

Current Account and Exchange Rate Dynamics in Presence of Risk and Economic Shocks

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ABSTRACT

The paper is using a two period model of consumption and current account balance and tries to determine the dynamics of the exchange rates by taking into consideration the increases in oil prices, national debts, budget and trade deficits, the global uncertainty, and the enormous liquidity, due to the recent financial crisis and recession. Specifically, in this paper we have used the insights of an intertemporal model of consumption to analyze the recent behavior of the current account balance in the U.S. We have examined the roles of risk, price of gold, price of oil, TED spread, as well as interest rate, GDP and government spending. We have also analyzed the behavior of spot rate.

1. INTRODUCTION

The recent oil shocks,³ the huge debts,⁴ the financial crisis,⁵ and the deep recession,⁶ created an enormous mistrust for the international financial system, a big disturbance to the real sector of the economy, and an uncertain future for the entire world. For an oil importing country a rise in the price of oil leads to currency depreciation (direct effect), which causes an increase in the value of imports and an improvement in exports. The high income of oil exporting countries is going to be spent on purchases of goods or assets from the country with the devaluated currency and its currency will appreciate (indirect effect). Thus, if the value of imported oil (capital outflow) is equal to the value of foreign investment (capital inflow) by the oil producers, the currency must stay unchanged. The elasticity of demand for importing oil is inelastic and the value of imports is large; but, the elasticity of demand for investment is relatively elastic, due to diversification and competition among financial assets issued by different countries, so the value of capital inflow will be less than outflow. In this case the currency of the oil importing country will depreciate.

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³ It reached \$143.67 per barrel on June 30, 2008. Now, the oil price is \$96.16 (*Bloomberg.com*, September 7, 2012).

⁴ The U.S. national debt was \$16.028 trillion on September 7, 2012.

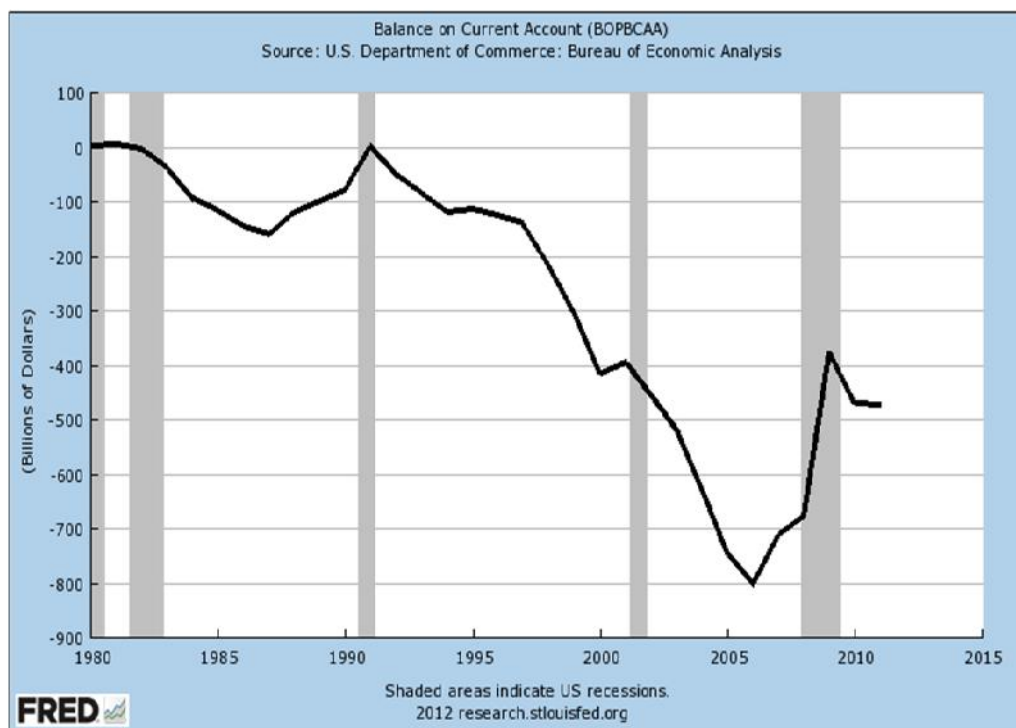
⁵ The DJIA from 14,164.53 (October 9, 2007) fell to 6,547.05 (March 9, 2009); an enormous decline by -7,617.48 points or -53.78%, a loss of \$18 trillion. Now (3/12/2013), its nominal value has surpassed the 2007 level, it is 14,447.29, but the real (inflation-adjusted) level is where it was in 1999. (*The Wall Street Journal*, March 6 and 12, 2013).

⁶ The real GDP fell drastically in 2008:Q4 ($g_Y = -6.78\%$) and the unemployment rate became a double digit in October 2009 ($u = 10.1\%$). Lately, the $g_Y = 2.2\%$ for 2012 (and for the 4th quarter of 2012, it was -0.14%) and the unemployment rate was $u = 7.9\%$ (January 2013).

36 Recently there have been numerous studies of the determinants and behavior of current
37 account balance for both the advanced developed countries and the developing countries.
38 See for example, Obstfeld and Rogoff 1(996), Calderon, Chong, and Loayza (2002),
39 Edwards(2002), Bernanke (2005), Blanchard, Giavazzi, and Sa (2005), Blanchard (2007),
40 Chinn and Ito (2008) among many others. Given increased globalization over the past
41 twenty years it is not surprising that there is tremendous interest in studying current account
42 balance. The behaviors of current account balance for most countries have also been
43 sufficiently varied to warrant such renewed interest in current account balance, after the
44 latest debt crises and the enormous unemployment.

45 Consider for example the current account balance for the United States. Figure 1 shows the
46 behavior of the U.S. current account balance since 1980. Starting from a zero current

47 **Figure 1. U.S. Current Account**



48

49 *Note:* Current account = exports - imports (of goods and services).

50 *Source:* Federal Reserve Bank of St. Louis: Federal Reserve Economic Data (FRED)

51

52 account deficit in 1980 within about twenty five years the current account deficit increased to
53 \$800 billion. Over the last thirty years the current account deficit in the U.S. increased
54 marginally during the recessions of 1982-83 and 2001. There was significant improvement in
55 the current account balance during the recession of 1991-92 and in the first half of the
56 recession of 2008-2009, while the second half of the 2008-2009 recession witnessed a
57 worsening of the current account balance. The rise and fall of the current account deficit

58 occurred over periods of increasing or stable oil prices, increasing uncertainty in global
 59 economic and political arena. Such diverse behavior of the current account balance is not
 60 limited to the United States. But, it implies that the behavior of the current account deficit in
 61 the United States and elsewhere cannot often be easily explained by traditional theories of
 62 the current account balance and that it needs to be constantly examined and reexamined.

63 The purpose of this paper is to analyze the determinants of the current account balance in
 64 the U.S. using a micro theory based intertemporal model of capital account balance and also
 65 to empirically examine the behavior of the spot dollar exchange rate. The structure of the
 66 paper is as follows. In section 2, we develop the intertemporal model of consumption and
 67 capital account balance and provide a graphical analysis of the effects of various economic
 68 shocks on the current account balance. In section 3, we estimate the U.S. current account
 69 balance using the data for 1999-2011. We also provide a related empirical estimation of the
 70 U.S. spot exchange rate using similar explanatory variables as used in the current account
 71 balance estimation. Concluding remarks are made in section 4.

72 73 **2. CONSUMPTION AND CURRENT ACCOUNT BALANCE**

74
75 In this section we develop a two period model of consumption and current account balance
 76 following Sachs (1984). The economy consists of identical consumers who live for two
 77 periods. Their preferences are characterized by a quasi concave utility function $U(C_1, C_2)$
 78 where C_1 and C_2 are the levels of consumption in periods 1 and 2. The consumers
 79 maximize their utility subject to a lifetime resource constraint given by,

$$80 \quad C_1 + \frac{C_2}{1+r} = R \quad (1)$$

81 where R = Lifetime Wealth of households + Firms' Value + Value of oil, as follows,

$$82 \quad R = W + V + N^D \quad (2)$$

83 Let us consider each component of the resource constraint

$$84 \quad W = (w_1 L_1 - t_1) + \frac{(w_2 L_2 - t_2)}{1+r} \quad (3)$$

85 where w_1, w_2 , are the wage rates, L_1 and L_2 are the levels of labor supply, t_1 and t_2 are the
 86 taxes in periods 1 and 2, and r is the underlying interest rate.

$$87 \quad V = (Y_1 - I - w_1 L_1 - q_1 N_1) + \frac{(Y_2 - w_2 L_2 - q_2 N_2)}{1+r} \quad (4)$$

88
89 where Y_1 and Y_2 are real GDP, I is real investments carried out by the firms, N_1, N_2 are the
 90 usage of oil and q_1 and q_2 are the world oil prices in periods 1 and 2. Finally,

$$91 \quad N^D = q_1 N_1^D + \frac{q_2 N_2^D}{1+r} \quad (5)$$

92 where N_1^D and N_2^D are the levels of domestic oil production in periods 1 and 2.

93 Note that governments taxes and expenditures are governed by the familiar intertemporal
94 budget constraint for the government

$$95 \quad G_1 + \frac{G_2}{1+r} = T_1 + \frac{T_2}{1+r} \quad (6)$$

96 Now, substituting (3) – (6) in (1) and collecting terms we get,

$$97 \quad \begin{aligned} W + V + N^D &= (Y_1 - G_1 - I_1 + q_1(N_1^D - N_1)) + \left(\frac{Y_2 - G_2 + q_2(N_2^D - N_2)}{1+r} \right) \\ &= Z_1 + \frac{Z_2}{1+r} \end{aligned} \quad (7)$$

$$98 \quad \text{where} \quad Z_1 = Y_1 - G_1 - I_1 + q_1(N_1^D - N_1) \quad (8)$$

$$99 \quad Z_2 = Y_2 - G_2 + q_2(N_2^D - N_1)$$

100 Thus, the optimization problem of the consumers is given by:

$$\begin{aligned} 101 \quad & \text{Maximize} \quad U(C_1, C_2) \\ 102 \quad & \text{Subject to} \quad C_1 + \frac{C_2}{1+r} = Z_1 + \frac{Z_2}{1+r} \end{aligned} \quad (9)$$

103 Now, (8) yields the fundamental characterization of the Current Account Balance (CAB).

$$\begin{aligned} 104 \quad \text{Note,} \quad Z_1 - C_1 &= (Y_1 - C_1 - G_1 - I_1) + q_1(N_1^D - N_1) \\ 105 &= \text{Net exports of goods and services} \\ 106 &+ \text{Net export from oil} \\ 107 &= \text{CAB}_1 \\ 108 & \quad (10) \end{aligned}$$

109 But, by virtue of (9),

$$\begin{aligned} 110 \quad (Z_1 - C_1) &= - \frac{(Z_2 - C_2)}{1+r} \\ 111 \quad \text{or} \quad \text{CAB}_1 &= - \text{CAB}_2(1+r)^{-1} \quad (11) \end{aligned}$$

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113 Because of (11), in our discussion we can simply focus on Current Account Balance in
114 period 1.
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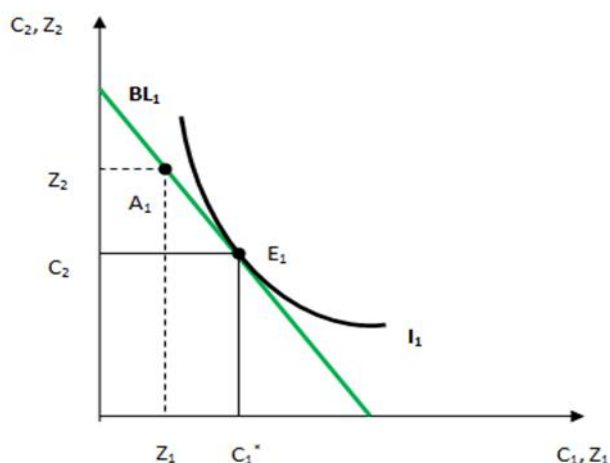
117 2.1 Shocks to the Economy and Current Account Balance

118

119 The closed form solutions for capital account balance and the related comparative static
120 effects are somewhat messy. So we use graphical analysis instead to show how the capital
121 account balance is affected by shocks and changes in economic variables. For our
122 discussion we consider an oil importing country that has a current account deficit. Figure 2
123 shows a standard graph for intertemporal utility maximization, where the budget line is BL1.
124 The endowment point and the equilibrium points are A1 and E1 respectively. Since C1
125 exceeds Z1, we can conclude that the country has a deficit in its current account balance.
126

Figure 2

Determination of Current Account Balance



Budget Line: BL_1 ; Endowment point: A_1 ; Indifference Curve: I_1

Equilibrium point: E_1

Since optimal consumption, $C_1^* > Z_1$, there is current account deficit.

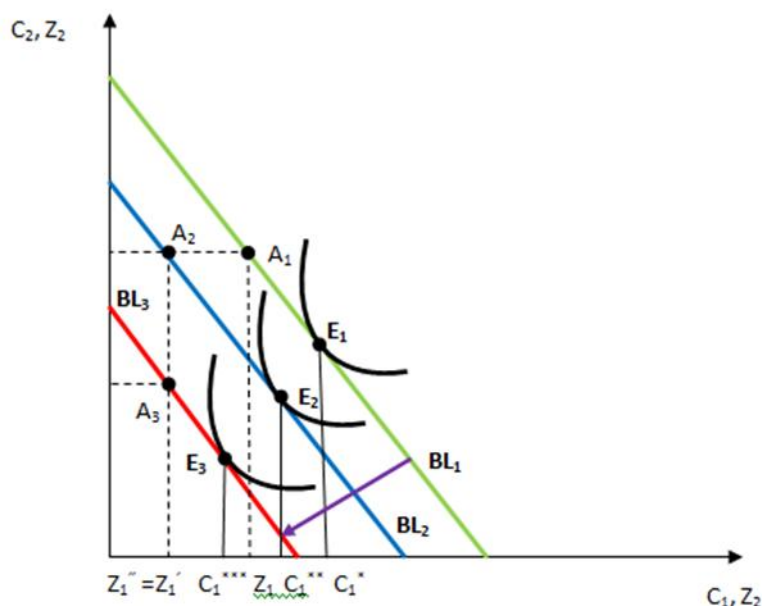
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129 Using the above graph we can determine the effects on current account balance of various
130 shocks to the economy, such as a reduction in GDP, increase in price of oil or increase in
131 government spending. Consider figure 3. Initially, as in figure 2, the country has current
132 account deficit. The initial budget line is BL1. The initial endowment point and equilibrium
133 point are E1 and E2 respectively. A reduction in current GDP, Y_1 or an increase in price of
134 oil q_1 , for an oil importing country, lowers Z_1 and shifts the intertemporal budget line from
135 BL1 to the left to BL2. If the shock is temporary the endowment point shifts horizontally to
136 A2. The new equilibrium is at E2. Current consumption falls but due to the consumption

137 smoothing motive, it falls by a smaller amount than the decline in Z_1 . As a result, the current
 138 account deficit (in period 1) increases.
 139

Figure 3

Effects of Temporary and Permanent shocks on Current Account Balance



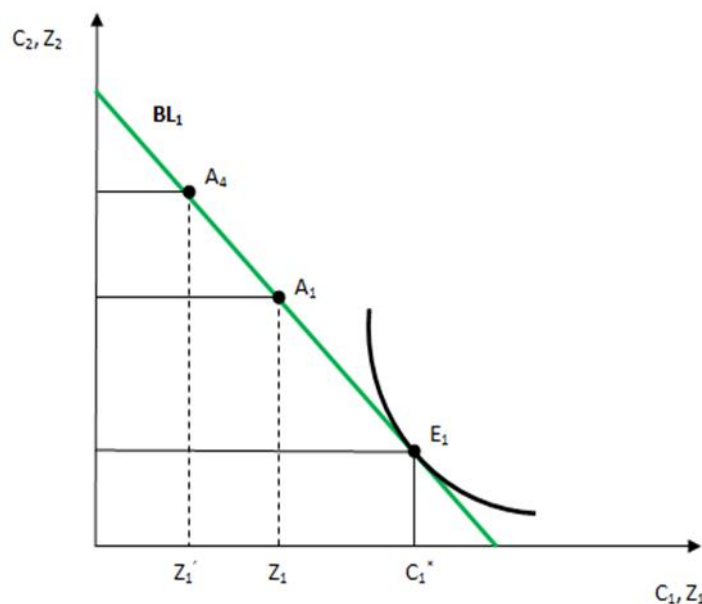
A temporary shock such as a temporary reduction in GDP or an oil price increase shifts the budget line from BL_1 to BL_2 and the endowment point from A_1 to A_2 . Equilibrium shifts from E_1 to E_2 causing current account deficit to increase. A permanent shock, such as a permanent increase in oil price shifts the endowment point vertically down to A_3 and the budget line further inward to BL_3 . Equilibrium point is now E_3 . Under a permanent shock current account deficit is less than under a temporary shock. Net effect of a permanent shock on current account balance is ambiguous.

140
 141
 142 Now, if the shock is permanent such as a permanent increase in oil price, since q_2 also rises
 143 by the same amount, the budget line shifts further to BL_3 with the endowment point shifting
 144 vertically down to A_3 . The new equilibrium is at E_3 . Compared to the temporary shock, the
 145 current account deficit improves. The net effect on current account balance is ambiguous.

146 Figure 4 is used to illustrate the effect of a temporary increase in Government spending G_1 .
 147 The increase in G_1 is assumed to be paid for by a corresponding future spending cut –i.e.,
 148 reduction in G_2 , so that the Government budget constraint (6) continues to hold. As a result,
 149 the budget line does not shift but the endowment point shifts up from A_1 to A_4 .
 150 Consequently, the current account deficit increases.

Figure 4

Effect of a Temporary Increase in Government Spending on Current Account Balance



A temporary increase in Government spending to be paid for by future spending cuts shifts the endowment point from A_1 to A_4 on the same budget line BL_1 . Current account deficit increases.

152
153

154 At this point, we should note that in this model a temporary slump is caused by an adverse
155 shock such as an adverse productivity shock or an increase in price of oil. The temporary
156 reduction in Y_1 or Z_1 causes current account deficit to increase. Conversely, temporary
157 increase in Y_1 or Z_1 caused by a favorable productivity shock or a reduction in price of oil
158 can reduce the current account deficit. These results are different from the conventional
159 macroeconomic prediction that a boom (slump) causes current account deficit to increase
160 (decrease) by increasing (decreasing) demand for imports. However, the current model can
161 also accommodate the conventional macroeconomic prediction. For example, if GDP
162 increases due to the multiplier effects associated with the increases in G , there may be
163 competing effects on the current account deficit and for such demand induced increase in
164 income, current account deficit may actually increase.

165 The above graphical framework can be used to demonstrate the effect of interest rate on
166 current account deficit. If the interest rate falls, the budget line becomes flatter but still

167 passes through the same endowment point. The current consumption for a country that has
168 a current account deficit, falls and as a result the current account deficit increases.

169 We summarize the basic results of the model in Result 1, below.

170 Result 1: Consider an oil importing country that has a current account deficit. The amount of
171 the current account deficit increases if (i) there is a temporary slump that reduces GDP; (ii)
172 there is a temporary increase in price of oil; in case of a permanent increase in price of oil,
173 the effect on current account deficit is ambiguous, (iii) there is a temporary increase in
174 government spending to be paid for by future spending cut and (iv) if interest rate falls.

175

176 **2.2 Current Account Balance under Uncertainty**

177

178 In this section we briefly discuss the effect of uncertainty on current account balance. The
179 framework is very similar to the previous section. However we assume that the households
180 maximize expected utility from consumption, where the utility function exhibits constant
181 absolute risk aversion. The consumers are exposed to risk from various sources, such as
182 the risk associated with future price of oil or political instability or the risk of a slump. We
183 further assume that the risk is captured by a random variable λ , which enters the budget
184 constraint (9) additively. Because of the structure of our model, the source of uncertainty
185 does not affect the main result.

186 The households' optimization problem can be formulated as follows

187 The households maximize

$$188 \quad U(C_1) + \beta EU(C_2) \quad (12)$$

$$189 \quad \text{Subject to} \quad C_1 + \frac{C_2}{1+r} = Z_1 + \frac{Z_2}{1+r} + \lambda \quad (9')$$

190 where λ is the additive random variable that captures risk and β the utility discount factor.

191 The following result summarizes the effect on current account balance of an increase in
192 riskiness associated with λ . [For details see, Ghosh and Kallianiotis (2011)].

193 Result 2: An increase in the risk as captured by a mean preserving spread of lowers current
194 consumption and thus improves the current account balance.

195

196

197 **3. EMPIRICAL RESULTS**

198

199 In this section we estimate U.S. current account balance using the monthly data from
200 1999:01 to 2011:12. The data source is economagic.com. We also run a related regression
201 on the U.S. spot exchange rate by using data from 1999:01 to 2010:12.

202

203 **3.1 Current Account Balance Regression**

204

205 In this regression of current account balance (CAB) we first use the explanatory variables as
206 suggested by the intertemporal model developed in section 2.1: GDP (Y), Government
207 Expenditure (G), Price of oil (p_{oil}), and interest rate on ten-year U.S. government bond (i).

208 All the variables are expressed as natural logs except interest rates. In addition we include
 209 two variables to capture risks: the TED spread, the three-month LIBOR minus the three-
 210 month T-Bill rate (TED) as a measurement of credit risk and the price of gold (p_{Gold}) as an
 211 indicator of a general investment risk. The use of price of gold as an indicator of investment
 212 risk is perhaps unusual, but can be easily explained. During the time period used in the data
 213 set, price of gold almost consistently increased since investors preferred gold over other
 214 risky financial assets. Finally, we also consider the spot exchange rate (s) as a determinant
 215 of current account balance, a variable that was left out of our single good intertemporal
 216 model of section 2.

217

218 The regression equation is given by

$$219 \quad ca_t = \beta_0 + \beta_1 TED_t + \beta_2 p_{oil_t} + \beta_3 p_{gold_t} + \beta_4 s_t + \beta_5 i_t + \beta_6 y_t + \beta_7 g_t + \varepsilon_t \quad (13)$$

220 The estimation results are presented in Table 1. As column 2 of Table 1 indicates both risk
 221 variables: TED and P_{Gold} are significant and that they have a positive effect on the current
 222 account balance. These effects are consistent with the results of the analytical model. As
 223 noted in section 2, an increase in price of oil has a negative effect on current account
 224 balance, but the effect is statistically insignificant. The spot exchange rate also has a
 225 negative but insignificant effect on the current account balance. As explained in the
 226 intertemporal model, increase in interest rate has a positive and statistically significant effect
 227 on current account balance. Besides our explanation of the impact of the increase in interest
 228 rate one can also make the traditional argument that by virtue of the interest rate parity, an
 229 increase in the interest rate is due to the expected depreciation of the dollar which improves
 230 the current account balance. Finally, both GDP and Government spending have significant
 231 effects on current account balance. However, the negative effect of GDP and the positive
 232 effect spending are in contrast with the results of our basic model. They underscore the
 233 importance of the demand side effects of the macroeconomic shocks.

234

235 However, the regression has a low D-W statistic of 0.456 suggesting that the error term is
 236 serially correlated. We now re-estimate equation 13 with the same explanatory variables but
 237 adding three MA processes: MA (1), MA (2), and MA (3). As the values of column 2 indicate
 238 none of the qualitative results of the previous regression changes but the D-W statistic
 239 improves to 1.786. Also, a cointegration test for eq. (13) shows that a stationary linear
 240 combination exists for the time series (Table 3). This cointegrating equation can be
 241 interpreted as a long-run equilibrium relationship among these variables, as Engle and
 242 Granger (1987) have developed in their theory of non-stationary time series analysis.
 243 Further, two other tests, a Q-statistics and a serial correlation LM test (Breusch-Godfrey
 244 Lagrange multiplier test) were performed to test for autocorrelation and partial
 245 autocorrelation of the residuals together with the Ljung-Box Q-statistics for high-order serial
 246 correlation. The results show that there is no first-order serial correlation, but there is serial
 247 correlation of higher order.

248

249 3.2 The Spot Exchange Rate

250

251 We finally run a related regression of spot exchange rate [s_t (\$/€)]. We use similar
 252 explanatory variables as in equation (13) with the exception of the risk variables, TED and
 253 p_{Gold} , lag values of the p_{oil} to test its dynamic effect, GDP, and Government spending, g .

254

255

Table 1. U.S. Current Account Balance Regression [eq. (13)]

Variables	ca_t	ca_t
α_0	16.911 ^{***} (1.500)	12.959 ^{***} (1.969)
TED_t	0.041 ^{***} (0.005)	0.016 ^{**} (0.006)
p_{oil_t}	-0.013 (0.014)	-0.019 (0.015)
p_{Gold_t}	0.204 ^{***} (0.017)	0.119 ^{***} (0.022)
s_t	-0.020 (0.028)	-0.004 (0.046)
i_t	0.018 ^{***} (0.005)	0.010 [*] (0.006)
y_t	-2.383 ^{***} (0.219)	-1.957 ^{***} (0.284)
g_t	0.513 ^{***} (0.096)	0.583 ^{***} (0.119)
$MA(1)$	-	0.980 ^{***} (0.088)
$MA(2)$	-	0.750 ^{***} (0.108)
$MA(3)$	-	0.365 ^{**} (0.085)
R^2	0.876	0.951
SSR	0.120	0.047
$D-W$	0.456	1.786
F	149.762	282.160
N	156	156

Note: ca_t = current account balance, TED_t = TED spread ($= i_{LIBOR} - i_{RF}$), p_{oil_t} = price of oil, p_{gold_t} = price of gold, s_t = spot exchange rate (\$/€), i_t = interest rate on ten year U.S. government bond, y_t = GDP, g_t = Government spending, MA = moving average process, R^2 = R-squared, SSR = sum of squared residuals, $D-W$ = Durbin-Watson statistic, F = F-statistic, N = number of observations, (*), (**), and (***) = significant at the 10%, 5%, and 1% level, standard errors in parentheses. All variables except TED spread and interest rate are in natural log.

Data Source: *Economagic.com*. Data from 1999:01 to 2011:12.

We however include a national debt variable (in natural log), nd . We also include two dummy variables to capture the effects if Iraqi war and the European debt crisis: war dummy, WD ,

with values of zero (0) before 2003:03 and one (1) afterward, and European debt crisis dummy, EDCD, with values of zero (0) before 2009:10 and one (1) after.

The regression equation is given by,

$$s_t = \alpha_0 + \sum_{j=0}^n \alpha_j p_{oil_{t-j}} + \alpha_2 nd_t + \alpha_3 ca_t + \alpha_4 WD + \alpha_5 EDCD + \varepsilon_t \quad (14)$$

The initial regression results are reported in Table 2, column 1. But as in the case of the current account balance regression, the D-W statistic is low (0.265) suggesting that the error

Table 2. U.S. Spot Exchange Rate Regression [eq. (14)]

Variables	s_t	s_t	s_t	s_t
α_0	0.897 (0.566)	-2.662*** (0.612)	-0.391 (0.595)	-0.636*** (0.102)
p_{oil_t}	0.111*** (0.020)	0.130*** (0.021)	0.200*** (0.049)	0.126*** (0.023)
$p_{oil_{t-1}}$	-	-	-0.012 (0.069)	0.023 (0.020)
$p_{oil_{t-2}}$	-	-	-0.105** (0.048)	0.028 (0.023)
nd_t	-0.129** (0.066)	0.252*** (0.072)	0.027 (0.070)	0.001 (0.001)
ca_t	0.686*** (0.132)	-0.116 (0.149)	0.608*** (0.119)	0.029 (0.158)
WD	0.264*** (0.026)	0.058** (0.025)	0.236*** (0.025)	0.062*** (0.024)
$EDCD$	-	-0.026 (0.026)	-0.083*** (0.025)	-0.025 (0.026)
$MA(1)$	-	1.257*** (0.076)	-	1.309*** (0.077)
$MA(2)$	-	1.048*** (0.100)	-	1.211*** (0.110)
R^2	0.849	0.969	0.875	0.972
SSR	0.614	0.126	0.557	0.125
$D-W$	0.265	1.729	0.326	1.936
F	190.552	513.154	148.176	455.652
N	141	141	156	156

Note: See, Table 1; s_t = spot exchange rate (\$/€), p_{oil_t} = price of oil, nd_t = ln national debt, ca_t = current account balance, WD = war dummy, $EDCD$ = European debt crisis dummy, (*), (**), and (***) = significant at the 10%, 5%, and 1% level, standard errors in parentheses. All variables are in natural log. **Source:** Economagic.com. Data from 1999:01 to 2010:12.

Table 3. Cointegration Tests of the Multi-variables Models

Eq. (13); Variables: ca , TED , p_{oil} , p_{Gold} , s , i , y , g

(Maximum lag in VAR=2)

Null	Alternative	Eigenvalue	Trace Test		Maximum Eigenvalue Test	
			Statistics	Critical Value 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.574	257.790 ^{***}	159.530	130.379 ^{***}	52.363
$r \leq 1$	$r > 1$	0.224	127.412 ^{**}	125.615	38.864	46.231
$r \leq 2$	$r > 2$	0.183	88.548	95.754	31.076	40.078
$r \leq 3$	$r > 3$	0.127	57.539	69.819	20.720	33.877
$r \leq 4$	$r > 4$	0.104	36.819	47.856	16.726	27.584
$r \leq 5$	$r > 5$	0.075	20.093	29.797	11.986	21.132
$r \leq 6$	$r > 6$	0.039	8.107	15.495	6.113	14.264
$r \leq 7$	$r > 7$	0.013	1.994	3.841	1.994	3.841

Note: See Table 1; Trace test indicates 2 cointegrating equations at the 5% level. Maximum eigenvalue test indicates 1 cointegrating equation at the 5% level.

Eq. (14); Variables: s , p_{oil} , nd , ca , WD , $EDCD$

(Maximum lag in VAR=2)

Null	Alternative	Eigenvalue	Trace Test		Maximum Eigenvalue Test	
			Statistics	Critical Value 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.202	102.765***	95.754	34.550	40.078
$r \leq 1$	$r > 1$	0.183	68.214*	69.819	30.947	33.877
$r \leq 2$	$r > 2$	0.108	37.267	47.856	17.487	27.584
$r \leq 3$	$r > 3$	0.086	19.780	29.797	13.795	21.132
$r \leq 4$	$r > 4$	0.033	5.985	15.495	5.180	14.265
$r \leq 5$	$r > 5$	0.005	0.805	3.841	0.805	3.841

Note: See Table 2; Trace test indicates 1 cointegrating equation at the 5% level and 1 cointegrating equation at the 10% level. Maximum eigenvalue test indicates no cointegration at the 5% level.

Source: See Table 1 and 2.

term is serially correlated. We now re-estimate equation 14 with the same explanatory variables, but adding two MA processes: MA (1) and MA (2). The new regression results are reported in column 2. The D-W statistic improves to 1.729. In addition, a cointegration test for eq. (14) shows that a stationary linear combination exists for the time series (Table 3). This cointegrating equation can be interpreted as a long-run equilibrium relationship among these variables. Finally, the two other tests, a Q-statistics and a serial correlation LM test (Breusch-Godfrey test) were performed to test for autocorrelation and partial autocorrelation of the residuals for high-order serial correlation. The results show that there is no first-order serial correlation, but there is serial correlation of higher order, too.

The results of column 2 in Table 2 show that, as expected, national debt and price of oil have statistically significant positive effects on the spot rate causing dollar to depreciate. The Iraqi war (WD) has a significant negative effect on the value of the U.S. dollar (spot rate was increasing). The European debt crisis (EDCD) has a significant negative effect on euro and consequently lowers the spot rate and causes the dollar to appreciate. Current account balance has a statistically insignificant effect. [The details of exchange rate dynamics are discussed in Ghosh and Kallianiotis (2011)].

4. CONCLUDING REMARKS

The objective of this analysis is to determine the exchange rate dynamics based on shocks on the economy and on current account, due to oil prices, debts, and risk, between the U.S. dollar and the euro. Lately, the U.S. dollar was losing value with respect the euro and other major currencies of the world and we want to see if this depreciation depends on economic shocks and economic fundamentals or it is just speculation from individuals and countries, which hold large amounts of foreign assets denominated in different currencies or due to the current global financial crisis, recessions, instability, and the risk that the U.S. might freeze the foreign funds invested in its assets. The preliminary conclusion from this ex post analysis is, here, that, international investors are investing in countries with higher return, lower risk, and safety. This increase in demand for these assets, increases the demand for currency in that country and its currency is appreciated,⁷ the oil prices, the high risk and the enormous debts are affecting negatively the currency. Before 2001, people were invested in the U.S. and Japan, so the U.S. dollar and the Japanese yen were appreciated. After 2001, they invested in Euro-zone and the U.K. and the dollar and yen lost their value. Of course, due to high risk (wars and creeping ones, political conflicts, and a unique financial crisis) and low returns, many speculators have invested in euros and other currencies, instead in dollars denominated assets. Since November 2009, we have seen a change in this trend because of the Euro-zone debt problems. The current account is affected by risk and high debts, too.

Lastly, in this paper we have used the insights of an intertemporal model of consumption to analyze the recent behavior of the current account balance in the U.S. We have examined the roles of risk, price of gold, price of oil, TED spread, as well as interest rate, GDP and government spending. We have also analyzed the behavior of spot rate. In future papers we plan to use this framework to run a cross-country analysis of current account balance where we plan to include both the OECD and the developing countries.

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⁷ Here, the causality goes from $i_{AAA} \uparrow \xrightarrow{3.236} S \downarrow (\$ \uparrow)$ and $(\rho_{i,S} = -0.809)$.

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