ON THE RELATION BETWEEN CURRENCY DEPRECIATION AND DOMESTIC CONSUMPTION

1. Introduction

A structural macro model consists of several relationships among macro variables. Any macro model we consider, each relationship seems to have its own literature and the consumption function is no exception. The attempt in the literature has been one of trying to identify main determinants of consumption. Historically, Keynes (1936) was the first to introduce the consumption function as a relationship between consumption and income and to design a mathematical function to express this relation. In Keynesian economics, aggregate consumption function is a brief way of explaining consumer expenditure. Different from the classical macroeconomics, new and old Keynesian macroeconomics did not begin with the assumption that an economy is made up of individually rational economic suppliers and demanders. Instead, it aimed at directly specifying a behavioral rule. Keynes claimed that aggregate spending on consumption was governed by a 'consumption function' in which consumption depends only on changes in current disposable income.

Inspired by the Keynesian school of thought, early 1950s is commonly referred to as the 'golden era' for the development of two dominant consumption theories of the Permanent Income Hypothesis (PIH) of Friedman (1957) and the Life Cycle Hypothesis (LCH) of Ando and Modigliani (1963), though they complement each other. In both theories the main assumption is that individuals attempt to maximize their utilities through smoothing their consumption based on their income over time. New Classical economists argued quite differently and believed that household's consumption in a specific time period depends on its current income and on the income it expects in the future, as well as on the interest rate at which it can borrow or lend. The key difference between the Keynesians and the New Classicals is the importance each put on expectations about future economic conditions. While many Keynesian macroeconomists might accept some role for expectations, they do not think expectations are

important. The revolution that was brought to the field by rational expectation theory in the 1970s and 'New Keynesianism' in the 1990s introduced important elements into consumption theory. In sum, most researchers have identified income and interest rate as two major determinants of consumption.

In a seminal article in 1952, Alexander (1952) argued that the exchange rate can also be identified as another determinant of consumption in addition to income and interest rate. By a reference to inflationary effects of devaluation or depreciation, Alexander argued that if the adjustment of wages to inflation occurs with some lags, then currency depreciation will shift income from workers to producers. Since workers have a relatively high marginal propensity to consume than producers, their consumption will decrease by more than the increase in consumption of producers with a low marginal propensity to consume, leading to a decrease in aggregate consumption. Therefore, it is our purpose in this paper to empirically investigate Alexander's (1952) proposition that devaluation or depreciation lowers aggregate consumption. Our conjecture is that Alexander's proposition could be considered a short-run phenomenon. In the long run, as wages adjust to inflation, aggregate consumption may not change. Therefore, a methodology that differentiates the short-run effects from the long-run effects should be called upon. To this end, in Section 2 we introduce our consumption model and the method of estimation. Section 3 reports the results with a summary appearing in Section 4.

2. The model and methodology[1]

From the previous section we gather that the two main determinants of consumption that are employed by most previous authors are income and interest rate. In this paper, we add the real exchange rate as another determinant to test Alexander's (1952) conjecture. Thus, the long-run consumption function in this paper takes the following form:

$$LnC_t = \alpha + \beta LnY_t + \gamma Lnr_t + \varphi LnRE_t + \varepsilon_t \quad (1)$$

[1] The method and explanation here closely follows Bahmani-Oskooee and Tanku (2008). For some other applications of bounds testing approach see Bahmani-Oskooee *et al*. (2005), Bahmani-Oskooee and Hegerty (2007), Halicioglu (2007), Narayan *et al*. (2007), Tang (2007), Mohammadi *et al*. (2008), Wong and Tang (2008), De Vita and Kyaw (2008), Payne (2008), and Bahmani-Oskooee and Gelan (2009).

where C is real consumption; Y is real income; r is the nominal interest rate; and RE is the real exchange rate. We expect an estimate of β to be positive and γ to be negative. As the Appendix shows, the real exchange rate RE is defined as the real effective exchange rate and a decline in it reflects a real depreciation. Based on Alexander's theoretical argument, if real depreciation is to lower aggregate consumption, an estimate of φ is expected to be positive.

As mentioned in the introductory section, Alexander's argument is mainly based on the assumption that there is a long lag structure in the adjustment of wages to inflation. Since this is a short-run possibility, we try to distinguish the short-run effects from the long-run effects by introducing the short-run dynamics into equation (1). Hence, following Pesaran *et al*.'s (2001) bounds testing approach to cointegration, we re-write (1) in an error-correction modeling format outlined by equation (2) below:

$$\Delta LnC_t = a + \sum_{i=1}^{n1} b_i \Delta LnC_{t-i} + \sum_{i=0}^{n2} c_i \Delta LnY_{t-i} + \sum_{i=0}^{n3} d_i \Delta Lnr_{t-0} + \sum_{i=0}^{n4} e_i \Delta LnRE_{t-i} + \delta_0 LnC_{t-1} + \delta_1 LnY_{t-1} + \delta_2 Lnr_{t-1} + \delta_3 LnRE_{t-1} + \nu_t \quad (2)$$

In this set up the short-run effects of real depreciation on consumption is judged by the estimates of e_i's and its long-run effects by the estimate of δ_3 that is normalized on δ_0[2]. However, the long-run effects would be meaningful if the lagged level variables as a proxy for lagged error term from (1) are jointly significant (i.e., cointegrated). To test this cointegration hypothesis Pesaran *et al*. (2001) propose applying the F test with new critical values that take into consideration the integrating properties of all variables. For cointegration, the calculated F must be greater than the upper bound critical values tabulated by Pesaran *et al*. (2001).

3. The results

In this section we estimate the error-correction model (2) for as many countries as possible. There are a total of 50 countries for which all required data were available over the 1975-2006 period[3].

[2] For more on the normalization procedure see Bahmani-Oskooee and Tanku (2008).

[3] All data used in the study are annual and come from the International Financial Statistics of the IMF. Variables are defined as C, household

Equation (2) is estimated by applying the OLS. Following Bahmani-Oskooee and Tanku (2008), a maximum of four lags are imposed on each first-differenced term and Akaike's Information Criterion (AIC) is employed to select an optimum model for each country. The results for each optimum model and for all 50 countries are reported in Tables 1 and 2.

Since one major purpose is to distinguish the short-run effects of currency depreciation on consumption from its long-run effects, we only report the short-run coefficient estimates for the real exchange rate. Concentrating on Table 1, from the short-run results, we find clear evidence that the real exchange rate carries at least one significant coefficient in 37 countries, implying that indeed, currency depreciation has short-run effects on consumption supporting Alexander (1952). Shifting to long-run estimates, we gather that the short-run effects last into the long run only in 21 countries. In these 21 countries (i.e., Argentina, Bangladesh, Bolivia, Brazil, Chile, Colombia, France, Germany, Greece, India, Indonesia, Ireland, Malawi, Mexico, Morocco, Niger, Nigeria, Senegal, Singapore, U.K., and Zambia) the real exchange rate carries a coefficient that is significant at the usual 5% level. This may imply that either for these countries our estimation period is not long enough during which wages adjust to inflation or in these countries there are wage-price rigidities that slow down the adjustment process. Furthermore, while in nine countries the coefficient estimate is positive supporting Alexander, in 13 countries it is negative, rejecting him. Of course, to make sure our long-run findings are not subject to spurious regression problem, we must establish cointegration among the variables[4].

The results of the F test for cointegration along with other diagnostics appear in Table 2 which is available from authors upon request. The calculated F statistic was greater than its upper bound critical value of 3.77 in majority of the cases including all nine countries in which Alexander's hypothesis was supported (i.e., Argentina, Bangladesh, Chile, Greece, India, Indonesia, Mexico, Senegal, and Zambia). Next, in order to determine whether the

---

consumption expenditures, including NPISHs. Y, income measured by real GDP (2000=100). ER, the real effective exchange rate. R, domestic interest rate.

[4] Note that in most cases income carries a significantly positive coefficient supporting the income hypothesis but the interest rate does not, rejecting the classical view.

TABLE 1 - *Short-Run and Long-Run Coefficient Estimates*

	Short-Run Estimates				Long-Run Estimates			
Country	Δ *Ln* ER_t	$\Delta LnER_{t-1}$	$\Delta Ln\ ER_{t-2}$	$\Delta Ln\ ER_{t-3}$	*Constant*	*LnY*	*LnER*	*Lnr*
Algeria	-0.17(2.45)				32.85(0.49)	-0.91(0.25)	-3.74(0.51)	0.14(0.51)
Argentina	0.45(3.89)	-1.66(1.80)	-2.02(2.04)	1.19(3.19)	12.67(1.78)	-0.32(0.23)	1.02(81.26)	0.34(1.16)
Australia	-0.06(2.02)	0.05(1.56)	-0.06(1.52)	-0.18(2.49)	-3.72(2.11)	1.98(18.20)	0.11(0.37)	0.34(4.42)
Bangladesh	0.23(1.75)	-0.59(3.41)	-0.48(3.20)	-0.25(1.79)	-0.75(1.35)	0.52(3.02)	1.38(12.47)	0.05(0.57)
Belgium	0.69(0.74)				-11.94(1.44)	3.75(3.16)	0.69(0.74)	0.25(0.76)
Bolivia	-1.06(6.67)				-39.32(5.36)	11.46(9.44)	-1.66(19.18)	1.96(3.21)
Brazil	0.22(1.52)				22.39(2.16)	-2.15(-0.92)	-1.11(18.38)	0.14(0.47)
Cameron	0.29(1.69)	0.54(2.46)	-0.46(3.30)	-0.39(3.32)	4.76(3.34)	1.20(8.57)	-0.27(0.93)	-0.34(1.85)
Canada	-0.19(4.28)	-0.07(1.49)	0.05(1.22)		0.14(0.05)	1.49(5.85)	-0.11(0.21)	0.06(0.76)
Chile	-0.32(3.46)	-0.36(5.43)	0.07(0.78)	0.26(3.36)	-1.55(0.55)	4.02(5.36)	1.75(3.92)	0.62(2.36)
Colombia	-0.29(3.70)	0.11(.89)	-0.15(2.23)	0.08(1.56)	-5.59(1.37)	4.51(6.81)	-0.91(3.69)	0.29(2.31)
Costa Rica	-0.23(3.22)				-54.46(0.50)	10.64(0.57)	4.46(0.34)	3.17(0.22)
Denmark	-0.24(3.31)	-0.20(3.18)			-5.30(2.10)	2.55(3.84)	-0.02(0.15)	0.31(1.80)
Egypt	0.06(1.66)	-0.01(0,17)	-0.19(2.18)		-0.48(1.15)	0.98(25.92)	0.08(1.57)	0.12(1.57)
Finland	1.06(0.62)	-5.11(1.88)	-5.04(2.07)	-3.24(1.89)	19.24(0.43)	-149.37(0.61)	146.26(0.62)	0.34(0.13)
France	0.01(0.05)	-0.14(0.56)	-0.73(3.54)		8.28(1.62)	1.34(1.57)	-1.36(2.37)	0.43(1.16)
Germany	-0.13(2.15)				1.31(3.69)	2.28(19.74)	-0.28(2.10)	-0.01(0.18)

TABLE 1 - *continued*

	Short-Run Estimates				Long-Run Estimates			
Country	Δ *Ln* ER_t	$\Delta LnER_{t-1}$	$\Delta Ln\ ER_{t-2}$	$\Delta Ln\ ER_{t-3}$	*Constant*	*LnY*	*LnER*	*Lnr*
Greece	-1.74(0.92)	2.53(1.22)	-5.46(2.86)		-3.84(1.22)	26.53(1.55)	5.96(2.04)	3.84(1.23)
India	-0.24(4.42)				1.39(3.12)	1.16(7.66)	0.64(7.96)	0.04(0.81)
Indonesia	0.13(0.96)				1.11(1.74)	1.46(5.80)	0.84(6.37)	-0.65(4.69)
Ireland	-0.35(2.27)				8.56(3.83)	1.63(19.68)	-1.22(2.73)	0.25(1.83)
Italy	-0.28(0.77)	-0.24(0.59)	-0.01(0.03)	-1.89(4.74)	-17.76(4.16)	3.65(3.76)	1.51(1.42)	0.49(2.69)
Jamaica	0.37(7.97)	-0.82(5.81)	-0.62(5.42)	-0.26(4.34)	8.98(12.20)	-0.24(1.46)	1.38(70.35)	-0.33(8.92)
Japan	-0.02(0.55)	-0.01(0.17)	-0.05(2.29)		6.65(13.32)	1.24(11.74)	0.06(0.62)	0.04(2.18)
Jordan	0.26(3.13)	-0.27(2.04)			1.21(1.82)	1.58(14.28)	-0.33(5.42)	0.03(0.33)
Korea	-0.18(0.74)	-0.19(1.33)	-0.30(2.4)	0.08(0.82)	-4.57(0.82)	2.01(10.96)	1.00(1.59)	0.94(1.43)
Kuwait	-1.41(0.88)	0.15(0.11)	-4.02(2.76)		11.29(1.85)	0.90(1.72)	-4.87(1.28)	-0.51(1.85)
Lesotho	-0.03(0.33)				1.56(2.36)	0.83(0.33)	-0.04(0.33)	0.17(3.10)
Malawi	-0.27(2.12)				-16.16(3.4)	6.24(7.43)	-0.53(2.87)	0.59(1.42)
Malaysia	0.10(1.04)				7.67(3.93)	1.25(11.35)	-0.26(0.87)	-0.22(2.05)
Mexico	0.19(4.19)				-4.53(2.57)	2.31(6.25)	0.97(35.47)	0.01(0.11)
Morocco	-0.78(3.98)	-0.61(5.27)	-0.18(1.56)		-5.37(9.75)	2.49(43.49)	-0.24(2.85)	0.36(12.97)
New Zealand	-0.06(1.54)				5.47(2.67)	1.73(7.01)	-0.52(1.89)	0.16(1.24)
Niger	0.09(1.61)				-0.27(0.77)	0.81(13.87)	-0.19(4.16)	0.02(0.34)

	Short-Run Estimates				Long-Run Estimates			
Country	Δ *Ln* ER_t	$\Delta LnER_{t-1}$	$\Delta Ln\ ER_{t-2}$	$\Delta Ln\ ER_{t-3}$	*Constant*	*LnY*	*LnER*	*Lnr*
Nigeria	-0.18(2.28)				-1.80(0.25)	2.50(2.09)	-0.59(2.76)	0.67(1.33)
Norway	-0.01(0.04)	-0.18(3.11)			-1.67(1.21)	1.28(1.86)	0.50(0.60)	0.06(0.66)
Pakistan	0.59(3.59)	-0.28(4.55)	0.06(1.04)	0.10(1.99)	-33.59(2.00)	6.47(3.0)	1.61(1.36)	2.38(2.20)
Philippines	0.07(0.62)	-0.06(1.12)	-0.04(0.37)	0.12(1.45)	57.73(0.53)	-5.95(0.37)	-2.51(0.77)	-1.72(0.39)
Senegal	0.20(5.07)	0.08(1.61)	-0.58(1.00)	-0.16(3.15)	-3.13(1.58)	1.19(2.67)	1.02(3.9)	-0.13(0.64)
Singapore	-0.51(2.73)	-0.28(1.42)			9.77(7.27)	1.41(16.77)	-1.14(3.16)	-0.03(0.63)
South Africa	0.03(0.44)	0.11(1.91)	0.64(1.36)	-0.09(2.19)	6.55(0.67)	2.35(2.08)	-1.34(1.36)	1.50(3.51)
Spain	1.26(0.43)	-8.13(1.89)	-5.28(1.62)	-2.38(0.89)	-24.77(4.09)	2.54(2.39)	-4.2(1.98)	1.26(6.21)
Sri Lanka	0.17(0.58)	-0.46(3.89)	-0.22(2.56)		2.72(9.32)	1.54(11.07)	-0.96(11.59)	0.01(0.16)
Sweden	-0.05(0.72)	-0.14(1.50)	-0.03(0.34)	0.06(1.20)	-14.41(4.10)	3.54(12.68)	-0.98(1.88)	0.51(10.57)
Thailand	0.25(2.14)				4.54(1.01)	1.00(1.18)	0.34(0.25)	-0.16(0.48)
Tunisia	-0.26(2.14)				4.53(1.01)	1.00(1.18)	-0.34(0.26)	-0.16(0.48)
Uk	0.05(1.43)	0.17(5.03)	0.02(0.78)	-0.07(2.68)	-4.13(4.69)	2.92(18.00)	-0.70(4.72)	0.20(3.32)
US	-0.16(0.25)	-0.01(0.39)	-0.03(2.01)		-0.64(1.69)	1.99(25.28)	0.11(1.65)	0.12(2.58)
Venezuela	0.12(0.68)				161.84(0.23)	-27.87(0.21)	-4.58(0.29)	-3.24(0.20)
Zambia	0.02(0.38)	0.06(0.82)	0.05(0.66)	-0.12(1.66)	-2.28(1.48)	2.77(7.62)	0.30(3.17)	0.47(2.36)

adjustment of all variables is toward equilibrium, we use the long-run coefficient estimates and form and error-correction term (ECM). After replacing the linear combination of the lagged level variables with lagged error-correction term, we estimate the model one more time at optimum lags. A significantly negative coefficient, which also measures the adjustment speed, will be an indication of adjustment toward long-run equilibrium. Most models enjoyed this property as evidenced from a significantly negative coefficient for ECM_{t-1}.

Three additional statistics were also reported. Lagrange multiplier test (LM) for residual serial correlation; Ramsey's RESET test for functional misspecification; and the Normality test based on a test of skewness and kurtosis of residuals. Since in most cases these statistics were less than their critical values, the models passed these tests confirming autocorrelation free residuals, correctly specified models, and normality of the errors. Note also that majority of the estimated models were stable using CUSUM and CUSUMSQ tests applied to the residuals of each error-correction models. Finally, most models enjoyed a reasonable goodness of fit.

4. Conclusion and summary

In explaining the impact of currency depreciation or devaluation on the trade balance at full employment, Alexander (1952) argued that the only way devaluation could improve the trade balance is to reduce domestic consumption so that more could be exported, leading to an improvement in the trade balance. The main reason for the decline in domestic consumption was said to be due to the inflationary effects of devaluation. Specifically, Alexander argued that if wages do not adjust fully to inflation, producers who charge higher prices will gain at the expense of the workers whose wages are not caught up with inflation. This will lead to a transfer of income from workers with high Marginal Propensity to Consume (MPC) to producers with low MPC, resulting in a decline in aggregate domestic consumption.

The main purpose of this paper is to test directly Alexander's (1952) hypothesis by including the exchange rate as a determinant of consumption in addition to income and interest rate. Since wages may not adjust to inflation in the short run but they do so in the long run, we employ a methodology that distinguishes the short-run effects of depreciation on consumption from its long-run effects. By employing the bounds testing approach to cointegration we test

the main hypothesis for 50 countries. In most countries, we find evidence of the significant effect of exchange rate on consumption in the short run but not in the long run. This is consistent with our expectation as wages do not adjust to inflation in the short run but they do in the long run.

Mohsen Bahmani-Oskooee
The University of Wisconsin-Milwaukee, Department of Economics, Center for Research on International Economics, Milwaukee, Wisconsin, USA

Massomeh Hajilee
University of Huston-Victoria, School of Business Administration, Houston, Texas, USA

REFERENCES

Alexander, S.S. (1952), "Effects of a Devaluation on Trade Balance", *International Monetary Fund Staff Papers,* 2(2), 263-78.

Ando, A. and F. Modigliani (1963), "The 'Life-Cycle' Hypothesis of Saving: Aggregate Implications and Tests", *American Economic Review*, 53(1), 55-84.

Bahmani-Oskooee, M. and A. Gelan (2009), "How Stable is the Demand for Money in African Countries?", *Journal of Economic Studies*, 36(3), 216-235.

Bahmani-Oskooee, M. and S.W. Hegerty (2007), "Exchange Rate Volatility and Trade Flows: a Review Article", *Journal of Economic Studies*, 34(3), 211-255.

Bahmani-Oskooee, M. and A. Tanku (2008), "Black Market Exchange Rate vs. Official Rate in Testing the PPP: Which Rate Fosters the Adjustment Process?", *Economics Letters,* 99(1), 40-43.

Bahmani-Oskooee, M., C. Economidou and G.G. Goswami (2005), "How Sensitive are Britain's Inpayments and Outpayments to the Value of the British Pound", *Journal of Economic Studies*, 32(6), 455-467.

De Vita, G. and K.S. Kyaw (2008), "Determinants of Capital Flows to Developing Countries: A Structural VAR Analysis", *Journal of Economic Studies*, 35(4), 304-322.

Friedman, M. (1957), A Theory of the Consumption Function, Princeton University Press: Princeton, New Jersey, USA.

Halicioglu, F. (2007), "The J-Curve Dynamics of Turkish Bilateral Trade: A Cointegration Approach", *Journal of Economic Studies,* 34(2), 103-119.

Keynes, J.M. (1936), The General Theory of Employment, Interest and Money, Macmillan, Cambridge University Press: London.

Mohammadi, H., M. Cak and D. Cak (2008), "Wagner's Hypothesis: New Evidence from Turkey using the Bounds Testing Approach", *Journal of Economic Studies*, 35(1), 94-106.

Narayan, P.K., S. Narayan, B.C. Prasad and A. Prasad (2007), "Export-led Growth Hypothesis: Evidence from Papua New Guinea and Fiji", *Journal of Economic Studies*, 34(4), 341-351.

Payne, J.E. (2008), "Inflation and Inflation Uncertainty: Evidence from the Caribbean Region", *Journal of Economic Studies*, 35(6), 501-511.

Pesaran, M.H., Y. Shin and R.J. Smith (2001), "Bounds Testing Approach to the Analysis of Level Relationships", *Journal of Applied Econometrics*, 16(3), 289-326.

Tang, T.C. (2007), "Money Demand Function for Southeast Asian Countries: An Empirical View from Expenditure Components", *Journal of Economic Studies*, 34(6), 476-496.

Wong, K.N. and T.C. Tang (2008), "The Effects of Exchange Rate Variability on Malaysia's Disaggregated Electrical Exports", *Journal of Economic Studies*, 35(2), 154-169.

ABSTRACT

In a 1952 article Alexander argued that currency devaluation could lead to a decline in domestic consumption by redistributing income from workers with high MPC to producers with low MPC. In this paper we include the exchange rate as another determinant of domestic consumption in addition to income and interest rate. We estimate the model using time-series data and the bounds testing method for each of the 50 countries in our sample. In most countries, the results support Alexander's argument in the short run but not in the long run.

Keywords: Bounds Testing, Devaluation, Domestic Consumption
JEL Classification: F31

RIASSUNTO

La relazione tra deprezzamento della valuta e consumi interni

In un saggio del 1952 Alexander ipotizzava che la svalutazione della moneta avrebbe potuto portare ad una diminuzione dei consumi interni tramite la redistribuzione del reddito dai lavoratori con alta propensione marginale al consumo ai produttori con bassa propensione marginale al consumo. In questo studio includiamo quale determinante del consumo interno il tasso di cambio in aggiunta al reddito ed al tasso di interesse. Viene effettuata una stima su un campione di 50 paesi utilizzando dati *time-series* ed il metodo *bound testing*. Per la maggior parte dei paesi analizzati i risultati avvalorano la tesi di Alexander nel breve periodo ma non nel lungo periodo.