

# Capital Openness and Income Inequality: Smooth Sailing or Troubled Waters?

Kevin Gallagher, Guillermo Lagarda, and Jennifer Linares

## 1 Introduction

Capital openness has long been associated with financial and banking crises. Most recently, the financial crisis raised concerns among policymakers about the effects of capital openness and the growing income inequality within countries. This reaction is not baseless: over the past three decades, increases in financial liberalization and economic downturns have coincided with income inequality aggravation. In response, there has been an increase in capital controls and the re-regulation of the financial account.<sup>1</sup> This return to *orthodoxy* could be a setback for supporters of global coordination.

The troubling decision of choosing sides between closing rather than opening has not been exclusive of policymakers. Capital controls are making an intellectual comeback, too: “The general presumption was that capital account liberalization was always good, and capital controls were nearly always bad. I’ve seen the thinking change, partly because it was already wrong then, and because it was particularly wrong in the crisis,” said Olivier Blanchard, former professor of the Massachusetts Institute of Technology (MIT) and former Chief Economist of the International Monetary Fund (IMF). As Blanchard said, openness has traditionally been seen as Pareto improving since it expands possibility frontiers. In contrast, closing or restricting the capital account is considered by many to be detrimental to countries’ economies. It can, for instance, discourage inward investment, as investors may fear they will not be able to easily withdraw their money during an economic downturn.

But is capital account liberalization the way to go? Claimants of openness have long argued that it increases risk-sharing and domestic consumption smoothing. However, when financial institutions are weak and access to credit is not inclusive, liberalization may bias financial access in favor of those better off and therefore increase income inequality. It could go the other way as well: on the likelihood of financial crises, income inequality could fall as bankruptcies and falling asset prices may have a greater impact on those with access to financial markets. On the other hand, long-lasting recessions may disproportionately hurt the poor as they have limited access to banking services to hedge against risks. Finally, capital account openness may affect the distribution of income through its effect on the labor share of income. The best way to think of this is in the context of a bargaining game between labor and capital. If capital account liberalization represents a credible threat to reallocate production abroad, it may lead to an increase in the profit-wage ratio and to a decrease in the labor share of income (Harrison 2002).

Should we shift gears and revert capital openness? A surge of discussions addressing this question suggests that this issue is far from being a closed, or even a cold, case. Most of the available

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<sup>1</sup> The concept of capital flow liberalization is used in this paper interchangeably with capital account liberalization and financial account liberalization.

literature focuses on within-country experience (Larrain 2014, 88) or on a limited set of countries (Das and Mohapatra 2003, 217-48), thus leaving key issues unaddressed. Important questions remain, including: under what circumstances is capital openness negatively related to income inequality, and if there is evidence that capital account openness only exacerbates income inequality during downturns and improves it during economic expansion? Ultimately, we would like to answer if there is a right moment to restrict the capital account during contractions, and if these measures should be coordinated worldwide.

This paper contributes to the empirical literature on the effects of capital openness on income inequality by examining the distributional consequences of capital account liberalization for a large (unbalanced) panel of 141 countries from 1990 to 2013. We specifically focus on answering three questions: i) Is there (on average) a positive or negative relation between income inequality and capital account openness? ii) Are the negative effects of income distribution larger during booms, busts and/or regular periods? iii) Have ex-ante and ex-post capital openness policies contributed to reduce income inequality? To the best of our knowledge, there is still no research document covering these issues. Therefore, our research contributes to existing literature and brings in to consideration if capital account liberalization occurred too rapidly relative to the implementation of other policies.

We find that the level of financial development and the occurrence of crises play a key role in shaping the incidence that financial globalization reforms have on income inequality. In particular, we present evidence that capital account liberalization reforms are associated with a statistically significant and persistent increase in income inequality ex post a crisis. However, results also suggest that restrictive measures aimed at limiting distributional negative effects during economic downturns have ambiguous outcomes and are conditional on the duration of the bust. Closing the accounts *ex post*, for instance, reduces the Gini by 0.02 but only when the downturn lasts more than a year. Otherwise, when the bust is gone after a year, the policy changes are ineffective as the pace at which they actually impact the economy is slower. The increase of income inequality is, however, conditional on the structural policies that accompanied liberalization reforms.

The rest of the paper is organized as follows. Section 2 presents a summary of the related literature. Section 3 focuses on describing data and showing some descriptive statistics regarding the evolution of inequality and capital account openness. Section 4 specifies the methodology and is followed by a discussion of results in Section 5. Finally, in Section 6 we present our conclusions.

## **2 Related Literature**

In the last 25 years, over a dozen countries in the developing world have eased restrictions on cross-border capital flows, resulting in a more financially-integrated world. Theory suggests that these policies are Pareto-optimal, as they allow for resources to flow from capital-abundant countries in the developed world, where return to capital is low, to capital-scarce nations in the developing world, where return to capital is higher (Henry 2006). This influx of capital to the developing world reduces the countries' cost of capital and consequently encourages investment, *ceteris paribus*. Investment triggers economic growth and therefore raises the standard of living of these countries. However, as explained in the theoretical report elaborated by Hellmann et al. (2000), financial market liberalization could increase the moral hazard problem: liberalization is associated with an increase in bank competition, which in turn erodes profits. A decrease in

profits is associated with lower franchise values, which lower the incentive of making good loans, thus increasing moral hazard. A similar case of information asymmetries is presented in McKinnon and Pill (1996, 7-50). Even Gourinchas and Jeanne (2006, 715-41) show limited benefits of transitioning from an autarkic state to an open economy, with regards to improvements in domestic productivity. Thus, theory does not conclude whether capital account liberalization is ultimately beneficial or not.

This ambiguity is also found in empirical studies. A variety of studies, including Quinn and Toyoda (2008, 1403-49), Arteta, Eichengreen, and Wyplosz (2001),<sup>2</sup> and Henry (2006), find a positive relationship between financial openness and economic growth. Similarly, Ferreira and Laux (2009, 271-92), using a panel of 50 countries from 1988 to 2001, find a positive relationship between portfolio investment and growth in both developed and emerging economies. Moreover, Henry (2003) explores 18 episodes of equity market liberalization and finds benefits reflected in the cost of capital, accumulation of capital stock, and output growth per worker. However, several other studies suggest that liberalization may not be beneficial to all economies, especially those where institutions and macroeconomic policies are not strong enough. This was the case for some countries with “premature” liberalization, such as Mexico in the mid-1990s and several Asian economies in the late 1990s (Glick, Guo, and Hutchinson 2006, 698-714), which, after a period of foreign direct investment and portfolio investment bliss, experienced massive capital outflows.

Financial openness has also been detrimental in countries with distorted domestic markets, as domestic resources are concentrated in less efficient sectors (Wang 2002). In other instances, liberalization has resulted in a minimal increase in inflows, as is the case of some African countries (Kose and Prasad 2012). This is not the case for developed economies, as evidenced by Klein and Olivei (2008, 861-75), who find a significant positive effect between financial liberalization, financial depth and growth in Organization for Economic Co-Operation and Development (OECD) countries. Further, Prasad and Rajan (2008) mention that there may even be a threshold of institutional development where liberalization costs outweigh the benefits, or that collateral benefits of liberalization are greater at higher levels of development.

In addition to institutional development and financial depth, timing has also been identified as an important factor in determining if liberalization will be beneficial. Reinhart and Reinhart (2008), using a panel of 181 countries for the period 1960 to 2007, concluded that periods of high capital flows result in a greater likelihood of subsequent financial and economic crises. Further, Bussiere and Fratzscher (2008, 69-95), using a panel of 45 advanced and emerging economies, found short-term positive causality between liberalization and economic growth, but low significance in the long-term. Furceri (2015) also explores the timing factor by using an exogenous monetary shock. His results suggest that the largest increases in income inequality occurred in countries with weaker financial institutions and when followed by financial crises. Atkinson and Morelli (2011) also sought to quantify the changes in income distribution during atypical periods-crises. However, unlike this paper and that of Furceri (2015), they did not control for financial openness. They conclude that there are no consistent patterns within the sample. This is because a crisis can encourage the creation of policies that permanently change the level of income inequality, such as the creation of the Social Security program in the United States after the 1929 depression.

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<sup>2</sup> However, the effects vary with time. We elaborate on the importance of timing later in this section

Timing requires planning: Arora, Habermeier, Ostry, and Weeks-Brown (2013, 205-55), Gallagher (2012, 283), and Helleiner (2011) all discuss the role of international coordination and global governance. Their common denominator is that capital openness requires comprehensive planning. Liberalization policies should be timed and sequenced to ensure that their benefits outweigh their costs. Contrary to other academic research, they consider that financial liberalization policies should be designed as a function of both domestic and multilateral effects. Appropriate policy responses comprise a range of measures and involve, both, countries that are senders and recipients of capital flows.

A less researched topic is the relationship between financial liberalization and income inequality, yet the available literature has also found mixed results. Agnello, Mallick, and Sousa (2012, 583-87), using a panel of 62 countries for 1973-2005, found that certain financial liberalization reforms, including the elimination of policies towards directed credit and high reserve requirements, help in the reduction of inequality at the low-end of the income distribution. Claessens and Perotti (2007, 748-73) explored how political influence encourages liberalization reforms that improve the financial access of the elite. This induced inequality because the benefits of openness were absorbed by the elites while risks were assimilated by the rest of the population. The authors concluded that financial reforms are only beneficial when accompanied by supervisory institutions. Similarly, and incorporating some of the elements on financial depth discussed above, Bumann and Lensink (2016, 143-62) developed a theoretical model of the banking sector and explore two types of countries: one with more financial depth than the other. Liberalization reduces credit costs, driving demand for loans and raising interest rates to attract savings deposits. This improves income distribution. Empirically, the authors proved that the direct relationship between openness and inequality is positive, but that it is subject to financial depth. This finding may explain why Ang (2010) found that financial liberalization is associated with an increase in inequality in India.

Delis et al. (2013) explored the relationship between liberalizing banking systems and income inequality, and found that the former was associated with a significant decrease of the latter (represented by both the Theil index and the Gini coefficient), yet that the effect varied across countries and liberalization policies. The effect was not significant in countries with low levels of economic and institutional development, and market-based economies (as opposed to bank-based economies). Further, the policies that narrowed income inequality the most included the abolishment of credit controls (in the long term), and interest rate controls, and tighter banking supervision (in the short term).

A persistent finding in most of the aforementioned studies is that effects vary across countries given their income levels or institutional development. We therefore include dummy variables by income groups in our model. In addition, we add other indicators that may have an effect on income inequality, as identified by the literature. These include monetary shocks (Furceri 2015), trade (Jaumotte et al. 2013), and skilled labor (Larrain 2014). Further, we explore atypical economic events (i.e., the timing factor). This allows us to confirm if capital account liberalization is beneficial in absence of an atypical economic cycle. This method is different from Bumman and Lensink's, who do not account for economic booms or busts. As for coordination, our research does not test hypotheses on the degree of financial linkages within countries or discuss the direct effects of international assistance by multilaterals. However, our findings encourage the pursuit of better coordination that may help minimize the detrimental effects on income distribution that greater financial openness may bring. Finally, in the case of

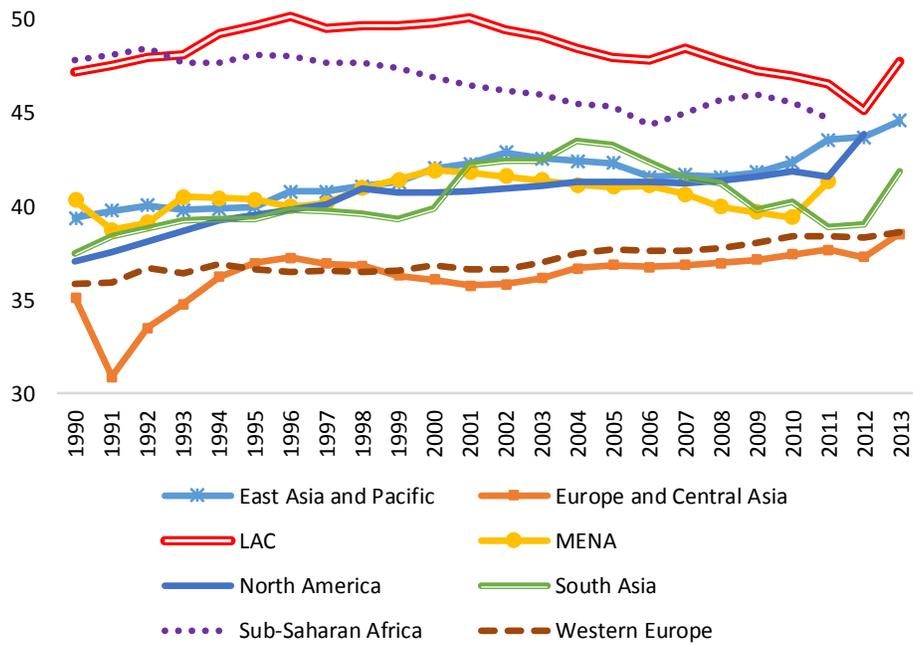
labor market elements mentioned in Larrain (2014, 88), we do not include correlations between financial liberalization and increases in skilled labor (or relative wages), at least not explicitly. However, we include in our estimations schooling and trade openness to account for wage-skill differentials.

### **3 Measures and Correlations**

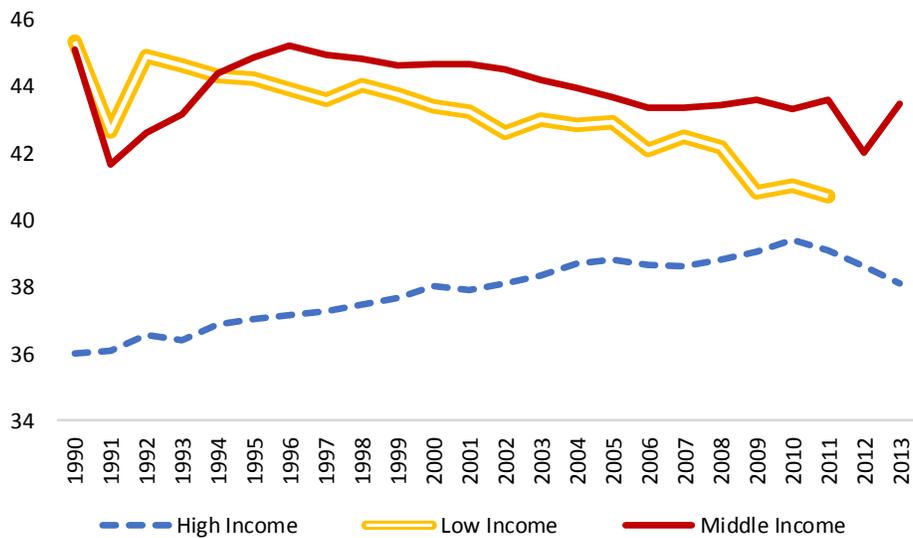
#### *Income Inequality*

The Gini coefficient is the most widely used measure of income inequality. The Standardized World Income Inequality Database (SWIID) (Solt 2014) contains post-tax income estimates represented in 100 separate imputations per country. For simplification purposes, we averaged the 100 imputations for each country, per year. Figure 7.1a shows time series for eight world regions. Income inequality has increased in most regions, especially in the developed economies. Interestingly though, in Latin America, the most unequal region of the world, income distribution seems to be improving, even after the late 90s when the large countries in the region experienced economic slowdowns. Figure 7.1b shows all countries divided by income groups. Once again, high-income countries seem to have the worst trend. This in part could be associated with the 2008-09 crisis, given that these countries are very open to the global economy. Low-income countries seem to be the least affected, possibly because of the countries' fewer linkages with the global economy.

**FIGURE 7.1a: Gini Coefficient in Eight World Regions**



**FIGURE 7.1b: Gini Coefficient by Income Group**



**Source:** Solt, Frederick. 2016. "The Standardized World Income Inequality Database." *Social Science Quarterly* 97(5):1267-1281.

## *Capital Account Liberalization*

Capital Account liberalization de jure measures are typically constructed from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), which measures over 60 different types of controls. Measures typically result in binary variables where one equals the presence of financial controls, and zero otherwise. One such de jure measure is the Chinn-Ito index, which has been fine-tuned for the extent of openness in capital account transactions (Chinn and Ito 2008, 309-22). It does not, however, measure the intensity of capital controls as Quinn (1997, 531-51) and Quinn (2003, 189-204) do. Chinn-Ito's correlation with Quinn, though, is 0.84, suggesting that it captures capital control intensity to a reasonable extent.

Fernandez et al. (2015) recently developed a de jure dataset (KA-Urbe hereafter) using AREAER and the methodology in Schindler (2009). The dataset offers information on capital controls that are disaggregated both by type (i.e. whether the controls are on inflows or outflows), and by 10 different categories of assets, including money market instruments, derivatives, collective investment securities, guarantees, sureties, financial back-up facilities, and direct investment accounts. KA-Urbe constructed an index from these data that ranges from zero to one, where zero is equivalent to a capital account lacking restriction, while one is equivalent to a fully "closed" account. The correlation between KA-Urbe and the Chinn-Ito index stands strong at -0.87. It is important to recall that it is normal that the Chinn-Ito index and KA-Urbe move in opposite directions, because in the former, the maximum value is equivalent to a fully liberalized account, while in the latter, the maximum value is equivalent to a fully restricted account.

Several de facto measures have also been generated in response to de jure measures' shortcomings. Lane and Milesi-Ferretti (2007, 223-50), proposed a stock-based de facto database that captures a country's exposure to international financial markets. It includes countries' aggregate assets and liabilities in the following categories: portfolio equity, foreign direct investment, debt, and financial derivatives. For this paper, we summed all portfolio investment and debt assets and liabilities,<sup>3</sup> as a percentage of gross domestic product (GDP). The resulting "index" was used as a de facto measure. It should be noted that gross capital flows are more volatile than equity based measures (Quinn, Schindler, and Toyoda 2011, 488-522).<sup>4</sup>

For our empirical analysis, we considered both de jure and de facto measures, as many countries legally allow capital account transactions but do not receive flows.<sup>5</sup> Only a handful of countries with liberalized capital accounts receive a high percentage of capital flows. Therefore, utilizing only de jure measures could bias results. Similarly, omitting variables that explain the difference between the degree of de jure and de facto liberalization could cause heterogeneity issues if we only use de facto measures. To reduce the possibility of omitting these variables, we used additional controls, including depth of financial system (i.e. credit to private sector as a percentage of GDP) and institution strength.

It should be noted that having a closed capital account does not guarantee a lack of investment flows into a country either. For instance, direct investment and funds recorded as "other investment" in the balance of payments can enter a country through the banking system or any other means offered by the central bank. However, this research focuses on portfolio investment

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<sup>3</sup> Flows

<sup>4</sup> These measures usually suffer from endogeneity and may not reflect changes induced by policies.

<sup>5</sup> A scatterplot of Chinn-Ito vs. a de facto measure (see figure 9.2) shown in the Annex provides evidence for this argument.

flows. It would be unlikely to find a situation where portfolio investment enters a country without a de jure framework that allows for it.

### *Relationship Between Financial Liberalization and Income Inequality*

A quick glance at our panel shows that the Chinn-Ito and the Gini coefficient are negatively correlated. In other words: the opening of the capital account is associated with a reduction in income inequality. However, this correlation is rather weak (-0.15). The effect of openness is also beneficial (but weaker) when comparing the Fernandez-Uribe index to the Gini coefficient. As mentioned above, considering only de jure measures can provide an inaccurate picture of reality. Therefore, we also evaluated the relationship between capital flows (as a percentage of GDP) from the Lane and Milesi-Ferretti database and the Gini index. The result (-0.07), although very weak, also suggests that a greater amount of capital flows is associated with a fall in income inequality.

These correlations contrast with the econometric findings in the literature--a proof that the effects of financial openness on inequality are not uniform across countries. There is clearly more to explore than just a simple correlation. Some of the reasons for these contrasting effects discussed in the literature include political, institutional and market efficiency differences. While the reasons are many, researchers seem to agree on the role of institutions, as countries with solid institutions usually have a higher penetration of financial services. To control for institutions, we assume that the degree of institutional strength is correlated with GDP per capita.

Thus, we classified countries into three income groups: high income, middle income and low income based on the following rule:<sup>6</sup>

$$Income\ Group^7 = \begin{cases} Low & \text{if } GDPpc < 4,999 \\ Middle & \text{if } 5000 \leq GDPpc \leq 19,999 \\ High & \text{if } GDPpc > 20,000 \end{cases}$$

Correlations by income group, although generally weak, vary significantly. For instance: while the correlation between the Chinn-Ito index and Gini is negative for the entire panel, it is positive (although weak) for the low and middle-income groups, implying that only high-income groups have benefited (in terms of inequality reduction) from liberalizing their capital account.

In addition to income groups, we further disaggregated the panel into three periods that we consider fundamentally different from each other: 1990-1999, 2000-2007, and 2008-2013. Between 1990 and 1999, more than 80 countries opened their capital accounts. However, it was starting in 2000 that de facto openness accelerated. Finally, 2008 marks the beginning of the Great Recession.<sup>8</sup> This additional disaggregation allowed us to visualize whether there were characteristics between income groups and over time that contrast the aforementioned correlations.

<sup>6</sup> We used GDP per capita, PPP, and constant 2011 international dollars from the World Bank.

<sup>7</sup> The rule above allowed us to account for countries' transitions between groups throughout time. For a detailed list of countries by income group, please see the Annex

<sup>8</sup> According to the U.S. NBER, the great recession started in December 2007. Given that the panel contains annual data, we marked 2008 as the start of the recession

Correlations by period also show inconsistent results: for the high-income group, the relationship between capital account liberalization (using Chinn-Ito) and income inequality is unfavorable during most periods;<sup>9</sup> that is, that capital account liberalization is associated with an increase in income inequality. The correlations are even stronger when using the Fernandez-Urbe index. We run a final check by exploring the relationship between Gini and the lags of each of the de jure measures, given that the Gini coefficient usually reports the previous year's inequality. However, correlations remain virtually identical to those found with their contemporary values.

We also explored the relationship between our de facto measure and income inequality by income groups. For these correlations, we used the lag of the de facto measure, for reasons mentioned above. The results are ambiguous: liberalization is usually unfavorable for low and middle-income countries,<sup>10</sup> but is beneficial for high-income countries. This correlation, along with the correlations mentioned above, are consistent with the arguments of Klein and Olivei (2008, 861-75) and Prasad and Rajan (2008) on the importance of the strength of institutions for a beneficial reception of capital flows.

### *Relevant Shocks*

The academic literature has identified several shocks that may have an effect on the reduction of income inequality. For our purposes, we focus on impacts that are transmitted through portfolio investment. Monetary policy in particular (Coibion, Gorodnichenko, Kueng, and Silvia 2012), can have global effects that are reflected in the cost of capital. An exogenous shock that suddenly increases liquidity and persistently maintains low rates can generate changes in investment patterns. In this case, income inequality could improve or worsen, depending on the sector of the economy that absorbs the benefits. The reasoning behind this is that most households primarily rely on labor earnings instead of business and financial income: if expansionary monetary policy shocks raise profits more than wages, then those with claims to ownership of firms will tend to benefit disproportionately. Since these people also tend to be wealthier, this channel should lead to higher income inequality in response to monetary policy shocks. Also, if some agents frequently trade in financial markets and are affected by changes in the money supply prior to other agents, then an increase in the money supply will redistribute wealth toward those agents most connected to financial markets.

Another variety of shocks could be related to internal conditions that suddenly change from optimistic to pessimistic, such as the difference between growth expectations and the actual GDP growth rate. Although there is usually much correlation between this variable and other factors, and while this variable is not the best representation of a domestic shock, it allows for the estimation of an orthogonal component to external factors. In addition, this difference between expectations and reality may be interacting with the capital account liberalization policy or with de facto capital flows. Finally, including this variable into our analysis could be interesting as it allows us to see the effect that an underperforming economy<sup>11</sup> has on income distribution during periods of capital account liberalization.

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<sup>9</sup> Except for the low and middle-income groups during 1990-1999, where the relationship is practically inexistent

<sup>10</sup> Except for middle-income countries from 2008-2013.

<sup>11</sup> That is, performing slower than expected

We thus control for these two types of shocks by including the following variables in our analysis:

- Romer and Romer (2004) (hereafter RR) shocks, which reflect changes in U.S. monetary policy (agreed at each Federal Open Market Committee meeting) which are orthogonal to the set of information from the Fed, obtained from the GREENBOOK forecasts. This variable can be used to identify monetary policy innovations purged from anticipated effects related to economic conditions
- To characterize unusual economic episodes, we generated a proxy variable that is only weakly correlated with world economic performance. To do so, we used the real GDP growth rate of each country and projected to current and lagged GDP growth of U.S., Japan, Germany, and China<sup>12</sup> both lagged and contemporaneous. The estimation results are then used to find the forecast error the proxy we seek.
- We also used a simple categorization of GDP growth performance: regular episode whenever GDP growth is within a 1.5 (historical) standard deviation, boom when it is above, and bust when it is below.

$$Unusual\ Event = \begin{cases} Bust & \text{if } GDPg < \mu_i - 1.5\sigma_i \\ Regular & \text{if } \mu_i - 1.5\sigma_i \leq GDPg \leq \mu_i + 1.5\sigma_i \\ Boom & \text{if } GDPg > \mu_i + 1.5\sigma_i \end{cases}$$

## 4 Methodology

We first perform a baseline estimation that inherits some elements from Bumann and Lensink (2016, 143-62) as well as Furceri (2015). We then improve the baseline estimations by adding variables that we believe are useful in the identification of unusual economic episodes. Doing so allows for a better understanding of correlations and helps to identify the direction of causality between capital account openness and income inequality over different time periods. We focus on answering three questions: i) If, on average, there is a positive or negative relation between income inequality and capital account openness; ii) whether the negative effects of income distribution are larger during booms and/or busts, and iii) if ex-ante and ex-post capital openness policies have contributed to reduce income inequality.

To address the above, we begin describing the general econometric model:

$$g_{i,t} = c + \varphi_i + \rho g_{i,t-1} + \alpha KAOP_{i,t} + \varepsilon_{i,t}. \quad (1)$$

In this equation,  $i = 1, \dots, N$  and  $t = 1, \dots, T$  are indices for country and time, respectively. Our measure for income inequality  $g_{i,t}$  is expressed in natural logarithms.<sup>13</sup>  $\varphi_i$  are country fixed effects. We include the lag of the Gini coefficient as explanatory variable to account for the persistence of inequality that is observed in the data. Capital Account Openness (or KAOP) corresponds to the capital openness indicator and  $\varepsilon_{i,t}$  is the error term.

Our hypothesis here is that on average, for the entire sample,  $\alpha \leq 0$  with some good level of significance. We believe this should be the case since capital openness has been widespread,

<sup>12</sup> China's GDP and lagged GDP is only included from 2004-on

<sup>13</sup> We follow Furceri (2015), using the logarithm of the Gini index as it makes it behave more like a normally distributed variable and thus more amenable for an OLS estimation

suggesting that policy makers at least perceive that open policies are contributing to improving inequality. However, given that the literature indicates that institutions play a key role on the distribution of benefits, we expand the basic regression to quantify if there is a significant different level effect between countries with strong, medium and weaker institutions. To do so, we include a full set of dummies to identify if a country is a high, medium, or low-income group. Furthermore, we add other controls that may help better identify the correlation between capital openness and inequality.

$$g_{i,t} = c + \varphi_i + \rho g_{i,t-1} + \alpha KAOP_{i,t} + \sum_j \beta D_{i,j} + \sum_j \gamma x_{i,j,t} + \varepsilon_{i,t}, \quad (2)$$

where  $D_{i,j}$  are  $j$ -dummies variables income groups per each  $i$  countries.  $x_{i,j,t}$  is a set of  $j$ -variables usually associated with inequality changes including inflation, financial depth, trade openness, age dependency ratio and secondary education enrollment as control variables. Academic research has identified these variables as key correlates of income equality. Some of the arguments are listed as follows:<sup>14</sup>

1. Low-income households normally keep a large percentage of their income in cash to buy goods. Thus, they are more likely to be affected by a generalized increase of prices (Albanesi 2007, 1088-114). However, the effect of price level changes on income inequality might be conditional on the capacity of household to shield against them, (through the banking system, for instance). Therefore, we add credit to the private sector as percent of GDP as a measure of financial depth.
2. Trade openness might also be a channel inducing income inequality, as trade flows could cause sudden changes in the relative demand of high skilled workers. In the absence of migration policies or an adequate education system, these trade flows could cause a rise of relative wages thus increasing income inequality (Anderson 2005, 264-74).
3. Education deficiencies may also induce income inequality as education levels could create wage differentials (Goldin and Katz 2007).
4. A country's age structure may also have an effect on income inequality. For instance, inequality could be lower among retirees (but so is their average income) (Alesina and Perotti 1996, 1203-28).

Unlike Bumann and Lensink (2016, 62), we do not include GDP per capita as a proxy for development of institutions. Instead, we group the countries by income level, as explained in the previous paper. This allows us to indirectly control for institutions without having to regress on one additional variable.

To address question ii), we follow two approaches. The first one is simply based on the link between higher RR values and an unusual episode, which surprises the world economy as a whole. To briefly recapitulate, RR is large when the increase of interest rates is higher than the expected. Recall that RR constructs this variable in such a way that is strongly exogenous to other macroeconomic variables. Therefore, RR acts as a shock that may help determine a causal relation between a boom or bust episode and the changes in inequality. We use this event to contrast the coefficients for KAOP. We hypothesize that, given a more than expected decrease of

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<sup>14</sup> Bumman and Lensink (2016) include a complete discussion on the selection of these variables.

the interest rate (worse economic conditions than expected),  $\alpha^s < \alpha$ . The rationale behind this is that when countries are caught in an unexpectedly worse economic condition than anticipated, low-income households are unable to adjust their spending fast enough, and lack the financial instruments to mitigate the downturn, reducing the beneficial multiplier of KAOP. A second estimation to account for economic conditions considers a simple categorization of GDP growth performance based on the categories of unusual events previously defined. We do not have a prior or a particular position here. However, we seek to answer if on average KAOP has led to larger inequality during busts compared to booms.

Finally, to investigate if ex-ante and ex-post capital openness policies have contributed to reduce income inequality (question iii), we categorize the magnitude of changes in our capital openness variable. First, we define that a liberalization policy occurred whenever there was a positive change on KAOP between  $t - 1$  and  $t$ . Otherwise, the policy remained unchanged (“none”) or had a negative change (“close”):

$$Policy = \begin{cases} Close & \text{if } \Delta KAOP_{i,t} < 0 \\ None & \text{if } \Delta KAOP_{i,t} = 0 \\ Open & \text{if } \Delta KAOP_{i,t} > 0 \end{cases}$$

We then use these variables to answer if income distribution improves. A key element here is that policies on capital account openness are typically non-linear. For instance, it is likely that a decision of adding capital controls occur during a bust or a moment when economic conditions might induce capital flights. Therefore, we modify equation (1) to add these features:

$$g_{i,t} = c + \varphi_i + \rho g_{i,t-1} + \sum_j \mu Policy_{i,j,t} * Z_{i,t-1} + \sum_j \gamma x_{i,j,t} + \varepsilon_{i,t}, \quad (3)$$

where  $Policy_{i,j}$  are *j-dummies* variables for Policy groups per each  $i$  country.  $x_{i,j,t}$  is a set of *j-variables* usually associated with inequality changes and  $Z_{i,j,t}$  includes a 1 and those variables that denote a macroeconomic shock. It is worth noting that KAOP is omitted from equation (3) given that the objective is to assess restrictive policies.

## 5 Results and Discussion

### *Capital Account Liberalization and Income Inequality*

The initial hypothesis—whether capital openness is correlated with lesser inequality—in the full sample regression largely holds. On average, we find that for every unit of capital liberalization the Gini coefficient falls about 2.3 percent with 99 percent of confidence. This result broadly confirms the trends we have seen in the data: since the 1990’s, countries across the globe have liberalized their capital account to some degree, potentially after observing success stories elsewhere. The sign of this estimation seems also consistent with other recent studies as Furceri (2015).

Surely, this is not the whole story. Figure 7.1 shows that while some income groups had improved in terms of reducing inequality, high-income countries had seen a steady increase on inequality that has only ceded recently. How is this possible? Gini estimates usually are sensitive to the measure of income or wealth that is taken into considerations. However, an increase of the mass of people in the lowest income percentiles will impact the Gini calculation, for instance,

because of low-skill migration. Nonetheless, we hypothesize that strong institutions should, or at least could, explain the positive correlation between financial liberalization and the inequality reduction.

Under this hypothesis, stronger institutions suppose a better governance environment that could lead to more inclusive policies. Thus, we test for a negative correlation between inequality and capital openness (KAOP) differentiating income groups. In other words, the direct effect of KAOP on the Gini should be stronger as countries gain stronger institutions. Columns (2)-(4) in table 7.1 show different estimations to test the hypothesis. The income group effect is divided into two sets: weak institutions (low and middle-income countries) and strong institutions (high-income countries). In all these estimations, KAOP continues to be negatively correlated with the Gini although with slightly lesser impact. Nonetheless, a simple t-test provides evidence of non-significant difference of the KAOP coefficient between the dummy regression and the baseline estimation. These same estimations (column (2)) show us that conditional on being part of the group of weak institutions the level impact is positive, that is, on average these countries have more inequality—an expected result.

The estimations in column 3 provide us with an interesting result. Here, we do not use single dummies, but their interaction with KAOP. Since the previous dummy estimation offered no additional information regarding the KAOP coefficient, we seek here for a likely slope effect. The intuition behind this option is that, while it is clear that there is a different level of inequality between each group, the way capital account openness has impacted inequality could vary according to the degree of openness they each decide to keep. According to the estimations, conditional on whether a country has strong or weak institutions, the total accounting of direct and indirect effects seems to balance in favor of our hypothesis. In fact, we first note that the direct effect—the coefficient of KAOP—reduces the impact level from approximately 2 percent to 1.6 percent. But the story does not end here. What will determine the final overall effect is whether a country has weak or strong institutions? This second component is measured by the interaction term. The estimation outcomes suggest that there is certain evidence of differential effects between countries with different degrees of institutional strength. Having weak institutions for a certain level of capital openness will more likely drive inequality up, though this is only significant at 10 percent. Contrastingly, under stronger institutions, the coefficient is negative—inequality reducing—with larger significance. For completeness of these analysis, the final column in table 7.1 combines the dummy analysis with the interaction terms. The results are consistent with what we discussed here. The dummies track the same sign as before and the interaction terms follow suit. The direct effect of KAOP on Gini growth remains below 2 percent, the strong institution coefficients remain basically unchanged, the weak institution dummy reduced almost half its magnitude, and the weak institution interaction term doubled its detrimental effect on inequality growth.

**Table 7.1: Baseline Regression using all sample**

	(1)	(2)	(3)	(4)
Gini (t-1)	0.837** (40.81)	0.829** (39.13)	0.839** (38.37)	0.729** (58.77)
KAOP	-0.0230** (-3.00)	-0.0209** (-2.72)	-0.0162* (-2.11)	-0.0178** (-6.07)
<b>Dummies</b>				
Weak		0.0275** (2.77)		0.0103+ (1.72)
Strong		-0.0195* (-2.11)		-0.0134+ (-1.89)
KAOP*Weak			0.0244+ (1.66)	0.0401** (5.99)
KAOP*Strong			-0.0227+ (-1.69)	-0.0278** (-6.43)
Constant	0.620** (8.06)	N/A	0.614** (7.52)	N/A
Observations	2438	2438	2438	2438

*t* statistics in parentheses

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Source: Authors' calculations

It seems reasonable to associate income inequality with institutional strength. The estimations in table 7.1, a snapshot, will be conducive to the common belief that stronger institutions will identify and take advantage of the benefits of capital account openness, while weaker institutions might not seize the benefits, resulting in more inequality. However, it seems that a better interpretation would be linked to answering if transitioning from weak to strong institutions is associated with a significant improvement of equality. With the dummy regressions, plus interaction terms, we can answer this question. Because the dummy estimation uses a discrete set of binary variables, the only way to evaluate how inequality growth changes as a country moves from weak to strong institutions is a simple difference. We now pay attention to the estimation in column (4). To answer if transitioning to a better income group induces a significantly different effect on Gini growth, we calculate the following:

$$E[g_{i,t}|Institutions = Strong] - E[g_{i,t}|Institutions = Weak] = [\beta^{(s)} - \beta^{(w)}] + [\delta^{(s)} - \delta^{(w)}]KAOP_{i,t}, \quad (5)$$

The above equations divide the total effect of improving institutions into two parts. The first component,  $\beta^{(s)} - \beta^{(w)}$ , quantifies a direct effect of improving institutions. However, the global effect is conditional on the degree of capital openness which supposes an indirect effect  $\delta^{(s)} - \delta^{(w)}$ . Column (4) demonstrates that there is a reduction in income inequality when a country strengthens its institutions. However, the effect is stronger when coupled with a liberalized capital account.

Another way to think about these correlations is to quantify how the marginal contribution of capital openness changes given the strength of institutions. This analysis derives straightforwardly from the previous estimations. That is, we are interested in determining the magnitude and size for:

$$\frac{dg_{i,t}}{dKAOP_{i,t}} = \alpha + \sum_j \delta^{(j)} D_{i,j}. \quad (6)$$

We once again examine the results shown in column (4) of table 7.1. In this case, we see that the marginal contribution to the elasticity has different patterns. For instance, conditional on having weaker institutions will lead to a positive overall value, thus, implying that capital openness could lead to higher inequality. In contrast, the effect when there are strong institutions is completely the opposite; the total effect would reduce inequality in 10 percent.<sup>15</sup> Both calculations seem to go in the same directions: capital openness seem to be inequality-reducing as institutions are strengthen.

The analysis based on level effect differences by income groups—our proxy for institutional strength—gives us some initial thoughts of inequality patterns. The truth is that while institutions are key on handling distributional policies, there are multiple factors that are usually correlated strongly with inequality growth. Endogeneity may arise when a public policy, say in education, gradually has a feedback effect on institutional strength. A likely story here could be that as human capital increases, institutions may gain strength and this in turn provides a better machinery to implement better policies in education. It would remain unclear if the initial implementation of the educational policy would had happened without any previous changes on institutions. This sort of ambiguity is a source of endogeneity that would require us to address it further. Thus, so far, we can only attest to the correlation between changes in inequality and the degree of openness unconditional on other latent factors. Previously, we discussed the usual variables that literature usually links with inequality. These variables speak out about structural features of the economy that form part of the way income is distributed within a country. Since we want to isolate as much as we can the direct effect of capital openness on inequality we proceed to control for the usual variables that literature uses as correlates for inequality.

Because countries with weak institutions have important differences from those with strong institutions, we try here a slightly different way to test our hypotheses. We divide the sample into two groups, those with weak and strong institutions. This way, we proxy per capita income and quality of institutions. By doing so, we implicitly constrain the distribution of the other factors for instance:<sup>16</sup> i) most of the observations with a private credit ratio below 25 percent come from low income and middle-income countries; ii) high school enrollment rate is usually below 44 percent in low income countries, and so on. For each sample, we perform a set of estimations incrementally adding the structural variables. We then proceed by asking how relevant are these variables for countries of weaker institutions?

The estimations for the weak institutions sample is reported in table 7.2. We find that the sign of the correlation between inequality and KAOP holds with strong significance in the baseline case. Sign and magnitude is similar as in the whole sample baseline. Significance, though, falls for some of the subsequent regressions. Table 7.2 incrementally shows how the main structural variables affect the KAOP correlation with inequality. Inflation, while significant at 10 percent, has the expected detrimental effect on equality. The KAOP coefficient slightly shifts down compared to the baseline. A larger change occurs when we added trade openness. The KAOP coefficient drops in absolute value from 0.0243 to 0.0170, about 42 percent, albeit with much less statistical significance. Also important is the fact that the trade coefficient has a negative correlation with inequality. As reported in the literature review, the extent to what trade has

<sup>15</sup> We did not find statistical support for the correlations in low-income countries.

<sup>16</sup> Tables 12-15 in the Annex have summary statistic tables per income group

contributed to a reduction of inequality has divided views. Here, we find that in this time span and with these combination of controls, trade seems to be mostly beneficial in this subsample. Education also pulls down the magnitude of the KAOP's coefficient. According to the estimation, schooling turns out to be an important element for inequality. Schooling has an interesting interpretation. Because increasing the average years of schooling is a long-term process, the sample covering since 1990 can only capture few generations of young individuals. In spite of this, we can see the positive effects that schooling has through possible salary channels in the non-high income countries.<sup>17</sup>

So far, all correlates, including inflation, trade openness, and school enrollment, preserve the expected sign: inflation associated with inequality growth, trade openness with decrease of inequality, and high school enrollment with less inequality. According to these outputs, capital openness-when controlling for inflation, age structure, trade openness, and secondary enrollment is associated with a 1.2 percent-2.4 percent decrease in income inequality. We validate these differences again through a test of means between each marginal contributor and the baseline estimation. The differences are all statistically significant as can be attested in table 9.2

**Table 7.2: Weak Institutions: Controlled Fixed-Effects**

	(1)	(2)	(3)	(4)	(5)	(6)
Gini (t-1)	0.849** (66.39)	0.885** (68.70)	0.845** (62.79)	0.743** (47.10)	0.703** (48.59)	0.737** (47.77)
KAOP	-0.0279** (-6.19)	-0.0243** (-4.80)	-0.00170+ (-1.32)	-0.0119 (-1.02)	-0.01285+ (-1.22)	-0.0147* (-2.20)
<b>Structural Controls</b>						
Inflation		0.00140+ (1.46)	0.00124+ (1.30)	0.00221 (1.28)	0.00308+ (1.81)	0.00260+ (1.52)
TradeOP			-0.0771** (-13.50)	-0.0551** (-9.96)	-0.0514** (-9.38)	-0.0538** (-9.71)
Schooling				-0.000271** (-3.06)	-0.000360** (-3.94)	-0.000329** (-3.58)
<b>Financial Controls</b>						
Fin. Depth					-0.00679+ (-1.45)	-0.00128 (-1.05)
KAOP*Fin.Depth						0.0171** (2.70)
Constant	0.582** (12.06)	0.442** (9.14)	0.643** (12.46)	1.027** (16.68)	1.006** (16.90)	1.053** (16.98)
Observations	1704	1548	1518	1087	1065	1065

*t* statistics in parentheses

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Source: Authors' calculations

<sup>17</sup> While not the core of the discussion here, is important to keep in mind that as countries open to trade, schooling improved. This would be compatible with the increasing job opportunities due to trade.

When analyzing the strong-institutions set of countries, findings differ from those of weak institutions in several ways. First, the baseline estimation for this sample shows a positive coefficient for KAOP. This is true for most of the subsequent estimations, though most of them with very low significance. This seems to contradict the results obtained with the whole sample, but it does not. In our sample, high-income countries reached their highest levels of capital account openness in the 90s and since then, they have only experienced increases in inequality whenever new countries join this income group. At the same time, inequality has been increasing, passing from an average Gini coefficient of 36 in the 90s to nearly 40 in the 2000s. Regardless of this, our incremental estimations seem to move KAOP from a positive coefficient to a negative and significant one.

Table 7.3 shows the estimations for countries with strong institutions. Once again, our structural correlates keep their signs consistent with most of the literature. But this should not surprise us at all. Schooling differentials, increases on price level, or trade openness are usually at desired levels throughout the time span of this sample. Inflation is positively correlated, as expected, although never significant. This is because for these countries, inflation has been relatively steady during most of the sample, inducing a low covariance between these two and a resulting low *t-statistic*. Just as with the weak institutions sample, we observe a larger change in the KAOP coefficient when we control for trade openness. The KAOP coefficient drops from 0.01 to 0.001, albeit with low statistical significance. Trade coefficient has a negative and significant correlation with inequality, too. While this is also the case for the weak institutions sample, the magnitude is much lower here (in absolute terms). Recall that the point estimate in the weak institution case was -0.07, much higher (in absolute terms) than the -0.002 of the high-income countries.<sup>18</sup>

Education seems to be a key factor in high-income countries. When we added the high school enrollment rate to the estimation, the KAOP coefficient became negative. While the significance of the KAOP coefficient is very low, this movement might be telling us that once we account for education, then it reveals that capital openness can also have a beneficial effect on equality. Two important things should be kept in mind. Increasing the average years of schooling is a long-term process and usually these countries already have high schooling indexes. The main beneficiaries of schooling are for instance people who migrated from areas with lower schooling, or in the case of the European Union, as new countries with lower schooling joined their population may have been experiencing a faster catch up. Thus, we can think about the intergenerational positive effects that schooling has through possible salary channels for these population groups.

It is worth to point out that KAOP in countries with strong institutions shows a persistent lower significance. Given that these countries are usually either completely or highly open to capital flows (both *de jure* and *de facto*) throughout the entire period of study, variation is very limited, thus resulting in a weaker relationship between capital account openness and income inequality. It is likely that in these countries, other factors, such as financial depth, have a stronger effect on inequality.

Estimations (5) and (6) in table 7.2 add our proxy for financial development to the incremental estimations for weak institutions. The first change to note is the increase (in absolute terms) of the KAOP estimate. In other words, when controlling for financial development, the correlation between capital openness and income inequality becomes stronger in magnitude and significance.

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<sup>18</sup> Once again, this could be related to the fact that these countries usually are more capital intensive and from the perspective of the sources of jobs it generates might have a more limited penetration in the lower percentiles. Yet this could be just a possibility as trade of labor intensive goods should reduce or maintain certain prices relatively stable, thus potentially helping low income households.

The level moves from -0.0119 to -0.01285 within a 15 percent significance. The final estimation including the interaction between financial development and KAOP is quite promising. First, it induces a more negative coefficient for KAOP and improves the statistical significance of the direct effect of financial development. The KAOP point estimates moves from -0.0128 to -0.0147 with a 95 percent of confidence. Also, the interaction term has a negative sign, which also means that there is an indirect spillover effect from deepening the financial system when the capital account is open. The interpretation of the interaction term is straightforward: financial liberalization, when accompanied by financial depth, benefits equality as more people has access to mechanisms to insure their stream of income and consumption via credit or savings.

It is worthwhile to expand the discussion of the differences among low-income and middle-income countries. Capital openness is again associated with lesser inequality growth after splitting the group into low- and middle-income groups. Yet, our findings suggest that lower income countries are associated with lower statistically significant correlations.<sup>19</sup> Financial development remains a relevant variable to consider in the analysis, and in every case, there is some kind of beneficial effect as depth increases. Auxiliary regressions for the low-income group are shown in Table A2 in the annex. Incremental regressions show evidence of KAOP losing significance in low-income countries. However, this fact is not surprising at all. As shown in table 7.2, low income countries, regardless of their *de jure* openness, have very small portfolio flows as a percentage of GDP, which also explains the implicitly high *p-values* in the same table. In middle-income countries, capital openness improves its significance once we added financial depth and the interaction term. The middle-income countries parameters pool the weak institution ones. For instance, while in the low-income group financial depth is not significant, in the middle-income group it is strongly significant, thus, leading to a significant outcome in the weak institution estimation.

The high-income economies are typically the most financially integrated and normally more financially open. We find that in high-income countries financial development has served as a buffer for inequality increases (table 7.3). Here, the estimations also confirm the beneficial effects of a developed financial system. The role of financial depth, measured by crediting the private sector as a percentage of GDP, is significant, both the linear and the non-linear components. The keynote here is the two-piece decomposition of the total effect on income inequality of opening the capital account. On the one side, the marginal effect of opening the capital account reduces inequality by 0.0105 (KAOP coefficient). On the other, financial depth alleviates even further the detrimental effects as indicated by the significant coefficient on the interaction term. More precisely, the negative sign implies that the greater the financial depth, the smaller (less detrimental) the effect of capital account liberalization on income inequality will be. In fact, both, the single effect and the interaction term render a negative coefficient. The power of the estimates increases too: both with significance within 1 percent and 5 percent.

The estimations of the financial controls also show key differences between groups of weak and strong institutions. Recall that for lower and middle income countries (weak institutions) the magnitude of the financial correlates are near -0.0170 for the interaction term and about -0.001 for the single effect. Table 7.3 shows the corresponding estimates are both near -0.0170. The fact that the magnitude is similar for the interaction term is simply a sign that the role of a deeper financial system in an openness environment is equally beneficial. In contrast, the larger difference in the single effect simple denotes that a weaker correlation between variations of inequality and large

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<sup>19</sup> It is important to note that low income countries tend to be less unequal and receive less capital flows relative to other income groups.

changes in financial depth. The higher significance of financial depth in table 7.3 compared to table 7.2 might not be totally unreasonable: in high-income countries, while there are no meaningful differences in terms of financial development (they all have similar depth indicators), they have larger access to banking services for household of all income levels which would explain correlations with higher significance.

**Table 7.3: Strong Institutions: Controlled Fixed-Effects**

	(1)	(2)	(3)	(4)	(5)	(6)
Gini (t-1)	0.852** (39.90)	0.849** (36.58)	0.843** (27.77)	0.811** (24.13)	0.780** (22.33)	0.777** (22.26)
KAOP	0.0113 (1.26)	0.0101 (1.02)	0.0010 (0.82)	-0.0084 (-1.06)	-0.00999 (1.09)	-0.0105* (-1.63)
<b>Structural Controls</b>						
Inflation		0.000326 (0.92)	0.000334 (0.94)	0.000161 (0.38)	0.000106 (0.25)	0.000196 (0.46)
TradeOP			-0.00213+ (-1.26)	-0.00807* (-1.90)	-0.0131+ (-1.31)	-0.0149+ (-1.48)
Schooling				-0.00202+ (-1.27)	-0.00064+ (-1.37)	-0.000968* (-1.55)
<b>Financial Controls</b>						
Fin. Depth					-0.00304 (-1.02)	-0.0163* (-1.62)
KAOP*Fin.Dept						-0.0169* (-1.78)
Constant	0.533** (6.96)	0.547** (6.53)	0.565** (5.38)	0.709** (5.99)	0.799** (6.55)	0.756** (6.01)
Observations	734	709	707	635	599	599

*t* statistics in parentheses

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Source: Authors' calculations.

While this is a very optimistic result, one could question whether this holds only for those countries where households and firms are able to acquire insurance or hedge their savings portfolios during downturns. Table A1 shows these same estimations for both strong and weak institutions' groups. The results confirm that financial depth is usually beneficial, although with some evidence that in weaker institutions countries, where bankarization is lower, these direct effects are not as strong. A second way to address this is by using a variable that better describes access to households. Financial depth aggregates all credit available to the private sector, but different countries may have different rates of access among different income groups within the country. We use lending interest rates as a proxy. The underlying assumption is that typically, a country with high credit interest rates is either subject to low credit screening or low credit availability, both factors linked to the perceived risk by the financial institutions. In this case, lower income households are usually the most affected.

Table A1 show these estimations for weak and strong institutions groups. Weak institutions keep magnitude levels that are less than half than those for strong institutions. For instance, level impact of or proxy for access is -0.0015 in weak institutions subset, below a -0.0386 of strong institutions. Significance differs too. The single effect of our proxy for access while preserves the negative sign it is not significant at all. In contrast, the point estimate for strong institutions is quite high (1 percent *p value*). A similar reasoning applies to the interaction term. Our findings confirm the

previous argument: in high-income countries, financial development seems to be a factor for better income distribution, while in the opposite group, the correlation is significantly weaker.

### *Timing Matters*

Capital account liberalization policies are aimed at allowing a free flow of financial resources in and out of a country. Countries running current account deficits need to find financing for all the goods and services they purchase abroad. Whenever direct investment is not enough to cover the deficit, capital inflows may find their way in, of course, assuming that the return on investment compensates the risk appetite. The previous section shows that as a country strengthens its institutions, the benefits of opening the capital account become more apparent. Structural conditions like schooling, trade openness, or financial depth also play important roles in the potential to seize the benefits. If macroeconomic conditions are considered relevant at all, a natural question to ask is whether capital openness is beneficial (or detrimental) exclusively during episodes of economic expansion (or contraction). This seems a critical question to answer, especially as policy makers may be tempted to restrict openness if they believe that it may harm the distribution of wealth. Taking as a starting point our previous findings, the main hypothesis here is that a deep financial system will allow households of all income levels to insure their consumption and income streams, even during sudden busts. However, this has to be contingent on the persistence of the poor economic conditions.

To test our hypothesis, we estimate a parsimonious version of equation (3) that includes the Gini lag, the usual controls, capital openness policy changes, and a variable representing cyclical behavior of GDP growth. The estimations consider the whole sample and identify via dummies episodes for booms and busts. Table 7.4 shows a sequence of incremental regressions focused on booms and busts. Taking as baseline the controlled regression, the indicator variable for booms seems to agree with our hypothesis. The coefficient is negative and has a 10 percent significance. On average, during booms, the inequality indicators fall at a rate of 1.93 percent, coincidentally with a larger point estimate for KAOP that increased (in absolute terms) two times more than in the baseline. Structural variables see a beneficial effect only in trade openness and no significance on either inflation or schooling. Financial depth continues to be important in explaining the reduction of income inequality. In turn, busts seem to lead to important increases of inequality. The point estimate for the busts dummy is large: 0.0476. The estimate is only significant at the 15 percent level, and while this is low compared to booms, it is worth taking into consideration. Consider a scenario where the economy slumps into a recession, say for four years. On average, the expected inequality raise will be of about 5 percent. To compensate for this, we would have to see an enormous increase on KAOP or financial access or any of the other structural variables, which is highly unlikely.

Policy reactions are fundamental to avoiding the worsening of income distribution. For deciding whether a policy is going to be effective, it is important to consider its timing and strength. This reminds us of the steps taken by Iceland to control the volatility of flows and massive outflows. Economists use theory to characterize the optimality of a policy in terms of time and instrument, but it is only ex-post when one can test if those policies had the intended effect. In this sense, a policy change in response to a “bust” that only persists for a year will not be as effective as a policy change for a bust that persists for a longer period. This is simply because implementing a policy takes time and the adaptability of agents is not immediate. In fact, in table 7.4, estimation (3) includes an interaction term of a change in the capital openness policy. The change of policy is

a restriction on openness measured by a negative change in KAOP compared to the previous year as defined in the methodology section. As a reminder, KAOP is not needed as a control because the objective in this group of regressions is to assess restrictive policies.

The estimation suggests that restricting the capital account during the first year of a bust has no beneficial effect on income inequality; in fact, it shows an average increase of about 1 percent within a 90 percent of confidence. This reflects the previous discussion about timing and the adaptability of agents to policy changes. By the time the first year passed, income distribution has already been affected (on average). Anticipating the bust, that is, applying a restrictive policy the year before the bust ( $t=-1$ ), has, on the contrary, a beneficial effect, by reducing inequality by about 2 percent (see estimation (4)). The estimation is significant at the 5 percent level, but is only evidence that countries that were already processing changes to restrict openness weathered the bust better than those that did not. It does not test if countries that reduced their openness obtain benefits during posterior booms.

Estimation (4) also give us some other insights on why timing matters. Once again, a policy change in  $t=0$  registers a correlation with increase of inequality, albeit in a lower magnitude but higher significance. The more interesting part results from the interaction between the change of policy at  $t=0$  and the periods that the bust lasted. In this case, on average, the point estimate suggests a 2 percent beneficial effect with a 95 percent confidence, in agreement with our hypothesis. A plausible story backing these findings could be that, when a policy that restricts capital openness is enacted early during the bust, it will meet some of its goals. However, it is unlikely that it will avoid distributional effects within a year. Thus, if the same level of restrictions is held in place throughout the duration of the bust, then we should expect to observe an average reduction of inequality.

Could unexpected shocks magnify through the capital account? It is common to find arguments supporting this view. We previously tested for policy reactions to an already unfavorable environment, but we have not talked about sudden shocks. The sudden crash in 2008-09 affected the most financially integrated economies first. This in part occurred because the crash started in the core of the world's largest financial system. However, contagion entered through the financial and monetary channel before affecting the rest of the real economy. It seems like our previous estimations gave us a taste of the advantages of deepening the financial system, but the great recession suggests otherwise. Where's the catch? Financial depth variables are usually negatively correlated with the Gini, but the post-crisis years only derived into larger inequality in the high-income economies. Larger economies are typically the most open, but the financial sector could not avoid hurting households since the core of the crash was the financial system. Thus, with an ill financial system the real economy contraction was faced with limited chances to smooth income and consumption. Households, especially lower-income ones, could not react to protect their income streams. It is this unexpected component that we hypothesize is behind the steep increases of inequality post-crisis.

**Table 7.4: Booms and Busts: Fixed Effects Estimations**

	(1)	(2)	(3)	(4)
Gini (t-1)	0.768** (24.03)	0.769** (24.00)	0.768** (23.98)	0.733** (24.06)
KAOP	-0.0135* (-1.72)	-0.0298* (-1.75)		
<b>Structural Controls</b>				
Inflation	0.00306 (0.74)	0.00306 (0.74)	0.00161 (0.39)	0.00310 (0.75)
TradeOP	-0.0255** (-2.76)	-0.0246** (-2.61)	-0.0257** (-2.72)	-0.0255** (-2.71)
Schooling	-0.000338+ (-1.59)	-0.000370 (-1.21)	-0.000740+ (-1.42)	-0.000583+ (-1.33)
<b>Financial Controls</b>				
Fin. Depth	-0.00288+ (-1.38)	-0.00326+ (-1.42)	-0.00224 (-1.15)	-0.00283 (-1.17)
KAOP*Fin.Depth	-0.0148* (-1.74)	-0.0182+ (-1.37)	-0.0145+ (-1.38)	-0.0183+ (-1.40)
<b>Dummies</b>				
Boom		-0.0193+ (-1.39)		
Bust		0.0476 (1.26)		
ΔKAOP*Bust (t=-1)				-0.0176* (-1.72)
ΔKAOP*Bust (t=0)			0.0109+ (1.56)	0.0089* (1.76)
ΔKAOP*Bust (t=0; t≥1)				-0.0202* (-1.96)
Constant	0.907** (7.62)	0.903** (7.58)	0.886** (7.62)	0.711** (7.66)
Observations	1664	1664	1664	1664

*t* statistics in parentheses

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Source: Authors' calculations

Table 7.5 ensembles a set of estimations to study the correlation between capital openness and inequality after an unexpected shock. A monetary shock, as the one represented by RR, has been used to proxy markets performance or economic expectations. It also carries an important feature: as it is based on U.S. monetary policy, it is linked directly to the financial system, which, as previously discussed, is key for distributional effects. We keep in the regression the direct effect that KAOP may have on the Gini, but we also interact it with the RR. The main reason to do so is that we seek to track the marginal effect of changes in KAOP, that is,

$$\frac{dg_{i,t}}{dz_{i,t}} = \gamma_1 + \gamma_2 KAOP_{i,t} \quad (7)$$

The estimations reveal that, when controlling for unexpected shocks, the correlation between KAOP and Gini weakens in terms of the magnitude of impact. In the baseline regression (shown

again in table 7.5, column (1)), point estimate was -0.0135. When controlling by our proxies for exogenous shocks the point estimates increased their correlation with inequality growth. In particular, the RR estimation resulted in a coefficient of -0.0101, substantially below the baseline. This seems to be on the expected track: shocks are detrimental for equity. Only changes in policies that shifts negatively the Chinn-Ito Index could change the direction of equation (7). Even if the KAOP change is null, the total effect will be an increase of 0.0123 –though only 85 percent of the times. A similar conclusion results from estimation (3) in the same table. The interaction effects track about the same significance as (2), but the single effect is now both, detrimental and significant at 10 percent. In summary, unanticipated deviations from growth forecasts may induce increases in inequality by nullifying any positive spillover of opening further the capital account. In both cases, we did find weak statistical evidence to argue a possible conditional effect  $\gamma_2$ , but only with *p-values* between 10 percent and 5 percent.

**Table 7.5: Unexpected Shocks: Fixed-Effects Estimations**

	(1)	(2)	(3)
Gini (t-1)	0.768** (24.03)	0.754** (23.57)	0.768** (23.71)
KAOP	-0.0135* (-1.72)	-0.0101* (-1.84)	-0.0117* (-1.69)
<b>Structural Controls</b>			
Inflation	-0.00306 (-0.74)	-0.00277 (-0.68)	-0.00321 (-0.77)
TradeOP	-0.0255** (-2.76)	-0.0237** (-2.58)	-0.0252** (-2.72)
Schooling	-0.000338+ (-1.59)	-0.000262+ (-1.55)	-0.000352 (-1.20)
<b>Financial Controls</b>			
Fin. Depth	-0.00288+ (-1.38)	-0.00289 (-0.38)	-0.00376 (-0.48)
KAOP*Fin.Depth	-0.0148* (-1.74)	0.00416 (0.41)	0.00408 (0.39)
<b>Shocks</b>			
RR		0.0123 (1.20)	
KAOP*RR		0.00521* (1.91)	
Growth.Forecast			0.00140+ (1.62)
KAOP*Growth.Forecast			0.0402* (1.89)
Constant	0.907** (7.62)	0.958** (8.04)	0.910** (7.52)
Observations	1664	1664	1664

*t* statistics in parentheses  
+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$   
Source: Authors' calculations

Note:  $\Delta$ KAOP\*Bust (t=-1) means that  $\Delta$ KAOP happened at (t=-1) where (t=0) is the year when the bust begins.  $\Delta$ KAOP\*Bust (t=0) means that  $\Delta$ KAOP happened at (t=0) where (t=0) is the year when the bust begins.  $\Delta$ KAOP\*Bust (t=0; t $\geq$ 1) means that  $\Delta$ KAOP happened at (t=0) where (t=0) is the year when the bust begins and is multiply all the periods the bust lasted.

Overall, the estimations broadly support our hypothesis. First, global exogenous shocks, such as the RR monetary shocks, increase the level of detriment of income distribution. Moreover, the size of the shock plays an important role by increasing income inequality through a direct effect and as a magnifier through KAOP. The RR shock is linked to how developed the financial system is. Therefore, we would expect that its effect on inequality is larger in lower and middle-income countries compared to high-income. Nonetheless, there was no strong evidence to support this assumption. The channel is the precisely the financial system that under these circumstances acts as a magnifier or shock. Therefore, opening further the capital account KAOP open will not offer the positive returns as it did before. Second, whenever an unusual economic performance is more correlated to the global economic cycles, the negative effects on income distribution magnify. This is consistent with the boom-busts discussion: capital openness is unambiguously worse for income equality during bust. As atypical economic performances depart from global cycles, capital account openness correlates negatively with inequality, suggesting also the existence of a magnifying effect whenever the global economies are the main cause of an atypical event.

What lessons can we extract? Much has been discussed about the rationale behind policies that restrict capital openness. Controls on capital account transactions represent a country's attempt to shield itself from risks associated with fluctuations in international capital flows. Capital controls take on special circumstances, for instance, in the context of a fixed exchange rate regime. In a country with a fragile banking system, for instance, allowing households to invest abroad freely could precipitate an exodus of domestic savings and jeopardize the banking system's viability. Likewise, short-term capital inflows can be quickly reversed when a country is hit with an adverse macroeconomic shock, thereby amplifying its macroeconomic effect. In theory, capital account liberalization should allow for more efficient global allocation of capital from capital-rich industrial countries to capital-poor developing economies. This should have widespread benefits by providing a higher rate of return on people's savings in industrial countries and by increasing growth, employment opportunities, and living standards in developing countries. Access to capital markets should allow countries to "insure" themselves to some extent against fluctuations in their national incomes such that national consumption levels are relatively less volatile. Since good and bad times often are not synchronized across countries, capital flows can, to some extent, offset volatility in countries' own national incomes.

The evidence, as we have seen, is not quite as compelling as the theory, however. Middle income countries that have liberalized their capital accounts typically have had questionable improvement on inequality. According to our findings, this is associated with swings in the domestic and world economy, thereby magnifying the negative effects. Is there actually evidence of the goodness of closing the external accounts? Considering the whole panel, we tested if restrictive measures on the capital account were significantly followed by periods of lower inequality (table 7.5). The coefficients broadly keep the same patterns as the baseline regression. However, to support a "closing policy" requires more thought. The key element is when the policy is enacted and the expected time that it will actually affect the markets. Evidence suggest that policies restraining openness at the year of a bust that lasts about a year are practically ineffective to mitigate distributional effects. However, these policies might turn the balance in favor if the bust persists. The only way to avoid distributional negative effects in busts is to anticipate them. However, it is usually not easy to do so. Policies, therefore, must not be passive. If no policy changes occur, unexpected shocks will be detrimental, especially when the financial system is affected. So should

a country close, open, or settle on a mixture of the two? It seems that the right direction is to call for an active mechanism to respond. Certainly, we find evidence on how timing matters, as restricting the account to face a shock reduces the negative effects on income distribution when it lasts more than a year. However, whether the policies should be focused on those related to the financial account may as well be inconclusive since governments usually can expand their social spending during recovery periods (assuming there is a certain level of public spending efficiency). Notwithstanding, this result opens the door to explore the role of safety nets as co-policy instruments to mitigate the negative effects during downturns.

## 6 Conclusions

Literature has largely concluded that capital account liberalization may have negative effects on growth through financial instability in emerging markets. Moreover, the links between economic and financial distress, and income inequality have also been frequently revisited, especially in the last decade. In this paper, we attempt to build upon these two literatures to examine the extent to which capital account liberalization is associated with income inequality. We conclude that capital openness is associated with a decrease in inequality when a country transitions into a higher income group, where stronger institutions are usually in place. Our findings offer supportive evidence that financial development is key to extending the benefits of the capital account liberalization to all income levels. Financial development in the form of access is important as it allows households to insure and smooth consumption and income streams. However, we also show evidence that unexpected shocks, especially those affecting the financial channels, make a strong case for active policy actions to reduce their detrimental impact on income distribution.

We expand on these findings to learn that there are differential impacts of capital account liberalization on inequality during periods of economic expansion and contraction. The impact of financial liberalization on income inequality is positive during normal economic times, whereas during contractions, capital account liberalization appears to exacerbate income inequality. Strong institutions and financial depth are key factors in determining the extent of the negative impacts. One possible reason behind this is that financial services may provide households with better risk sharing and the possibility of shielding themselves against economic swings. Furthermore, our findings suggest that when a country decides to implement regulations to slow and steer financial flows during atypical economic events, the detrimental effects on income distributions diminish. These findings offer supportive ground in favor of counter-cyclical, temporary, and flexible “speed bumps” during sudden stops or similar atypical events. However, this result might also be in favor of not exclusively focusing on capital account measure and instead combine them with other social redistributive policies simultaneously.

Finally, it is conceivable that for most developing countries, where institutions are weak, the absence of ex-ante policies implies that capital account liberalization will probably increase income inequality during periods of economic contraction. In order to ensure dignifying living conditions, it seems relevant to implement additional protection measures for the initially disadvantaged groups as seems to be the case in Latin America and the Caribbean. Thus, further work is required to explain whether safety nets (especially conditioned cash transfers) are behind these observed differences and if liberalization should be synchronized with social safety net coverage.

The findings discussed in this paper bring to consideration two kinds of policies. On the one hand, we consider policies geared to seize the positive spillovers of openness during economic expansion, albeit designed such that they can also act as safety nets during contractions. On the other hand, our findings support resorting to capital restrictions during busts, especially if social safety nets have low coverage or are inexistent. For most developing countries, where institutions are weak, the absence of safety net policies implies that capital account liberalization will likely increase income inequality. In order to ensure dignifying living conditions, it seems relevant to implement additional protection measures for the initially disadvantaged groups.

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## 7 Annex

**Table A1. Access. Fixed-Effects Estimation, Arellano-Bond**

	Weak (1)	Weak (2)	Strong (1)	Strong (2)
Gini (t-1)	0.716** (43.93)	0.716** (43.92)	0.715** (17.92)	0.658** (15.53)
KAOP	-0.0155* (-2.10)	-0.0204* (-2.54)	-0.0163 (-1.42)	-0.0184** (-4.15)
<b>Structural Controls</b>				
Inflation	0.000221 (1.11)	0.000232 (1.16)	0.000231 (0.48)	0.000105 (-0.21)
TradeOP	-0.0612** (-11.19)	-0.0614** (-11.22)	-0.0145* (-1.264)	-0.0204* (-1.72)
Schooling	-0.000260** (-2.82)	-0.000259** (-2.80)	-0.000110** (-2.54)	-0.000153** (-2.75)
<b>Financial Controls</b>				
LendRate	-0.00142 (-0.42)	-0.00149 (-0.36)	-0.000314* (-1.56)	-0.00386** (-3.29)
KAOP*LendRate		-0.000216* (-1.47)		-0.00653** (-4.06)
Constant	1.131** (17.92)	1.131** (17.90)	1.053** (7.50)	1.217** (8.31)
Observations	921	921	492	492

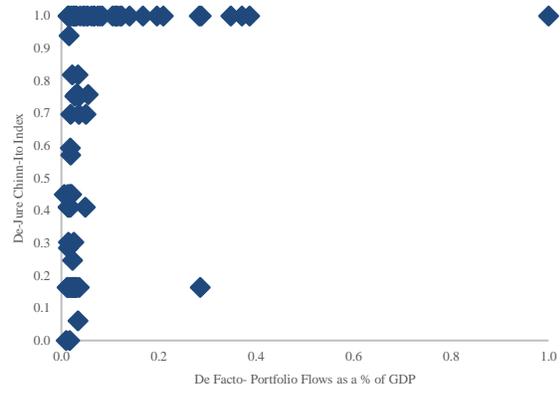
*t* statistics in parentheses  
 \*  $p < 0.15$ , \*  $p < 0.05$ , \*\*  $p < 0.01$   
 Source: Authors' calculations

**Table A2. Low-Income Countries. Fixed-Effects Estimation, Arellano-Bond**

	(1)	(2)	(3)	(4)	(5)	(6)
Gini (t-1)	0.951** (55.16)	1.041** (55.95)	1.011** (51.27)	0.973** (38.32)	0.987** (36.66)	0.989** (36.15)
KAOP	-0.0312** (-4.06)	-0.0572** (-6.58)	-0.0179* (-1.95)	-0.0331 (-1.49)	-0.0182 (-1.37)	0.0115 (0.37)
<b>Structural Controls</b>						
Inflation		-0.000209* (-2.43)	-0.000109 (-1.04)	-0.000209 (-1.42)	-0.000289* (-2.06)	-0.000282* (-2.00)
TradeOP			-0.00105** (-13.68)	-0.000719** (-8.84)	-0.000597** (-7.22)	-0.000565** (-6.45)
Schooling				0.000281* (2.14)	0.000269* (1.97)	0.000218* (1.54)
<b>Financial Controls</b>						
Fin.Depth					-0.00366 (-1.31)	0.000337 (0.07)
KAOP*Fin.Depth						-0.0119 (-1.07)
Constant	0.195** (2.99)	-0.134* (-1.91)	0.0386 (0.51)	0.152* (1.56)	0.0947 (0.91)	0.0786 (0.73)
Observations	790	705	682	422	403	403

*t* statistics in parentheses  
 +  $p < 0.15$ , \*  $p < 0.05$ , \*\*  $p < 0.01$   
 Source: Authors' calculations

Figure A.1: Relationship between de jure and de facto measures



Source: Authors' calculations

## Countries in the Sample

Table A3 shows all countries by income groups. Note that some countries (such as Chile) appear in two groups. This is because the income criteria that we used (Section 3) allow for countries to transition between income groups.

**Table A3: Income Groups**

High Income	Middle Income		Low Income	
Australia	Albania	Mongolia	Afghanistan	Nepal
Austria	Algeria	Morocco	Albania	Nicaragua
Belgium	Armenia	Namibia	Armenia	Niger
Canada	Azerbaijan	Nigeria	Azerbaijan	Nigeria
Chile	Barbados	Panama	Bangladesh	Pakistan
Croatia	Belarus	Paraguay	Benin	Papua New Guinea
Cyprus	Belize	Peru	Bhutan	Philippines
Czech Republic	Bhutan	Philippines	Bolivia	Rwanda
Denmark	Bolivia	Poland	Bosnia and Herzegovina	Senegal
Estonia	Bosnia and Herzegovina	Russia	Burkina Faso	Sierra Leone
Finland	Botswana	Seychelles	Burundi	Sri Lanka
France	Brazil	Slovakia	Cambodia	Tajikistan
Germany	Bulgaria	Slovenia	Cameroon	Tanzania
Greece	Chile	South Africa	Central African Republic	Togo
Hong Kong	China	Sri Lanka	Chad	Turkmenistan
Hungary	Colombia	St. Lucia	China	Uganda
Iceland	Costa Rica	Suriname	Comoros	Ukraine
Ireland	Croatia	Swaziland	Cote d'Ivoire	Uzbekistan
Israel	Czech Republic	Thailand	Djibouti	Vietnam
Italy	Dominican Republic	Trinidad and Tobago	El Salvador	Zambia
Japan	Ecuador	Tunisia	Ethiopia	Zimbabwe
Kazakhstan	El Salvador	Turkey	Gambia	
Latvia	Estonia	Turkmenistan	Georgia	
Lithuania	Fiji	Ukraine	Ghana	
Malaysia	Georgia	Uruguay	Guinea	
Malta	Guatemala	Venezuela	Guinea-Bissau	
Netherlands	Hungary		Guyana	
New Zealand	Indonesia		Haiti	
Norway	Iran		Honduras	
Poland	Israel		India	
Portugal	Jamaica		Indonesia	
Russia	Jordan		Kenya	
Seychelles	Kazakhstan		Kyrgyz Republic	
Singapore	Latvia		Lesotho	
Slovak Republic	Lebanon		Madagascar	
Slovenia	Lithuania		Malawi	
Spain	Macedonia		Mali	
Sweden	Malaysia		Mauritania	
Switzerland	Maldives		Moldova	
Trinidad and Tobago	Mauritius		Mongolia	
United Kingdom	Mexico		Morocco	
United States	Moldova		Mozambique	