

# Determinants of sudden stops and retrenchments of a developing or developed count...



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Sudden stops and retrenchment developing or developed country issue and are the determinants global or domestic?

Introduction

Extreme capital flows have been experienced by countries since the 80's with the volatility of such flows ever increasing (Forbes + Warnock 2012). Sudden stops are defined as a sudden slowdown in capital inflows. The expression "sudden stops" was inspired by a bankers' "adage"; "it's not speed that kills, it is the sudden stop" (Dornbush, 1995). First discussed and defined by Calvo (1998) they were originally thought to be a developing world phenomena. Sudden stops can harm economies in a number of ways for example bankruptcies, reductions in the availability of credit and restrictions on trade (Calvo 1998). Retrenchments are where local investors reduce their foreign investments during a local crisis (often in times that coincide with sudden stops) and use their global liquidity at home. During an episode of retrenchment, the usually forgone conclusion that an extreme reduction in capital flows would cause financial instability does not hold (Caballero, 2016).

Empirical literature has thus far mostly focused upon using net capital flows in order to define and detect episodes of sudden stops and focused on domestic factors as the cause. Kristin Forbes and Francis Warnock (2012) have argued that global factors play a more important role. They use a slightly different definition of sudden stops whereby they use gross flows in order to detect an episode rather than net flows. This allows for a disaggregation between domestic and foreign investors and allows for a

more precise analysis of both sudden stops and retrenchments (Forbes + Warnock, 2012).

I will attempt to look at:

1. The determinants of sudden stops and retrenchments
2. Are sudden stops and retrenchments a global or domestic issue
3. Why retrenchment episodes seem to occur in conjunction with sudden stops in developed countries but not in the developing world.

Previous work as usually focused on sudden stops alone, therefore the rationale behind this research area is to try and expand on the preceding works. I am also interested in retrenchment as it can be very beneficial to the countries in which it occurs, for example as noted by Obstfeld (2012); if we take in to consideration the US' financial account at the end of 2008 Q4, the quarter after which the Lehman Brothers filed for bankruptcy. The gross inflow which the us received fell by around \$100billion. A fall such as this should have if everything else was equal caused a fall in the exchange rate. What happened in reality was an appreciation of the dollar due to the US experiencing a retrenchment whereby US citizens sold nearly \$300billion of their foreign assets (Obstfeld, 2012). This example is interesting as it shows what could have been a damaging sudden stop was avoided.

Gross capital flows will be used in the analysis as, capital flows by domestic and foreign agents are likely driven by different factors and the disaggregating effect of using gross flows makes it possible to look at how the agents behave during crises and over the cycle and whether they behave differently (Broner et al, 2013). Data from the International Financial

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Statistics of the International Monetary fund will be used. The balance of payments data will be used to construct the gross capital inflows and outflows of foreign and domestic agents respectively. Gross flows are in fact a sort of “ net” item, gross inflows are the net of foreign purchases of domestic assets and the net foreign sale of domestic securities. Whereas gross outflows are the net of the domestic residents’ purchases of foreign assets and domestic residents’ sales of foreign assets. An outflow therefore is expressed as a negative value following the standard balance-payments accounting (Forbes + Warnock 2011).

### Literature review

This section will look at the theoretical literature behind sudden stops and therefore retrenchments, capital flows and what drives them as well as factors that might relate to different types of episode (sudden stop, retrenchment and surges).

Periods of extreme capital flow episodes were first noted by Calvo in 1998 when he defined sudden stops as a large reduction in net capital inflows.

### Theory of Sudden Stops

The equation that follows is a balance of payments accounting identity:

$$KI = CAD, (1)$$

CAD, stands for current account deficit

KI, stands for capital inflows

$$CAD = Z - GNP = Z^* - GDP - NFTA \quad (2)$$

For both non-monetary and monetary economies the identity above distinguishes between non-tradeable and tradeable goods. (Calvo, 1998)

Z, stands for aggregate demand

Z\*, stands for demand for tradables

GNP, stands for gross national product

GDP\*, stands for gross domestic product of tradables

NFTA, stands for net factor transfers abroad

A sudden stop would be noted as a sharp decrease in KI, this would therefore lead to a sudden contraction of CAD. There are a number of forms that this could take via identify (2). CAD will decrease thus a lower demand for tradeable goods might contain the stop without a decrease in output, but given the real exchange rate this is unlikely (Calvo, 1998). Lower demand for tradeables will usually be accompanied by a lower demand for non-tradeables therefore alongside flexible prices a higher exchange rate would be expected. As a result, loans that have been given out using the old expected relative prices might default thus leading to bankruptcies (Calvo, 1998). This might lead to an overall negative effect as credit channels to firms that are linked to the firms which have gone bankrupt would begin to cease therefore leading to a loss of human capital and people losing their jobs (Calvo, 1998).

The effects of a sudden stop depend therefore on the economy's ability to accommodate for the fall in CAD thus the larger the proportion of consumption in total expenditure the larger the effect of a sudden stop on the economy. Retrenchments would cause the decrease in KI to be reduced or reversed thus leading to a reduction in the negative impacts caused by a sudden stop.

Calvo et al. in their 2004 paper summarize the proposition that Calvo put forward in 1998 of the effects of sudden stops on the relative prices on the tradeable and nontradeable sectors. They used the demand function for non-tradeables:

$$\ln(H) = \alpha \ln(E) + \beta \ln(Z) \quad (3)$$

where  $H$ , stands for the demand for non-tradeable goods

$RER$ , stands for the real exchange rate

$Z$ , stands for the demand for tradeable goods

This equation (3) can be simplified to:

$$h = \alpha + \beta \ln(Z) + \ln(RER)$$

The lowercase letters denote the logs of the variables as shown above.

Following Calvo et al. (2004) the current account deficit is defined as (slight variation on (2))

$$CAD = Z - Y - NFTA \quad (4)$$

Y, is the output of tradeables

Z, is as defined above

NFTA, is net factor transfers abroad

Before a sudden stop it is often found that CAD is positive but as a result it goes to zero or in some cases negative (Calvo and Reinhart (2000)). Thus, given NFTA and Y a sudden stop will result in:

$$- \Delta Z = CAD$$

(5)

then if both sides are derived by Z:

$$- \Delta Z Z = CAD Z$$

(6)

By assuming the supply of non-tradables (H) is constant and approximating the change in Z by,  $-\Delta Z Z$

(its first differential) one arrives at the equation:

$$\Delta \text{rer} = \delta \beta * CAD z$$

(7)

This equation is the effectively the summary of Calvos' proposition in his 1998 paper on the effects of sudden stops. A sudden stop will drive CAD down and the real exchange rate will fall. A fall in the exchange rate could

cause firms to go bankrupt as a currency depreciation will make repaying foreign debt more difficult.

### Measuring Sudden Stops

Calvo et al.(2004) came up with the most widely used definition of sudden stops, allowing then for empirical studies in to the determinants of the sudden stops themselves. Firstly, they defined a sudden stop according to few parameter's:

A proxy of net capital flows (NCF) must be constructed for which a sudden stop episode can then be found.

- The episode begins when the annual change in net capital flows falls one standard deviation ( $\sigma$ ) below the historical mean.
- There must be at least one quarter where  $\Delta\text{NCF}$  falls by at least  $2x \sigma$  below the historical mean ( $\mu$ )
- A episode of sudden stop will end when  $\Delta\text{NCF}$  goes above one  $\sigma$  below  $\mu$

There have been slight variations on this definition for example the time periods used (Cavallo and Frankel, 2008)

### Using Gross flows not Net

Much of the literature has focused on net capital flows rather than gross capital flows (Eichengreen 2001, Obstfeld 2009). However, using net flows does not allow for the disaggregation between domestic and foreign investors (Janus and Riera-Crichton, 2005). It is standard practice to measure



outflows with a negative sign when domestic residents send their capital abroad (Rothenberg and Warnock 2006). If we follow standard IMF practice;

$$\text{NFC} = \text{Gross inflows} + \text{Gross Outflows} \quad (8)$$

A sudden stop could be caused by a sudden rise in domestic residents buying foreign assets. This is an outflow but is measured as a negative, therefore Net Flows Capital would fall. This rise in domestic outflows would unlikely have the same impact as a sudden stop in foreign capital (inflows). Janus and Riera-Crichton use a measure of gross flows in which they record a capital outflow as both, for example;

- an increase in domestic holdings of foreign assets
- a buyback of domestic assets from foreign investors

If the standard measure for gross flows was used, the flows would be underestimated. The standard measure would decrease the measured inflow rather than raising the measured outflow. Net flows and gross flows had been roughly similar until the early 1990 but recently gross flows have become much more volatile (Forbes and Warnock, 2012).

### Capital Flows

Much of the research surrounding this topic is to determine whether the factors behind capital flows are external or domestic with regards to the country. A number of papers have found that the external factors are more important in driving capital flows (Chuhan, et al, 1998). That is not to say that domestic factors don't have any role in the movement of capital flows, Calvo, Leiderman and Reinhart (1996) put forward an argument that the

initial domestic developments in emerging markets of the early 1990's could be attributed to the surge of capital that they received.

Capital flows are also affected by contagion. Contagion is another external factor defined as resulting from circumstances that are taking place in another country but not the entire world (Claessens and Forbes, 2001).

Contagion includes such things as proximity, whether the country's share the same language or similar economic characteristics. Contagion can also be broken down into trade and financial channels, both of these will have impacts on the flows of capital depending on how closely or not they are related.

Domestic factors play a part in the determinants of capital flows work by Ju and Wei (2011) and Mendoza et al. (2009) has shown that country's financial system i. e. the size the depth and the fragility can themselves attract or drive away flows of capital. Domestic productivity shocks can cause booms or busts in the country which can in turn lead to an increase or decrease in lending and therefore affecting capital flows (Aguar and Gopinath, 2007).

### Methodology

The data used in order to complete this work will be secondary data, sourced from the International Financial Statistics and the Balance of Payments data within the International Monetary Funds' website. Due to the nature of the question proposed and the fact that the data needs to have been collected over a number of years, it would be near impossible to collect the data required through primary sources.

In order to calculate the gross capital inflows focus will be upon the financial account within the Balance of Payments (BOP) dataset. The capital flows in the Financial Account of the BOP are disaggregated by the type of flow.

There are five main type of flow: direct investment, portfolio investment, other investment, financial derivatives, and reserves (Avdjiev et. Al, 2018).

Gross inflows will be calculated according to the flows. Gross inflows will be defined as such:

Gross inflows = Direct Investment + Portfolio investment + Other investment

Both financial derivatives and reserve transactions will be excluded.

Financial derivatives data is scarce as it is a new addition whist reserves are assets that are held externally by central banks and used to meet BOP financing needs therefore this component is a public-sector asset flow. The countries included must contain at least 10 years of data (Forbes and Warnock, 2012). Data may also be gathered from domestic sources in order to fill in gap that may be there. Data for Tiawan and Bangladesh is missing in the IMF but can be found fairly easily (Avdjiev et. Al, 2018).

In order to measure the sudden stop I will follow the methodology of Calvo et al. (2004):

Let  $C_t$

equal the 4-quarter moving sum of inflows. This will eliminate any seasonality problems with the data. The annual year upon year change in

$C_t$  ;  $\Delta C_t$

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must then be calculated, so that a moving average,  $\mu$ , and standard deviation  $\sigma \Delta Ct$

can be calculated over a five-year period. The next step involves using a filter known as a Bollinger band which is a technique developed by a famous technical trader called John Bollinger in the 1980's to measure volatility (Investopedia, 2018). Four bands will now need to be calculated surrounding  $\Delta C$

t:

$\mu + / -$

$\sigma \Delta Ct$

$\mu + / -$

$2 * \sigma \Delta Ct$

By calculating these bands, it is now possible following Calvo et al. (2004) to define an episode of sudden stop per their parameters:

- The episode begins when  $\Delta Ct$

falls one standard deviation ( $\sigma$ ) below the historical mean ( $\mu$ ).

- There must be at least one quarter where  $\Delta Ct$

falls by at least  $2x \sigma$  below the historical mean ( $\mu$ )

- An episode of sudden stop will end when  $\Delta Ct$

goes above one  $\sigma$  below  $\mu$

Forbes and Warnock (2012) have added one extra condition that is the episode must last for more than one quarter for it to be classified as a sudden stop.

Using the same methodology above but rather than gross inflows using gross outflows it is possible to measure 'retrenchments'. Retrenchments are measured as an episode whereby outflows fall sharply. Due to outflows being defined as the sum of direct portfolio investments by domestic residents abroad and other investments (Petkov, 2015), if a retrenchment occurs at the same time as a sudden stop the effects of the sudden stop can be minimised or mitigated all together.

#### Regression set up

To look at the role of different factors in the probability of a country experiencing a retrenchment episode the following model will be estimated (Forbes and Warnock, 2012)

$$P_{RT} = 1 = F ( X_{domestic} + X_{global} + X_{contagion} )$$

RT is a dummy variable that takes a value of 1 if the country is experiencing an episode of retrenchment. The variables  $X_{domestic}$ ,  $X_{global}$  and  $X_{contagion}$  are a collection of multiple variables affecting either domestic or global factors. In order to estimate this model either a complementary logarithmic framework ( as used in Forbes and Warnock 2012) or a probit model could be used previous literature has used different probit models. Calderon and Kubota (2013) used a probit model with no fixed effects whereas Calvo et al. (2004) used a probit model with random effects.

The Contagion variable will contain a measure of proximity of one country to another, it will be a dummy variable equal to one if a country in the same region has had an episode at the same time.

The global variable will include a measure of global risk; this will be taken from stock option prices on the S&P 100. The measure is known as VXO with a fall corresponding to an increased risk appetite. Global interest rates will be taken from the IFS and are measured as an average of the UK', Japan', the core Eurozone' and USA' nominal interest rates. Money supply growth data will again be taken from the IFS and this will be used as a proxy for global liquidity. Finally global growth will also be included.

The domestic variables will include inflation as if inflation is high the country's financial stability could be in question especially domestically. GDP growth will be included as the past might affect what investors think about the future and will therefore be lagged. Reserves as a share of imports will be especially useful when looking at retrenchments as this measure the size of a country's foreign reserves which it could use in a time of crisis or sudden stop. Lastly the foreign borrowing by banks as a fraction of the money supply is used as a proxy liability dollarization as suggested by Cavallo and Frankel (2008).

With this model, it will be possible to look at the determinants of retrenchments and therefore it will be possible to make comparisons between developed and developing countries.

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## References

- Forbes, Warnock. (2011). *Capital Flow Waves: Surges, Stops, Flight, and Retrenchment*. [Online]. [10 December 2018]. <https://www.nber.org/papers/w17351>
- Petkov, M. (2015). *International Capital Flows and Sudden Stops: a global or a domestic issue?*, [Online]. [10 December 2018]. <http://www.https://assignbuster.com/determinants-of-sudden-stops-and-retrenchments-of-a-developing-or-developed-country/>

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uk/international-development/Assets/Documents/PDFs/Dissertation/Prizewinning-Dissertations/PWD-2014/2014-MomchilPetkov. pdf

- Janus, T. Riera-Crichton, D. (2008). *International Gross Capital Flows: A New Measure and Application to a Global Panel*. [Online]. [10 December 2018]. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.560.3528&rep=rep1&type=pdf>
- Wang, Y., (2018). 'Fickle capital flows and retrenchment: Evidence from bilateral banking data'. *Journal of International Money and Finance*, 87, pp. 1-21.
- Alberola, E., Erce, A. and Serena, J. M., (2016). 'International reserves and gross capital flows dynamics'. *Journal of International Money and Finance*, 60, pp. 151-171.
- Broner, F., Didier, T., Erce, A. and Schmukler, S. L., (2011). 'Gross capital flows: Dynamics and crises'. The World Bank.
- Efremidze, L., Schreyer, S. M. and Sula, O., (2011). 'Sudden stops and currency crises'. *Journal of Financial Economic Policy*, 3 (4), pp. 304-321.
- Caballero, R. J., Cowan, K. and Kearns, J., (2004). 'Fear of sudden stops: lessons from Australia and Chile'. *The Journal of Policy Reform*, 8 (4), pp. 313-354.
- Caballero, R. J. and Krishnamurthy, A., (2004). 'Smoothing sudden stops'. *Journal of Economic Theory*, 119 (1), pp. 104-127.
- Caballero, R. J. and Simsek, A., (2016). *A model of fickle capital flows and retrenchment*. National Bureau of Economic Research.



- Mendoza, E. G., (2010). ' Sudden stops, financial crises, and leverage'. *American Economic Review* , 100 (5), pp. 1941-66.
- Calvo, G. A., Izquierdo, A. and Mejia, L. F. (2004). *On the empirics of sudden stops: the relevance of balance-sheet effects* . National Bureau of Economic Research.
- Calvo, G. A. and Reinhart, C. M., (1999). When capital inflows come to a sudden stop: consequences and policy options.
- Cavallo, E. A. and Frankel, J. A. (2008). ' Does openness to trade make countries more vulnerable to sudden stops, or less? Using gravity to establish causality'. *Journal of International Money and Finance* , 27 (8), pp. 1430-1452.
- Eichengreen, B., (2001). Capital account liberalization: What do cross-country studies tell us?. *The world bank economic review* , 15 (3), pp. 341-365.
- Avdjiev, S., Hardy, B., Kalemli-Özcan, S. and Servén, L. (2018). *Gross capital flows by banks, corporates, and sovereigns* . The World Bank.
- Investopedia. (2018). *The Basics Of Bollinger Bands* . [Online]. [10 December 2018]. <https://www.investopedia.com/articles/technical/102201.asp>
- Claessens, S. and Forbes, K. (2001). ' International financial contagion: An overview of the issues and the book'. In *International financial contagion* (pp. 3-17). Springer, Boston, MA.