ATLANTIS PRESS

Advances in Economics, Business and Management Research, volume 155

Proceedings of the 2020 2nd International Conference on Economic Management and Cultural Industry (ICEMCl 2020)

Causes and Solutions for the Weak Economic Recovery in Finland

Yijin Wang

Department of Economics, London School of Economics and Political Science, London, WC2A 2AE, United Kingdom
Corresponding author's e-mail: Vivian.wang@cas-harbour.org

ABSTRACT

Finland is experiencing a prolonged recession since the financial crisis. In particular, its export sector has been hit severely. This paper discussed the potential reasons and solutions for the sluggish recovery of Finnish economy and used empirical data to prove the ineffectiveness of exchange rate tool in restoring the export sector under the regime of EMU. The results show that the impulse on exchange rate would have minor effect on the level of exports in Finland and further prove the limited usefulness of exchange change rate tool under the regime of common currency union.

Keywords: *Macroeconomics, Finland, financial crisis, exchange rate, VAR*

1. INTRODUCTION

The issues related to the "asymmetrical shock" faced by European Union after the financial crisis has cast doubts on the effectiveness of the common monetary policy regime and threaten the stabilization of the union. Literature focuses mainly on the subsequent sovereign debt crisis experienced by countries in the Southern part of the Europe, while few literature has drawn attention to countries in the Northern part, which is characterized by strong economic growth and sophisticated welfare system. The financial crisis has badly hit the economy in the North and countries are still struggling from the recovery of the crisis, Finland is the worst performer among them. It has experienced a nearly 9% decline of GDP in 2009, though moderate growth has been witnessed during the period of 2010-2011, it is still undertaking one of the slowest recovery peace among the European Union. Paradoxically, Finland was one of the most competitive economic entity by WEF prior to the crisis and has remained a very strong current account surplus. Unlike other countries that are entangled by problematic banking system, with the experience of 1990s financial crisis, Finnish banking system remained subtle. Thus, it is interesting to discuss reasons behind the slow recovery and the potential policy implication in solving the situation. In this paper, the author will mainly focus on the trade side as it is the main driver of the economic growth in Finland, which has been the most effected sector since the financial crisis.

2. ANALYSIS

The case of Finland has not been widely studied by the academia, a few studies have been conducted in discussing the potential reasons behind the slow recovery of Finnish economy. Begnt, Sixten, Matti (2014) [1] in their paper adapt the sectoral analysis and attribute the sharp decline in the manufacturing sector as the main reason for the sluggish recovering phrase. Through 1998 to 2007, the development in manufacturing sector accounted for nearly half of the economic growth of Finland and the ICT sector lead by the tech giant Nokia is the main source of the prosperity. In 2000, Nokia's direct contribution to Finnish GDP reached nearly 4% and accounted for over 40% of the value added in the ICT sector. However, with the massive industrial reconstruction and the fierce competition within the international market, the market value of Nokia shrank by 90% since the financial crisis and was acquired by Microsoft in 2013. Eric, Annika, Petri (2015) [2] made a comparison of the ICT sector between Finland and Sweden, suggested that the ICT sector in Sweden is more dynamic and diverse [2], so that it could be more flexible in corresponding to the shocks in the market. Whilst the ICT sector in Finland is more concentrated and the economic development in Finland has been highly dependent on this single industry, thus the collapse of Nokia acting as the fuse of the contraction in high-tech ICT sector and dragged the economy into further recession. Moreover, the weak performance of Russia's economy also affected the Finnish economy disproportionally; Suni (2015) [3] suggested that the decline of oil price and sanction in Russia did not have significant influence on Finnish economy initially, but the impact was enlarged subsequently due to the constraints on the Western export market. There are no doubts that these asymmetrical shocks experienced by Finland account for the sluggish recovery in the post-crisis period; however, Paavo, Vesa (2016) [4] argues that these shocks were spread over six years, a resilient and flexible economy should be able to recreate a considerable amount of new production with the time frame.

Finland is a typical export-led economy, as its export accounts for nearly 40% of its overall GDP, the performance of the export sector do have significant impact on the economy. Laszlo (2006) [5] conducted the Granger causality analysis between the logarithms of real exports and real GDP in twenty-four OECD countries and proved a two-way causality between export and growth in Finland. The paper presented by the European Commission (2014) [6] suggested that the continuous deterioration in the export sector weighs on the muted recovery of Finnish economy after the crisis and the loss competitiveness in the international market could largely be explained by non-cost factors, such as narrow product range and low propensity of Finnish small companies to export [6]. Weak cost competitiveness in terms of the relatively high labor cost also weighs the trade performance in Finland. A stimulation test examined by Paavo, Vesa (2016) [4] indicated that a 5% reduction on the average labor costs would result the growth in exports and GDP by 3% and 1% respectively.

It then raises the question about the potential policy implications that could be used to restore the performance of Finnish economy. The Finnish ICT sector has been hit severely by the structural change, to prevent the effect of the change, a vibrant and board-based industrial structure should be constructed. This requires the injection of new business as well as the government policy that would favor the new innovation within the wide market. However, time horizon would be a major concern of this approach, it would take several years to find an effective and balanced business structure for Finland. Reduction on the average wage is also a possible solution which could enhance the cost competitiveness of Finnish products in the international market; this approach would also help to reduce the heavy burden of labor costs on the profit margin of companies in Finland. Though the issues related to wage rigidity should also be taken considerations; besides, as the well-known high welfare oriented country, the reduction on wage would reduce the incentive of working and thus further hurt the employment in the country.

It is worth looking back on the crisis in 1990s, the crisis is also originated from the financial sector; though its banking system has been hit drastically back to the time.

However, unlike the recession experienced since the 2008 financial crisis, Finnish economy was able to recover efficiently from the crisis and resulted the subsequent boom in the ICT sector. The fast resume from the crisis was benefit from the export-led strategy conducted by the government, a forced devaluation by nearly 12% was applied first; and in 1992 a float exchange rate regime of Markka was implemented. These measures adapted allowed Finland to regain the competitiveness in the international trade. Finland joined the EMU (European Monetary Union) in 1999. As the member of the common currency union, it loses the ability to manipulate its exchange rate regime. However, it is still valuable to investigate the association between the EU exchange rate and the export level in Finland, so that people can have a better evaluation on the membership of EMU and the fixed exchange rate regime.

3. MRTHODOLOGY

The purpose of the empirical test is to determine the relationship between exchange rate and exports and evaluate the reaction of exchange rate shock on exports. Two sets of data have been used in this paper: the exports of goods and services in Finland and the U.S/Euro Foreign Exchange Rate. The data sets cover the time horizon from 2000Q1-2019Q4.

3.1. Vector Auto-regression Model (VAR) model

The model used in this paper is an extension of the model constructed by Grafoute (2019) [7]. A VAR model is an N equations and N variables linear model in which the current value is explained not only by its lagged variables but also the current and past values of the N-1 variables. Sims (1980) [8] argued that the VAR model provides a coherent and credible analysis for forecasting and policy analysis.

3.2. Model Specification

$$EXP_t = \beta_0 + \beta_1 EXR_{t-1} + \beta_2 EXR_{t-2} + \dots + \beta_k EXR_{t-k} + \gamma_1 EXP_{t-1} + \gamma_2 EXP_{t-2} \quad (1)$$

$$EXR_t = \alpha_0 + \alpha_1 EXR_{t-1} + \alpha_2 EXR_{t-2} + \dots + \alpha_k EXR_{t-k} + \phi_1 EXP_{t-1} + \phi_2 EXP_{t-2} \quad (2)$$

EEXP_t indicates the level of export in Finland; EEXR_t indicates the exchange rate (U.S/EU)

To ensure the stability of the model and reduce the error, the logarithm form is taken as LEXR=log(EXR); LEXP=log(EXP);

3.3. Stationary Test

The Augmented Dickey-Fuller (ADF) unit root test is applied in this paper to investigate the stationarity of the two variables. The results indicate that the P-value in both cases is less than 0.5. Therefore, the null hypothesis is rejected, the data do not contain a unit root and are stationary.

Table1. ADF Stationary test results.

Null Hypothesis: D(LEXP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.572270	0.0000
Test critical values:	1% level	-2.594946	
	5% level	-1.945024	
	10% level	-1.614050	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXP,2)
Method: Least Squares
Date: 07/30/20 Time: 04:24
Sample (adjusted): 2000Q3 2019Q4
Included observations: 78 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXP(-1))	-1.086283	0.113482	-9.572270	0.0000

R-squared	0.543374	Mean dependent var	-2.38E-05
Adjusted R-squared	0.543374	S.D. dependent var	0.033725
S.E. of regression	0.022789	Akaike info criterion	-4.712316
Sum squared resid	0.039990	Schwarz criterion	-4.682102
Log likelihood	184.7803	Hannan-Quinn criter.	-4.700221
Durbin-Watson stat	1.953095		

Null Hypothesis: D(LEXR) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.360839	0.0000
Test critical values:	1% level	-2.594946	
	5% level	-1.945024	
	10% level	-1.614050	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXR,2)
Method: Least Squares
Date: 07/30/20 Time: 04:23
Sample (adjusted): 2000Q3 2019Q4
Included observations: 78 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXR(-1))	-1.060766	0.113320	-9.360839	0.0000

R-squared	0.532267	Mean dependent var	9.34E-05
Adjusted R-squared	0.532267	S.D. dependent var	0.031187
S.E. of regression	0.021329	Akaike info criterion	-4.844719
Sum squared resid	0.035031	Schwarz criterion	-4.814505
Log likelihood	189.9440	Hannan-Quinn criter.	-4.832624
Durbin-Watson stat	1.993130		

4. RESULTS

4.1. Lag order selection

Lag order selection is a preliminary step for impulse response analysis; in this paper, I adapted five criteria (LR/FPE/AIC/SC/HQ) in determining the optimal lag selection. Ventzislav, Lutz (2005) [9] provides a thoroughness comparison among different lag-order selection criteria which have been widely used in applied work. They concluded that for monthly VAR model, AIC model produce the most accurate structural and semi-structural impulse response estimates for realistic sample size; as for quarterly VAR models, HQC is the most accurate one for sample size greater than 120 [9]. Whilst in this paper, the results show divergence when applying different criteria. The value is the lowest for AIC/LR/FPE with the lag of order equal to 5; whilst for SC/HQC, the value is the lowest with the selection of the lag equal to 1. In this case, the author chooses the lag that has been selected by the major criteria, so lag 5 is the optimal lag selection.

Table 2. Lags selection criterion.

VAR Lag Order Selection Criteria
Endogenous variables: LEXP LEXR
Exogenous variables: C
Date: 07/30/20 Time: 04:30
Sample: 2000Q1 2019Q4
Included observations: 73

Lag	LogL	LR	FPE	AIC	SC	HQ
0	210.3176	NA	1.14e-05	-5.707332	-5.644580	-5.682325
1	357.3805	282.0384	2.26e-07	-9.626863	-9.438606*	-9.551840*
2	358.2404	1.601923	2.46e-07	-9.540832	-9.227070	-9.415792
3	361.0950	5.161780	2.54e-07	-9.509452	-9.070185	-9.334396
4	364.9491	6.757963	2.56e-07	-9.505456	-8.940685	-9.280385
5	373.5754	14.65286*	2.26e-07*	-9.632203*	-8.941928	-9.357116
6	375.1962	2.664264	2.42e-07	-9.567018	-8.751238	-9.241916
7	379.8297	7.362829	2.39e-07	-9.584375	-8.643090	-9.209257

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

4.2. Vector Auto Regression Estimate

After the identification of the VAR (5) model, the author then conducted a vector auto regression estimates. The results are surprising as the influence of exchange rate on export varies. In the first lag, the influence of LEXR (-1) on export is positive but insignificant; in the second lag, the influence of LEXR (-2) on export is negative and insignificant; in the third lags and onwards, the influences of LEXR (-3)/LEXR (-4)/LEXR (-5) on export are significant and positive/negative/positive respectively. The estimation here does not really present a definite relationship between exchange rate and the level of export. However, the results are still useful as the values of R squared prove the good fitting effect of the VAR (5) model. The R squared values are 0.911795 and 0.896854, respectively.

Table 3. The regression results.

Vector Autoregression Estimates
Date: 07/30/20 Time: 04:34
Sample (adjusted): 2001Q2 2019Q4
Included observations: 75 after adjustments
Standard ~~errors~~ in ( ) & t-statistics in [ ]

	LEXP	LEXR
LEXP(-1)	1.038058	0.220900
	(0.11984)	(0.11333)
	[8.66236]	[1.94925]
LEXP(-2)	0.056728	-0.235607
	(0.16205)	(0.15324)
	[0.35007]	[-1.53745]
LEXP(-3)	-0.331224	-0.218983
	(0.15210)	(0.14384)
	[-2.17767]	[-1.52244]
LEXP(-4)	0.388852	0.403694
	(0.16159)	(0.15281)
	[2.40637]	[2.64173]
LEXP(-5)	-0.204471	-0.189405
	(0.12280)	(0.11612)
	[-1.66513]	[-1.63105]
LEXR(-1)	0.049627	0.948262
	(0.12669)	(0.11981)
	[0.39172]	[7.91483]
LEXR(-2)	-0.161260	0.031781
	(0.16133)	(0.15257)
	[-0.99953]	[0.20830]
LEXR(-3)	0.330062	0.091533
	(0.15902)	(0.15038)
	[2.07557]	[0.60866]
LEXR(-4)	-0.474535	-0.370407
	(0.16466)	(0.15572)
	[-2.88190]	[-2.37874]
LEXR(-5)	0.266302	0.239189
	(0.12398)	(0.11724)
	[2.14796]	[2.04011]
C	0.535698	0.204548
	(0.50209)	(0.47481)
	[1.06694]	[0.43080]
R-squared	0.911795	0.896854
Adj. R-squared	0.898013	0.880737
Sum sq. resids	0.029213	0.026126
S.E. equation	0.021365	0.020204
F-statistic	66.15823	55.64775
Log likelihood	187.9777	192.1670
Akaike AIC	-4.719406	-4.831120
Schwarz SC	-4.379508	-4.491222
Mean dependent	10.26507	0.086243
S.D. dependent	0.066900	0.058505

Determinant resid covariance (dof adj.)	1.86E-07
Determinant resid covariance	1.36E-07
Log likelihood	380.1885
Akaike information criterion	-9.551694
Schwarz criterion	-8.871898
Number of coefficients	22

4.3. VAR Granger Causality test

The Granger Causality test shows that at the significance level of 10%. LEXR and LEXP pass the Granger Causality test; indicating the fact that the lagged values of LEXP exist Granger Causality with LEXR; and the lagged values of LEXR exist Granger Causality with LEXP.

Table 4. Granger Causality Test results.

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 07/30/20 Time: 04:43
Sample: 2000Q1 2019Q4
Included observations: 75

Dependent variable: LEXP

Excluded	Chi-sq	df	Prob.
LEXR	9.966912	5	0.0762
All	9.966912	5	0.0762

Dependent variable: LEXR

Excluded	Chi-sq	df	Prob.
LEXP	9.328369	5	0.0967
All	9.328369	5	0.0967

4.4. Impulse response

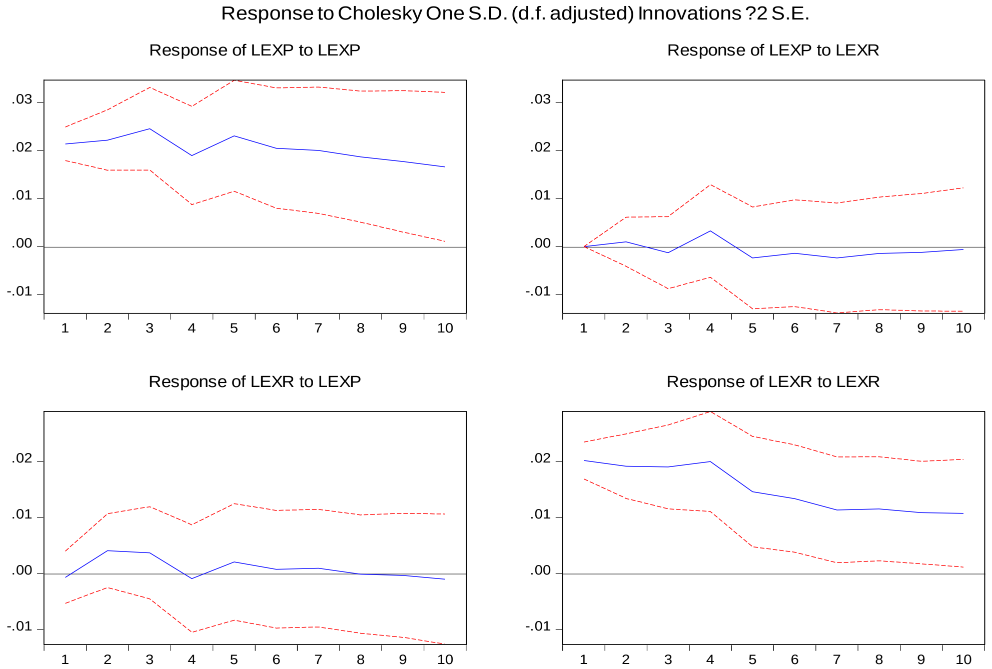

Figure 1 Impulse response.

The results of the impulse response show that the reaction of export to exchange rate raises continually from period 1 to period 4. It reaches the peak in period 4. A decline is witnessed in period 5, and remain stabilized throughout the rest of the period on the zero baseline. As for the response of export to its own shock, the reaction increases steadily from period 1 to 3, and reaches the peak in period 3. A decrease is presented in period 4 and an increase is witnessed from period 4 to period 5. After period 5 the reaction continues to decrease.

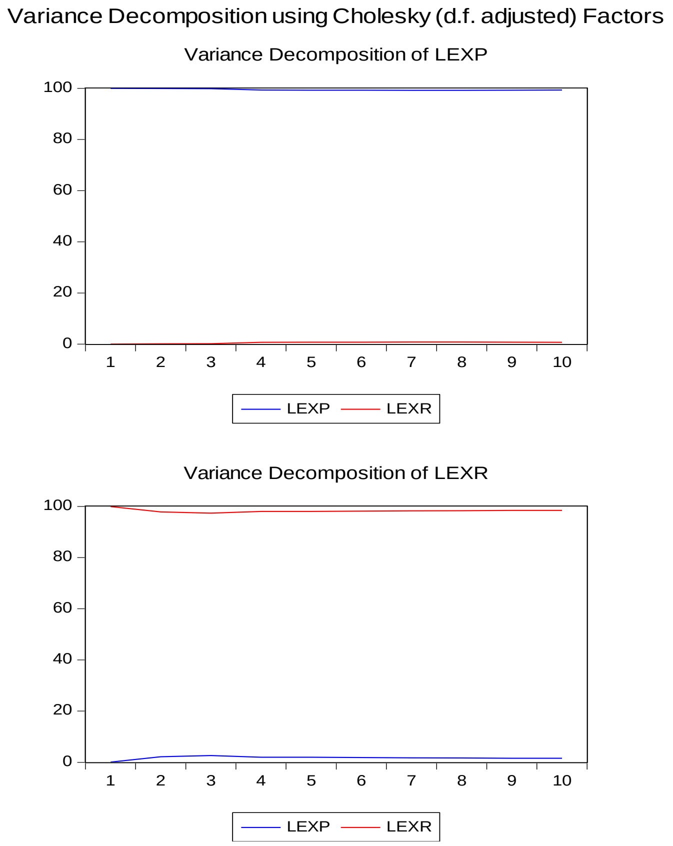

Figure 2 Variance Decomposition.

The result of the variance decomposition reveals that from period 5 onwards, 2% of the fluctuation in LEXP (export) can be explained by the shocks in LEXR (exchange rate).

5. CONCLUSION

The VAR test shows that the shocks of exchange rate only have limited effect on the level of exports in Finland, which is in line with the feature of Finnish exchange rate regime. By joining the common currency union, the fluctuation of the exchange rate on Euro will not have a significant impact on the export level, as Finland is not able to alter the exchange rate accordingly. This paper further proves the losing effectiveness of exchange rate tool of Finland in restoring its export and the economy as a whole; even with the possible future shocks on the U.S/Euro Foreign Exchange Rate.

ACKNOWLEDGMENT

This work could not be done without the supports from my mentor Priscilla and my supervisor Yvonne, they are the ones that always encouraging me when I face difficulties when proceeding the research. Family is always the harbor for me, I would like to thank my parents, they are the role models. During this special period of pandemic, I would also express my great respect to those who work in the frontline, without them we would be able to get back to the normal life.

REFERENCES

[1] B. Holmström, S. Korkman and M. Pohjola. The nature of Finland's economic crisis and the prerequisites for growth. 2014.
https://www.eesc.europa.eu/ceslink/en/documents/the-nature-of-finlands-economic-crisis-and-the-prerequisites-for-growth

[2] E. Giertz, A. Rickne,P. Rouvinen. Small and beautiful: The ICT success of Finland & Sweden Vinnova, 2015, P:226.

[3] P. Suni. Raakaöljyn hinnan laskun talousvaikutukset. 9.1. 2015, ETLA Brief 2015.

[4] P. Suni, V. Vihriala. Finland and its Northern Peers in the Great Reccession, ETLA Reporait 2016, No. 49.

[5] L. Kónya. Exports and growth: Granger causality analysis on OECD countries with a panel data approach, Economic Modeling, 2006, V23/Issue6, P:978-992.

[6] European Commission. Macroeconomic Imbalances Finland, 2014, Occasional Papers 177.

[7] G. Amoro. Does the Exchange Rate Matter on Import -Export in Cote D'Ivoire? American Journal of Economics; 2019, 9(6): 311-319.

[8] C.A. Sims. Macroeconomics and Reality, Econometrica, 1980, 48, 1-48.

[9] V. Ivanov, L. Kilian . A Practitioner's Guide to Lag Order Selection for VAR Impulse Response Analysis, Studies in Nonlinear Dynamics Econometrics, 2005, V9/Issue 1/Article2;