

## Capital account liberalisation in India: Volatility of capital flows and selective policy issues

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**Abstract.** *This paper attempts to investigate the relationship between capital account openness and occurrence of financial risks in India by employing finite distributed lag model. Annual data from 1979 to 2018 on real effective exchange rate, real interest rate, international reserve and net capital have been used to compute Exchange Market Pressure index and the degree of capital account liberalization. The study finds that opening up of capital account will have harmful effects on the financial stability of the country in the initial years, say a year or two. However, the degree of financial risks will go down in later years by influencing capital inflows. Finally, the study has suggested that the Reserve Bank of India needs to take precautionary measures to mitigate short term volatility of capital flows before choosing fuller capital account convertibility.*

**Keywords:** capital account liberalization, financial stability, real exchange rate, real interest rate, foreign exchange reserve, finite distributed lag model.

**JEL Classification:** F20, F21, F31, F37, F41.

## 1. Introduction

The matter of capital account liberalization has always taken a lot of heat from the time the wave of globalization and liberalization swept over most of the emerging economies to periods of financial meltdowns, particularly that of the 2008 financial crisis which had cascading effects worldwide depending on a country's level of integration into the world economy. The objective of liberalizing capital account is to transfer and reallocate capital and assets from capital-rich nations to capital-poor nations, which is reflective of changes in the ownership patterns of the assets in an economy.

Economists of varying school of thoughts have different opinions regarding the same. On one hand, there are some economists, such as Stanley Fischer who advocate on the lines of traditional neo-classical theory. They suggest that financial liberalization can contribute to a more inclusive efficiency in the world through allocation of resources from those who have excess of it to those who are starved of it but will be able to use them more productively and effectively leading to a general upward trend in social welfare. Free capital movement would ensure that people of various countries would be able to reduce the cost of capital along with risks associated with it and gain more returns by diversifying their portfolios. This point of view argues that capital liberalization will lead to development and expansion of financial system which will in turn ensure financial stability.

It is also argued that financial liberalization can generate greater competitiveness in the economy, promoting efficiency and innovation. For instance, if barriers to capital movement are substantially reduced, then it will attract a large number of foreign financial institutions and entities to enter into that country. This may hurt the domestic financial institutions in the short-run, encouraging them to improve their type and quality of financial goods and services, subsequently promoting efficiency. This is of great importance in the context of a country like India which is considered be a relatively capital-scarce economy. On the other hand, many economists such as Dani Rodrick and Joseph Stieglitz argue that capital liberalization can lead to financial instability due to the volatile nature of short-term capital flows. One of the greatest flaw in neo-classical theory is that it assumes that market for financial and capital goods is same as market for ordinary goods and services. However, the former depends upon information-gathering which may not be perfect all the time, leading to disequilibrium in the economy. The major bone of contention that capital account liberalization leads to financial stability and decline in risks is also heavily criticised. Direction of capital flows is mainly determined by the lender's or investor's perception about risk and gain, and he/she may choose to pull his/her money out whenever they perceive there to be any kind of risk.

The numerous preconditions imposed by IMF and various committees (such as Tarapore committee in India) also require a lot of discipline, political and macroeconomic variable stability in the economy which may or may not be translated into reality. For instance, Tarapore committee had laid down various preconditions that had to be met before India opted for full conversion of rupee on capital account. It included stabilization of inflation rate within the target range of 3 to 5 percent, financial consolidation and improvement in performance of financial sector. However, this never manifested into reality as India continued to have stricter capital controls.

High capital controls in China and India have been repeatedly applauded, for having helped these economies to not get dragged into the catastrophe of Asian financial crises and financial meltdown of 2008. Even though the capital flows are heavily criticised by many, India and China happen to be two of the most popular and largest recipients of foreign direct investments. Even after attracting such high investments, both the countries have never been deeply affected by any financial crisis. According to the literature, there is no explicit positive correlation between financial liberalization and financial instability. Financial liberalization then may or may not have an impact on the volatility of different types of capital flows. One view also suggests that financial crisis can in fact lead to a better institutional and political environment.

Research conducted in China, a country which is comparable to India in various aspects such as demography, economic growth rate, purchasing power parity et cetera, has also shown that even though it employs capital controls, it is on its path to greater capital convertibility. This is of even more relevance to China due to the development of belt and road initiative along with formation and expansion of Asian Infrastructure Investment Bank. It has been revealed through various papers that when China opened up its economy to capital flows, there was instability for a time period of one year, which was later compensated by financial stability in the long-run.

Even though India opened up its economy in 1991 after the advent of LPG policy, it had not reduced its controls on capital account. Opening up of capital account remained a huge debate amongst numerous economists as many blamed it for causing numerous financial crises. Reserve Bank of India had set up a special committee to analyse and direct full capital convertibility in 1997. The committee laid down various preconditions that were necessary for the same. However, its recommendations were never fully realized. The Tarapore committee was set up again in year 2006, and similar to their earlier experience, the recommendations were again neglected. It is thus very imperative to understand why India chose to disregard the committee's suggestions and continue to have capital controls. To understand that, it is first vital to establish an association between financial liberalization and financial stability through application of econometric models that takes country-specific characteristics and time lag into consideration. Inclusion of macroeconomic variables such as real effective exchange rate, foreign exchange reserves and real interest rate will provide a correct picture of the capital account liberalization scenario in India.

Similarly, it is important to compare the Indian experience with that of other emerging economies and countries in its vicinity due to several similarities. Countries in South America and Mexico show that the economy and financial system slow down after opening up of the capital account. This can be exemplified by the Mexican exchange rate crisis of 1994 wherein the peso got severely devalued against the US dollar and is considered to be one of the first crisis due to capital openness. Likewise, countries in sub-Saharan countries also show that there is an inverse relationship between financial liberalization and financial stability. Greater emphasis then would have to be given to political environment, financial infrastructure, exchange rate regime and institutional framework for the country to reap benefits from full capital convertibility. These different perspectives and contradictions seem to baffle its readers. Hence, it is crucial to develop a model to study the impact of

capital account openness on soundness of financial and banking sector of the economy. Against these backgrounds, the major issues arises are; Will capital account liberalization lead to financial stability in the economy? How long does capital account liberalization have an influence on the stability of domestic financial system? Is the overall influence of financial liberalization on financial market positive or negative? Is the Indian institutional framework, financial infrastructure and exchange rate regime supportive of capital account liberalization to create positive effects?

Against the background and research issues, the **major objectives of the study** is to examine the relationship between financial liberalization and financial risk by employing finite distributed lag model. Also, it necessary to forecast the influence of capital account convertibility on the stability of financial system of the economy. Finally, the study test whether overall influence of capital movement on financial stability is positive or negative.

## 2.1. Literature review

The economic transactions of a country are reflected on its balance of payments either through the current account or the capital account. Simply put, current account reveals the net income of the economy whereas capital account shows the ownership of assets. Sequencing of the two reforms has also garnered a lot of attention, that is, which account should be liberalized first- current account or capital account? James A. Hanson (1992) criticizes the conventional theory of liberalizing current account before capital account which suggests that liberalization of the latter would lead to unwarranted real appreciation of real exchange rate. However, research shows that there is a greater availability of resources in the economy if capital account were to be liberalized first.

Most of the countries have still opted for current account liberalization before that of the capital account because of growing skepticism around the latter even when numerous research papers show that free capital movement can prove to be beneficial for the economy. For instance, Bogdan Bogdanov (2014) has identified the relationship between large capital movements and volatility of foreign exchange rate and capital flows. To test the same, the author has used propensity score matching methodology on data covering 69 countries for a period of 31 years from 1980-2011. The results of the study show that when an economy opens up its capital account, it leads to lower volatility of foreign exchange rates and that financial liberalization may or may not have an impact on the volatility of long-term and short-term capital flows. Furthermore, the study also suggests that capital account convertibility can lead to stronger institutional foundation and political stability in the economy.

Finally, there is also another group of academicians and researchers that propagate that an economy need not follow any sequence, that is, the developing economies on the path of fuller capital account liberalization can initiate both financial and external reforms concomitantly. This strategy will ensure in mitigating all the distortions in a single shot and will help in reducing costs and maximizing benefits derived from both these reforms. For instance, Philippe Bacchetta (1992) examined the bearing of a combined liberalization of financial sector and capital account by comparing both the simultaneous and sequential

strategy of liberalization. They found out that in the initial periods, a country receives more of capital inflows and is followed by capital outflows in the subsequent periods. It also leads to rise in prices of shares along with rise in the level of investment.

Similarly, Liqing Zhang and Qin Gou (2015) have explained the impact of reform sequencing and risks associated with it on capital account convertibility in China. In their analysis consisting of 50 countries in the time frame of 1973 to 2005, the authors found out that reforms of the domestic financial sector and gradual elimination of credit controls can reduce the instances of financial instability and crises. The paper highlights the importance of accelerating domestic banking reforms along with opening up of capital account and that it should be made the utmost priority for the Chinese economy and must include strengthening of insurance system, capital markets, banking and financial system as well as interest rate liberalization.

Still, many economists remain ardent and long-standing critics of capital account convertibility. Capital account liberalization has constantly become a burning issue time and time again, especially during the times of financial crises. Asian financial crisis of 1997 and financial meltdown of 2008 are convincing evidences for the critics to keep blaming capital account for the fall and slowdown of well-managed and advanced economies such as United States and South Korea. Joseph Stiglitz (1999) in his paper titled “Capital Market Liberalization, Economic Growth and Instability” develops a case against the liberalization of capital account by finding empirical weaknesses in the cases supporting the same. He highlights the importance of having an effective regulatory framework in place instead of opening the capital account hastily. He has focused on the effectiveness of the short-term capital flows instead of the long-term capital flows such as FDIs as he believes that such “investment brings with it not only resources, but technology, access to markets and (hopefully) valuable training, an improvement in human capital”. He questions the traditional theory which propagates that more transparency and better access to information can decrease the occurrence of financial crisis, suggesting that capital flight can be beneficial. However, in Scandinavian countries such as Norway, Sweden and Finland, where transparency is the highest amongst all the nations, incidence of financial crisis has also been very high. There is also a great deal of speculation regarding the reforms dedicated to strengthening of the foundation of financial institutions in emerging and poorer economies. It is alleged that EMEs and poorer nations cannot reduce the adverse impact of capital account, when even the developed and financially strong nations continue to face the brunt of full capital convertibility.

On the same lines, Ismail Ceviz and Cem Kadilar (2001) have investigated the impact of short-term capital movements on the Turkish economy through application of vector auto-regression model. The authors have found out that the policies which promote high interest-low exchange rate result in larger amount of short-term capital inflows which as mentioned above happen to be very volatile in nature. They propose certain controls on capital inflows such as taxation on capital imports, stronger government intervention and sterilization policies to safeguard EMEs from macroeconomic instability due to international speculation.

While many economists consider the volatility of short-term capital flows to be the main culprit for financial instability, some believe that foreign direct investments (FDIs) can also lead up to financial fragility. For instance, Ajit Singh (2003) has analyzed the impact of liberalizing capital account on free long-term capital flows, financial crisis and economic development of a country. He has addressed many controversies surrounding the subject matter by asking questions such as why is there an increase in crises in emerging economies after capital account liberalization and if these adversities can be compensated by faster economic growth in the long run. He has claimed in his paper that FDIs, which are strongly supported by numerous economists such as Stiglitz himself, may not lead to financial and economic development of a nation. The author believes “that even FDI, if unregulated, may do more harm than good to many countries”. He has also found weak empirical evidence for faster long run economic growth after full capital convertibility.

While full capital convertibility remains a topic that baffles many, it is a general consensus amongst numerous economists that there are certain preconditions that need to be met before opening up the capital account. For instance, Daianu and Vrancean (2003) have examined various policy issues for developing countries when they open up their capital account. In 1980s, it was widely believed that financial liberalization would lead to greater economic gains, however higher incidence of crises distorted the relationship between development and capital liberalization. The authors propose various prerequisites before opening up the capital account such as: (i) stabilized inflation and exchange rate; (ii) well-organized information and statistical system; (iii) low corruption and money laundering, (iv) increase in competitiveness through appropriate policy measures, and (v) development of an efficient financial system.

Apart from these prerequisites, other factors such as adaptability of domestic financial institutions also play a big role. Allegret, Courbis and Dulbecco (2003) have discussed the influence of financial liberalization on stability of the financial system from the institutional perspective. They highlight on the importance of adaptability of domestic financial institutions when financial reforms are employed. When the capital account is opened, international investors play a dominant role. At this point, it becomes very imperative to develop a well-organized and efficient financial institutional infrastructure which makes use of capital controls to help stabilize the financial system.

While some give importance to the adaptability of financial institutions in the emerging economies, some highlight on the importance of political environment that can help smoothen the hostile impacts of liberalization. Xiang Li and Dan Su (2016) have analyzed the impact of free capital movement on the level of bank risk using bank-level data. The authors have taken a large bank level dataset for 75 countries for a time period of 18 years from 1995-2013. The study reveals that both individual bank risk and systemic bank risk tend to escalate during financial opening of the economy. However, these unfavourable impacts can be softened by suitable political and economic environment.

In India, the task to suggesting a pathway to full capital account convertibility was assigned to the Tarapore Committee (1997) which was created by the Reserve Bank of India. The committee mentioned several preconditions for the same such as: (i) Fiscal consolidation, (ii) mandated inflation target between 3 to 5 percent, and (iii) strengthening of financial

system through reduction in non-performing assets and average affective cash reserve ratio (CRR). The first time the committee was set up, they had recommended the operation of capital account convertibility for a period of three fiscal years from 1997-1998 to 1999-2000. However, the committee's proposal was never translated into full convertibility, and India still employed capital controls which are now worldwide appreciated to have reduced the impact of various financial crises. Some can argue that the reason why India escaped Asian financial crisis was because of its reforms of partial convertibility. The second time the committee was again set up in 2006, wherein they suggested three phases for 100% capital liberalization. Certain preconditions were again laid down for the same such as: (i) increase in external commercial borrowings (ECB); (ii) Provision of tax benefits and higher investment opportunities to NRIs, and (iii) improvement in banking regulations. The recommendations of the committee were again met with the same unfortunate fate.

M.J. Manohar Rao has examined the interaction effect of several variables such as foreign exchange reserves, inflation rate, money, interest rates and growth rate to critically evaluate the suggestions that have been laid down by the Tarapore committee. The author found out that the recommended 6 percent growth rate and 5 percent inflation rate are inconsistent with the recommended foreign exchange reserve requirements, however they are consistent with the current foreign interest rates if the economy makes use of tighter monetary policies. The paper also cautions the economy and its policymakers to not take any hasty decisions regarding capital account convertibility. It is extremely crucial for an economy like India to strengthen its financial sector and other preconditions before opting to take such a big step.

On the other hand, researchers such as Nachane (2010) believe that India is facing reduced fiscal space, loss of sovereignty of monetary policy and unpredictability in exchange and equity market due to its incompetence in imposing capital controls at the right time. As it would also result in uncertainty regarding investment decisions, he proposes that India should make use of complementary set of policies, that is, capital controls on inflows such as: (i) interest equalization taxes, (ii) sector-wise regulation of FDI, (iii) taxes on external commercial loans and controls on outflows such as exchange controls along with financial regulations.

However, in contrast, even though large capital flows are associated with high inflation, financial sector fragility, real exchange rate misalignment and imbalances in current account, India has been worldwide appreciated to have absconded macroeconomic and financial instability. Rakesh Mohan and Muneesh Kapur (2009) have analyzed various macroeconomic and external sector policies and reforms to explain less volatility of capital flows in India. Various policy measures such as: (i) active management of capital account; (ii) tighter restrictions on access of financial institutions, entities and intermediaries to external borrowings; (iii) Managed floating exchange rate, (iv) expansion of financial markets, and (v) timely regulations of financial sector have resulted in low inflation and financial stability even at times of financial meltdowns. India serves as an example for many countries and suggests that capital controls can be effective by making use of multiple instruments that are at the disposal of the central bank rather than implementing just a single one.

For a deeper understanding of relationship between capital convertibility and financial stability, various economists and researchers have extensively studied the cases of transitional and emerging economies. For instance, Sheng Li in his paper has attempted to theorize the concept of capital account convertibility in the context of developing countries. While there is a general consensus in the traditional economics that developed countries gain at the expense of losses and risks faced by their developing counterparts when they open their capital account, the author in the paper proves that that reverse can also actually be true. By pushing their developing counterparts on the path of full capital convertibility, developed nations may reduce their own first-mover advantage when it comes to strategic bargaining for capital mobility benefits.

Willem Buiter and Anita Taci have studied the impact of financial and capital account liberalization on financial development of countries that are still in the transitional phase from partial convertibility to full convertibility. Capital account transition has led to substantial restructuring and development of financial sector. However, this progress has not been equitable in all the countries. Even the advanced countries with financially strong institutions have not been successful in achieving an efficient banking sector. It is crucial for these economies to work on making their financial infrastructure stronger. Irrespective of level of banking reform, timely regulation and monitoring, stricter enforcement of laws and corporate governance are very important for overall financial development of the economy.

Literature on capital liberalization of economies such as China, Pakistan and Bangladesh (that lie in the vicinity of India) and other Latin American, Middle-eastern and African countries are of great significance as they are comparable to India in various aspects. Li-Gang Liu (2005) has analyzed the impact of capital account liberalization on domestic financial institutions of China through application of gravity model. The study shows that financial liberalization has proved to be a stimulus for China's financial system. As more and more foreign banks are setting up, their influence over Chinese financial structure is increasing which will rise more when there is a higher decline in barriers and capital controls. This will help in encouraging efficiency in the banking sector.

Another paper by Yuanyuan Shen and Lu Yang (2015) has given a detailed analysis on the impact of capital movement on the financial stability of the Chinese economy. The authors have employed finite distributed model to test the same. The authors suggest that financial liberalization will have adverse impact on financial stability for a one year period but will aid financial stability in the long run. The authors have also suggested various policy measures such as: (i) improvement in economic restructuring; (ii) development and expansion of foreign exchange markets, and (iii) managed floating exchange rate.

Similarly, Joseph Ollo (2018) has also established a relationship between capital account liberalization and financial stability through the application of finite distributed lag model employed in 31 sub-Saharan African countries for a time period of 19 years from 1996-2015. He has made use of exchange market pressure index (EMP) to measure financial risk. He concludes that financial liberalization has a negative impact on financial stability of African countries and suggests improvement in macro-economic and institutional setting



for enhancement of financial development. A major limitation of this paper is that it has failed to take specific country characteristics or heterogeneity into consideration.

Batuo et al. (2017) has also analyzed the impact of financial liberalization on financial stability, economic growth and financial development in 41 African countries for period of 25 years from 1985-2010. The findings of the paper expose that financial liberalization has indeed led to greater financial instability. Even though higher economic growth can help in reducing financial instability, the rate of reduction is much slower in post-liberalization period than in pre-liberalization period.

Ganesh Kumar Nidugala (1997) did a comparative analysis on the journey of capital account liberalization of India and Mexico. Through this paper, the author tries to explain why and how India was able to evade a crisis similar to the peso crash that occurred in Mexico in 1994. The author cites several reasons for the same, such as: (i) India followed a correct pattern of reform sequencing and went for a gradual opening of the capital account whereas Mexico went for the reverse; (ii) Financial sector reforms were slow in India compared to rapid growth of the same in Mexico; (iii) Gradual trade liberalization in India and (iv) the fact that India had moderate restriction on long term capital flows such as foreign direct investment and tighter restrictions on short-term portfolio flows (which are very volatile in nature) in contrast to full liberalization of both long and short term capital flows in Mexico during the same time period.

Ashima Goyal (2012) has discussed the future of capital account liberalization in South Asia. The author has compared Indian experience with that of other South Asian countries such as China, Bangladesh and Pakistan. India has adopted a strategy of deepening of the domestic financial market into the world economy and improvement in government finances before full capital convertibility. China and India have had similar strategic capital controls and hence are considered two of the fastest growing economies in the world. Whereas, Pakistan which has had more open capital account has faced many BOP crisis and has had to turn to IMF for help numerous times. Bangladesh, on the other hand, has had more severe controls and has needed aid only once.

Sarah M. Brooks (2004) has analyzed capital account liberalization in Latin America and the OECD countries for a sample period of two decades. The paper shows that countries in South America with more fragile domestic financial system and institutions face higher risks of transitional costs following liberalization and move slowly towards openness. In the OECD countries, however, financial weakness is linked with lower transitional costs and hence, move at a relatively faster pace than South American nations. Analysis of the transitional costs of financial liberalization thus helps us to understand how market pressures may act as a stumbling block, rather than stimulus, for market-oriented reforms in Latin America.

Aidi Wafa (2013) evaluates the liberalization dynamics and its implications on financial stability of nine middle-east and North African countries (MENA) for a period of 28 years from 1980-2008. The study has made use of Hansen model to show that financial and capital openness has a nonlinear relationship on exchange pressure and incidence of

financial crises. It is hence vital, and a challenge to maintain a balance between financial and commercial integration.

Even though most of the literature on CAL suggests that financial crisis give a nudge to economies to liberalize their capital account, some economists like Thomas B. Pepinsky (2012) believe that it is actually the reverse that is true. As a consequence of crisis, most of the economies are found to impose capital control in the pretense of self-help. Through his research, he proves that crises are often associated with “capital account closure” in many developing and emerging economies. Hence, the results are inconsistent with the conventional theory that periods of financial meltdowns and depressions lead to adoption of neo-liberal policies.

Literature on liberalization of capital account has also faced scrutiny, especially in their approach towards testing its impact on financial variables. Peter Blair Henry (2007) has tested a theory to explain the impact of financial liberation on cost of capital, investment and economic growth of the country. He links capital account liberalization to neo-classical growth model to ask a very imperative question: “If evidence lines up with the theory, then why does liberalization have no real effects?” This is because of the fact that most research papers have used cross-sectional approach which fails to provide accurate results due to measurement errors and country heterogeneity. The paper suggests a policy-experiment approach to capital account liberalization as it will take into account the differences in economic reforms of distinct economies. The major findings of the paper are that when a nation liberalizes its capital account, the cost of capital falls which subsequently increases investments as well as economic growth rate. He concludes by mentioning that while conducting research, one should not commit the mistake of ignoring the temporary rise in investments as it can permanently raise the standards of living of an economy.

Similarly, Eswar S. Prasad and Raghuram G. Rajan (2008) have shown that there is a little connection between capital account liberalization and economic growth of developing countries due to the failure in methodology of not taking heterogeneity into consideration, such as domestic savings of different countries as proposed by neo-classical model. They also advice that financial liberalization is not an appropriate policy for poorer countries that are tainted by weak policies and institutions. It is thus prudent to have disciplined policies as well as stronger institutional framework before opening up the capital account.

As proposed by above mentioned papers, Dennis P. Quinn and A. Maria Toyoda (2008) have tested the relationship between capital account liberalization and economic growth. They have used pooled time-series, system GMM estimators and cross-sectional OLS to evaluate economic growth rates for a period of 49 years from 1955-2004 for 94 countries. The authors have established that financial liberalization has positive impact on growth of both advanced as well as emerging economies as opposed to prior research papers that couldn't establish such a relationship due to measurement errors and usage of different time periods in the study that would lead to high multicollinearity among explanatory variables.

## 2.2. Research gap

It has been established, as mentioned above, that capital account openness can lead to financial instability in the economy as also exemplified by the financial crisis of 2008, 1994 Mexican exchange rate crisis and Asian financial crisis of 1997. However, some studies have also shown that there is no direct correlation between financial liberalization and financial instability. This makes it extremely imperative to test whether capital account convertibility will lead to financial soundness or not. Moreover, in the Indian context, researchers have not employed any model to test the same. Application of finite distributed lag model can assist in estimating the degree of capital account openness and financial stability in the economy. Most of the researches done in this area have concentrated on theoretical analysis of the same with detailed examination of policy measures that were adopted by India. There also has been no analysis on how long the capital account liberalization will have an effect on stability of domestic financial institutions and entities.

Moreover, India opened up its economy in 1991 after the advent of LPG policy, it had not reduced its controls on capital account. Opening up of capital account remained a huge debate amongst numerous economists as many blamed it for causing numerous financial crises. Reserve Bank of India had set up a special committee to analyse and direct full capital convertibility in 1997. The committee laid down various preconditions that were necessary for the same. However, its recommendations were never fully realized. The Tarapore committee was set up again in year 2006, and similar to their earlier experience, the recommendations were again neglected. It is thus very imperative to understand why India chose to disregard the committee's suggestions and continue to have capital controls. To understand that, it is first vital to establish an association between financial liberalization and financial stability through application of econometric models that takes country-specific characteristics and time lag into consideration. Inclusion of macroeconomic variables such as real effective exchange rate, foreign exchange reserves and real interest rate will provide a correct picture of the capital account liberalization scenario in India. Hence, the present study occupies higher level of significance for empirical estimations.

## 3. Research methodology

In this section, the author describes the variables that help establish a relationship between capital account openness and financial stability in the economy. Then, the paper models the equation using a finite distributed lag model. This section also covers the reasons for selecting the period of study along with sources of data.

### 3.1.1. Model specification

Exchange Market Pressure Index (EMP) as an indicator for the degree of financial risk. To measure and quantify the degree of financial instability and risk, the paper employs exchange market pressure index (EMP) as a proxy variable for the same. Exchange Market Pressure Index, also popularly known as "currency crisis stress index" is an aggregation of a standardized change in exchange rate, interest rates and foreign exchange reserves. As

the name suggests, the purpose of this index is to analyze the occurrence of currency crisis in a country at a given point of time.

According to Eichengreen et al. (1996) in their paper “Contagious Currency Crises”, currency crisis is seen as an excess pressure that the monetary authority can help prevent or keep in control by running down their foreign exchange reserves or by raising the interest rates or through currency depreciation. Thus, EMP is a weighted average of the changes in real interest rates, real exchange rate and international reserves. Hence, this index is considered to be one of the most comprehensive and significant indicators of financial instability.

According to the author, exchange market pressure index is defined by the following equation:

$$EMP_t = \lambda_{RER} \frac{\Delta RER_t}{RER_{t-1}} + \lambda_{RIR} \frac{\Delta RIR_t}{RIR_{t-1}} + \lambda_{FER} \frac{\Delta FER_t}{FER_{t-1}} \quad (1)$$

where  $EMP_t$  is the exchange market pressure index and the formula for it includes summation of variables such as RER which is the real exchange rate, RIR which is the real interest rate and FER which is the foreign exchange rate.  $\Delta RER_t$  is the change in real exchange rate,  $\Delta RIR_t$  is the change in real interest rate and  $\Delta FER_t$  is the change in foreign exchange reserve. The symbols  $\lambda_{RER}$ ,  $\lambda_{RIR}$  and  $\lambda_{FER}$  are the weights for the variables as specified.

Even though application of unweighted formula of  $EMP_t$  will lead to simpler outcome and time-saving computation, taking weights proves to be an extremely crucial step as it takes into consideration the volatility aspect of these variables. Taking a weighted average will ensure that no one variable among the three dominates the entire index. Therefore, to ensure that the conditional variance of the three components are equal, we use weights as defined by the following formula:

$$\lambda_i = (1/\sigma_i) / (1/\sigma_{RER} + 1/\sigma_{RIR} + 1/\sigma_{FER}) \quad (2)$$

where  $\sigma_{RER}$ ,  $\sigma_{RIR}$  and  $\sigma_{FER}$  are the standard deviations of real exchange rate, real interest rate and foreign exchange reserves.

The table below shows the standard deviations and the weights for the three variables which have been computed with the help of the equations given above:

**Table 1.** Standard variance and weights of RER, RIR and FER

	Real Exchange Rate	Real Interest Rate	Foreign Exchange Reserve
Standard Variance ( $\sigma$ )	24.78	2.58	884771
Weight ( $\lambda$ )	0.0943	0.9057	2.64104E-06

### 3.1.2. Definition of capital account liberalization

Removal of restrictions on capital account ensures that there is free mobility of capital flow, both of long-term FDI and short-term portfolio flows and therefore “scale of capital flows” can be used to estimate the degree of capital account openness. The extent of capital account openness (LB) can be measured by taking the difference between capital outflows

and capital inflows and then dividing it by the country's GDP for the specific year. According to the paper "Capital Account Liberalization and Economic Performance: Survey and Synthesis", this definition of LB shows the long-term trends that exist in the capital markets, which reflects the changes in capital account convertibility in a longer period.

$$LB = \frac{\text{Net Capital.}}{GDP} \quad (3)$$

### 3.1.3. Overall estimations

In this section of the paper, the author tries to establish a relationship between the degree of financial risk and capital account openness and determine how movements in capital flows have an impact on the occurrence of financial crisis in the economy. For this purpose, both the lagged and current influences of capital account openness i.e. LB are taken. The paper has used finite distributed lag model on data covering a period of 39 years from 1979-2018.

Thus, the author estimates the following equation with the help of variables as described in sections 3.1.1 and 3.1.2:

$$EMP_t = \alpha + \beta_0 LB_t + \beta_1 LB_{t-1} + \beta_2 LB_{t-2} + \beta_3 LB_{t-3} + \dots + \mu_t \quad (4)$$

where the exchange market pressure index ( $EMP_t$ ) is the response variable and measures the degree of financial risk,  $LB_t$  is the explanatory variable and measures the degree of capital account openness and  $\mu_t$  is the residual term. The subscript "t" indicates the time period for the particular variable.  $\beta_0$  is the impact or short-run multiplier and measures the change in the mean value of  $EMP_t$  due to a unit change in the  $LB_t$  in the same time period. The summation of all the  $\beta$ 's ( $\beta_0 + \beta_1 + \beta_2 + \dots$ ) gives the total or the long-run multiplier, measuring how the current and lagged values of the independent variable have an impact on the dependent variable over a period of time.

### 3.2. Period of study and sources

The paper has covered 39 years of data on real exchange rate, real interest rate, foreign exchange reserve and net capital flows from 1979 to 2018 to compute and establish a relationship between the degree of financial risk and degree of capital account openness. The author has taken data from 1979 to understand the flow of capital into the country even before the advent of LPG policy in 1991 i.e. fuller current account convertibility. The author has collected data on net capital, GNP (at current price), foreign exchange reserve, real effective exchange rate from the RBI's Handbook of Statistics on Indian Economy and data on real interest rate has been collected from IndiaStat.com.

## 4. Empirical results

As an economy opens up its capital account, it becomes more susceptible to financial risks due to the effect of sudden and short-term capital flows. However, this impact is an accumulation of both current and lagged influences of capital account liberalization as shown in Eq. (4).

### Test for stationarity (Unit Root Test)

To test for stationarity, the paper has employed Augmented-Dickey Fuller test (ADF) and Phillip-Peron test, two of the most common and popular unit root tests available. The results for the same are tabulated in Table 1. From the table, it can be observed that the time series data for both capital account openness (LB) and exchange market pressure index (EMP) is stationary at level i.e. raw data is stationary and therefore, regression analysis can be implemented.

**Table 2.** Test for stationarity and causality

	EMP	LB
ADF test	-5.6087 (0.0000)	-6.1166 (0.0000)
Phillip-Peron test	-5.7002 (0.0000)	-6.1880 (0.0000)

**Note:** The values in cell show the t-statistic for the ADF test and adjusted t-statistic for the Phillip-Peron test for both the variables with probability values in the brackets below. Null hypothesis for ADF test is that the variables EMP and LB have unit root.

### Granger causality test

Table 1 shows that the null hypothesis for LB i.e. LB does not Granger Cause EMP is rejected and is significant as its probability is 0.0163 (less than 5%). This proves that LB is useful in forecasting the dependent variable (EMP). Whereas, we reject the null hypothesis for EMP as the p-value is more than 5% level of significance (p-value is 0.0826).

**Table 3.** Test for Granger causality

	EMP	LB
Granger Causality test	2.3195 (0.0826)	3.6741 (0.0163)

**Note:** The values in cell show the F-statistic for the variables with probability values in the brackets below. The null hypothesis for Granger causality test for EMP is that EMP does not Granger Cause LB while null hypothesis for LB is that LB does not Granger Cause EMP.

As the results derived from ADF test, Phillip-Peron test and Granger Causality test are significant, we can run regression analysis successfully.

### Empirical findings

A finite distributed lag model has been performed as prescribed in the Eq. (4) using EViews Software, which has provided the following results:

**Table 4.** Estimated regression equation

$$EMP_t = 0.146927 + 16.43942LB_t^* - 24.53080LB_{t-1}^{***} + \mu_t$$

$$S_e = (0.319093) (8.548737) (7.738147)$$

$$t = (0.460453) (1.923023) (3.170113)$$

$$R^2 = 0.2594 \quad S_e = 0.8133$$

**Note:** The numbers in parenthesis below indicate the values of standard error and absolute values of t-statistic of the estimated coefficients. \*, \*\*, \*\*\* indicate that the estimated coefficients are statistically significant at 0.1, 0.05 and 0.01 level respectively. *EMP* = exchange market pressure index (indicator of the degree of financial risk); *LB* = degree of capital account openness.

The regression results show that the influence of time delay of capital account convertibility on the financial stability of India lasts for about a year. It can also be inferred from the above results that the short-term/ impact multiplier effect of the degree of capital account openness is significant (at 10%) and positive, with the value of 16.43942. This shows that there is a direct relationship between the explanatory and response variables. Thus, more open the capital account, the degree of financial risk as measured by the exchange market pressure index (EMP) also increases. Whereas, the long-term multiplier effect of the same is negative, valuing at (-) 8.09138 i.e. as capital account gets liberalized gradually over the years, financial risks associated with it will fall. This shows that capital account openness can lead to volatility in financial market in the initial years, however can aid in financial stability in the long run.

This result has been proved by numerous authors and economists who suggest that fuller capital account convertibility can lead to financial risk due to increasing amount of capital inflows and outflows, especially the sudden and highly volatile short-term flows. This would give rise to financial instability, reflecting the volatility of foreign exchange market. However, in the long run, to accrue the benefits of CAC, the economy will device various policies to improve the financial environment of the country through reforms related to foreign exchange rate, interest rate and foreign exchange reserves.

However, one needs to keep in mind that because of low R squared, the data also suggests that there are other variables apart from those that we have already considered in computation of capital account openness that have an impact on the degree of financial risks in the Indian context.

## 5. Conclusion and policy implications

The paper attempts to establish a relationship between fuller capital convertibility and level of financial risks in India i.e. whether opening capital account in India would have a positive or negative impact on the financial stability of the economy. Using annual data from 1979 to 2018, the author has formalized two key variables of the model i.e. exchange market pressure index (EMP) and degree of capital account liberalization (LB) by using crucial macroeconomic variables such as real effective exchange rate, real interest rate, international reserves and net capital flows.

The paper has then employed a finite distributed lag model to understand how current and lagged values of capital flows-both inflows and outflows-have an impact on the degree of financial risks in the economy. From the empirical analysis, it can be observed that the immediate impact or the short-run effect of capital account liberalization is harmful for the overall financial stability of the economy. This is because there is a positive and significant relationship between EMP and LB. However, within one year of opening up of capital account, the economy starts to accrue the benefits of fuller capital account convertibility as with time it leads to financial stability. Therefore, capital account liberalization should be adopted by the economy even if it experiences harmful effects in the very beginning. Nevertheless, this effect will only last for a period of one year in the Indian economy according to the data that has been analyzed for a timeframe of 39 years.

However, there are several suggestions that the policymakers need to keep in mind before opting for fuller capital convertibility. Firstly, the monetary authority of India needs to take precautionary measures to mitigate the adverse impact of short-term, sudden and highly volatile capital flows

Moreover, the economy also needs to take several measures to strengthen its banking sector as it has been proposed by the Tarapore committee in 2006 such as: (i) incorporation and formalization of shadow banking sector; (ii) providing encouragement and incentives to institutions that help or back up private banks as such private banks have proved to be extremely successful; (iii) conversion of non-banking financial companies into full-functioning banks; (iv) alignment of voting rights of the investor to that of the Companies Act; (v) reevaluation of the performance of the top management and employing measures to strengthen it; and (vi) ensure that all banks, both in private and public sector have a level playing field.

The economy also needs to take several measures for the development of its financial market which is inclusive of equity market, corporate bond market, money market, government securities market etc. by focusing on three main aspects i.e. (i) development of physical infrastructure in terms of IT and technology, disaster management and communication services; (ii) adoption of techniques to improve skills and capabilities of the top management and people who lead the offices in the financial sector; and finally (iii) improvement of quality of regulatory arrangements that are already in place.

In addition to this, it is also extremely imperative for the Indian government to develop and create a strong foundation for its foreign exchange markets which can help the economy in realizing proper resource allocation, price discovery as well as prevention of financial risks and uncertainty. Government can also incentivize banks that have a stronger balance sheet to lend and borrow from foreign banks for both short-term and long-term, however at the same time have restrictions on banks with weaker balance sheet.

Finally, several policies should come into place to ensure that there is a proper diversification of portfolios and investment strategies to reduce systematic financial risks. The government and other related bodies such as SEBI also need to focus on promotion of healthy investment environment for the benefit of the national and international investors. Promotion of a healthy investment environment will require creating an extensive regulatory and legal capacity that can manage capital inflows, promote policies that attract long-term investments on physical infrastructure and manufacturing and encourage responsible business conduct of MNCs. India needs to pay heavy attention on not only the quantity of capital flows, but also the quality of capital flows to ensure that there is persistence of financial stability in the country.

### **Limitations of the study**

One of the limitations of the study is that the R squared for the study is quite low. This suggests that there are other variables apart from those that have already been considered in computation of capital account openness that have an impact on the degree of financial risks in India. Due to lack of data availability on debt creating and non-debt creating capital flows, the author has not been able to focus on their impact on overall financial stability.



### Future scope of the study

Using the same model, a comparative analysis can be conducted for emerging countries to find out if the results for these countries are same or not, and if they are, an investigation can be carried out to find out the differences that lead to financial stability in some countries and financial instability in other countries. In this panel data, country specific characteristics should be taken into consideration such as different types of exchange rate regimes that are in force in each country that are considered in this study.

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