Export-led or household consumption-led growth in China: An empirical analysis

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Abstract. GDP growth dependence on various factors of the country during (1980-2013) 34 years has been estimated. Ordinary Least Squares Technique of regression is applied here. The results are indicative of incidence of devaluation in the Yuan taking real effective and nominal exchange rate. Further, incidence of systematic impact of capital formation on GDP growth is greater than that of the international trade and domestic household consumption expenditure. That signifies the importance of domestic economy in contrast to the general belief of external sector dependence of the Chinese growth.
Keywords. Currency devaluation, GDP growth, Regression.
JEL. F13, F43, O47, E21.

1. Introduction

China being the second largest economy in the world after US has been under pressure during last couple of years (World Bank, 2017). The stack of previous studies has been presenting diverse opinions on the Chinese growth patterns and the source of tremendous success in GDP growth and development. The reviewed literature can easily be classified into two groups. One group of scholars endorsing that the Chinese growth strategy has been more towards domestic consumption-led than export-led include (Chap, 2007) and (Hardy, 2006). Hardy, (2006) has been convincing on the notion that the Chinese growth patterns are observing a transition phase from export-led to the consumption driven growth strategy though at a slow pace. This transition phase has a logical argument in it. The export-led approach entails investment in machinery and factories that necessitates immense energy consumption that may be detrimental to the environment. Another factor that has motivated China to adopt consumption-led growth instead of the export-led growth is the burgeoning trade surpluses that may create trade frictions (People's Bank of China, 2005). Another study (Shaikh, Shah, & Shah, 2014) has been arguing that Chinese growth strategy has been more towards expanding domestic consumption in recent years quoting (Central Economic Conference, 2004). Further the studies on whether exports lead to economic growth or GDP growth results into higher exports have been under considerable research yet the link is debatable (Shan, 1998). On the other hand,

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studies on export-growth nexus are limited. The noteworthy studies are (Kwan, & Cotsomitis, 1991), Kwan, & Kwok, (1995) and Shan, (1998). It is generally believed that Chinese spectacular growth has been credited to its export oriented growth policy. Nevertheless there have been studies that claim that the country has been rethinking to make growth more sustainable by expanding consumption by households. Theoretically soaring current account surpluses (Hardy, 2006).

Historically countries have been following currency devaluation policy to make their exportables competitive in international market. Based on the "an experiment of gradualism", Chinese exchange rate regimes mainly respond to the changes in the currencies of two major countries; namely USA and Japan (Huang & Wang, 2004). Chinese devaluation of currency has drawn significant attention worldwide due to detrimental consequences of currency manipulation for lost jobs in USA and Europe. The raison d'être for this is the indictment of Chinese policy of currency devaluation for export enhancement that may have caused trade distortions in favour of the country.

2. Literature review

The review of literature in the present paper is divided into three parts. Part one is taking account of the export-GDP growth and the consumption led growth. Second part is about the devaluation of currencies and its dynamics. And the third part is about the link between oil price and the currency devaluation. The whole stack of reviewed literature consists of theoretical and empirical work.

2.1. Export-led or consumption led growth

Export-led growth as a policy tool to approach export and GDP link replaced import substitution archetype in 1970s and remained prominent for forty years justifying the process of globalization and interdependence (Palley, 2012). Existing literature on the consumption-led and export–led growth strategies is rich in the context of growth process in Asian and South East Asian Countries. The literature on the export-growth causality increasingly represents time series studies than the cross sectional studies. These studies include Marin, (1992), Bodman, (1996) and Dutt, & Ghosh, (1996). They have proposed that the time series studies have been against the hypothesis that exports are leading towards higher growth rates. Jin & Yu, (1996) applying VAR techniques found no significant causal systematic association between exports and output so proposed that export growth is nonaligned with the growth of the US economy. Another study Jang, (1995) investigating for the export-growth nexus also found no consistent long run relationship between exports and economic growth in four little dragons[1] however short run results are consistent. Similarly Lai Yew, (2004)[2] using co integration analysis on time series data pertaining the periods over 1961-2000 found short run bilateral causality among exports, domestic demand and economic growth in case of Malaysia. The study implied that at least in short run domestic demand-led growth and export-led growth is valid. Another study Paul & Chowdhury, (1995) found unit root in the log levels of growth and exports with them being cointegrated. Although the Granger causality was running from exports to growth in case of Australia. Moreover, Wong, (2008) examined the causal link of exports and domestic demand to economic growth in 5 Southeast Asian countries[3] using Granger causality test. The study showed the presence of bidirectional causality of exports and private consumption towards economic growth. For more discussion see Shaikh, Shah, & Shah, (2014).

In contrast, the cross sectional studies have been in favour of the hypothesis of trade-economic growth nexus Massell-Benton (1972). Conforming the hypothesis Lin, (2002) proposed a new estimation method and reported an objective measure

[1] Taiwan, South Korea, Hong Kong, and Singapore
[2] Quoted in (Shaikh, Shah, & Shah, 2014)
[3] Indonesia, Malaysia, the Philippines, Singapore and Thailand

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of this relationship. They claimed that for China in the 1990's, a ten percent increase in exports resulted in a one percent increase in GDP. Another cross sectional study Zhenhui, (1996) using data on 32 countries found little supporting evidence on export-led growth. They found it stronger in 9 and weaker in 17 countries. Similarly Riezman, Peter, & Charles, (1995) found a modest evidence in support of export-led growth hypothesis. The causality from exports to growth ran in 30 out of 126 countries conditional to the import growth and 25 countries showed reverse causality. The hypothesis of export led growth prevailed in case of Asian tiger economies only conditional to the human capital and investment growth.

2.2. Currency exchange policy

According to traditional Heckscher-Ohlin and Stolper model applications (see Shaikh, 2011; Shaikh, Mangi, & Soomro, 2011; Shaikh & Shah, 2014; Yue, 2001), the developing countries can enjoy comparative advantage from international trade stimulated from the abundant resource. The study by Rodrik, (2008) suggested that the developing countries mainly follow devaluation of currency to promote capital imports and sustainable demand for their exports. China has been exploiting its abundant skilled and unskilled human resources to attain massive levels of production. Although there are number of studies investigating the role of currency devaluation in spectacular growth in exports and GDP of China Garcia-herrero & Koivu, (2009) yet the stack may be divided into two categories. First stream of papers includes the work that claims that the real exchange rate appreciation in China has been leading towards lowering the trade balance. Some of these studies include (Benassy-Quere, & Lahreche-Revil, 2003; Cerra & Dayal-Gulati, 1999; DEES, 2001). Further Garcia-herrero & Koivu, (2009) has quoted the findings of Marquez & Schindler, (2006) that imports are more sensitive to lower exports induced by the appreciation of real exchange rates. However devaluation of the nominal exchange rate tends to put upward pressure on the domestic inflation induced by expensive imports. Higher inflation tends to offset the benefits of nominal devaluation to improve trade balance. Devaluation of the real exchange rate can only improve the trade balance Shahbaz, (2009). Nominal devaluation of exchange rate may lead towards real devaluation in a short or medium span of time Bruno, (1978) and Edwards, (1988).

2.3. Real effective exchange rate and oil price

Further there have been several studies that have linked oil price with that of the value of currency (Real Effective Exchange Rates) like (Bénassy-Quéré, Mignon, & Penot, 2007; Dibooglu, 1996). They have argued that the change in dollar price coincides with that of the oil price. Further Amano & van Norden, (1998) have concluded that the direction of causality between oil price and exchange rate is from oil price to the exchange rate in case of Germany, Japan and US. In case of US, the oil prices may have been the dominantly creating exchange rate shocks in post Breton woods period. In case of China, currency manipulation has been important since it carries strong effects for world oil prices. This is because of the emergence of China as energy-intensive growth with rising trade (exports) and a fixed exchange rate against the dollar, may lead to a negative reverse causality from the dollar to the oil price Bénassy-Quéré *et al.,* (2007). The intuition here is that the devaluation in the US dollar will affect Chinese energy driven economic activity positively and consequently the Chinese demand for oil will rise which will push oil prices high.

3. Methodology

Primarily Ordinary Least Squares Method is applied on following two equations:

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$$GDP = \alpha_0 + \alpha_1 HCCE + \alpha_2 Trd + Gr\_C\_F + \varepsilon \quad\quad (1)$$
$$Oil = Imp = \alpha_0 + EFFE_x + \varepsilon$$

GDP and three most important determinants of GDP growth

Gross Capital Formation Chow, (1993) and Tan & Wei, (2010)

Household Consumption Expenditure Chap, (2007) and Blanchard & Giavazzi, (2006)

Trade Ding & Knight, (2010) and Sun & Heshmati, (2010)

GDP equation estimated using OLS regression method is given as under:

The objective here is to estimate the GDP equation to find out the most important factor affecting the GDP of China. Log transformation is applied on the equation I.

Here two advantages are intended from the log transformation of the series:

1. Any unknown skewness in the data series would be normalized

2. The relationship is estimated in percentage change in dependent due to percentage change in independent variable instead of the unit change.

3. The coefficient estimates can be used as the respective elasticities.

3.1 Oil Import by China and the Yuan Depreciation

Regression equations each separately with effective exchange rate and imports and nominal Yuan/US $ rate with import of oil are estimated. The two general functional forms are given as under:

$$Imp\ oil = f(ExR) \quad\quad (2)$$
$$Imp\ oil = f(Eff\_ExR) \qu\quad\quad (3)$$

Similarly, like equation I, Equations II and III are log transformed.

$$LnImp\ oil = f(lnExR)$$
$$LnImp\ oil = f(lnEff\_ExR)$$

4. Results

Table 1. *Summary of Estimations of GDP Equation*

	Constant	Ln_Gr_C_F_BUS$	Ln_HH_F_Con_BUS$	Ln_Trade_BUS$
Coefficients	0.585 (0.000)	0.302 (0.000)	0.677 (0.000)	0.067 (0.000)
Std. Error	0.06	0.38	0.43	0.017
Beta	-	0.323	0.596	0.183
t	9.816	7.935	15.635	3.976
R^2 0.96		F-stat	[32845.109 (0.000)]	

Note: Dependent Variable: GDP growth

Explanation: GDP equation with three independent variables has been estimated using multiple regression equation. The results confirm the strength of the model and significant coefficients.

Table 2. *Diagnostic Tests*

Diagnostic Tests			
	LM Version	F-Version	DW
Serial Autocorrelation	1.0146 (0.153)	1.125 (0.328)	1.87
Functional Form	0.725(0.452)	0.71528 (0.346)	
Normality	0.064(0.8)	NA	
Heteroscedasticity	0.845(0.542)	0.76274 (0.524)	

Explanation: diagnostic tests have been performed using Microfit 5.0 to check the errors in data used for analysis. The data has passed all diagnostic tests and seem fit for analysis.

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Table 3. *Summary of Regression results of Effective and Nominal Yuan/$ Exchange Rate*

	Constant	Ln ExRate
Coefficients	17.019 (0.002)	-1.596 (0.006)
Std. Error	4.998	0.537
Beta		-0.917
T	3.405	-2.971
R^2 0.279	F-stat [5.218 (0.021)]	

Explanation: Regression results have been estimated using SPSS to have the causal link between the natural log values of dependent and independent variables.

Correlation between Effective Exchange rate and the nominal exchange rate is -0.79 that suggests that the discrepancy between the two is rising as one is falling the other is rising. This reflects the presence of devaluation in the currency.

5. Conclusion

The estimated results of GDP with respect to the capital formation, trade and household expenditure are robust and reliable. F and R^2 values are sufficiently large and significant at <5% level of significance reflecting the good explanatory power of the model.

All coefficient estimates are also significant at <5% level of significance reflecting the generalizability power of the estimates.

Further, Beta standardized coefficients, their size and sign suggest that the household consumption expenditure is the major factor affecting the change in GDP. Secondly, capital formation has assumed higher "beta" value. Third comes trade with lowest standardized "Beta" Values. Import of oil and exchange rates (both nominal and effective) are regressed. The results reflect that the oil imports from china fall as the devaluation takes place.

Negative and sufficiently large value of Pearson Correlation coefficient between effective and nominal exchange rate reflects divergence between the two. That confirms the presence of devalued nominal exchange rate.

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