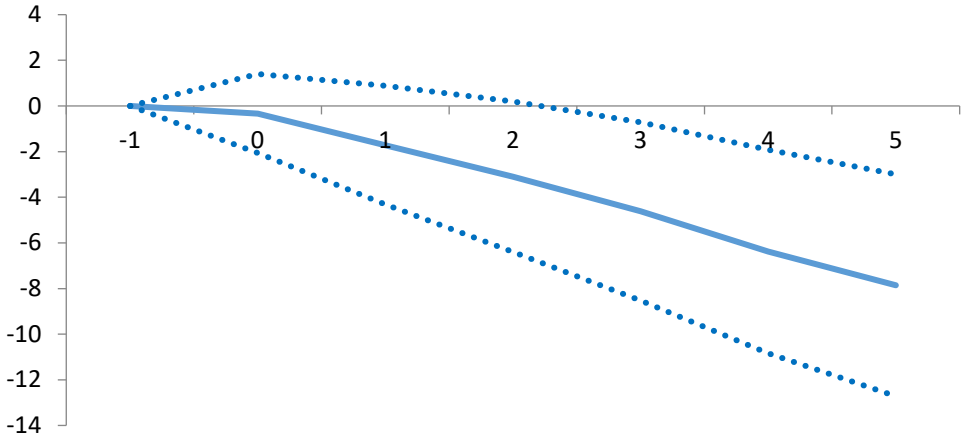


Figure B. The Evolution of Union Density following Major Capital Account Liberalization Episodes (%)



Note: The solid lines indicate the response of output (inequality) to a capital account liberalization episode; the dotted lines correspond to 90% confidence bands. The x-axis denotes time. t=0 is the year of the reform. The estimates are based on equation (7), using as dependent variable union density—taken from the OECD labor market database.

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