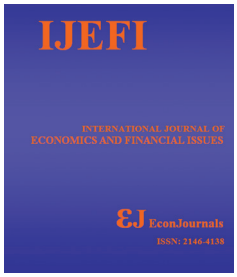

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The Effect of Capital Account Liberalization on Income Inequality, focusing on South Asia#

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ABSTRACT

As a result of globalisation, countries across the world have opened their capital accounts, affecting economic growth, bargaining power of labor, and income inequality. A disproportionately large number of studies on capital account liberalization has focused on OECD and developed countries, leaving gaps in the literature for developing countries. To address this research gap, this paper focuses on the effect of capital account liberalization on changes in income inequality in South Asian countries, specifically Bangladesh, India, and Pakistan. Following Furceri and Lougani (2018), Li and Su (2020), and Quinn-Toyoda (2008), we examine the relationship between capital account liberalization and Gini coefficient as a measure of income inequality. Our findings reveal a small, positive, but statistically insignificant relationship between capital account liberalization and changes in income inequality for 149 countries, including South Asian countries of interest. The results from this study are inconclusive in determining if capital account liberalization exacerbates or reduces income inequality in the South Asian region.

Keywords: Capital Account Openness, Capital Account Liberalization, Globalisation, Income Inequality, Gini Coefficient
JEL Classifications: F13, F36, G15, G28, 011

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1. INTRODUCTION

Capital account liberalization refers to the lessening of restrictions on capital flow across a country's border (Kose and Prasad, 2018). According to Gourinchas and Jeanne (2002), capital account liberalization can be beneficial in several ways, including improving access to foreign capital markets. This, in the process, helps economies to smooth their consumptions against any output fluctuation that may arise. One of the benefits of capital account liberalization[1] includes better allocation of production inputs, which would otherwise be a barrier for poor countries.

Neoliberalism pushed forward the idea that unrestricted capital mobility would benefit an economy, leading to the establishment of capital account liberalization (Chwieroth, 2007). The idea was further driven forward by the work of McKinnon and Shaw. They stated that the repressed financial sector prevented financial intermediaries from effectively channeling savings into investments, impeding economic growth, and the antidote to that was capital account liberalization (McKinnon, 1973; Shaw, 1973). During the late 1970s to early 1980s, developed countries adopted the idea. Developing countries were encouraged to open their capital accounts by the International Monetary Fund (IMF), The World Bank, and the U.S. State of Treasury (Reisen and Fischer, 1993). While there was an initial flow of capital into developing countries following capital account liberalization, a sudden reversal of capital flow in the mid-1990s resulted in major crises,

1 The capital account can be divided into equity, which is categorized as foreign direct investment (FDI) and portfolio equity investment, and debt, which is categorized into portfolio bond investment and bank lending (Dhingra, 2004).

including the East Asia Crisis, which prompted a re-examination of the benefits of capital account liberalization (Kregel, 2008; Henry, 2007; Radelet & Sachs, 1998*)*.

The effect of capital account liberalization on income inequality has been studied for a couple of decades. Quinn (1997) found that capital account liberalization increased income inequality, and Dixon and Boswell (1996) found that when the capital account is liberalized and there is a foreign investment inflow, income inequality is increased. Agnello 2012 and Delis 2014 found that even though financial liberalization helped reduce income inequality for developed countries, the effect of liberalization on income inequality was insignificant for low-income countries. Hence, the result has been mixed.

Capital account liberalization of South Asian countries (i.e., Pakistan, Bangladesh, India, Sri Lanka, and Nepal) has increased capital inflow into the region. Appendix Figure 1 shows the Gini coefficient for the South Asian countries over time. The figure illustrates that inequality is the highest in India. Further, inequality has been on the rise for Bangladesh and India. On the other hand, inequality in Pakistan has been lower than that of the other countries since 1970 and has been relatively constant over time. According to the World Investment Report of 2019, the South Asian region saw FDI inflows of $54 billion, which increased 3.5% from the previous year. However, no study shows whether this increase in capital flow has equally benefitted different income groups within a population. Moreover, this sudden large increase in capital inflow may end in unforeseen outflow, leading to financial crises and, consequently, increasing income inequality, as observed for some East Asian countries. Thus, it is essential to study the trend of capital account liberalization and its impact on income inequality to prevent economic disasters in the South Asian region. The South Asian countries are emerging in the sense that they have been able to ensure a sustained period of economic growth, so it's crucial for these countries to not only reap the benefits of capital account liberalization but also to make sure the gap between the rich and poor do not widen over time. Appendix Table 1 provides an overview of the capital account liberalization reforms or episodes that have taken place. Based on the measure conducted to compute liberalization episodes, there are 259 episodes of liberalization from the entire sample. Concentrating on the South Asian front, liberalization for Bangladesh and India took place in 1996 and 1991, respectively, whereas for Pakistan, there was a liberalization episode in 1983. Bangladesh had a second liberalization episode in 2009. All these findings are consistent with the literature. Overall, there are five capital account liberalization episodes experienced by South Asian countries from 1970 to 2014.

To the best of our knowledge, there is no empirical study emphasizing the effect of capital account liberalization on income inequality in South Asian countries. The paper aims to fill the gap in the literature on capital account liberalization and its impact on income inequality in three developing South Asian countries: Bangladesh, India, and Pakistan. These regions of South Asia have seen a substantial increase in capital flow and have also experienced robust growth over recent times. We specifically wanted to answer whether the surging capital inflow has been beneficial in improving people's lives from across the income board or if one portion of the population has gained more from the capital inflow than others. In addition, this paper employs a novel combined empirical methodology, following the model of Furceri and Loungani (2018)'s Autoregressive Distributed Lag (ARDL) approach[2], as a baseline regression and a modification of a difference-in-difference-in-differences (DDD) estimator based on Li and Su (2000). The DDD estimator allows us to determine subgroup effects and compare South Asian countries in question with the other set of countries, with a reasonable number of observations that would justify the result. Our results show that capital account liberalization has had no significant effect on income inequality across the South Asian countries of interest and is consistent with the limited existing literature for other developing countries. There has been no definitive impact on income inequality due to this liberalization. The findings of this paper can direct policymakers towards making an informed decision regarding the opening of the capital account.

We undertook a secondary analysis to further validate our primary findings, an alternate economic specification: Difference-in-Difference-in-Differences (DDD). The DDD estimator will allow us to determine subgroups effects and additionally allow us to compare South Asian countries in question with the other set of countries, with a reasonable number of observations that would justify the result. Our results show that capital account liberalization has had no significant effect on income inequality across the South Asian countries of interest and is consistent with the limited existing literature for other developing countries. There has been no definitive impact on income inequality due to this liberalization. The rest of the report is as follows: section 2 focuses on a literature review of capital account liberalization and its effect on income inequality, section 3 contains the data and descriptive statistics, section 4 discusses the findings of the analysis, and section 5 contains the concluding remarks.

2. LITERATURE REVIEW

The literature review is divided into three main sub-sections. The first sub-section focuses on stylized facts about capital liberalization in Bangladesh, India, and Pakistan. The second sub-section is the theoretical motivation based on existing literature, followed by discussion and findings of essential papers highlighting both sides of the argument.

2.1. Capital Account Liberalization in the Countries of Interest

Capital account liberalization in South Asian countries began in the 1990s. According to Bekaert and Harvey (1998), India was liberalized in 1992. The government allowed foreign investors to invest in listed Indian securities (Edwards, 2007). Pakistan completed its capital account liberalization in 1991, although the process started in the mid-1980s. The first steppingstone

2 The approach Furceri and Loungani (2018) undertake is that of Cerra and Saxena (2008) and Romer and Romer (2010)

of Pakistan's liberalization took place in the mid-1980s when foreign exchange bearer certificates were introduced that could be purchased by foreigners and Pakistanis using foreign exchange (Shahzad, 2019). Based on the International Monetary Fund (2000) information, capital account liberalization in Bangladesh began in 1997. Bangladesh Taka was declared convertible for current account transactions in Article VIII of the IMF Articles of Agreement (International Monetary Fund, 1996). Moreover, in 2009, there were easing of restrictions in the foreign exchange market, and the country lifted restrictions on matching requirements on forwarding sales (International Monetary Fund, 2010).

2.2. Theoretical Motivation

The most prevalent idea regarding capital account liberalization is that capital will flow from industrialized countries, where the marginal return is low, to developing countries, where the marginal return is arguably high. In return, people in developing countries would benefit by securing jobs and earning wages. While some studies have shown that not all income groups benefit equally from capital account liberalization, thus increasing income inequality, few studies highlight the case for developing countries. However, literature supporting the notion that capital account liberalization can decrease income inequality exists. A brief overall theoretical motivation, a compilation from different authors, is portrayed in Appendix Figure 2. This Appendix Figure, in particular, has motivated me to conduct my analysis to find out whether the South Asian countries in question belong to the left side or the right side of the table. The motivation behind studying the effect of capital account liberalization on income inequality in the three South Asian countries is manyfold. First of all, recent times have seen a substantial increase in capital account liberalization across the globe in terms of lifting legal restrictions on international capital transactions (Larrain 2013). This recent phenomenon by itself is an interesting topic to study. Secondly, much of the literature on income inequality has focused on trade integration rather than capital account liberalization; thus, there is a gap in the literature on the direct effect of liberalization on income inequality (Jayadev, 2007; Furceri and Loungani, 2018). Thirdly, several studies have shown that liberalization disproportionately benefits the richer population, who have better access to financial institutions, increasing income inequality. This is further exacerbated in countries with weak financial institutions and non-inclusive credit access (Furceri and Loungani, 2018). Lastly, the rich and poor gap has increased substantially in South Asia, with the most inadequate lacking access to essential services (Rama, 2014). Whether this increase in inequality has been due to a surge in capital inflow following capital account liberalization has not been extensively studied.

2.3. Discussion and Findings from the Literature

Jayadev (2007) found a robust negative correlation between the degree of openness and the labor share. He argued that the labor bargaining power loss is higher for developed countries than developing countries when capital account is liberalized. In developing countries, labor cost is relatively low to begin with. Therefore there is less room to lower wages, so the bargaining power of laborers is already low, and thus, capital reallocation does not tremendously hurt them. However, in developed countries, labor power takes a hit when capital reallocation occurs because wages may be significantly reduced. Thus, the income inequality between the labor and capitalist owners increases with capital account liberalization.

Brownbridge and Gayi (1999) assessed the achievements, limitations, and constraints of financial sector reforms implemented in eight Least Developed countries and found financial liberalization tended to decrease the number of financial services in rural areas in those countries. The paper found that the share of agriculture in bank lending fell sharply in Malawi and Bangladesh after liberalization, providing suggestive evidence of increasing income inequality. This is because foreign banks entering a liberalized economy tend to serve foreign customers rather than rural areas. Consequently, the agriculture sector and small farmers tend to lose access to credit due to the closure of rural branches.

Kaminsky and Reinhart (1999) analyzed the relationship between banking and financial crisis and found that five years after liberalization, 18 out of the 26 countries studied faced banking crisis. Reinhart and Reinhart (2008), using data from 181 countries from the period 1980 to 2007, also concluded that financial and economic crises are more likely to occur following a surge in capital inflows.

Agenor (2002) empirically concludes that there is a nonlinear relationship between globalisation and poverty and also highlights the 'labor hoarding' hypothesis, which states that unskilled workers, who are more likely to be poor, end up losing their jobs as firms 'hoard' their trained labor force during financially challenging times. Therefore, the impact of the crisis is different for capital owners and workers of varying skill levels, further increasing inequality.

The empirical model of Lensink and Bumann (2016) using the Chinn and Ito (2008) index suggests that the impact of capital account liberalization on income inequality depends on the level of financial depth of a country (measured by private credit over GDP) and accordingly, a country with a strong financial depth will enjoy the benefits of capital account liberalization without affecting inequality, and the result is the opposite for developing countries which do not have strong financial depth.

According to Kose and Prasad (2018), liberalization of a country's capital account can be beneficial in many ways, such as better capital reallocation, 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.

The following two descriptive pieces of literature are the two papers where the authors have developed their methodology from. The first one is the Furceri and Loungani (2018) also showed, using Gini coefficient as the measure for inequality and the widely used Chin and Ito indices for capital account openness, that income inequality and income share of the richest increase with capital account liberalization, The authors postulated that for countries where the financial institutions are weak, liberalization might allow

mostly rich people to better financial access and therefore increase inequality. The authors also mention that even though financial crises may reduce inequality due to bankruptcies and falling asset prices, which may shorten the gap between rich and poor, crises are more likely to be followed by recession, which may have an unfavorable consequence on poor people. Li and Su (2020) investigated the relationship between capital account liberalization and income inequality for OECD and non-OECD countries. They used the dynamic panel fixed effect model and difference-in-difference model with a broad approach and propensity score matching between liberalized and non-liberalized countries regarding capital account liberalization. They found that the effect of capital account liberalization has a more substantial negative impact on inequality in the long run, and this includes a decrease in the income share of the poorest 50% by 2.66-3.79% points and an increase in the income share of the richest 10% by 5.19-8.76% points.

Given the conflicting data on capital account liberalization and income inequality, it is unclear whether everyone in developing countries can benefit from capital account openness. Some of the mechanisms discussed above are more relevant than others when looking at capital account liberalization of the South Asian countries of Bangladesh, India, and Pakistan, such as decreasing access to financial institutions for people living in the rural areas, who constitute a large portion of the population. Given how capital account liberalization might affect the income share of a large part of the population in these countries, it is essential to have a study focusing particularly on these countries. That is what this report focuses on. Bangladesh, India, and Pakistan will be collectively termed as the South Asian countries for the remainder of the paper.

3. EMPIRICAL MODEL AND JUSTIFICATION OF VARIABLES

3.1. Baseline Model

We build upon the empirical model of Furceri and Loungani (2018) and empirically examine the effect of capital account liberalization for 149 countries[3]. Our extended model focuses primarily on South Asian countries compared to the remaining 146 countries. The study covers the period from 1970 to 2014. The baseline methodology consists of estimating a univariate autoregressive equation.

$$\delta\ \text{Inequality}_{i,t} = \beta o + \beta 1\ \text{Inequality}_{i,t-2} + \beta 2\ \text{Capital Account Liberalization}_{i,t} + \beta 3\ \text{Capital Account Liberalization}_{i,t-1} + \beta 4\ \text{Capital Account Liberalization}_{i,t-2} + \beta 5\ \text{Current Account Liberalization}_{i,t} + \beta 6\ \text{Current Account Liberalization}_{i,t-1} + \beta 7\ \text{Current Account Liberalization}_{i,t-2} + \beta 8\ \text{South Asian Countries} * \text{Capital Account Liberalization}_{i,t} + \beta 9\ \text{South Asian Countries} * \text{Capital Account Liberalization}_{i,t-1} + \beta 10\ \text{South Asian Countries} * \text{Capital Account Liberalization}_{i,t-2} + a\ i + \gamma t + u \quad (1)$$

In the equation, the dependent variable is the annual change in the log of Gini coefficient (which is a measure of inequality for this analysis). We also included the lag of inequality as an independent variable to rule out the possibilities of the dynamics of inequality and any correlation of inequality from year to year. Capital Account Liberalization is a dummy variable equal to 1 when the annual change in capital account openness indicator changes by one standard deviation for a country at a given time[4]. Like capital account liberalization, current account liberalization is a dummy variable equal to 1 when the current account liberalization episode begins, and it is equal to zero during other times. The baseline model controls country fixed effects 'a i' to control for characteristics of countries that remain the same over time. The model also controls for time fixed 'γt' to eliminate bias from unobservable characteristics that change over time and controls for global shocks. South Asian Countries * Capital Account Liberalization is the interaction term we are interested in. It is the interaction between a dummy of South Asian countries (which is equal to 1 if it is the South Asian Countries of India, Pakistan, or Bangladesh and 0 otherwise) and capital account liberalization.

3.2. Difference-In-Difference-In-Differences (DDD) Model

As part of a secondary analysis, we built upon the model of Li and Su (2020) and conducted a Difference-In-Difference-In-Difference (DDD) analysis to estimate the impact of capital account openness on income inequality for an 8-year window. DDD would allow us to estimate a difference-in-differences test in multiple treatment groups and multiple time periods, which is very appropriate for our case where different countries are experiencing liberalization at different times, enabling us to investigate the possible causal effect of liberalizing the capital account on income inequality. We specified a fully saturated model with all possible combinations of dummy interactions to capture all possible states.

The DDD specification is given below:

$$\text{Inequality}_{i,t} = \beta_o + \beta_1\ \text{POST}_t + \beta_2 \text{TREATED}_i + \beta_3\ \text{South Asian Dummy}_i + \beta_4\ \text{South Asian}_i * \text{POST}_t + \beta_5\ \text{South Asian Dummy}_i * \text{TREATED}_i + \beta_6 \text{POST}_t * \text{TREATED}_i + \beta_7\ \text{South Asian Dummy}_i * \text{TREATED}_i * \text{POST}_t + a_i + X'\beta + u \quad (2)$$

For the DDD analysis, we cast the dataset in terms of liberalization episodes and period (pre and post). Treat countries are defined as countries that have undergone capital account liberalization, which lasts for at least four years[5]. We averaged the inequality and control variables for the country treated in the episode. We also do the same step for each non-treated country, defined as countries that have not undergone liberalization in that given period of time (within the pre and post-periods) that serve as controls[6]. To identify

3 We use the same 149 countries as listed in Furceri and Loungani (2018)

4 e The start of a capital account liberalization episode is identified when the dummy variable is equal to 1. In all other instances, the dummy variable is equal to 0

5 4 is an arbitrary number. The analysis involves a short-term effect of capital account openness, and hence we use the 4-year average of all the variables before and after capital account liberalization.

6 For refinements in treated countries, in the cases where the countries have two episodes of capital account liberalization, we treat them as two separate observations if the gap between the two liberalization periods is more than 6 years and drop cases if there is a reversal of capital account openness within these 7 years. If there are two episodes of liberalization within 7 years, we only include the first episode and exclude the second one. We drop the case if the identified liberalization year lies within the first two years of the country sample.

untreated countries, we use the broad approach employed by Li and Su (2020). If a country is treated in year t, we consider the 4-years span before the year t and 4-years after t (inclusive of t) as the 8-year window of analysis. During these eight years, if a country does not undergo capital account openness, the country is considered as an untreated (control) country. Countries whose capital accounts are always closed are also considered as control countries. We drop countries that are always open and countries that have missing observations for capital accounts. We limit our analysis to only non-OECD countries for the DDD analysis.

Furthermore, POST is 1 for the 4-year period after the liberalization year (including the liberalization year) and 0 for 4-years before the liberalization period. The dependent variable, log of Gini Coefficient, is measured by the SWIID Database, like the baseline model. The control variables (X'β) are based on the literature (Asteriou et al., 2014; Johansson and Wang, 2014; Seven and Coskun, 2016), which include GDP per capita, the square of GDP per capita, inflation, trade openness, education, age dependency ratio, government consumption, private credit, money supply, and unemployment. The coefficient of interest is β_3 (the interaction term of POST and TREATED) and β_7 (interaction between South Asian Dummy and POST and TREATED). Since the observations are averaged over these two periods, there are two sets of averaged observations for each liberalization episode, one for the average of the 4 years before (pre) and the other for the average of the 4 years after (post) liberalization. This is the case for both the treated countries and untreated countries.

3.3. Data and Methodology

The data for Gini coefficients comes from the Standardized World Income Inequality Database (SWIID)[7], which combines information from the OECD Income Distribution Database, the Socio-Economic Database for Latin America and the Caribbean generated by CEDLAS and the World Bank, Eurostat, the World Bank's PovcalNet, the UN Economic Commission for Latin America and the Caribbean, national statistical offices around the world, and many other sources. Luxembourg Income Study data were also prioritized in the database. The gross Gini coefficient used is the market (pre-tax, pre-transfer) income. The SWIID is the preferred database for inequality over other databases (World Income Inequality Database, Estimated Household Income Inequality Data Set (EHII), World Inequality Database, and World Development Indicators) because the baseline regression is focused on annual frequency analysis, and SWIID has available data for every year for the South Asian countries.

The data for the control variables (X'β) in the DID specification, including GDP per capita, the square of GDP per capita, inflation, trade openness, education, age dependency ratio, private credit, and money supply, are taken from World Development Indicators[8]. Data for capital account openness and current account openness are taken from the Quinn-Toyoda (2008) database[9]. The Quinn-Toyoda (2008) index is constructed based on a simple form of content analysis of the text published in IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), which provides information on the exchange rates regimes and international financial transactions. Alternate methods of *de jure* indicator of capital account restrictions include the widely used Chinn and Ito (2008), which is also based on IMF's AREAER, the 'Ckaopen' index by Karcher and Steinberg (2013), and the Fernández et al. (2016) measure of capital control. While Fernández et al.'s (2016) index is based on capital control restrictions on both inflows and outflows, it does not have the coverage of the 1990s, which is crucial for my research as most of the capital reforms for the South Asian countries took place around that time. The Fernández et al. (2016) index as is (with its disaggregation by assets/direction of lows) cannot be extrapolated back, as the structure of the underlying source (AREAER) changed in 1996. 'Ckaopen,' an index proposed by Karcher and Steinberg (2013)', on the other hand, improves upon the Chinn-Ito (2008) index. However, based on Appendix Table 2, it is evident that if we try to coincide the finding of the liberalization years (based on the indicators as described) with the liberalization years stated in the literature, Quinn-Toyoda (2008) provides us with the closest measure among all. We used Quinn-Toyoda (2008) for the analysis based on this reasoning.

Several methods have been used in the literature to identify the capital account liberalization year for a particular country. The method gets more challenging when the criteria of liberalization are applied to a larger set of countries (Furceri and Loungani, 2018). While Furceri & Loungani (2018) and Bernal-Verdugo et al. (2013) identify a liberalization episode when a given country has a two standard deviation and a mean change in the capital account index, we use Larrain (2013) method of identifying liberalization episodes as when, for a given country at a given time, the annual change in the capital account openness indicator exceeds by one standard deviation. This method helps capture the relatively small changes in the absolute value of openness of capital account of South Asian countries. Using the method of Furceri & Loungani (2018) and Bernal-Verdugo et al. (2013), who use two standard deviations and one mean change to identify episodes, is relatively more stringent and will miss the small reforms of South Asia countries. Although the Larrain (2013) method is very lax in the sense that it will classify any changes in the index as a significant reform, it is the preferred method for identifying episodes in South Asian countries since the reform years found using this method coincides with that found in the literature. To maintain consistency, we use Larrain (2013) method to construct the current account liberalization episodes. As mentioned previously, both the capital and current account liberalization are dummy variables identifying liberalization episodes when it is equal to 1 and 0 otherwise.

The basic descriptive statistics are reported in Appendix Table 3. It is divided into two primary segments: the full sample which consists of 149 countries and the South Asian sample. The picture

7 I used the SWIID 8.2 version of the excel file. Retrieved from: https://dataverse.harvard.edu/file.xhtml?persistentId=doi:10.7910/DVN/LM4OWF/DBWK5H&version=3.0

8 The data for control variables are taken from the World Development Indicators. Retrieved from: https://databank.worldbank.org/source/world-development-indicators

9 I am thankful to Dr. Dennis P Quinn for sharing the dataset with me. The dataset is not publicly available

in both cases look quite similar. In both the cases, the average overall change in Gini coefficient is positive, indicating that the inequality has been increasing over time for all the countries. For the South Asian countries, the average increase is slightly more than the full sample. The Gini coefficient ranges from 22.4 to 68.6 for the entire sample, where the higher the Gini coefficient, the higher is the degree of inequality for a particular country.

The capital account openness ranges from 0 (which is fully restricted capital account) to 100 (which is fully open capital account). The change in overall change in capital account openness is also positive, which means that the restrictions of capital account have lessened over time. To sum up, an overall picture from descriptive statistics suggest that capital account openness and inequality have increased over time.

Appendix Figure 3 shows a definite pattern in terms of average Gini coefficient before and after the liberalization episode. The average Gini coefficient 4 years and 1 year before the liberalization was less than 45. The average Gini coefficient 1 year after liberalization was slightly above 4 and 4 years after liberalization, this average increased to 45.5. Hence, the change in the average Gini coefficient before and after the beginning of these liberalization episodes suggest that capital account liberalizations, on average, is associated with an increase in the average of Gini coefficient.

4. FINDINGS AND DISCUSSION

The results in Appendix Table 4 shows the baseline regression results. Column A provides us with the effect of capital account reform on inequality without controlling for any other factor. Then we add new controls and assess how this impact of liberalization episodes changes. We find no significant impact of capital account liberalization on inequality, and this is not only true for the entire sample but also when we interact the South Asian countries with the capital account liberalization episodes. However, the results are not in line with the findings of Furceri and Loungani (2018) who uses the same dataset[10] and the same set of countries and concludes that capital account liberalization episodes are associated with a persistent and statistically significant impact on inequality.

Column (C) of Appendix Table 4 is very similar to Column (B), where we add the interaction of being a South Asian country with the two-year lags of capital account reform episodes. The results do not change much. The effect of initial year of capital account liberalization episode of Non-South Asian countries is associated with a 0.0074% point increase in inequality, holding other factors constant and it is statistically insignificant at all levels. The interaction term of column C now means that difference in inequality between South Asian countries having capital account liberalization episode and not having capital account liberalization episodes is 0.080% points higher than non-South Asian countries having capital account liberalization episodes and not having capital account reform episodes. The coefficients are also very small compared to the overall change in Gini coefficient (4.3%) as reported in Appendix Table 2.

Using the estimates of the baseline regression, we have traced out the response of capital account liberalization reforms on inequality in Appendix Figure 4. The figure illustrates the estimated effect of capital account liberalization and the associated 90% confidence bands (dotted lines). Capital account liberalization episodes have statistically insignificant and very small lasting effects on income inequality. The Gini index increased by a mere percent (a little above 0% Gini index) in the initial year of liberalization, and it increases to 0.07% 3 years after the occurrence of the reform episode. Appendix Table 5 is very similar to Appendix Table 4, but it adds capital account reform and its 2 years lags as a robustness check to each column to see if my original coefficient of interest changes. As can be seen in Column A, the initial year of capital account liberalization episode is associated with a 0.0058% point increase in inequality, and the effect is statistically insignificant at 10 % level of significance.

The result of Difference-In-Difference-In-Differences (DDD) analysis is given in Appendix Table 6. Column E is the DDD analysis. Here, we assume that prior to capital account liberalization, the treatment and control countries are behaving in a similar way but after the liberalization, the treatment countries behave differently relative to the control countries. The triple interpretation between South Asian dummy, Treated Countries and Post is the coefficient of interest which can be interpreted as the differences between two differences hence the name difference-in-difference-in-difference. In this case, the two differences are firstly, 'the difference between the change in inequality among South Asian countries when treated and when not treated' and secondly, 'the difference between the change in inequality among all other countries when treated and when not treated'. The second difference is then be subtracted from the first difference. The coefficient, here is -0.0005, which means that the change in inequality after liberalization was 0.05% point lower among SA countries than among Non-South Asian countries and the effect is statistically insignificant at 10% level. This is particularly a very small coefficient because the average change of Gini coefficient for the control countries is 9.6% and even if I add 0.05% points to that, it does not change much. Overall, the effect of liberalization is 0.12% lower in inequality in the South Asian countries and the effect is statistically insignificant (the p value of F-test is 0.9890). The control countries would have followed the same pattern as the treatment countries after liberalization had the control countries experienced liberalization.

Column D involves the full sample of countries. The coefficient of interest is the interaction between post and treated. The coefficient is 0.0002 meaning that the change in inequality after liberalization was greater (0.02% point higher) among treated countries (countries who have experienced capital account reforms) than

10 The database of SWIID has been revised completely (Solt, 2019) from the one that has been used by Furceri and Loungani (2018). This is most likely the main source of variation between my result and the result of Furceri and Loungani (2018). One of the many revisions include the use of adult-equivalent scale in the revised dataset which previously was considered a single category and the SWIID's revised estimates of uncertainty has been improved. (Solt, 2019).

the untreated countries (countries who have not experienced capital account reforms). This effect, like the other coefficients in the DDD model, is also statistically insignificant at 10% level of significance.

Similar to Appendix Tables 6 and 7 added the control variables (inflation, domestic credit to private sector, school enrolment, general government consumption, urban population to total population, age dependency ratio, trade as a percentage to GDP, GDP per capita and GDP per capita square) to the baseline DDD model. The main variables of interests (the interaction terms as noted above) in Column D and Column E do not change much, although the individual country-wise results (of Column A, Column B and Column) change quite a lot. The interaction coefficient (of TREAT*POST) on Column A means that the change in inequality after liberalization was greater (0.149% point lower) among Bangladesh as the treated country than among the untreated countries (which haven't experienced liberalization during the two episodes in which Bangladesh had liberalization). Previously, the coefficient was positive without the inclusion of control variables. This effect is still statistically insignificant at all levels. Similar to the interpretation of Column A, the interaction coefficient (of TREAT*POST) on Column B means that the change in inequality after liberalization was lower (0.246% point lower) among Pakistan as the treated country than among the untreated countries (which haven't experienced liberalization during the episode Pakistan had experienced liberalization). The sign did not change but the coefficient got smaller in this case, and the effect is statistically insignificant at 10% level. Lastly, the interaction coefficient on Column C means that the change in inequality after liberalization was lower (0.293% point higher) among India as the treated country than among the untreated countries (which haven't experienced liberalization during the episode India had experienced liberalization). The coefficient got bigger and the sign was negative previously. The effect, like Column A and Column B, is statistically insignificant at all levels.

The main variable interests are TREAT*POST of Column D and TREAT*POST*SOUTH ASIAN of Column E. The coefficient of triple interaction of Column E is -0.01596, which means that the change in inequality after liberalization was 1.5% point lower among SA countries than among Non-South Asian countries and the effect is statistically significant at 10% level. Although the coefficient got bigger, it is still relatively small compared to the average change of Gini coefficient for the control countries. For Column D, the coefficient of the interaction term (TREAT*POST) is 0.00079 meaning that the change in inequality after liberalization was greater (0.079% point higher) among treated countries (countries who have experienced capital account reforms) than the untreated countries (countries who have not experienced capital account reforms). In this case, the coefficient got even smaller compared to the case which excluded the use of control variables. Overall, our interpretation and results do not change much after the inclusion of control variables because although the signs of the individual countries (of Column A, Column B and Column C) change, but all the coefficients in all the columns remain small and statistically insignificant. Therefore, the final findings remain consistent with the baseline findings.

5. CONCLUSION

The effect of capital account liberalization on income inequality in developing countries remain unclear. In this study, we attempted to address the issue, focusing on three South Asian countries: Bangladesh, India, Pakistan. According to our analysis, these countries have partially open capital accounts, and the liberalization of these accounts have been taking place steadily. Overall, the effects of capital account liberalization, although positive in most of the cases, are rather small, and all the coefficients are statistically insignificant. We find no definite relationship between capital account liberalization and inequality, taking the control variables into consideration. Our results are consistent with the findings of Jayadev (2007), who also saw no effect of capital account liberalization on income inequality for a number of developing countries. We also analysed 146 other countries, and in those cases, we also found no clear link between capital account liberalization and income inequality. Thus, the findings of our analysis cannot provide any strong policy recommendations to policymakers regarding capital account liberalization in the South Asian countries.

Income inequality in the countries of interest may have gone up due to reasons other than capital account liberalization. These countries have very steadily opened their capital account, which may have prevented a drastic change in income inequality. If this observation is true, then these countries can continue to open their accounts slowly, while monitoring any change in income inequality, such that any marginally negative effect of capital account liberalization can be swiftly resolved by partially closing the capital account for some time, until the inequality is brought back to its earlier stage.

There are a couple of limitations to our research, beginning with data of capital account openness. The Quinn-Toyoda (2008) index of capital account openness is a widely used measure for studying capital account liberalization. However, the data is not of the highest quality and has not been updated since 2014. As mentioned before, we would have been unable to capture change in capital account openness for our countries of interest, if we had used Furceri & Loungani (2018) index (a change of two standard deviation and one mean of a particular account), since it requires a large change in capital account openness and the changes in my countries of interest were small. The measure we instead use is the Larraine (2013) method, which allows us to capture the small changes in capital account openness. This ultimately helped us to ensure that the liberalization episode align with what was stated in the literature. In order to maintain consistency, we used the same method for all the countries. However, using Larraine (2013) method may not be the best one to capture liberalization for all the other 146 countries, since it measures any positive change in capital account openness as liberalization episode, which can lead to overestimation error.

Future studies of our analysis can attempt to find better methodology to separate the methods in a way which would

allow consistency as well as ensure that the above limitations are reduced, providing a clearer picture of the effect of capital account liberalization on income inequality across countries of all economies. In addition to that, studies can also compare these countries specifically with other countries of the same region, as well as look in-depth for country-specific traits and case studies.

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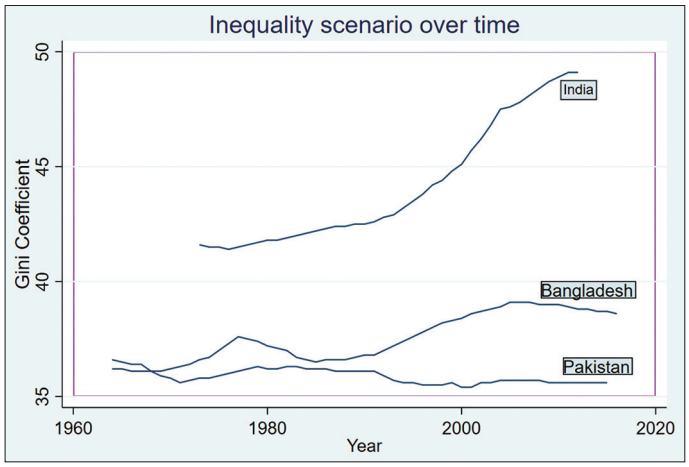
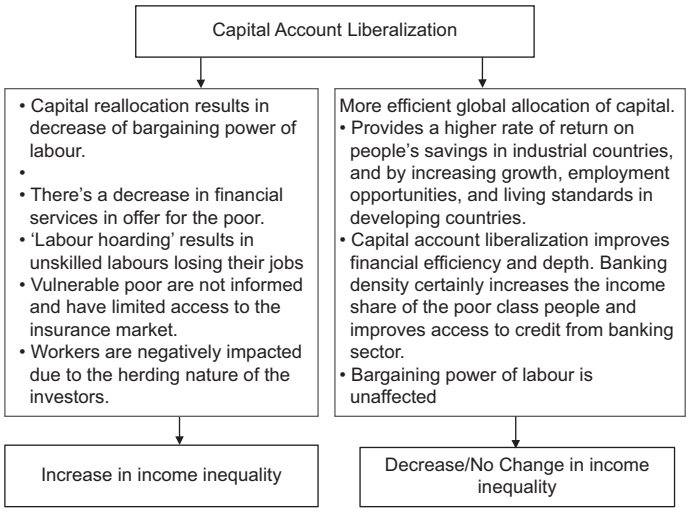
APPENDIX

Appendix Figure 1: Inequality scenario over time

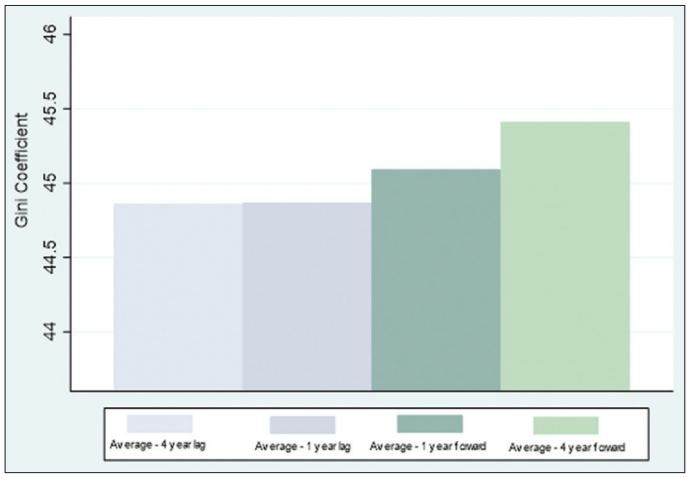


Source: Authors' Work

Appendix Figure 2: Authors' compilation from different literature

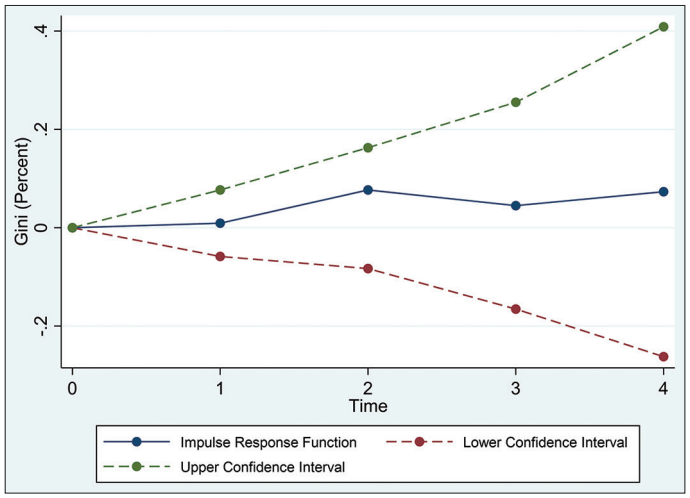


Appendix Figure 3: The evolution of inequality before and after capital account liberalizations



Source: Authors' Work

Appendix Figure 4: The effect of capital account liberalization on inequality, Gini (percent)



Note: Impulse Response Function (IRF) is estimated using the specification in baseline model. The solid line corresponds to the IRF; dotted lines correspond to 90% confidence bands.
Source: Authors' Work

Appendix Table 1: Number of capital account liberalization reforms

Country	70s	80s	90s	2000s	2010-2014	1970-2014
Full Sample	**19**	**47**	**105**	**76**	**12**	**259**
Bangladesh	0	0	1	1	0	2
India	0	0	2	0	0	2
Pakistan	0	0	1	0	0	1

Source: Authors' Work

Appendix Table 2: Comparisons of capital liberalization indices

Measure	Country	70s	80s	90s	2000s	2010-2014	1970-2014	Exact Years	Literature
Kaopen Measure	Bangladesh	0	0	2	0	0	2	1992, 1994	1997, 2009
Ckaopen Measure	Bangladesh	0	0	2	0	0	2	1992, 1994	
Quinn-Toyoda Measure	Bangladesh	0	0	1	1	0	2	1996, 2009	
Kaopen Measure	India	0	0	0	0	0	0		1992
Ckaopen Measure	India	0	0	0	1	0	1	2000	
Quinn-Toyoda Measure	India	0	0	2	0	0	2	1991, 1994	
Kaopen Measure	Pakistan	1	0	1	0	0	2	1972, 1999	Mid 1980s, 1991
Ckaopen Measure	Pakistan	1	0	1	0	0	2	1972, 1999	
Quinn-Toyoda Measure	Pakistan	0	1	0	0	0	1	1983	

Source: Authors' Work

Appendix Table 3: Descriptive statistics

	N	Average	SD	Min	Max
Sample: Full Sample (149 Countries)					
Gini	3396	45.45	6.13	22.4	68.6
Change in Gini	3396	0.043	0.32	−1.79	2.2
Capital Account	3396	66.81	28.96	0	100
Change in Capital Account	3396	0.802	6.37	−50	62.5
Sample: South Asian Countries					
Gini	126	39.1	3.88	35.4	49.1
Change in Gini	124	0.075	0.165	−0.3	0.7
Capital Account	126	29.26	12.16	12.5	50
Change in Capital Account	124	0.2	3.18	−12.5	12.5

Source: Authors' Work

Appendix Table 4: The effect of capital account liberalization on inequality (1970-2014), OLS

	Column A	Column B	Column C
	Gini Growth (t)	Gini Growth (t)	Gini Growth (t)
Gini Growth (t-1)	0.538024***	0.538108***	0.538148***
	(0.043739)	(0.043770)	(0.043800)
Gini Growth (t-2)	0.105099***	0.105084***	0.105015***
	(0.031292)	(0.031299)	(0.031346)
Capital Account Reform (t)	**0.000092**	**0.000074**	**0.000074**
	(0.000342)	(0.000348)	(0.000348)
Capital Account Reform (t-1)	0.000257	0.000258	0.000270
	(0.000413)	(0.000413)	(0.000424)
Capital Account Reform (t-2)	−0.000174	−0.000172	−0.000177
	(0.000393)	(0.000393)	(0.000402)
South Asian Countries*Capital Account Reform (t)		0.000823	**0.000807**
		(0.000962)	(0.000983)
South Asian Countries*Capital Account Reform (t-1)			−0.000530
			(0.001009)
South Asian Countries*Capital Account Reform (t-2)			0.000195
			(0.000565)
Country Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
N	3396	3396	3396

Source: Authors' Work

Appendix Table 5: The effect of capital account liberalization on inequality (1970-2014) with controls, OLS

	Column A	Column B	Column C
	Gini Growth (t)	Gini Growth (t)	Gini Growth (t)
Gini Growth (t-1)	0.537934***	0.538028***	0.538070***
	(0.043828)	(0.043861)	(0.043896)
Gini Growth (t-2)	0.105607***	0.105588***	0.105529***
	(0.031497)	(0.031505)	(0.031566)
Capital Account Reform (t)	**0.000058**	**0.000038**	**0.000038**
	(0.000357)	(0.000364)	(0.000365)
Capital Account Reform (t-1)	0.000167	0.000167	0.000177
	(0.000462)	(0.000462)	(0.000477)
Capital Account Reform (t-2)	−0.000271	−0.000269	−0.000276
	(0.000369)	(0.000369)	(0.000379)
Current Account Reform (t)	0.000040	0.000049	0.000050
	(0.000331)	(0.000333)	(0.000334)
Current Account Reform (t-1)	0.000282	0.000285	0.000280
	(0.000382)	(0.000382)	(0.000389)
Current Account Reform (t-2)	0.000328	0.000326	0.000327
	(0.000378)	(0.000377)	(0.000377)
South Asian Countries*Capital Account Reform (t)		0.000833	0.000828
		(0.000974)	(0.000996)
South Asian Countries*Capital Account Reform (t-1)			−0.000396
			(0.001079)
South Asian Countries*Capital Account Reform (t-2)			0.000291
			(0.000562)
Country Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
N	3396	3396	3396

Source: Authors' Work

Appendix Table 6: The effect of capital account liberalization on inequality, Difference-in-Difference-in-Difference (DDD) model

	Column A	Column B	Column C	Column D	Column E
	Gini Coefficient	Gini Coefficient	Gini Coefficient	Gini Coefficient	Gini Coefficient
	Bangladesh	Pakistan	India	Full Sample	Triple DID
POST	−0.002	0.015**	−0.000	0.003***	0.003***
	(0.003)	(0.006)	(0.002)	(0.000)	(0.000)
TREAT* POST	**0.011**	**−0.005**	**−0.001**	**0.0002**	**0.0003**
	(0.018)	(0.033)	(0.012)	(0.003)	(0.003)
SOUTH ASIA* POST					0.005**
					(0.002)
SOUTH ASIAN*TREAT*POST					**−0.0005**
					(.)
_cons	3.780***	3.749***	3.794***	3.778***	3.778***
	(0.002)	(0.004)	(0.002)	(0.000)	(0.000)
Fixed Effect	Yes	Yes	Yes	Yes	Yes
N	203	68	56	6786	6786

Source: Authors' Work

Appendix Table 7: The effect of capital account liberalization on inequality, Difference-in-Difference-in-Difference (DDD) model with controls

	Column A	Column B	Column C	Column D	Column E
	Gini Coefficient	Gini Coefficient	Gini Coefficient	Gini Coefficient	Gini Coefficient
	Bangladesh	Pakistan	India	Full Sample	Triple DID
POST	0.00064	−0.00134	0.00748	0.00072	−0.00043
	(0.00603)	(0.01166)	(0.00594)	(0.00087)	(0.00088)
TREAT*POST	−0.00149	−0.00246	0.00293	0.00079	0.00149
	(0.02332)	(0.01213)	(0.02545)	(0.00285)	(0.00289)
SOUTH ASIA*POST					0.01549***
					(0.00221)
SOUTH ASIA*TREAT*POST					−0.01596
					(0.01260)
Inflation, consumer prices					−0.00001***
					(0.00000)
Domestic Credit to Private Sector	0.00040	0.00041	0.00047	0.00023***	0.00024***
	(0.00029)	(0.00122)	(0.00041)	(0.00004)	(0.00004)
School Enrollment	−0.00011	−0.00045		−0.00009	−0.00011*
	(0.00047)	(0.00077)		(0.00006)	(0.00006)
General Government Consumption	−0.00136	−0.00038		0.00037*	0.00035
	(0.00129)	(0.00593)		(0.00022)	(0.00022)
Urban Pop. to Total Pop.	0.00144	−0.00008		0.00251***	0.00272***
	(0.00212)	(0.00484)		(0.00030)	(0.00030)
Age Dependency Ratio	0.00188	−0.00047		0.00139***	0.00141***
	(0.00116)	(0.00142)		(0.00017)	(0.00017)
Trade (%) of GDP	−0.00009	−0.00002	0.00028	−0.00001	−0.00002
	(0.00023)	(0.00110)	(0.00058)	(0.00004)	(0.00004)
GDP per capita	−0.00002*	0.00008	−0.00001	−0.00001***	−0.00001***
	(0.00001)	(0.00008)	(0.00002)	(0.00000)	(0.00000)
GDP per capital square	0.00000	−0.00000	0.00000	0.00000**	0.00000**
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Constant	3.68752***	3.78609***	3.79651***	3.59347***	3.58462***
	(0.15176)	(0.21834)	(0.07074)	(0.02143)	(0.02123)
N	149	35	52	4719	4719

Source: Authors' Work