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The Impact of Financial Development, Net Foreign Assets and Domestic Businesses on Export Performance: A case of Singapore Economy

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Abstract
The effects of financial sector liberalization; foreign assets, domestic businesses in the form of listed companies and domestic manufacturing, and real interest rate on export performance of Singapore economy are tested by using ARDL bounds testing approach by covering period from 1978-2023. The empirical results suggest that liberalizing financial sector and foreign assets significantly accelerate export performance. This study considers two proxies for domestic businesses – listed companies and manufacturing. The results uncover the significantly expansionary effects of both indicators of domestic businesses on export performance. Lastly, real interest rate is adversely affecting export performance in Singapore. This study suggests that by expanding domestic businesses; increasing investments in foreign assets, liberalizing financial sector and reducing real interest rate can give boost to exports in Singapore.
Keywords: Financial Sector Liberalization; Domestic Businesses; Foreign Assets; Export Performance; ARDL Approach; Singapore

1. Introduction

The economic health of any country is dependent on export capacity of a country. The exports are important because it can help any country to earn foreign exchange earnings. Exports can be accelerated by triggering many economic indicators in the country. In our research we will consider financial sector liberalization; net foreign assets, domestic businesses and real interest rate in boosting export potential of Singaporean economy. We intuit that liberty of financial sector is an important instrument to boost exports of any economy. Our wisdom suggests us that financial development facilitates investors by providing credits to them. As a result they expand investments, which in turn elevate domestic production and hence after meeting domestic demand, the rest production will be exported. This will reveal increase in volume of exports in the country. Therefore, this research is going to explore this relation so that we may see whether financial sector liberalization help in extending export volume in Singapore or not. Besides this, another important driver of exports is net foreign assets. The deposits along with assets abroad excluding liabilities will reveal the size of net foreign assets. If it grows then it provides interest earnings on foreign deposits on the one side and rent earnings or capital gain on assets at abroad on the other side. The sum will help the monetary authority to earn foreign exchange. This will actually increase monetary base and hence facilitates monetary authorities to provide or advance more funds or credits to commercial banks. Subsequently they will advance more credits to general public or particularly the investors. Consequently the investors will boost productions and hence exports will be expanded. In order to capture the impact of foreign assets on exports, we have considered this driver of exports in our research.

The role of domestic businesses in strengthening exporting capacity is crucial in any economy. We have taken this factor in our study with the notion that it will play a vital role in accelerating export performance of a country. Through exports the local businesses will earn foreign exchange earnings which will help them to stabilize exchange rate and as result domestic prices of goods and service will be stabilized. The impact of domestic businesses on exports will be captured in the form two sub factors such as the impact of domestic listed companies and the impact of domestic production in the form of manufacturing valued added. Firstly we will highlight the role of first indicator of domestic businesses on exports. We all know that the increase in the size of listed companies in the country is actually reflecting more employment creation in the country. Besides this, it also reflects more investments in enhancing production capacity, expanding R&D, attaining diversification in production and switching to advance technology for enhancing efficiency. All this will help in increasing domestic output of the economy. The higher level of domestic output will give stimulation to the exports. After this, now we are going to throw light on the role of second factor of domestic businesses on exports. There are researches like Nazli et al. (2018) reported factor productivity dynamics while changes in domestic production were inquired by Hanif et al. (2014); Hanif and Gago-de Santos (2017); Hanif et al. (2020); Huang et al. (2020); Alharthi and Hanif (2020) and Wang et al. (2022). The improvement in manufacturing value added tends to energize industrial health, promotes innovation, stimulate supply of skilled workers and ultimately all this will increase domestic production in the country. As a result, it promotes exports volume in the country. The both indicators of domestic businesses are important for accelerating exports. Another important driver of exports is considered in this research which is real interest rate. This is also an instrument of monetary policy. The decrease in interest rate reduces cost of borrowings and allows the investors to borrow more. The increased borrowings motivate investors to expand investments. Therefore, demand for working class will be boosted who will be used for producing goods and services. This will improve overall production and hence the increased production will help in expanding exports. This indicator is taken in our research for testing whether it satisfies the above stated transmission channel or not.

The rest of the study is organized as the contribution of past studies is provided in next part of the study. The data, model and method scheme will be explained in section 3. Key findings and their explanation will be provided in section 4. Conclusion and policy recommendations will be discussed in the last section.

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2. Empirical Contribution of the Past Studies

In this part of the research, we will be presenting discussion of the contribution of scholars from the recent years. These studies will provide us guide that how export function changes due to changes in various explanatory factors with respect to time and countries. Our section starts from the contribution of Majeed and Ahmad (2006) who suggested significantly positive role of domestic production in expanding exports of 75 developing economies. After them, Nadeem et al. (2012) applied least square regression by taking data series from 1981-2011 and inquired export function for Pakistan economy. They highlighted significantly increasing role of industrial production and domestic production in the form of GDP on exports. The role of domestic production and private sector credit were investigated by Anagaw and Demissie (2012) for exports of Ethiopian country. They provided evidence of positive and statistically significant impact of domestic production and private sector credits on exports in the selected economy.

In another research we found Hassan et al. (2013) who used bounds test and provided evidence of positive impact of domestic production on exports in case of Pakistan.

Later on, we visited the contribution of Gul and Rehman (2014) who uncovered the significant and positive effect of domestic production on supply of exports for Pakistan economy. The nonlinear impact of foreign direct investment on exports of Malaysian economy was tested by Yee et al. (2016). Their results suggested that FDI had inverted U- shaped impact on exports in the selected economy. We then found Naseer and Mangla (2017) who in their research considered ARDL method for the data series from 1980 to 2016 and exposed insignificant impact of per capita GDP on export function of Pakistan. After them Bostan et al. (2018) tested the negative impact of interest rate on exports for Romanian case. After this, we found the contribution of Oo et al. (2019) who reported significantly positive impact of domestic production on exports for ASEAN country group. According to Hussain et al. (2020), production capacity had significant and appreciating effect on aggregated; primary and manufactured exports in Pakistan. During the same period, Rehman et al. (2020) inquired the relation between exports and infrastructure quality by taking domestic investment and per capita GDP as controlling indicators. Their findings suggest that infrastructure; per capita GDP and domestic investments had significant and expansionary effects on exports in case of Pakistan. In a research executed by Lin et al. (2021) in which they found that exports were elevating due to expansion in financial services; domestic production, capital and size in China. After them, Saeed et al. (2021) applied panel fixed effect approach by taking sample period from 1999-2018 and reported that total assets and domestic production were significantly improving product quality of exports while the study further explained the insignificant impact of size of the firms and real interest rate on product quality of exports in case of Pakistan. The real interest rate had negative but statistically significant effect on Canadian exports as highlighted by Hassan et al. (2022) in their research. After briefly highlighting the empirical contribution of the scholars, now we will be discussing the variables extraction source, functional form and suitable method in the coming section.

3. Data Source, Model and Methodology

For obtaining data for the proposed model of this research; we have considered databank of World Bank (2024). All the variables are dated on a regular frequency while our data covers period from 1978 to 2023. Our proposed model is presented as under:

$$\ln X_t = f\ (\ln F_t, \ln FA_t, \ln LC_t, \ln MF_t,\ \ln RIR_t)$$

Whereas;

Table 1: Names of the Variables & their Demonstration

Indicators	Representation
Exports as share of GDP	$\ln X_t$
Financial Development	$\ln F_t$
Net Foreign Assets	$\ln FA_t$
Total Companies listed Domestically	$\ln LC_t$
Manufacturing as share of GDP	$\ln MF_t$
Real Interest Rate	$\ln RIR_t$

The results of this research will be obtained by using various steps. We will present discussion of summary stats in the beginning. Later on we will talk about the presence of multicollinearity between the regressors of our proposed model by applying variance inflation factor matrix. After this we will report the status of integrated order by using KPSS (1992) test for unit root. The cointegrated link between exports and its determining factors will be found using the methodology suggested by Pesaran et al. (2001). Once the cointegrated linkage between exports and its determining factors is confirmed then the short and long term coefficients will be reported. The diagnostics will be presented in the end to see whether all the estimated results are reliable to suggest suitable policy implication. After this part, results and their discussion is going to be presented in the next section.

4. Findings and their Interpretation

This part highlights the empirical findings and their discussion. The findings initiates from the presentation of summary statistics. The results of the below provided Table- 2 suggests that financial development and domestic production in the form of

manufacturing value added as share of GDP are following traits of normal distribution because for these factors JB test appears as insignificant. While for the remaining factors, JB test is significant hence the rest factors do not meet the requirements of normal distribution. This is shared as under:

Table 2: Descriptive Stats

Variables	lnX_t	lnF_t	$lnFA_t$	$lnLC_t$	$lnMF_t$	$lnRIR_t$
Mean	4.8658	4.5538	-0.4098	5.6076	2.9976	1.3074
Std. Dev.	0.3505	0.1951	0.2667	0.6061	0.0615	0.7262
Jarque-Bera	4.9120	1.2870	4.6350	5.4501	0.7310	11.6626
Probability	0.0858	0.5255	0.0985	0.0655	0.6938	0.0029
Observations	46	46	46	46	46	46

After this, multicollinearity between regressors is explored by using VIF test which is then reported in the form of VIF matrix. For all the factors taken as regressors for exports in this research, VIF value is below 10 which reflect that there is no evidence of multicollinearity in this research. The results of VIF matrix are presented in below presented Table- 3:

Table 3: VIF Matrix

Variables	lnF_t	$lnFA_t$	$lnLC_t$	$lnMF_t$	$lnRIR_t$
lnF_t	-				
$lnFA_t$	1.0754	-			
$lnLC_t$	2.6711	1.7069	-		
$lnMF_t$	1.0680	1.0027	1.0046	-	
$lnRIR_t$	1.1099	1.0150	1.0001	1.1356	-

Besides throwing light on the VIF matrix, now we would like to uncover the possible order of the factors at which they are stationary. This will be done by using KPSS (1992) unit root test. The findings which are presented in Table- 4 suggest that foreign assets; domestic production and real interest rate have LM-stats less than the 1% critical value of 0.739 at level or at zero difference. This concludes that all these factors fall in the acceptance zone of null hypothesis which states that all these data series are stationary at zero difference. The rest indicators are nonstationary at zero difference. The LM- stats for all the selected factors are witnessed as less than the 1% critical value of 0.739. This shows that all these factors are stationary at first difference. Overall we conclude that our selected factors for this research have mixed order. It means that some of the variables have stationary status at zero difference and some have stationary status at first difference. These results are presented in below reported Table- 4:

Table 4: KPSS Unit Root Test

At Level		**At First Difference**	
Variables	**LM-Test**	**Variables**	**LM-Test**
lnX_t	2.2467	ΔlnX_t	0.3759
lnF_t	1.9229	ΔlnF_t	0.1150
$lnFA_t$	0.6105	$\Delta lnFA_t$	0.1582
$lnLC_t$	2.1567	$\Delta lnLC_t$	0.2315
$lnMF_t$	0.0847	$\Delta lnMF_t$	0.0548
$lnRIR_t$	0.0472	$\Delta lnRIR_t$	0.0238

The long run equilibrium link between exports; financial sector liberalization, foreign assets, domestic businesses in the form of list companies and domestic production and real interest is going to be investigated by considering method suggested by Pesaran et al. (2001). According to this procedure, if the calculated bounds test value (F-test) is witnessed as greater than the critical value at upper bound then this relationship will be confirmed. From the results which are provided in Table- 5 we may see the F- test value which is 5.2872 and it is greater than the 5% critical value at upper bound which is 4.2798. Therefore, based on this result we reject the null hypothesis and conclude that the long run equilibrium linkage between exports and its determining factors sustain in our research. Moving forward, we may also witness from the results that all the tests for diagnostics are insignificant. This means

that no serial correlation, no misspecification error, no heteroskedasticity issue and no abnormality issue exist in this research. All the diagnostics are fine. Therefore, the estimates are best fit. The results are provided in the below given Table- 5:

Table 5: Results of Cointegration using ARDL Approach

Proposed Function	$\ln X_t = f\ (\ln F_t, \ln FA_t, \ln LC_t, \ln MF_t, \ln RIR_t)$	
Lag Oder	(1 , 0 , 0 , 1, 0 , 0)	
F – statistics	5.2872	
Significance Level	Critical Bounds	
	Lower	Upper
5 percent	2.9335	4.2798
10 percent	2.4752	3.6399
	DIAGNOSTIC TESTS	
Serial Correlation	1.1224 [0.289]	
Functional Form	2.6078 [0.115]	
Normality	2.0642 [0.356]	
Heteroscedasticity	0.0180 [0.893]	

We will mention Prob. values in "[]".

Besides explaining cointegration between exports and determinants, the impact of financial sector liberalization; foreign assets, domestic businesses and real interest rate on exports is captured and presented in Table- 6 and Table- 7 in the form of long run and short run parameters. The findings which are disclosed in Table- 6 reveal that financial sector liberalization is an engine of exports expansion. Like if one percent financial sector is liberalized then it will expand significantly exports by 0.3489 percent. The more liberalized financial sector provides more credits to the private sector for producing goods and services. Higher production will boost exports after meeting domestic demand for goods and services. Besides this; as the size of foreign assets grow, it escalates foreign rents or incomes or profits. The higher earnings through foreign assets raise liquidity or cash potential domestically. This will further allow the domestic people to invest more leading to elevate domestic production and hence it leads to expand exports. The parameter shows that by increasing foreign assets by one percent will increase exports by 0.1371 percent. Afterwards, this research introduces two proxies for representing the performance of domestic businesses – domestic listed companies and – domestic manufacturing. The coefficients of domestic listed companies and domestic manufacturing are positive and significant which demonstrate that exports significantly follow upward trajectory by 0.4161 percent if the size of domestic companies is increased by one percent while exports expand significantly by 0.7116 percent if domestic manufacturing is increased by one percent. The increasing size of domestic listed companies refers to higher level of investors' interest in domestic economy for producing goods and services. Moreover, higher manufacturing also complement this argument. Both indicators represent the expanding performance of domestic businesses which is ultimately giving boost to overall domestic production and hence leading to increase exports in the domestic economy. Lastly, the coefficient of real interest shows that if interest rate enhances then it will increase cost of borrowing and leading to increase cost of credits. This will reduce credits to the investors and through this level of investments fall. The reduction in investments decreases domestic production and hence it leads to decrease exports. One percent increase in real interest rate will significantly reduce exports by 0.4694 percent. Among all the indicators, manufacturing value added is leaving more strong impact on exports in Singapore in the long run. The results are shared in the below given Table- 6:

Table 6: Long-Term Parameters

Dependent Variable = $\ln X_t$

Indicators	Parameters	S.Error	t-test	P.Value
$\ln F_t$	0.3489	0.1002	3.4832	0.0013
$\ln FA_t$	0.1371	0.0478	2.8686	0.0068
$\ln LC_t$	0.4161	0.0359	11.5750	0.0000
$\ln MF_t$	0.7116	0.1500	4.7449	0.0000
$\ln RIR_t$	-0.4694	0.1405	-3.3402	0.0019
C	-1.0373	0.5611	-1.8488	0.0725

After the above discussion, the impact of all the regressors of exports for short run period is presented in Table- 7. The results demonstrate that liberalization of financial sector; stimulation in the volume of foreign assets, expansion in the performance of domestic businesses and reduction in real interest rate are significantly giving boost to exports. Liberalizing financial sector by one percent; increasing volume of foreign assets by one percent, enhancing the size of listed companies by one percent, stimulating

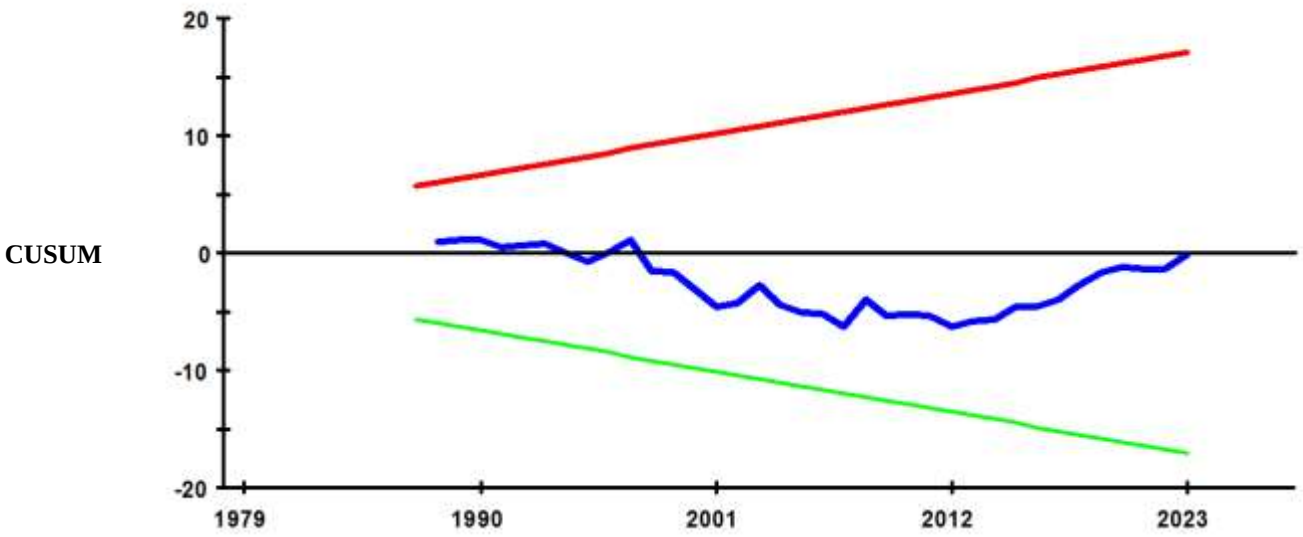
domestic production in the form of manufacturing value added by one percent and reducing real interest rate by one percent will significantly boost exports by 0.1793%, 0.0704%, 0.0985%, 0.3657% and 0.2412% respectively in the short run in Singapore. These findings are similar to long run. Based on these results, we may conclude that like long run span, domestic production in the form manufacturing value added has more strong impact on exports in the short run span of time. Through this we may safely say that financial development, foreign assets and both proxies of domestic business are the engine of exports in Singapore. Afterwards, the negative and significant parameter of lagged error term provides justification or validity or evidence of convergence hypothesis in this research. This means that the proposed model of this research has power to attain long run equilibrium again if any macroeconomic shock instable the long run equilibrium. The stable equilibrium will be achieved in about in about 1.95 years. The parameters for short run period are shared as below in Table- 7:

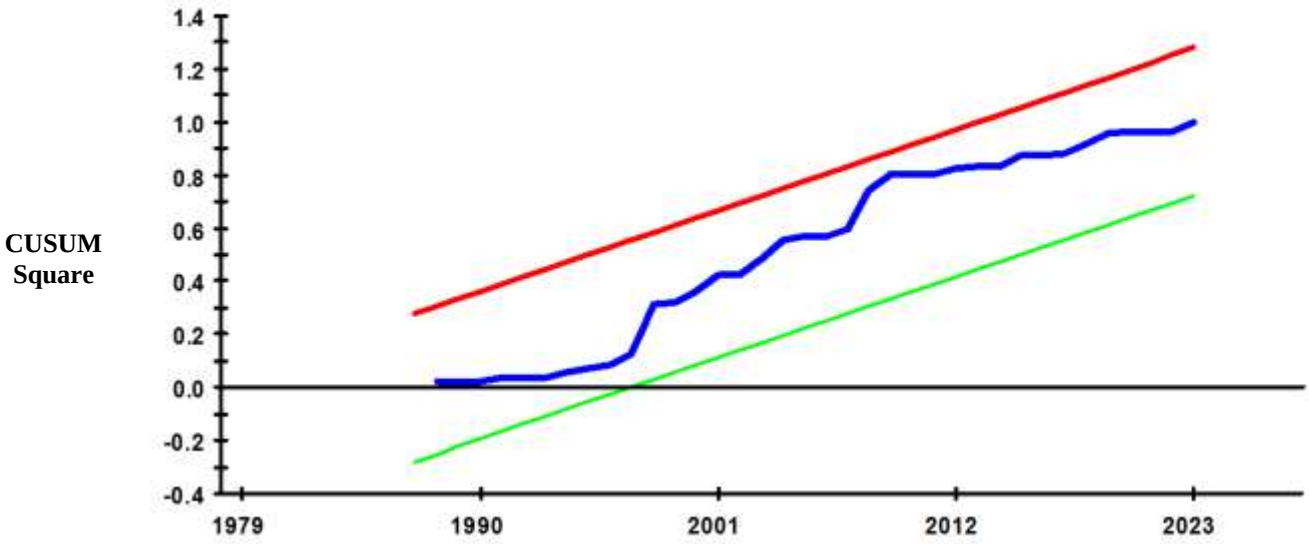
Table 7: Short-Term Parameters

Dependent Variable = $\Delta \ln X_t$

Regressors	Coefficient-size	Stand. Er.	t.Test	Pro.Value
$\Delta \ln F_t$	0.1793	0.0595	3.0120	0.0047
$\Delta \ln FA_t$	0.0704	0.0255	2.7600	0.0089
$\Delta \ln LC_t$	0.0985	0.0412	2.3933	0.0219
$\Delta \ln MF_t$	0.3657	0.0793	4.6116	0.0000
$\Delta \ln RIR_t$	-0.2412	0.0694	-3.4761	0.0013
CointEq(-1)	-0.5139	0.0704	-7.3043	0.0000
Diagnostic Tests				
$\overline{R}^2$			0.6514	
F-Test (Probability Value)			14.8676 (0.000)	
DW-Test			2.2473	

The stability test is presented after presenting discussion of short-run coefficients. This test carries two figures – Cumulative sum and cumulative sum of square. These figures provide information whether mean and variance of error term of the proposed model are stable during our suggested period or not. The cumulative sum if it is remain within its critical values then it will suggest that mean of error is stable while if the cumulative sum of square is appeared within its critical bounds then it will confirm the stability of variance of error term. From the below shared picture we may see that both cumulative sum and cumulative sum of square are falling within their critical bounds hence both mean and variance of the proposed model are stable during our proposed sample period. Hence the parameters that we have estimated are stable during the proposed time span. The figure carrying both cumulative sum and cumulative sum of square are shared as under:





5. Conclusion

The financial liberalization; foreign assets, performance of local businesses and real interest rate are identified as determining factors of exports in this research. This study proposes two proxies for representing performance of local businesses like local listed companies and local manufacturing. This study takes into account bounds test proposed by Pesaran et al. (2001) to inquire long run and stable equilibrium between exports and its factors for the period from 1978 to 2023. The findings suggest that exports have cointegrating relation with its determining factors in Singapore. Liberalization of financial sector and foreign assets are improving exports performance while real interest rate is showing decreasing impact on exports. Local businesses like local listed companies and local manufacturing are significantly encouraging exports. All these results are consistent with the diagnostic tests which we have applied in this research. The stability test in the form of cumulative sum and cumulative sum of square is also witnessed as stable which is concluding that all the estimated long and short run parameters are stable over the selected period. Based on these results, this research proposes that local business activities must be encouraged to reap escalating effects of exports. Moreover, financial expansion and investment in foreign assets can also give boost to exports. Lastly reducing real interest rate can become an engine of exports in Singaporean economy.

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