

Abstract:

The objective of this paper is to explore how the liberalisation of the financial sector affects private household consumption volatility, in South Korea. We focus on both the liberalisation of the domestic sector and the foreign sector. Using data over the period 1973-2014, the results show that liberalisation of the domestic sector is more strongly associated with lower consumption volatility than liberalisation of the foreign sector. We compare these results to Ang (2011), who examines India, finding them contradictory. We conclude that the differences are a result of the different levels of financial development at the time of liberalisation.

1. Introduction

Financial liberalisation, or the loosening of government regulations on financial markets, has been a prominent economic trend in recent decades. This shift, characterised by deregulation, privatisation, and increased competition, aims to enhance efficiency and promote economic growth. The most notable of these liberalisation waves occurred in the late 1990s and early 1990s, following the collapse of communism and the end of the Cold War. Global financial integration has increased as a result (Abiad et al., 2009). Many of these economies, especially in Asia, experienced rapid economic growth. However, there have also been concerns about macroeconomic volatility increasing during this period. (Ang, 2011) Most notably in the East, the Asian Financial Crisis: the flotation of the Thai exchange rate in mid-1997 triggered a panicky reassessment of risks that fed into a cross-country financial contagion of negative expectations, collapsing asset prices and exchange rates across East and Southeast Asia. Whereas financial crises in Latin America in the 1980s and Mexico in the 1990s were blamed mainly on bad macroeconomic policies such as excessive fiscal deficits and overvalued exchange rates, the Asian countries had generally been following reasonably good macro policies and, in addition, had been liberalising their financial systems as one element of fuller participation in the expanding globalised economy (Cole and Slade, 1998). If the Asian countries experienced macroeconomic volatility despite financial liberalisation and good macro policies, can we say that financial liberalisation had any effect?

This macroeconomic volatility is important to study. Loayza et al. (2007) argue that macroeconomic volatility can have negative effects on welfare in developing countries, including reduced investment, lower long-term economic growth, and increased levels of poverty.

There is a theoretical relationship between finance and macroeconomic volatility.

Lenchenko (2005) considers a two-agent model for opening up a country to the international financial market. Uribe, Schmitt-Grohe, & Woodford (2017) show that macroeconomic volatility is higher in countries with limited access to credit. Stiglitz and Weiss (1981) present a model that shows how imperfect information in financial markets leads to credit rationing; the more informational friction (i.e. underdeveloped financial market) the more credit rationing and the larger the credit constraints on the economy and households. On the other hand, Sutherland (1996) shows a two-country model where increasing financial market integration between the two countries reduces short-run consumption volatility. So, although there is certainly a relationship, the direction of the relation is ambiguous.

This makes the subject of financial liberalisation's effects on macroeconomic volatility an empirical issue. Yet even the empirical findings seem to be mixed. Ang (2011) shows a positive relationship between financial liberalisation and consumption volatility in India, while Makoto (2020) shows a negative relationship when studying Zimbabwe. Kose et al. (2003) provide the best explanation for these differences: liberalisation's effects depend on the state of the pre-liberalisation financial sector. These structural differences in economies are what hamper cross-country studies on this area.

In this paper, we will contribute to the literature by applying Ang (2011)'s methodology to study the development of South Korea. We will use updated policy indicator measures from the IMF, based on the original indicators used by Ang (2011). We will split the study of financial liberalisation into two sectors: the domestic sector and the external sector. The former focuses on domestic regulation and the latter focuses on access to the international financial markets and capital flows.

We find that there is strong significant evidence that liberalisation of the domestic financial sector in South Korea had a negative effect on consumption volatility while we find weaker evidence of a similar effect for the liberalisation of the external financial sector.

In the rest of this paper, we shall go into more detail. Firstly, we will examine the existing literature, starting with the theoretical literature, followed by seeing what empirical evidence supports each view discussed. We will then discuss the data and methodology behind it, producing a structural equation. Finally, we will deliberate on the results of the models used and show that these results are robust to changes in the underlying methodology of the volatility measure and the external finance policy indicator.

2. Literature Review

In this section, we shall evaluate the current literature on the subject of financial liberalisation and consumption volatility. We will find that most of the theoretical literature agrees that financial liberalisation will have some significant effect on consumption volatility/risk sharing in an economy but disagree on the direction of this effect. We will then analyse the empirical evidence and conclude that credence should be given to Levchenko's (2005) analysis that unequal access to markets (i.e. lack of financial development) can lead to a breakdown in domestic risk-sharing capability upon sector reforms that liberalise the market.

The idea behind consumption risk sharing is that households are able to adequately smooth their consumption over time, to the extent of not responding (or only responding minimally) to income fluctuation/shocks, and that the consumption pattern between households in the economy should, as such, be highly correlated (Cavoli & Gopalan, 2023).

Empirically, with the presence of efficient markets without significant restrictions or frictions present (such as that caused by over-regulation of the market or bureaucratic allocations), we should be able to witness that macroeconomic consumption volatility reduces over time. Financial liberalisation, theoretically, should remove credit constraints for many households, helping them to mitigate the effects of income shocks. This is one of the chief benefits of financial liberalisation proposed by the theoretical literature, at the macroeconomic level it should allow economies to better smooth consumption through international risk sharing (Levchenko, 2005).

However, this is where the literature diverges; the results of financial liberalisation are highly debated, both empirical studies and theoretical models disagree on the effects of such liberalisation. According to classical Dynamic General Equilibrium (DGE) models, such as those discussed in Uribe, Schmitt-Grohe, & Woodford (2017), macroeconomic volatility is higher in countries with limited access to credit, an economy can gain access to more credit via the international credit markets - as such financial liberalisation should decrease consumption volatility and macroeconomic volatility in general. Sutherland (1996) considers such a model, using a two-country intertemporal general equilibrium model, to show that increasing financial market integration between two countries reduces short-run consumption volatility by providing more options for consumption smoothing. Such models, however, don't consider the case where there is uneven access to international markets and capital. Credit rationing on international markets may limit the amount of participants in said markets.

Stiglitz and Weiss (1981) present a model that explores how imperfect information in financial markets can lead to credit rationing: a situation where lenders restrict access to credit even though there are willing borrowers. Lenders may not be able to perfectly distinguish between good and bad type borrowers, leading to an asymmetry of information.

Stiglitz and Weiss predict that banks and other financial intermediaries can't use the mechanism of raising interest rates as it could increase the riskiness of the bank's portfolio, either by discouraging safer borrowers or by inducing them to invest in riskier projects. The obvious criticism of this is that the bank could simply raise the collateral requirements. However, Stiglitz and Weiss show that this objection does not hold. If smaller projects have a higher probability of "failure", and all potential borrowers have the same amount of equity, then increasing the proportion of equity finance or collateral requirements will imply financing smaller projects. As such increasing the riskiness of the bank's portfolio. Another example given is that in the scenario where all potential projects require the same investment. Wealthy borrowers may be those who have succeeded in risky investments in the past, these borrowers are more likely to be less risk-averse than less wealthy (thereby more conservative) borrowers. If you screen out these less wealthy borrowers through increasing collateral requirements, you are left with borrowers with more appetite for risk. Thus, you inadvertently increase the riskiness of the bank's portfolio (Stiglitz and Weiss, 1981). As such there is credit rationing in markets with imperfect information, and perfectly good borrowers are denied finance.

We can apply this to international financial markets, as in Levchenko (2005). In Levchenko's model examining consumption volatility and credit markets, there are two types of agents, A and B. Only type A's have access to the international markets, this may be a problem of credit rationing in the international financial markets, as in Stiglitz and Weiss, 1981; or a problem of unequal physical access to the international financial markets, e.g. there being no banks in an agent's geographical area that deals in the international markets, as is discussed in Ang (2011). Agents' stochastic endowments are e_s^A and e_s^B in each $s = 1, 2$. We assume that endowments are perishable so there is no savings (this way we focus entirely on the financial markets). Type A agents can insure against a worse state by committing some endowment to the financial markets or enter

into a risk-sharing agreement with Type B. When there is no aggregate risk, the agent's incomes are perfectly negatively correlated. $e_1^A = 1 + \varepsilon$ and $e_1^B = 1 - \varepsilon$ and vice versa for $s = 2$. Foreign insurance provides $-\varphi^f$ to type A in $s = 1$, and φ^f in $s = 2$, for each unit of endowment type A commits to the international markets. There is a cost to entering the foreign markets denoted by π . Levchenko then provides us with a general formulation. (Levchenko, 2005).

The closed-economy case is replicated when π is prohibitively high so that even without type B, type A would be unwilling to enter the foreign market. This means the domestic risk-sharing relationship remains intact. At the opposite extreme suppose that the international market is costless ($\pi = 0$), then under Levchenko's general formulation type A opts for full insurance on the international market meaning the domestic risk-sharing relationship breaks down completely, as type B cannot offer type A with favourable enough terms of domestic insurance without violating their own participation constraint (Levchenko 2005). Due to the perfect negative correlation between the endowments of A and B, B is left completely uninsured, thus decreasing their lifetime utility and the aggregate lifetime utility of the economy.

Levchenko also remarks that lowering the international barriers type A faces ($\pi \rightarrow 0$) makes A worse off. International markets play two simultaneous roles under the Levchenko framework. Firstly, insuring abroad improves A's total lifetime utility by smoothing some of A's consumption. Secondly, A's ability to access international markets raises A's outside option, irrespective of whether A actually participates in the international market. This second effect is detrimental to A's ability to insure domestically, thus reducing A's welfare comparatively. (Levchenko, 2005).

Levchenko's model predicts that in an economy where the domestic financial market is underdeveloped compared to the foreign market, then the liberalisation of the financial

markets so that the international financial market becomes accessible to some of the population will lead to a complete breakdown in domestic risk sharing. With a complete breakdown in domestic risk sharing, those that do not choose to insure abroad or those who can't access the international market will experience an increase in consumption volatility due to an inability to insure against income shocks. (Levchenko, 2005; Ang 2011).

On an aggregate level, if there are more type Bs than there are type As – representing a lack of domestic market development – then the economy will experience an uptick in the level of macroeconomic volatility. Research has shown that instability has a persistent effect on economic growth. Growth is slowed for several years after a crisis has occurred (Stiglitz, 2000).

Stiglitz (2000) argues a similar point to Levchenko (2005), except focusing on investors and capital accounts instead of consumers. Consumption volatility is a product of both the ability to smooth consumption and income shocks, Stiglitz's argument as to why financial liberalization causes instability focuses on the income shocks. Financial and capital markets are fundamentally different from markets for goods and services. The main function of capital is information gathering – assessing the viability of projects and firms to yield the highest returns and monitoring them so that the funds are used appropriately. Such information, as alluded to before, is imperfect. Hence, arguments treating the financial and capital markets as the same as the markets for goods and services, i.e. the arguments for free trade, are incorrect (Stiglitz, 2000). Secondly, the idea that the liberalisation of capital markets allows for diversification, thereby enhancing stability is also wrong. Capital markets are pro-cyclical (Stiglitz, 2000). It speaks to the old adage that “Bankers are happy to lend you money when you don't need it,” except on a macroeconomic scale. When the bankers see economic weakness, capital flows out of the country, exacerbating the perceived weakness. Perceptions of “emerging market risk”

often lead to capital outflows, undermining the developing countries financial system. Once these capital outflows start more follow as the entire financial system becomes weaker (Stiglitz, 2000). It becomes a self-fulfilling crisis.

On the opposite side of the coin, if financial liberalisation does not induce stability does financial regulation? Once again, we are focusing on the income side of the consumption volatility equation. Stiglitz, 2000, presents the following arguments:

(a) Capital inflows

During the crises of the late 1990s, Chile imposed what essentially was a tax on short-term inflows. This has reduced the volatility of the pro-cyclical nature of capital inflow/outflow. Those bankers seeking to take money out of the country for brief periods in hopes of devaluation and then bringing it back in to make a profit are made to pay a substantial tax for the round trip. Although this didn't help during the 1998 crisis as no country faced excess inflows, only outflows, it will help with the next crisis (Stiglitz, 2000).

With this tax, Chile fundamentally raised the aggregate risk appetite of foreign investors by raising the barrier to entry to those whose investment is pro-cyclical (i.e. short-term). This serves the same purpose as ski resorts using dynamite to remove the loose snow that may cause an avalanche.

(b) Capital outflows

Malaysia tried the reverse. The government placed controls on the outflow of capital. The international capital markets greeted this with little enthusiasm. However, most arguments against the tax ignored the subtleties of the Malaysian policy which included provisions designed to protect the interests of long-term investors. The preliminary results of the controls suggest that it hasn't been the disaster those in the international capital markets predicted. The tax was smoothly removed afterwards, and the country used the additional

time and slowed down capital outflow to make significant progress in financial and corporate restructuring when compared to its Asian neighbours, while foreign direct investment continued at a relatively strong pace (Stiglitz, 2000).

Both of these methods restrict the availability of short-term capital and financing. This way they stabilise the otherwise pro-cyclical nature of these foreign investments. However, short-term capital serves a purpose within the financial system: often it is used to provide banks and businesses with liquidity in the short term to finance illiquid investments. By restricting the amount of short-term capital (i.e. those investors that wish to invest short-term or specialise in doing so), we will witness an increase in credit rationing for such investments. This may mean that some long-term investments need to be restructured or will need to be liquidity completely. However, there is another option that Stiglitz provides us with. This option is one we will see employed when we look at South Korea's financial development in the subsequent sections:

(c) Regulating capital flows through the domestic banking system

This can be achieved in two ways: market-led and government led. In a market-led system governments should insist that banks look at the uncovered exposure of firms to which they have lent. Such exposure can have a great effect on the ability of a firm to repay the loan. Such exposed firms would receive a higher risk-weighting from the bank. This limits exposure two-fold. It firstly forces banks to consider their exposure to uncovered firms, limiting the number of uncovered firms that banks lend to or forcing a higher interest rate onto such firms to compensate and thus limiting the effects of capital outflows as previously discussed. Secondly, it forces firms to consider their positions in order to get financing from the banks. (Stiglitz, 2000) Stiglitz points once again to Malaysia of such regulations succeeding in limiting the exposure of firms.

Or the regulations can be government-led. That is foreign financing is not allowed at all, with direct controls imposed and foreign direct investment limited. Instead, foreign capital is forced through the domestic banking system. Thereby firms are only exposed to the extent that domestic financial institutions are exposed. In turn the exposure these financial institutions have to foreign capital can be limited via different regulations or their liquidity can be supported in a crisis. This system is similar to the one employed by South Korea's pre-financial opening in the early 1990s. All foreign capital flows were subject to government approval and intermediated by domestic state-owned banks.

While Stiglitz (2000) argues that capital markets don't stabilise macroeconomic volatility, Bacchetta and Caminal (2000) argue that whether capital markets exacerbate or dampen shocks depends on the shock. Whether a shock initially affects the funds that are internal or external to a firm makes a significant difference. For a fiscal shock, the nature of capital markets being imperfect protects some credit-constrained firms from being crowded out (Bacchetta and Caminal, 2000) In a typical business cycle, the amplification effect of capital markets is present (Bacchetta and Caminal, 2000). Credit-constrained firms, typically smaller firms, more productive firms, contract during recessions and expand during booms. This implies a transfer of credit from smaller to larger, less productive, firms during shocks. These transfers are a result of capital market imperfections and asymmetric information discussed in Stiglitz and Weiss (1981). Thus, the amplification of negative effects is more likely during a shock that affects a firm's internal funds. Therefore, we must decide whether a developing country's economy is more likely to experience a shock to internal funds (amplification) or external funds (dampening) when considering whether to commit to financial liberalisation or to regulate capital markets.

The empirical literature is equally unclear on the effects of financial liberalisation on consumption growth. Both cross-country and single-country empirical models disagree on whether liberalisation increases or decreases financial volatility.

In analysing consumption behaviour in the United Kingdom, Bayoumi (1993), suggests that deregulation of financial markets has a substantial effect on the behaviour of consumption. They suggest that 60% of aggregate consumption was subject to liquidity constraints, this fell to 30% after deregulation took place during the 1980s in the course of Thatcher's premiership. By 1984 consumption patterns moved decisively towards optimality (Bayoumi, 1993). This evidence seems to agree with the view of Sutherland (1996) and others. Financial liberalisation expands channels to consumption smooth. Consumption behaviour has become more future-oriented. However, the evidence also suggests that because of these deregulations consumption smoothing became more elastic with respect to interest rates, rising from 0.16 closer to 0.3 (Bayoumi, 1993). In turn, monetary shocks, especially those affecting the interest rate, may have a greater impact on the economy and consumption. This aligns more with Bacchetta and Caminal (2000)'s view that the type of shock is the main factor when considering if the financial market will have a dampening or amplification effect. The case of the UK the effect of deregulation means the financial market is more likely to amplify monetary shocks. However, Bayoumi (1993) only looks at the deregulation during the 1980s which was mainly focused on increasing domestic competition in the financial sector, encouraging competition, and lowering the cost of financial intermediation for households. Further, it focuses on the United Kingdom, which can be considered a country with a well-developed financial market during this time period. We know from Levchenko (2005) that countries with well-developed domestic financial markets may experience different effects from the financial liberalisation of external (foreign) markets. Nevertheless, it is useful to know that the

deregulation of domestic markets have an effect on consumption smoothing and this will have to be controlled for in any future models.

Makoto (2020) focuses on the country of Zimbabwe, which is defined as a developing country by the OECD at the time of writing and at the time of Makoto's analysis. The study uses the ARDL cointegration approach, appropriate for the short time period studied and where levels of cointegration are different between time series. The study defines the extent of financial liberalisation of capital markets as the gross sum of capital flows in the form of foreign direct investment (FDI), portfolio investment and other flows captured in the balance of payments (Makoto, 2020). This is different from the approach taken by other studies, which use policy indexes to rate a government's approach to liberalisation (Ang, 2011). As such, the study isn't measuring the effect of the policies themselves but more so the effect of the of capital flows specifically. This is a slight although important distinction. Policies that may liberalise capital flows may also restrict how that capital is spent. Such a measure is an imperfect substitution for policy.

However, Makoto (2020) does control for the level of financial development (which is important, as discussed earlier); trade openness (goods and services) which often accompanies liberalisation so is necessary to control (Makoto, 2020); and income volatility which captures the effect of primary income on household consumption, an important control since foreign income plays a complementary role in the consumption path.

The results of Makoto's analysis of Zimbabwe's financial liberalisation since its dollarisation in 2009 are aligned with Sutherland (1996)'s view. Financial liberalisation (specifically of the capital accounts) had a positive but insignificant effect on consumption volatility. However, when controlled for the level of financial development this effect became significant and negative. That is financial integration reduced consumption volatility.

Be that as it may, we must consider Zimbabwe's circumstances. Levchenko (2005)'s model considers two types of individuals, one type that can access the international credit markets and one that cannot. Under Levchenko's model, the domestic risk-sharing agreements break down when we introduce foreign markets. On aggregate, this increases consumption volatility in a country. However, consider where an economy's domestic risk-sharing arrangements have already broken down. Before dollarisation and the accompanying liberalisation of financial markets Zimbabwe experienced hyperinflation (Makoto, 2020). Under hyperinflation insurance and saving becomes almost impossible as the value of any claims or cash accounts becomes almost valueless after even a short period of time. Therefore, it's not unreasonable to suggest that the formal risk-sharing agreement had already broken down in Zimbabwe before liberalisation. Under Levchenko (2005)'s model this means that there can only be an aggregate positive effect, as those who can access the foreign financial market, using other currencies as these became legal tender (McGee, 2015), do so by improving their lifetime utility via consumption smoothing while those that don't or can't are just as worse off as they were previously. It is hard to isolate the currency collapse from the increase in aggregate consumption smoothing, so we can't take Zimbabwe as the general case for financial liberalisation in developing countries.

Ang (2011) instead studies the case of India. India emerged from having subsistence agriculture dominate a large part of its economy in the 1950s to having a large industrial base by 2000. In this aspect India is largely similar to South Korea (Young-lob, 2007). Ang (2011) uses the vector-error-correction-model (VECM) given that the variables studied are cointegrated. However, the measurement of financial repression (a reverse measurement of financial liberalisation) used is focused on both domestic and foreign capital controls and credit regulations simultaneously. Ang (2011) uses two different index measurements of financial repression for the sake of robustness. Both Demetriades and Luintel (1997)'s

and Abiad and Mody (2005)'s measurements are used. Demoetriades and Luintel (1997) consider nine series for financial repressionist policies: six being interest rate controls and three being directed credit programs. Abiad and Mody (2005) consider six policy dimensions to construct their measure: credit controls and reserve requirements; interest rate controls; barrier to entry in banking; government regulation of operations; privatization in the financial sector; and restrictions on international capital flows.

Both measures distort the line between foreign financial liberalisation and domestic financial liberalisation, blurring them into one measure. We're interested in how each type of liberalisation independently affects consumption volatility in an economy. We see from Levchenko (2005) how the liberalisation of foreign capital and credit may affect risk-sharing agreements in the domestic sector. This type of liberalisation is much different from the domestic liberalisation of Thatcher in the United Kingdom in the 1980s (Bayoumi, 1993). The two types of liberalisation/repression should be separated in any measure of policy. The results of Ang (2011) should therefore be taken with a grain of salt for our purposes. We will employ more modern index measures from the World Bank, that separate foreign and domestic liberalisation policies, during our contribution to the literature.

Nevertheless, Ang (2011) controls for the level of financial development through the measure of credit to the private sector as a measure of GDP; volatility of income; and an income variable to control for the level of economic development. As we're working with a limited set of data here it's important to keep the number of variables to a minimum, so the model doesn't become non-parsimonious, which is one drawback of VECM and Vector Autoregressive models.

In all the models estimated, Ang (2011) finds both measures of financial repression to be estimated with a negative sign. This would suggest that the Stiglitz view would be correct.

Financial repression and regulation have a mitigating effect on consumption volatility. Levchenko (2005) suggests that a lack of financial development in the domestic sector may lead to a breakdown of domestic risk-sharing when liberalisation (domestic or foreign) occurs. India in 1991 had a Private Credit to GDP ratio of 24% (Ang, 2011), suggesting poor domestic development in its financial sector. Ang (2011) also argues that, based on the model developed by Aghion et al. (1999), financial market imperfections and unequal access can produce permanent macroeconomic volatility. Prior to financial deregulation in the 1990s, the directed credit programs, repressionist interest rates, and bank branch regulation significantly benefited rural farmers and small traders by significantly improving their access to formal finance. With liberalisations banks withdrew from rural areas, borrowing costs became higher, and directed credit programs were reduced. This significantly deprived the poorer and rural classes of consumption smoothing opportunities (Ang, 2011).

Although Ang (2011) focuses on domestic liberalisation, it also incorporates a measure of financial openness. However, the measure doesn't directly look at the policy positions of the country's government. Like Mokoto (2020), this measure utilises capital flows. As discussed previously this is an imperfect substitute for a policy index. However, like Mokoto (2020), Ang (2011) finds that financial openness is significantly associated with lower consumption growth volatility. Unlike, Zimbabwe, India did not undergo dollarisation or experience hyperinflation immediately prior to or after the financial opening. Therefore, Ang (2011)'s results should be treated as more general evidence in favour of financial openness for developing economies, while keeping repressionist policies in place for the domestic financial sector.

However, we need to utilise measures of aggregate policy positions, not capital flows when looking at the liberalisation of the foreign financial sector. Policies that may liberalise

capital flows may also restrict how that capital is spent; capital may be free to move in and out of the country, but it must do so through a tightly regulated domestic banking sector. Such a measure is, therefore, an imperfect substitution for policy.

South Korea, when analysing its economic development, comes under such a distinction in regards to capital flows. Until a wave of liberalisation in the 1980s and 1990s, the country extensively utilised international capital markets to finance imports of capital goods. However, all loans were subject to government approval and were intermediated by state-owned banks. Authorities strictly regulated foreign direct investment and did not permit foreign portfolio investment. The government participated in picking the winners and losers within industries – this what, in part, led to the rise of the chaebols (Leiteritz, 2015).

Overall, the empirical evidence is unclear. Kose et al. (2003) provide the best reasoning for the difference in outcomes between studies on the effects of financial liberalisation. The effect of financial liberalisation is very much a matter of timing and development (Kose et al., 2003). Whether or not an economy has a developed financial sector will determine the direction of the impact that financial liberalisation has on consumption volatility. A country with good-quality financial institutions (Kose et al., 2003; Ang, 2011) and good access to financial markets (Levchenko, 2005) will see a reduction in consumption volatility from liberalisation, but countries without such qualities will see the reverse upon liberalisation (Ang, 2011). This is especially true when a country that liberalises its external financial sector has a limited diversification of exports and imports making them particularly susceptible to sudden fluctuations in terms of trade and foreign demand shocks that affect capital flows (Kose et al., 2003).

More country-by-country evidence is needed. We shall contribute to the existing literature by studying the effects of financial liberalisation in South Korea, which had a high level of development within its domestic financial sector (defined as Private Credit to GDP Ratio >

70%) during the reforms. If the effect of financial liberalisation is different from Ang (2011) in South Korea, then our results would act in favour of Kose et al. (2003)'s prediction that liberalisation is a matter of timing. If our results are similar to Ang (2011) then they would act in evidence in favour of the Stiglitz (2000) view.

3. Empirical Model and Data

The model specification attempts to analyse how financial reform (liberalisation) affects the consumption volatility in South Korea from 1973-2014 using quarterly data. How our model differs from Ang (2011) is the use of separate measures for reform in the domestic financial sector and reform when it comes to foreign capital. Specifically, the following framework is adopted for this study:

$$VOC_t = \beta_0 + \beta_1 VOG_t + \beta_2 CPS_t + \beta_3 EFRI_t + \beta_4 DFRI_t + \varepsilon_t$$

Consumption volatility (VOC_t) is measured by the rolling standard deviation of the growth rate of real private consumption per capita. A window of 4 quarters (1 year) is used. The standard deviation for period t is estimated using the standard deviation from period $t - 4$ to t inclusive. The first available observation in the dataset was in 1970, but the VOC_t reporting begins in 1973Q1, which uses data from 1972Q1-1973Q1, this is so the data lines up with the other variables used in the structural equation.

VOG_t refers to the standard deviations of the growth rate in real per capita GDP, seasonally adjusted. The same window of 4 quarters is used to calculate the volatility of GDP in period t as in calculating VOC_t .

CPS_t refers to the total amount of credit provided to the private sector in South Korea, non-inclusive of the financial sector. This measure captures the availability of credit in the economy. This is an important inclusion because as Aghion et al. (2004) show the benefits of financial liberalisation may depend on the extent of the credit constraints in an economy.

This measure is a proxy for these credit constraints. The measure may also serve as a proxy for the level of development within an economy's domestic financial sector, an important consideration since Levchenko (2005) shows that the level of development and unequal access to financial markets are important considerations when suggesting liberalisation of a developing country's financial sector.

The next two measures are $EFRI_t$ and $DFRI_t$. Both variables are index measures from the IMF's Structural Reform database. $EFRI_t$ is the aggregate index of external finance. It is a composite of an index of capital outflow restrictions and an index of capital inflow restrictions. This is a more appropriate measure to use when examining government policy and attitude than simple measures of capital flows, like those used in Mokoto (2020). The aggregate index is formed by the sum of the two sub-indexes and then normalised between zero and one based on 126 countries. The construction of the index follows the methodology of Quinn and Toyoda (2008) and extends the originally studied database to 126 countries from 1973 (or independence) to 2014. A higher value on the aggregate index represents a higher degree of external finance liberalisation, with 1 being theoretically completely unrestricted and open, while 0 theoretically representing an economy completely closed to external finance. It should be noted that the IMF excluded restrictions on real estate, personal capital transactions, and commercial credits.

$DFRI_t$ is the aggregate index on domestic finance regulations. It is a composite of six sub-indicators: credit controls, interest rate controls, bank entry barriers¹, banking supervision², privatisation, and security market development. These are the same sub-indexes that Ang (2011) uses in the construction of their 'financial repression index'. Once again, the measures are aggregated by their sum and then normalised between one and zero based

¹ Quantifying the degree of domestic competition to banks as well as the range of financial activity a bank can engage in.

² A measure that examines whether a country's government has adopted capital adequacy ratio based in the Basel standards and whether there is an independent banking supervisor agency

on 126 countries to give the aggregate index. The construction of the individual sub-indexes follows the approach of Abiad et al. (2010), which is then extended to 126 between 1973 (or independence) to 2014.

Both $EFRI_t$ and $DFRI_t$ are different to Ang's (2011) measures as they both measure financial liberalisation instead of financial repression. The closer to 1 either index measure is the closer to full financial liberalisation of either the domestic or external financial sectors of a country. In particular the use of $EFRI_t$ as a measure of external financial liberalisation is new to the literature as the current literature mainly uses capital flows as a measure, which we've previously shown to be inadequate for our purposes.

Table 1. Descriptive Statistics

Variable	Obvs	Mean	Min.	Max.	Trend
VOC_t	168	2.83	0.130	12.6	Down
VOG_t	168	1.25	0.010	4.39	Down
CPS_t	168	1.20	0.511	1.80	Up
$EFRI_t$	42	0.577	0.250	0.875	Up
$DFRI_t$	42	0.524	0.111	0.778	Up

$DFRI_t$ and $EFRI_t$ are reported yearly rather than annually. However, policy changes tend to happen with shifts in government or with large economic events such as shocks and recessions. The time series of both variables are characterised by sudden shifts in the index as policy suddenly shifts. There should be minimal statistical effect on our results when we transform the annual data into quarterly. The overall trend for these variables is

upward, indicating more financial liberalisation in both the domestic and foreign sectors over time.

CPS_t experiences a consistent upward trend as the domestic financial sector becomes more developed. Starting at 51% of GDP in 1973, below the modern-day average for developing economies, and progressing into a developed financial sector with 180% of GDP as credit to the private sector by the end of the dataset.

VOC_t and VOG_t both experience downward trends over time, indicating the developing ability of households in South Korea to smooth consumption and the increasing resilience of the Korean economy to shocks.

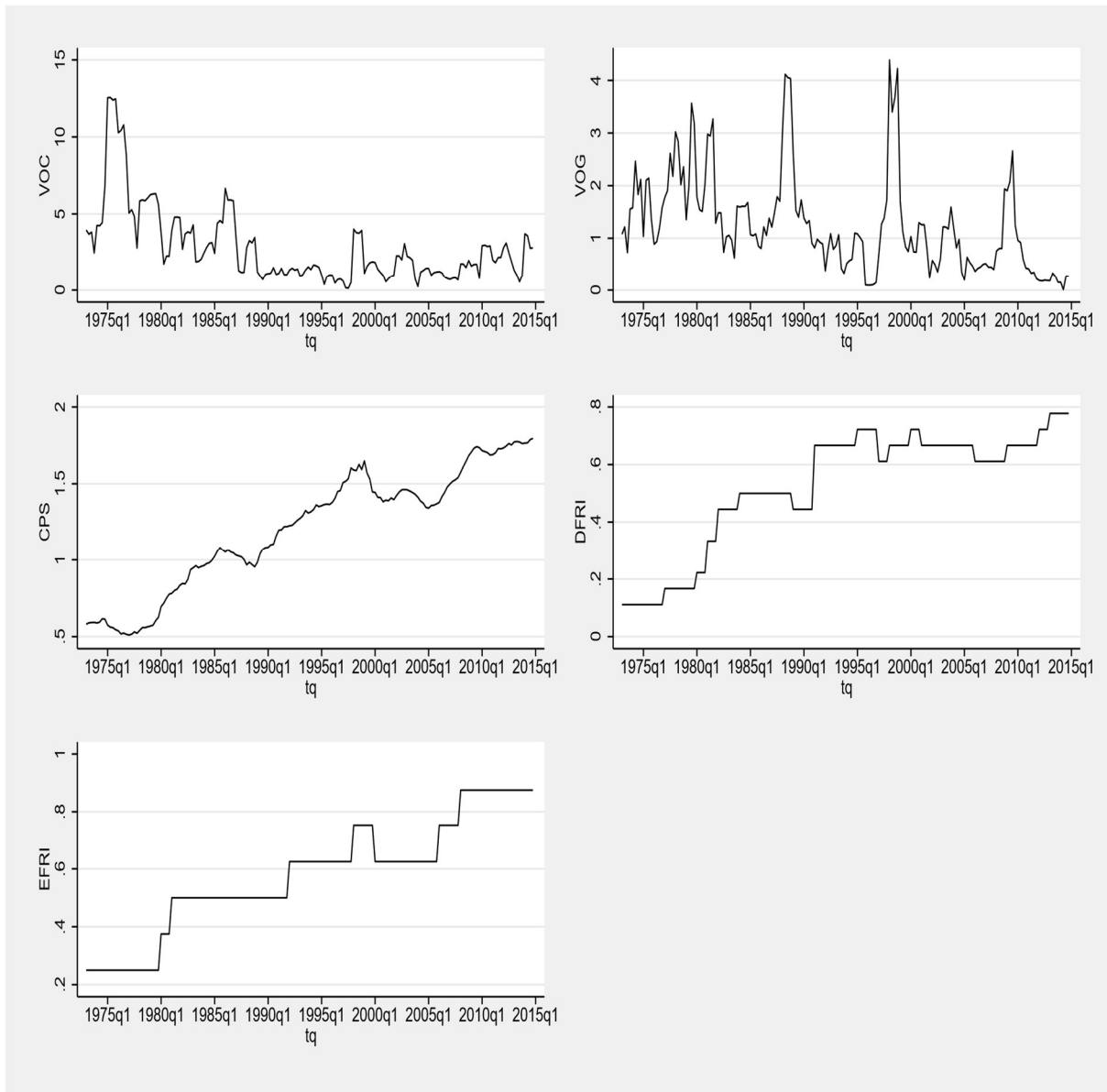


Fig. 1. Variables used in the analysis progression over time. Notes: VOC_t and VOG_t are the 4 quarters standard deviation of household private consumption and Real GDP respectively. $DFRI_t$ and $EFRI_t$ are policy indexes, indicating the degree of liberalisation in the domestic and foreign sectors respectively. CPS_t is the amount of credit to the private sector as a ratio to GDP, it is used as an indicator of financial institution development in an economy, following the World Bank.

4. Empirical Estimation and Results

4.1. VAR and VECM methodology

We will now formally analyse the relationship between financial liberalisation, consumption volatility, and the other variables in the structural equation using the appropriate time series analysis techniques. We begin by assuming the process for the relationship between the underlying variables is a vector autoregressive (VAR) model. We use a VAR model in this case as some of the variables may be endogenous, that is, there is no clear distinction between independent and dependent variables.

The VAR methodology that is employed involves three steps: First, we perform integration analysis for each underlying variable to ensure that they have the same order of integration (see Table 2). Second, we test for cointegration. We use the Johansen method for this (see Table 3). Unlike the Engle-Granger method, these techniques can identify multiple cointegrating vectors, this is particularly useful in attempting to determine the long-run relationships of the complex system in the structural equation. If we detect cointegration, the third step is to estimate the long-run relationships. If a set of variables is cointegrated they must have a valid error-correction representation of the time series. The following model is used:

$$\Delta X_t = \mu + \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Phi_i \Delta Y_{t-i} + E_t$$

Where $X_t = [VOC_t, VOG_t, CPS_t, EFRI_t, DFRI_t]$ and Π is the rank that is equal to the number of cointegrating vectors.

4.2. Integration and Cointegration Analysis

We examine unit roots using standard Augmented Dickey-Fuller. However, the presence of structural breaks may bias the results towards the null hypothesis of a unit root where

there may be none. However, this won't be as important as in Ang (2011) because South Korea hasn't seen as drastic changes to repressionist/liberalisation policies as India had during the same period studied. Therefore, comparatively, our financial liberalisation indexes both experience a clear trend.

Table 2. Augmented Dickey-Fuller Tests for Unit Root.

		-----Dickey-Fuller Critical Values-----			
	$I(n)$	Test Statistic	1%	5%	10%
VOC_t :	$I(1)$	-7.66	-4.02	-3.44	-3.14
VOG_t :	$I(1)$	-6.74	-4.02	-3.44	-3.14
CPS_t :	$I(1)$	-4.38	-4.02	-3.44	-3.14
$EFRI_t$:	$I(1)$	-13.05	-4.02	-3.44	-3.14
$DFRI_t$:	$I(1)$	-13.11	-4.02	-3.44	-3.14

There is a clear rejection of the null hypothesis of a unit root once each variable is first differenced. Making all variables integrated to an order of one, at the 1% level of significance. Given that all underlying variables have a common order of integration we can proceed to testing for the presence of long-run relationships via cointegration testing using the Johansen method.

We use a set of three models. Model A considers all variables and is therefore the least parsimonious. It is also the least significant. It includes VOC_t , VOG_t , CPS_t , $EFRI_t$, $DFRI_t$. Models B and C drop the variables $EFRI_t$ and $DFRI_t$ respectively.

A: $VOC_t, VOG_t, CPS_t, EFRI_t, DFRI_t$

B: $VOC_t, VOG_t, CPS_t, EFRI_t$

C: $VOC_t, VOG_t, CPS_t, DFRI_t$

The Johansen method may be sensitive to the choice of lag length. We therefore use a series of information criteria (FPE, AIC, SBIC, HQIQ) to determine the optimal lag length for our models. In all models, the information criteria selected one lag. It should be noted that in all three models, the information criteria disagreed with each other, therefore lags were selected by creating a VAR model for each lag selected by an information criteria and seeing which one was the best behaved in terms of little serial autocorrelation.

Table 3. Johansen Cointegration Tests.

	Trace Statistic (λ_{trace})			
	$r = 0$	$r = 1$	$r = 2$	$r = 3$
Model A:	102.6	53.72	28.62*	11.79
Model B:	77.61	42.05	19.69*	5.966
Model C:	82.26	34.85*	13.71	5.886

	Maximum Statistic (λ_{max})			
	$r = 0$	$r = 1$	$r = 2$	$r = 3$
Model A:	48.91	25.10	16.83	6.920
Model B:	35.56	22.36	13.72	5.966
Model C:	47.41	21.14	7.824	5.886

*selected rank

For models A and B, there are two cointegrating vectors. For model C there is only a single cointegrating vector. All are significant at the 5% significance level. It should however be noted that with a finite sample size Johansen test statistics may be biased. Further, it was especially hard to determine the optimal lag length in the case of model B, both VAR models experienced similar levels of autocorrelation. The alternative optimal lag length for model B was 3 lags, using this in the Johansen cointegration test suggests the presence of only one cointegrating vector. Therefore, we shall analyse both. The original model B with 2 cointegrating vectors shall be denoted as B2, while the alternative model B with 1 cointegrating vector shall be denoted as B1.

4.3. Long-Run Estimates

With the cointegration tests pointing towards the underlying variables being cointegrated, we estimate the coefficients of the long-run cointegrating equation via Vector Error Correction Modelling. In each model, we restrict the consumption volatility variable to -1 and then use additional restrictions depending on the amount of cointegrating vectors. In all models that include it (Models A and C) $DFRI_t$ is estimated with a negative sign. The estimated coefficients are significant at the 1% level. This suggests that the liberalisation of the domestic financial sector significantly impacted consumption volatility in Korea. Where there is a significantly estimated coefficient, CPS_t is consistently estimated with a positive sign, suggesting that real private credit has an amplifying effect on consumption volatility. This is a tough circle to square. How can domestic liberalisation, which should ease restrictions on household access to credit, have a negative effect on consumption volatility while the amount of credit available has a positive effect? The answer lies in rapid credit expansion. The financial system has the potential to act as a shock absorber but the rapid expansion of credit that often follows liberalisation creates macroeconomic bubbles that, once burst, hamper the risk-sharing system. That is, credit restraints often tighten in

response to economic recessions, so credit is less available when households need it most.

In Korea, post-liberalisation credit expansion is most associated with Chaebol firms.

Affiliation with a Chaebol is associated with an 18% increase in real total bank credit between 1996-1997, compared with non-chaebol affiliated firms. This association effect disappears post-1997 Asian Financial Crisis. This suggests that, in Korea, the credit expansion was mostly associated with the Chaebols (Borensztein & Lee, 2000).

Controlling for this credit expansion, domestic liberalisation is associated with a decrease in consumption volatility, as households can increase their consumption smoothing.

Therefore, credit expansion should be closely monitored post-liberalisation.

Model B2 estimated $EFRI_t$ with a negative sign. This seems to go against Levchenko (2005)'s model. However, in this model, domestic financial policy has been dropped as a measure completely. The $EFRI_t$ variable may be picking up some of this effect. Further, Levchenko (2005)'s model only applies to countries that don't have a developed domestic financial sector. By the time of liberalisation, it can be said that Korea's domestic sector was developed (Private Credit to GDP Ratio > 70%), therefore Levchenko (2005)'s analysis may not apply to the same extent as it would in a country like India (Private Credit to GDP Ratio of 24% at time of liberalisation).

Alternatively, looking at Model A's impulse response function graph (Fig. 2), we can see that despite the cointegrating equations showing two different signs (one equation examining the effect on VOC_t and the other on VOG_t) we see that a one-standard-deviation shock to $EFRI_t$ has two effects – one short-term and one long-term. In the short term a shock to $EFRI_t$ will have a negative effect on the volatility of consumption and then after ten quarters will have a net-positive effect on consumption volatility. This could be seen as evidence in favour of Levchenko (2005)'s hypothesis, but if we consider Korea to be

financially well-developed by the time of reforms it's hard to apply such a theory. Instead, there must be another explanation. We hypothesise that this effect on consumption volatility from liberalising the external finance sector indirectly comes from the CPS_t channel. That is, $EFRI_t$ affects VOC_t by increasing the volume of private credit in the system which in turn creates credit bubbles (as discussed previously). This affects income volatility (i.e. the bubble bursts), which the post-bubble financial sector cannot effectively 'shock-absorb' due to credit contraction and additional constraints imposed on potential borrowers to limit 'bad credit'. This suggests that policymakers need to monitor the expansion of credit carefully post-liberalisation of the external finance sector. A similar conclusion to Ang (2011) but with external finance liberalisation being the cause of the credit expansion. It should, however, be noted that the estimated coefficient for $EFRI_t$ in model A is only significant at the 10% level. Other models, discussed later, estimate the $EFRI_t$ with different signs.

As Korea had a developed financial sector at the time of liberalisation and the effect of $DFRI_t$ is consistently and significantly negative across the models, our contribution to the literature should be considered as evidence in favour of the theory put forward in Ang (2011): a country with good-quality financial institutions and good access to financial markets will see a reduction in consumption volatility from liberalisation, but countries without such qualities will see the reverse upon liberalisation.

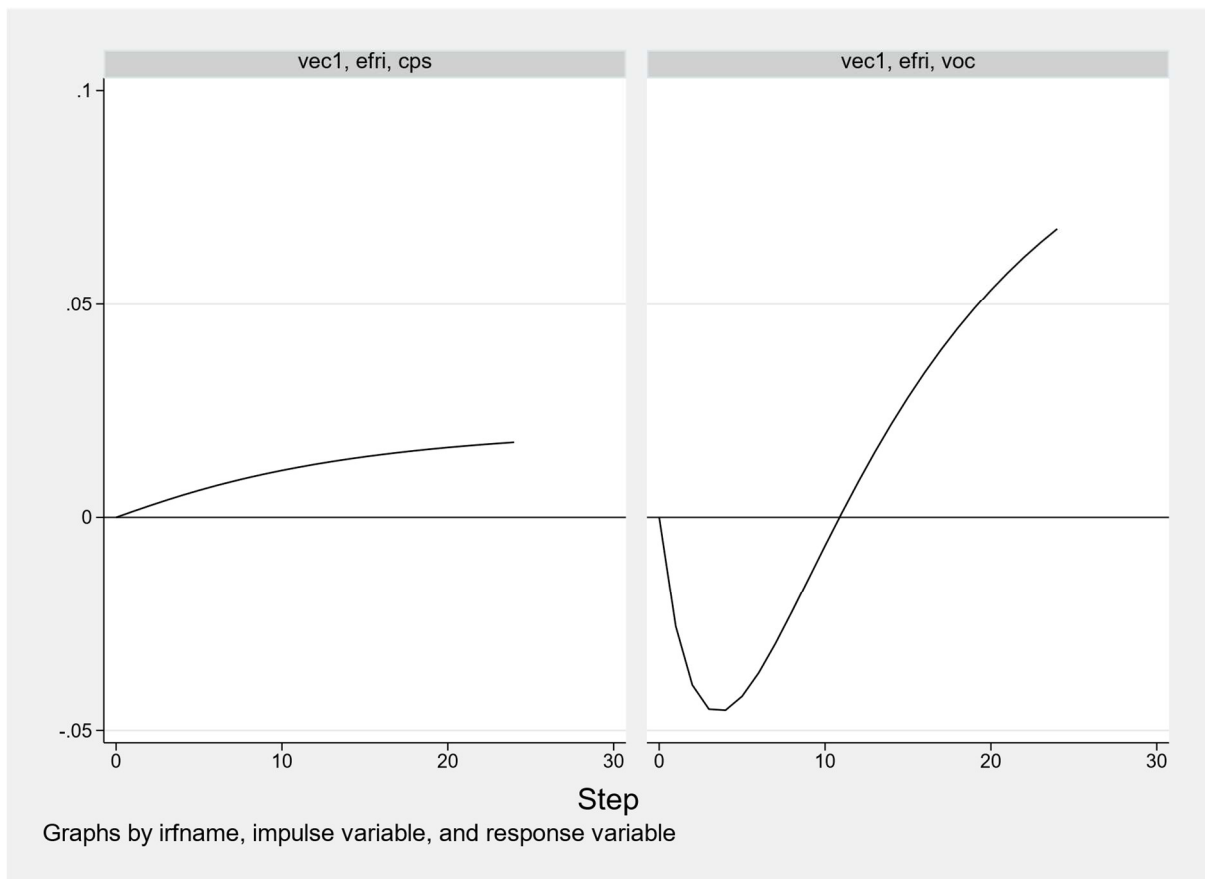


Fig. 2 Impulse Response Function Graph from model A. Demonstrates that, according to the model, a positive one standard deviation shock to $EFRI_t$ slowly increases the amount of private credit in the economy; and causes a transitory negative shock to consumption volatility before causing volatility to increase again.

Table 4. Long-run cointegrating coefficients

Cointegrating Vectors. ***= Sig. 1% **=Sig. 5% *=Sig. 10%

Model A.

Cointegrating Equation 1 ($VOC_t = -1$; $VOG_t = 0$)

	β_0	VOC_t	CPS_t	$DFRI_t$	$EFRI_t$
Coefficient:	8.85***	-1	-2.68	-15.49***	11.99*

Cointegrating Equation 2 ($VOC_t = 0$; $VOG_t = -1$)

	β_0	VOG_t	CPS_t	$DFRI_t$	$EFRI_t$
Coefficient:	1.66**	-1	6.07**	-3.65	-10.81**

Model B1.

Cointegrating Equation 1 ($VOC_t = -1$)

	β_0	VOC_t	VOG_t	CPS_t	$EFRI_t$
Coefficient:	-469.22	-1	167.58	163.71	91.07

Table 4. (Continued)

Model B2.

Cointegrating Equation 1 ($VOC_t = -1$; $VOG_t = 0$)

	β_0	VOC_t	CPS_t	$EFRI_t$
Coefficient:	6.73	-1***	48.42***	-107.7***

Cointegrating Equation 2 ($VOC_t = -1$; $CPS_t = 0$)

	β_0	VOC_t	VOG_t	$EFRI_t$
Coefficient:	9.98***	-1***	0.231	-9.37***

Model C.

Cointegrating Equation 1 ($VOC_t = -1$)

	β_0	VOC_t	VOG_t	CPS_t	$DFRI_t$
Coefficient:	9.98***	-1	-0.742*	3.92*	-18.49***

4.4. Alternative Variables

We will now use alternative variables to test the hypothesis that the signs of the estimate coefficients are down to the specific measures used in the model. Our $DFRI_t$ is very similar to the other measures of domestic financial policy, used in the literature. However, $EFRI_t$ is hardly used as a measure of external financial policy and different measures of volatility are used across the literature. We shall therefore test both an alternative measure of external financial policy and alternative volatility measures, to see if the effects are the same as the original models.

4.4.1. Volatility Measures

We employ an alternative volatility measure, that involves taking the range of the growth rate of the variable over 4 quarters. This methodology is applied to consumption and GDP. Comparatively, the VOG_t variable is similar to the VOG_{HL_t} , while there are differences between the VOC_t VOC_{HL_t} variables (See Fig. 3). The original models will be, from here on in the paper, referred to by their identifying letter followed by '(SD)'. Models with the alternative volatility measure shall be referred to by their letter followed by '(HL)'.

With the alternative volatility measure we can rerun the Johansen cointegration tests and find cointegrating relationships in all models. However, only models A(HL) and C(HL) produced statistically significant coefficient estimates. (See Table 5). Out of the two models, A(HL) produced the best estimate. Model A(HL) casts doubt on the predictions of model A(SD). Model A(HL) suggests that in the long term, liberalisation of the external finance sector significantly reduces consumption volatility. Liberalisation of the external financial sector is not as heavily related to credit expansion as initially thought. This would instead suggest that policymakers need to monitor credit expansion more generally rather than specifically after liberalisation. Unlike model A(SD), model A(HL) produced a more

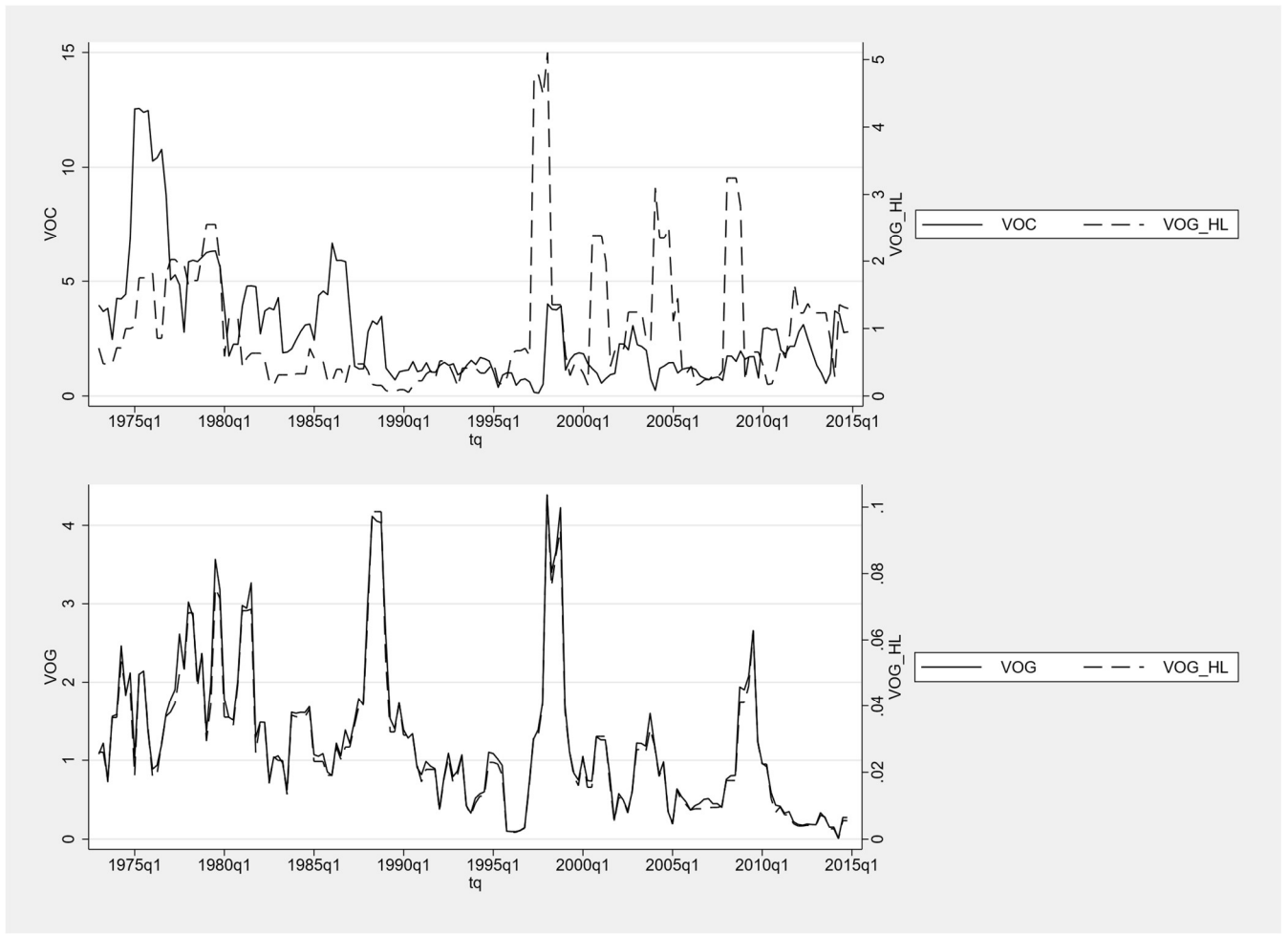


Fig. 3 shows the differences between the volatility methodology. Standard Deviation and High-Low Range. Both applied to the growth rate of the underlying variables.

significant coefficient estimate of $EFRI_t$ (1% level compared to the 10% level) inclining us to prefer model A(HL). Unlike model A(SD), model A(HL) produced a more significant coefficient estimate of $EFRI_t$ (1% level compared to the 10% level) inclining us to prefer model A(HL). Most importantly, both HL models produce significant coefficient estimates of $DFRI_t$ with negative signs, and significant coefficient estimates of CPS_t with positive signs. This confirms the original model that employed standard deviation volatility measures and shows it to be robust to alternative estimates.

Table 5. Long-run cointegrating coefficients with alternative volatility

Cointegrating Vectors. ***= Sig. 1% **=Sig. 5% *Sig. 10%

Model A.

Cointegrating Equation 1 ($VOC_t = -1 ; VOG_t = 0$)

	β_0	VOC_t	CPS_t	$DFRI_t$	$EFRI_t$
Coefficient:	0.537	-1	6.43***	-5.63***	-7.50**

Cointegrating Equation 2 ($VOC_t = 0 ; VOG_t = -1$)

	β_0	VOG_t	CPS_t	$DFRI_t$	$EFRI_t$
Coefficient:	0.0549***	-1	0.854**	-0.0850**	-0.146**

Model C.

Cointegrating Equation 1 ($VOC_t = -1 ; VOG_t = 0$)

	β_0	VOC_t	CPS_t	$DFRI_t$
Coefficient:	0.795**	-1	2.72***	-5.62***

Cointegrating Equation 2 ($VOC_t = 0 ; VOG_t = -1$)

	β_0	VOG_t	CPS_t	$DFRI_t$
Coefficient:	0.0629***	-1	-0.0171	-0.0220

4.4.2. External Finance Reform Indicator

In section 2 we criticised the use of the 'Financial Openness' measure as it was a measure of capital flows rather than an indicator of policy. Policies that may liberalise capital flows may also restrict how that capital is spent; capital may be free to move in and out of the country, but it may do so through a tightly regulated domestic banking and credit sector. Such a measure is, therefore, an imperfect substitution for policy. This is relevant for Korea, as until the wave of liberalisation in 1990s, Korea heavily utilised international financial markets to finance capital expenditure, but these loans were subject to government approval were intermediated by state-owned banks and there was strict regulation of foreign direct investment and no foreign portfolio investment (Leiteritz, 2015). However, to test our models' robustness to variable alterations, we shall employ it in the model in the place of the $EFRI_t$ indicator. As models A (both SD and HL) performed the best in producing significant coefficient estimates we shall use model A.

Our Financial Openness indicator (FO_t), follows Ang (2011). It is constructed using total capital flows (capital flows in + capital flows out) to real GDP ratio and is then normalised between zero and one. Data on capital flows for South Korea is only openly available from the start of the year 2000. We therefore expect this model to be less powerful than previous ones. The model shall be referred to as model A alternative (AA)

Although both variables follow the same long-term trend, there are significant differences (Fig. 4). Most obvious is the increased volatility in the FO_t measure, while the $EFRI_t$ indicator remains flat. Further if FO_t was a true reflection of government policy it would have increased after 2008/9, when the Korean government opened more (according to the $EFRI_t$ policy indicator), yet FO_t decreases.

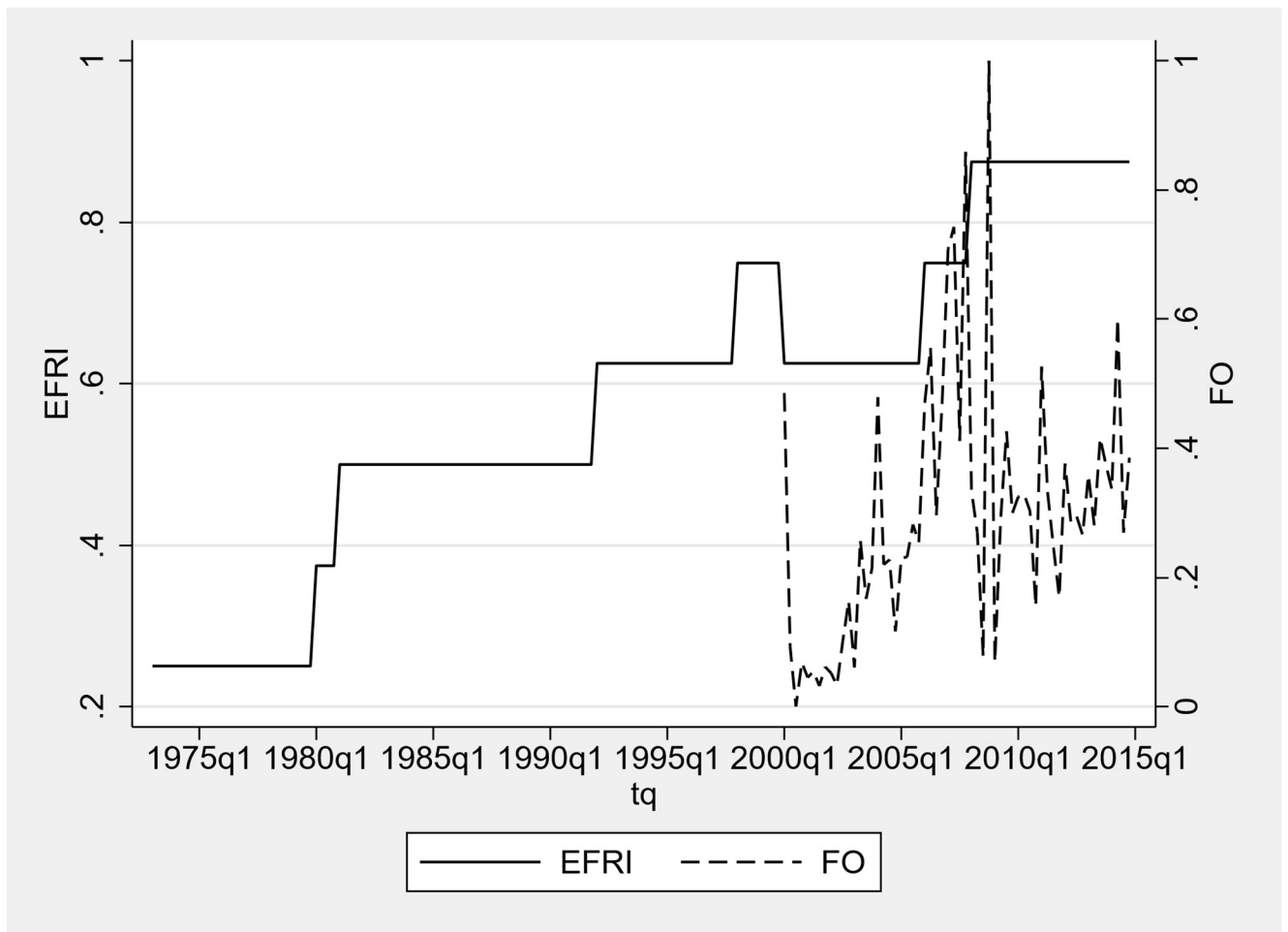


Fig. 4 shows the differences between the financial openness measure and policy indicator. Show's differences in percentage total capital flows and government policy. This reflects FO_t 's inappropriateness as a measure of government policy.

Model AA(HL) produced no useful significant evidence that might change our perspective on models A(SD) and A(HL). Model AA(SD), on the other hand, confirms our previous models but suggests that in the long term volatility of consumption and income are more sensitive to the structural variables included. Model AA(SD) failed to significantly estimate a coefficient for $DFRI_t$ but this could be due to the limited amount of data available. However, it did confirm the previous models' coefficient directions for external finance liberalisation (taking FO_t as proxy) and for volume of private credit (CPS_t). This is more evidence in favour of Model A(HL) over Model A(SD), as FO_t is also significantly estimated with a negative sign at the 1% significance level. Despite changing our measure of

external finance liberalisation, we can conclude once again that expansion of private credit is associated with an increase in consumption volatility.

Table 6. Long-run cointegrating coefficients with alternative external finance measure

Cointegrating Vectors. ***= Sig. 1% **=Sig. 5% *Sig. 10%

Model AA(SD).

Cointegrating Equation 1 ($VOC_t = -1 ; VOG_t = 0$)

	β_0	VOC_t	CPS_t	$DFRI_t$	FO_t
Coefficient:	0.679	-1	22.76**	-30.65	-52.45***

Cointegrating Equation 2 ($VOC_t = 0 ; VOG_t = -1$)

	β_0	VOG_t	CPS_t	$DFRI_t$	FO_t
Coefficient:	18.61	-1	23.97***	-67.02**	-33.21***

Model AA(HL).

Cointegrating Equation 1 ($VOC_t = -1 ; VOG_t = 0$)

	β_0	VOC_t	CPS_t	$DFRI_t$	FO_t
Coefficient:	2.76**	-1	-3.39***	5.20**	0.804

Cointegrating Equation 2 ($VOC_t = 0 ; VOG_t = -1$)

	β_0	VOG_t	CPS_t	$DFRI_t$	FO_t
Coefficient:	0.0798*	-1	0.0294*	-0.151*	-0.0129

By using alternative variables, we have shown that our model is consistently estimating the coefficients of financial liberalisation with a negative sign despite changing the methodology of our structural dependent variable or changing our index of financial liberalisation. This would suggest that the results of our model are not dependent on the specific measures utilised within it.

We can therefore conclude, with a relatively high degree of certainty, that financial liberalisation of the domestic sector in South Korea is associated with a reduction in consumption volatility for households in the country. We can conclude a similar point, but with a lesser degree of certainty, for financial liberalisation of the external sector - with models AA(SD) and A(HL) estimating significant negative coefficients for the relevant measure but model A(SD) estimating a positive coefficient, albeit to a lesser level of significance.

5. Conclusion

This study has been motivated by the drive, in recent decades, towards ‘financial reform’ in developing countries – that is the liberalisation of a country’s financial sector – in order to speed up both a country’s economic development and integration into the international market. However, there has been few studies analysing the relationship between this liberalisation and consumption volatility – a key factor in stable economic growth. This study contributes to the literature by replicating Ang (2011)’s study on India, but utilising newer methods in the measurement of policy stance (IMF Reform Index Indicators), applying it to studying South Korea’s economic development.

We utilised Johansen cointegration methods to analyse the appropriate time series and found significant evidence of an association between liberalisation policies and consumption volatility.

Unlike Ang (2011)'s India study, in South Korea, we found that liberalisation of the domestic financial sector is significantly associated with a reduction in consumption volatility. This difference should be taken as evidence in favour of the theory put forward by Ang (2011) and suggested by Kose et al., (2003): a country with good-quality financial institutions and good access to financial markets will see a reduction in consumption volatility from liberalisation, but countries without such qualities will see the reverse upon liberalisation. India (during the liberalisation period) was far from being considered financially developed, whereas South Korea was considered to be financially developed at the start of its shift towards liberalisation.

We also came to a similar conclusion to Ang (2011) on the expansion of private credit. The volume of private credit relative to GDP is associated with increases in consumption volatility. We hypothesised that this was down to credit expansion causing credit bubbles, which when they burst significantly affect household consumption. In one model – A(SD) - we hypothesised that this credit expansion was associated with the liberalisation of the external financial sector, however, this may be very specific to the context of the Asian Financial Crisis, as when we utilised alternative volatility measures, we found no such association.

Overall, we found weak evidence that liberalisation of the external finance sector is associated with consumption volatility decreases, but in one model – A(SD) - the estimated coefficient pointed towards an associated increase. We also found the same evidence when using capital flows as a proxy for policy indicators. More evidence is required to establish this association in the literature.

Taking our results in association with Ang (2011), we find them to be more consistent with the view of Kose et al. (2003) than that of Stiglitz. Specifically, our results should be taken as evidence in favour of the view that whether a country should fully liberalise its financial sector is dependent on the current development of said financial sector rather than the view that developing countries shouldn't fully liberalise as their financial systems do not function effectively. Although similar views, the main difference is the focus of the proscribed policy. That is instead of focusing on regulating the financial sector developing countries should instead focus on its development – through government interventions or alternative means.

While financial liberalisation is not always desirable in a developing country – as seen in Ang (2011) – if the country's financial system is well-developed then liberalisation may help alleviate consumption volatility problems. Developing countries should therefore work on developing their financial institutions rather than simply regulating them which may hamper the alleviation of consumption volatility issues in the future.

However, the evidence shown in this study is limited to a singular country. Further studies on this topic should focus on applying the methodology to other countries, potentially utilising panel vector error correction models to perform cross-country analysis, to build a pool of evidence to be utilised by policymakers. Such studies may wish to include further variables such as age demographics and wealth concentration measures to provide a clearer methodology and timing for developing countries to liberalise in order to alleviate consumption volatility problems.

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