The Impact of the Global Financial Crisis on Investment in Finland and South Korea

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Abstract

We provide a comparative study of the dynamics of investment activity in Finland and South Korea in the wake of the Global Financial Crisis. We find the following. First, although investment was lower, it was not especially hard hit relative to output and following the crisis in both countries. Second, we find that the main drivers for low investment following the crisis were primarily low foreign demand and heightened uncertainty. These suggest that the fall in investment were primarily externally driven. In addition, a case can be made for negative shocks to domestic supply and financial factors for Finland and South Korea respectively. Our results suggest that the Crisis amplified and exposed domestic weaknesses and that policy initiatives may have helped mitigate adverse consequences on investment.

JEL Classification: E22, G01, O57

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1 Introduction

It has been over 10 years since the Global Financial Crisis (henceforth GFC). In many countries, especially among developed economies, the aftermath of the crisis was characterized by deep and persistent slowdowns in economic activity. One key amplifying factor, especially for persistence, may be that investment activity was excessively negatively impacted by the crisis in relation to the crisis' impact on other macroeconomic variables. Through a fall in investment, and consequently a reduction in production capacity, crises such as the GFC may end up having persistent or even permanent scarring effects. Take the case of Finland and South Korea, two developed and small open economies. Figure 1 plots investment and output for both countries over the last two decades.

Figure 1: Investment and Output: Finland (left) and South Korea (right)
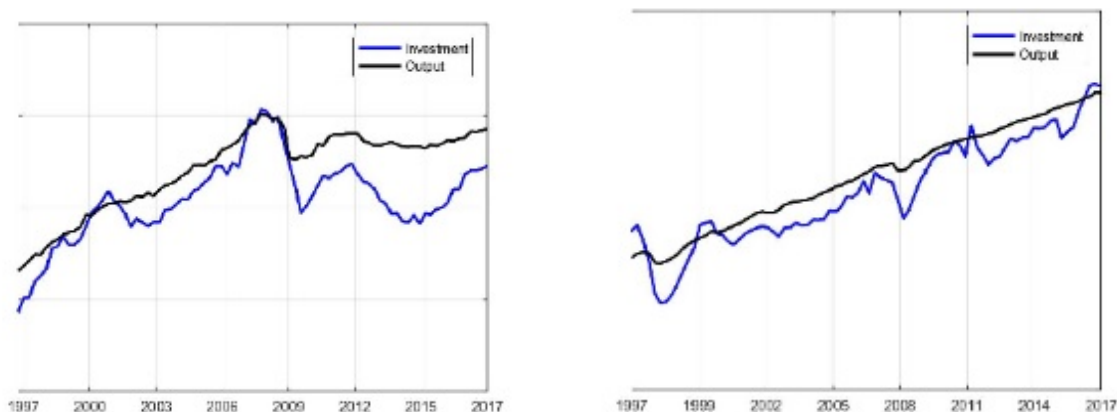
The figure above shows that both output and investment in Finland and South Korea experienced dramatic drops following the GFC. For the Finnish case, it also appears that both output investment growth were persistently lower following the GFC while a more rapid recovery is apparent for South Korea. What could be driving these fluctuations in investment? What role have government policies, in the form of monetary policy as well as domestic fiscal policies along with structural differences such as currency regimes, played in these developments?

To address these questions, we provide a comparative analysis of investment developments in South Korea and Finland. A comparison between the two countries provide an ideal setting to study the effect of policies, and their interaction with domestic factors given both the similarities and differences across the two economies. Both are small advanced open economies where the information and communication technology (ICT) sector and external factors play a prominent role in driving domestic developments. On the other hand, while Finland is in a monetary union which

shares a common currency and monetary policy with the Eurozone, South Korea has a floating exchange rate with an independent central bank. Nevertheless, monetary policy in both economies have similar inflation targeting objectives.

We first assess whether investment developments in both countries were excessively hit by the GFC. We then use structural vector auto regressions (SVARs) to tease out the main drivers behind investment developments in both countries and augment and interpret the results given narrative descriptions of domestic economic developments and policies undertaken in the two countries.

We find the following. First, we observe a large fall in Finnish and South Korean investment during 2008-2009 coinciding with the Global Financial Crisis. Nevertheless, when compared to output fluctuations, the fall in investment in Finland and South Korea were in line with general economic conditions. However, the Korean economy has recovered rapidly from 2010 and remained strong with pockets of weakness in 2012 and 2016 which can be attributed to relatively high levels of political uncertainty in South Korea.

Second, using a small recursively identified structural vector auto-regression (SVAR), we find that the main factors for low investment in the 2009-2016 are low foreign demand and, to a lesser extent, heightened uncertainty for both countries. By 2011 this has been augmented by low levels of domestic private consumption. Similar results are obtained using sign restrictions to identify shocks with the addition of domestic supply shocks for Finland and a more amplified role for financial factors in South Korea. These results suggest that lowered investment in both countries were primarily externally driven.

The results in Finland are largely consistent with past Bank of Finland assessments and which cites several domestic factors contributing to low levels of investment since 2011 such as changes in economic structure particularly the contraction of the ICT sector (mainly of Nokia Corp.) around the period of the Great Recession. Other contributing factors were weak domestic demand and growth prospects, excess capacity, uncertainty and demographics. On the other hand, the accommodative stance of monetary policy in the Euro area has helped support investment as indicated by the absence of negative financial factors in investment developments.

The results in South Korea show that the global financial crisis was relatively moderate, and the low investment has been marked before the crisis. As a small open economy, the business cycle in South Korea is strongly affected by international trade and foreign investment (Park, 2000). In particular, the competitive edge of the Korean economy facing challenges from abroad (e.g. emerging economies such as China and India) has eroded over the last decade. This has led to a decline in

investment and weak demand with a heightened uncertainty in politics (e.g. North Korea nuclear threat, impeachment of president Park).

The rest of the paper is organized as follows. Section 2 provides a brief economic history of Finland and South Korea focusing on investment developments. Section 3 describes the data used and Section 4 presents the methodological framework and analyses of investment for Finland and South Korea. Finally, Section 5 concludes.

2 Background

Prior literature has documented evidence on the profound impact of the GFC on investments worldwide. (IMF, 2015; Banerjee et al., 2015; OECD 2015). Several factors have been raised as possible explanations for the slowdown in investment. Low investment following the GFC may, in part, reflect the changing global distribution of investment among emerging economies as well as the shift towards knowledge-based capital (OECD, 2015). Pessimistic views about profitability or profit opportunities in the future has also been raised as a potential candidate (Banerjee et al., 2015).[1]

In response to these developments, investment-specific policy responses were developed and implemented. For instance, the European Union (EU) initiated the Juncker plan geared towards building up and improving the effectiveness of public investment.[2] However, studies on the effects of government spending on the business cycle have raised doubts on the effectiveness of such policies. For example, Alesina et al. (2002) pointed out that fiscal spending can crowd out private sector activity, providing upward pressure on wages, leading to a decrease in profits and lower private investment. For developing economies, there has been empirical support for a negative relationship between government spending and the business cycle (Agénor et al., 2000). These findings motivate our research question on the policy response to low investment during the GFC.

Finland is a developed small open economy and member of the Eurozone. It is perhaps notably among those described as following the Nordic welfare model where social safety nets including labor market policies are large and financed by hefty tax policies. An important development in the Finnish economy was the Finnish banking crisis of the early 1990s following financial deregulation in the 1980s. Lessons were learned and helped shape the financial sector in Finland leading to the

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[1]There is also a growing literature on the importance of secular trends such as intangible capital intensity (Gutierrez and Philippon, 2017; Crouzet and Eberly, 2018).

[2]The Investment Plan for Europe, known as 'Junker plan', consists of three pillars – the establishment of a European Fund for Strategic Investment (EFSI), elimination of procedural and information-related inefficiencies in terms of matching investment projects with private and public financing, and improvement of the investment climate at the Member State level.

GFC. Thereafter, the Finnish economy underwent two major recessions, in 2008-09 and in 2012-15. In both cases, it has been argued that external factors played a significant role, notably the embargo on Russian trade and the financial stress and depressed global demand brought about by the Global Financial Crisis.[3] In addition, the collapse of Nokia at the onset of the crisis period contributed to depress domestic economic activity.

It is notable that following the collapse of Nokia and the Global Financial Crisis in the 2008-09 period, the financial sector was not significantly impaired as lessons were learned from previous banking crises and the banking sector proved sufficiently resilient. Nevertheless, external demand put downward pressure at a time where wages were recently negotiated by labor unions such that labor costs were deemed too high in light of the recession. In response, Finland undertook a policy of austerity and negotiated a competitiveness pact with labor unions which sought to increase hours and reduce non-wage costs of labor (e.g. reduction in vacation especially for public sector). The economic situation in the rest of Europe was similar, and to some extent even worse. Consequently, the expansionary stance of monetary policy by the European Central Bank (ECB) in the Eurozone provided an additional policy stimulus to combat the recession.

Similarly, major events in the world economy shaped developments in the Korean economy. In the decades preceding the GFC, South Korea successfully adopted an export-led growth strategy which maintained extensive protection of domestic markets in a developing stage. During this period of rapid economic growth, the Korean government played a key role in animating the investment-profits nexus by protecting rents (Collins, 1990; Akyüz and Gore, 1996; Singh, 1998; Sakong and Koh, 2010). Starting from 1960s, the Korean government implemented 'Five-Year Economic Development Plan (FYEDP)' with export promotion specializing in labor intensive goods (1st, 2nd FYEDP in 1960s) and promotion of heavy and chemical industries (3rd FYEDP in 1970s). In the 1980s, the government implemented a stabilization policy for long-term stable growth and import liberalization and supply- and market-oriented policy which helped boost the private sector-led growth (Mah, 2011).[4] In particular, the reforms undertaken after the Asian Financial Crisis have stimulated structural changes in the Korean economy (Chang et al., 1998; Kwon, 2001; Eichengreen, 2015). Overall, economic restructuring and industrial rationalization has motivated the large private conglomerates- known as 'chaebols' to improve their market share instead of focusing on short-term profitability. This led to the high profits and corporate investments with substantial capital accumulation. Finally, during the GFC, sound fundamentals with active financial policy reactions have

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[3]See e.g. Gulan et al. (2014), Gorodnichenko et al. (2012), Honkapohja and Koskela (1999).

[4]In addition, direct financing through the capital market, both bond and stock markets, became much more important than bank borrowing after the Asian financial crisis of 1997. Refer to Joh (2004) and Tcha et al. (2004) for corporate governance structure in South Korea after the crisis.

helped South Korea recover from global shocks (Cho, 2010).

One of the striking features in which South Korea and Finland diverged in response to the GFC was in labor market developments. In Finland, government and labor unions were able to negotiate towards lowering "unit labor costs" whereas political instability in Korea tended towards strong labor unions with populist policies such as a drastic increase in the minimum wage. Furthermore, as other Eurozone countries were harder hit by the Global Financial Crisis and the subsequent sovereign debt crisis among southern European countries, monetary policy in the Eurozone was accommodative and facilitated the recovery of the Finnish economy. All of these policies have helped prop up investment in Finland in recent years (Bank of Finland 2017b, 2018).

Nevertheless, membership in the Eurozone and the consequent lack of exchange rate flexibility may help explain why Finland was vulnerable to adverse external conditions translating into weak domestic developments in the first place (Suni and Vihriala, 2016). On the other hand, monetary policy in South Korea is conducted by an independent central bank where price stability has been the primary objective since the Asian Financial Crisis of 1997-1998. In particular, the Bank of Korea (BoK) adopted inflation targeting to bolster transparency of monetary policy resulting in reduced uncertainty in financial markets (Kim and Lee, 2011). Furthermore, the BoK paid special attention to movements of the real exchange rate given that the Korean economy heavily depends on the world economy, e.g. the US, European, and Chinese/Japanese markets (Eichengreen, 2004).

Another interesting parallel between the two countries is how two prominent corporations, both of whom represent nontrivial shares of national economic activity at some points in time, have fared in the mobile technology sector. In the last two decades Nokia in Finland went from contributing to about a quarter of Finland's growth over the period 1998-2007 to contributing about one third to the decline in output over the 2008-2014 period (Suni and Vihriala, 2016). Nokia's decline and its effect on the Finnish economy was sufficiently significant as to coin the term "Nokia effect" describing one-firm economies.[5]

3   Data

The data used for the analysis includes the periods 1996Q1 to 2017Q4 when available. Table 1 lists variable names and their description. We focus on private non-residential investment as our main variable of interest. As such, we exclude investment in housing stock and focus on business investment. For the analysis pertaining to whether investment is above or below trend, we use

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[5]"The Nokia effect", The Economist, August 2012. See also Ali-Yrkko (2010).

measures of potential output and (lags) of actual output to estimate trend investment. On the other hand, to investigate the drivers behind investment dynamics, we include business surplus as a gauge of private sector profitability, consumption, inflation, measures of macroeconomic uncertainty, and a host of financial market measures such as stock market returns, lending spreads, and loan volumes.

As both Finland and South Korea are small open economies, we include external factors through estimates of foreign demand or exports. The Finnish measure of uncertainty is a composite of financial and policy uncertainty. The uncertainty measure as well as estimates of foreign demand and potential output for Finland are from Bank of Finland internal estimates. We use the Economic Policy Uncertainty (EPU) Index to measure overall uncertainty in South Korea. Data series are seasonally adjusted when available.

4 Results

4.1 Was investment especially "low" following the GFC?

To assess whether investment has been "low" following the GFC, we first assess and provide a measure for what it should have been. Benchmarking against desired investment levels, in contrast to a simple comparison of investment before and after the GFC, has the appealing feature that it can account for secular trends associated with low frequency (structural) changes economies undergo over time such as globalization and the growing importance of intangible capital (see e.g. Gutierrez and Philippon, 2017; Crouzet and Eberly, 2018). A widely used tool to determine desired levels of investment is the Accelerator model which posits that investment adjusts to maintain a desirable capital to output ratio:

$$\frac{K_{t+1}^*}{Y_t} = \alpha \tag{1}$$

If there were no frictions or costs to instantaneously adjust investments, then investments would adjust to preserve this ratio while taking into account depreciation of the capital stock (δ). That is, the dynamics of investment can be characterized by the following equations:

$$I_t \quad = \quad K_{t+1}^* - (1-\delta)K_t^* \tag{2}$$

$$I_t \quad = \quad \delta K_t^* + \alpha \Delta Y_t \tag{3}$$

Table 1: Data descriptions

Variable	Unit	Description (Finland)	Description (Korea)
Foreign Demand	q- o-q% growth	Bank of Finland estimates	Authors' estimates from exports
Consumption	q-o-q% growth	Real private consumption	Real private consumption growth
Business surplus	q-o-q% growth	Real gross operating surplus growth	Real gross operating surplus growth deflated with GDP deflator
Real loans	q-o-q% growth	Real loans to non-financial corporations	Real loans deflated with GDP deflator
Investment	q-o-q% growth	Real Private Gross Fixed Non-Residential investment	Real plant Equipment Investment
Lending spread	annualized %	Average loan rate on loans in bank balance sheets less Finland short rate	Three month interbank rate - Call rate
Stock returns	q-o-q% growth	Helsinki All stock index less Finland short rate	Annualized q-o-q growth of KOSPI
Uncertainty	index	Finland composite uncertainty index	South Korean EPU Index
Inflation	q-o-q% growth	GDP deflator inflation	GDP deflator inflation
Credit growth	percent to GDP	4 quarter change in non-financial sector credit growth	Non-financial sector credit
Potential output		Bank of Finland estimates	H-P filter estimates
Output		Real GDP	Real GDP

Given the preponderance of evidence with respect to inertia in investment fluctuations, it seems reasonable to assume that there may be frictions or adjustment costs to investments such that investment flows would only partially (and persistently) adjust to maintain this desired capital to output ratio. Consequently, the ratio of investment to output can be expressed as responding to lags of changes in output. We use the following regression model for our analysis,

$$\frac{I_t}{Y_t^*} = \frac{\alpha_0}{Y_t^*} + \sum_{i=0}^{p} \beta_i \frac{\Delta Y_{t-i}}{Y_{t-i}^*} + \alpha_1 + \varepsilon_t \tag{4}$$

where we have chosen to normalize investment with respect to potential output (Y_t^*) and include a non-zero constant term (α_0) as was done in Clark (1979).[6] The model is estimated with 12 lags for output. Parameter estimates were calculated over two sample periods, the full sample from 1997 to 2017 and a pre-crisis period from 1997 to 2009. The shorter sample is used to generate (pseudo-out-of-sample) predicted investment without taking into account the actual path of investment following the GFC. Table 2 reports the parameter estimates of the accelerator model for Finland and South Korea.

Table 2: Accelerator Model Estimates

	Finland			South Korea		
	α_0	α_1	$\sum \beta$	α_0	α_1	$\sum \beta$
Full Sample						
Mean	-0.363	13.836	2.380	-0.263	8.952	1.823
St. err.	0.115	0.139	0.220	0.115	0.145	0.389
$1997 - 2009$						
Mean	-0.561	16.973	2.771	0.071	7.311	2.127
St. err.	0.125	0.105	0.195	0.135	0.124	0.372

Note: The regression model is estimated by OLS with 12 lags and with Newey-West standard errors.

Figure 2 plots predicted investment from the Accelerator model relative to actual investment for both Finland and South Korea. It shows that investment developments were largely in line with output, or slightly above for South Korea. Finnish investment, on the other hand, appears to be above trend in the immediate years following the GFC and seems to be aligned with output developments thereafter. This suggests that for the Finnish case, the short-term impact of the GFC was more pronounced for output relative to investment.

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[6]See e.g. Clark (1917) and Jorgenson (1963). The particular implementation of the Accelerator model in this paper is largely based on Clark (1979). See also Kopp (2018) and Banbura et al. (2018) for a recent application to US and EU investment.

Figure 2: Predicted vs Actual Investment: Finland (left) and South Korea (right)
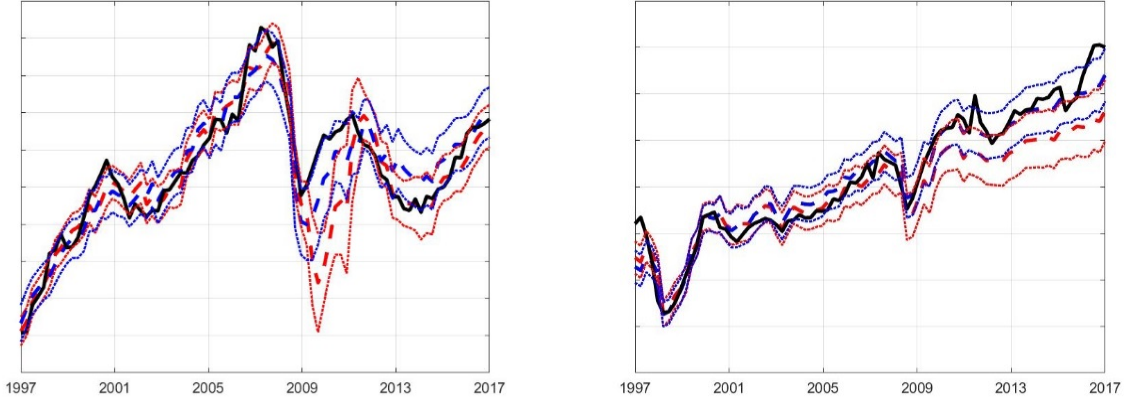
Note: The solid black line is actual data. The dashed blue line is the predicted investment using estimated parameters from the full sample. The blue dotted lines represent the 90% confidence interval. The dashed red line is the predicted investment using estimated parameters using data from 1997 to 2009 only. The red dotted lines represent the 90% confidence interval.

These results suggest that investment developments in both countries were largely in line with output developments following the GFC which in turn indicates that investment did not provide additional amplification and persistence in the resulting downturns.

4.2 What were the main drivers behind investment?

To determine what were the main drivers behind low investment during these period we estimate a structural VAR and perform a historical shock decomposition of shocks identified through two strategies. The empirical methodology regarding the VARs is as follows. Macroeconomic variables are modeled as a reduced-form vector-autoregressive process,

$$X_t = BX_{t-1} + \varepsilon_t \tag{5}$$

where X is a vector of macroeconomic observables and ε are reduced-form and potentially correlated innovations that hit the system.[7] The structural representation of the VAR is,

$$AX_t = CX_{t-1} + \mu_t \tag{6}$$

where $\varepsilon_t = A^{-1}\mu_t$, $B = A^{-1}C$, and μ is a vector of orthogonal structural shocks. In principle, the elements of the matrix A cannot all be identified from the data. Consequently, identifying the

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[7]Without loss of generality, we represent the model as a first-order vector-autoregression. See Sims (1980), Hamilton (1994), and Kilian and Lütkepohl (2016) for a detailed description of Structural Vector-Autoregressions.

impact of structural shocks on the system require restrictions on the matrix A.

A commonly-used procedure (see e.g. Christiano, Eichenbaum and Evans, 1998) is to assume that the matrix A is triangular after arranging the variables such that a shock to the first variable contemporaneously affects all variables in the system, a shock to the second variable contemporaneously affects it and all other variables below, etc. A popular arrangement is a "slow-to-fast" system with, for instance, real GDP ordered first and financial variables ordered last. This allows for a recursive identification of the underlying structural shocks.

The structural VAR is estimated using Bayesian methods with four lags.[8] The recursively identified Bayesian VAR has as variables and their order, foreign demand (block exogenous), uncertainty, consumption, business surplus, credit, private investment, and stock market returns. Investment is private non-residential fixed investment and the credit variable is the 4-quarter change in credit growth. The identified VARs provide us with a historical series for the identified shocks. Figure 3 plots the historical decomposition of investment for both Finland and South Korea using recursive identification.

Figure 3: Shock decomposition from recursively identified SVAR: Finland (left), South Korea (right)
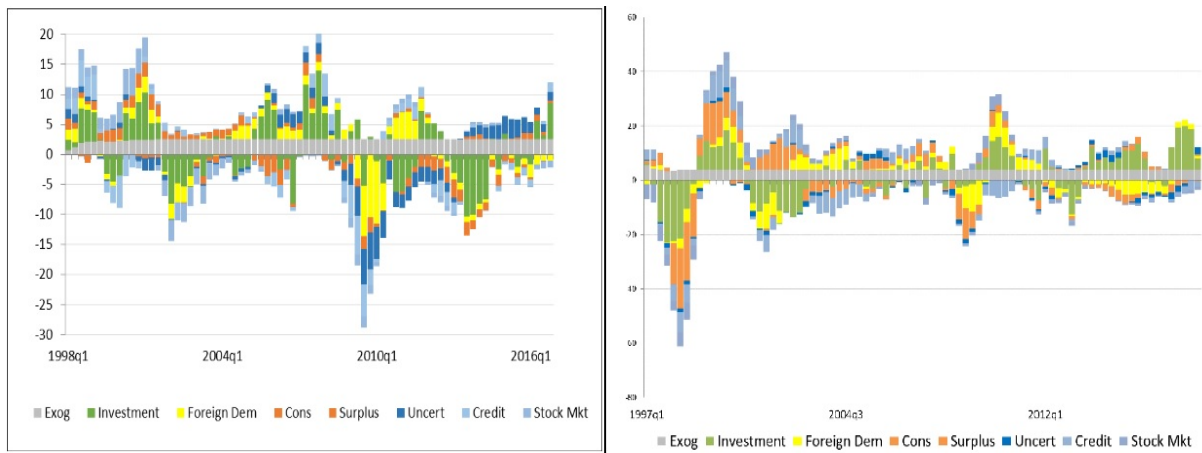
Note: Shock abbreviations (Exog: exogenous component attributed to initial conditions, Foreign Dem: Foreign demand shocks, Cons: Domestic consumption, Surplus: Business surplus or gross profit by businesses, Uncert: Uncertainty, Credit: Credit, Stock mkt: Asset prices (stock market index).

The results suggest that the main factors for low investment in the 2009-2015 period appear to be low foreign demand and heightened uncertainty and by 2011 this has been augmented by low levels of domestic private consumption for Finland. In the South Korean case, uncertainty seems to have played a much smaller role.

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[8]We use the BEAR toolbox (Dieppe, Legrand, and Van Roye, 2016) available at: `https://www.ecb.europa.eu/pub/research/working-papers/html/bear-toolbox.en.html`.

We augment these results with an alternative identification strategy to construct historical shock decompositions. In particular, we use sign restrictions implied by theory to set identify shocks.[9] This amounts to limiting the A matrix to a set of possibilities such that the effect of certain shocks on certain variables would have the right signs. This sign-restriction identification approach for instance would predict that demand shocks raises prices and output while a supply shock raises prices but lowers output. In particular, we use sign and zero restrictions to identify foreign demand shocks (FD) as one which raises foreign demand and domestic investment contemporaneously, foreign financial or uncertainty shocks (FFU) which lowers foreign demand, raises lending spreads and lowers loan volumes, domestic financial uncertainty shocks (DFU) with similar effects except for a zero restriction on foreign demand, and domestic supply (DS)and demand (DD) shocks as earlier described. Table 3 reports the sign and zero restrictions used.

Table 3: Sign and zero restrictions: Finland and South Korea

|	FD	DD	DS	DFU	FFU
Foreign demand	+	0	0	0	-
Consumption	0	+			
Investment	+	+	+		
Lending spread		0	0	-	+
Real loans				+	-
Inflation	0	+	-		-

Note: Row values pertain to variables in the VAR and columns indicate shocks. Restrictions are imposed contemporaneously. FD is foreign demand, DD is domestic demand, DS is domestic supply, DFU is domestic financial or uncertainty, FFU is foreign financial or uncertainty.

Figure 4 plots the historical decomposition of investment from the identified shocks. Consistent with the previous results, foreign demand and uncertainty shocks played an important role during the 2008-2009 period for Finland with the addition of domestic supply as an additional main factor. In the case of South Korea, financial and uncertainty shocks play a more prominent role relative to the previous result.

Depressed foreign demand and, to a lesser extent, heightened uncertainty appear as robust factors leading to lower investment for both countries and under the two identification strategies considered. When disciplining identification using theoretical foundations for sign restrictions, we find that domestic supply factors also play a major role for Finland while financial factors play a more major role in South Korea. In the case of Korea, importance of financial shocks suggest... On the other hand, the relative unimportance of financial factors in the Finnish recession suggests that the

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[9]In particular, we employ the Arias, Rubio-Ramirez, and Waggoner (2014) procedure which allows for both sign and zero restrictions. See also Canova and de Nicolo (2002) and Uhlig (2005).

Figure 4: Historical shock decomposition from sign-restriction identified SVAR: Finland (left), South Korea (right)
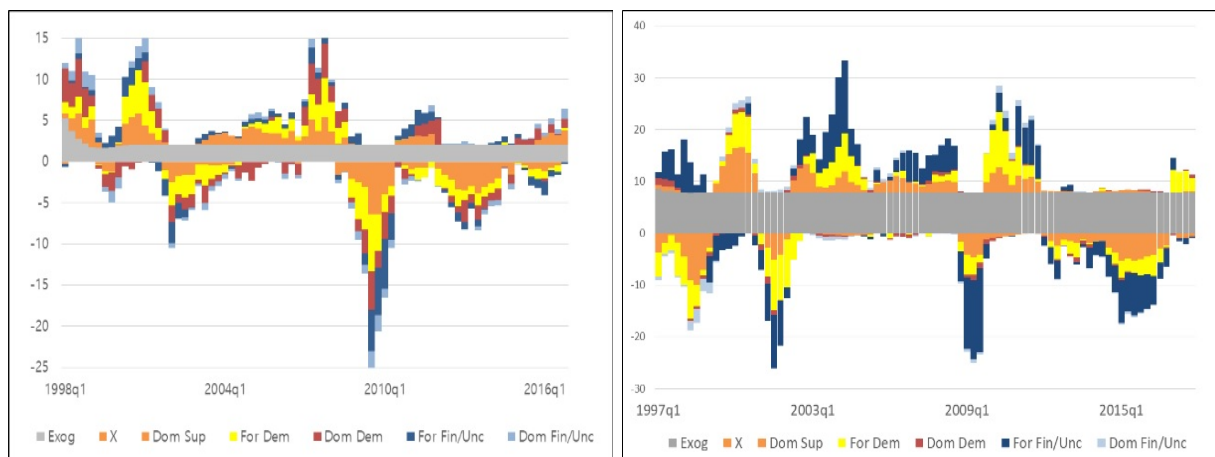
Note: Exog: exogenous component attributed to initial conditions, Dom Sup: Domestic supply shocks, For Dem: Foreign demand shocks, Dom Dem: Domestic demand shocks, For Fin/Unc: Foreign financial and uncertainty shocks, Dom Fin/Unc: Domestic financial and uncertainty shocks, X: Unidentified shock in the sign-and-zero restriction framework.

accommodative monetary policy stance in the Eurozone and resulting easy financing conditions may have helped mitigate financial channels to weakening investment developments in Finland.

5   Conclusions

After a sustained period of mostly positive investment growth for Finland and South Korea in the early 2000s we observe large falls in 2008-09 coinciding with the Global Financial Crisis. However, we find that these were in line with, or even less than, what would be expected given the fall in general economic activity (output) in both countries. While the Finnish economy muddled through a prolonged but mild recession until 2016, the Korean economy recovered rapidly from 2010. We also find that the main factors for low investment in the 2009-2015 period appear to be low foreign demand and heightened uncertainty. These results suggest that lowered investment in both countries were primarily externally driven. Shock identification based on sign restrictions also reveal that domestic supply factors may have also played in important role for Finland while the importance of financial factors in South Korea was amplified. These additional results appear to confirm the Finnish concern that labor costs were elevated and lends support to the policy initiatives in addressing these to help ease Finland out of the recession. Further, the relative unimportance of financial factors in Finnish investment suggests that the accommodative monetary policy stance in the Eurozone and resulting easy financing conditions may have helped mitigate the financial channel to weakening investment developments in Finland. In the case of Korea, the importance of

financial shocks suggest that there may be a need for more stable financial markets fundamentals. Further study is required to understand whether fiscal austerity either contributed to or held back the eventual recovery in Finland and South Korea.

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