Felipe Tâmega Fernandes
Clio@LSE Presentation

Elasticity of Rubber Demand

From previous sections, it was possible to infer that the rubber industry in Britain and in the USA evolved in a competitive environment and that its activities and profitability was directly dependent upon establishing a stable and reliable supply of crude rubber. This competition from the top emanated along the rubber chain and resulted in fierce competition for that raw material. Given the nature of production until 1910, which was almost exclusively from wild sources, this section investigates, from British and American trade balance data[1], how hunger for rubber these industrial centres were. It is shown here that the USA were much more in need of a steady crude rubber supply than Britain which might even have been able to extract monopoly rents from the USA due to its position in the market: the imported more than its needs and re-exported a sizeable fraction of its rubber supply, notably to the USA.

The methodology is based on the estimation of an Almost Ideal Demand System (AIDS) which provides a framework that is general enough to be used as a first-order approximation to any demand system. Equation 1 below is the specification to be estimated here, using data on import of rubber from UK balance of trade statistics.

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \log \frac{x}{P} \tag{1}$$

where $$\log P = \sum_k w_k \log p_k \tag{2}$$

where w_i is the budget share of country i, α_i is the intercept, p_j is the implicit price for rubber from all sources j and x is the amount of money spent on rubber by country i. Lastly, P is the Stone's Price Index as defined in Equation 2, which is used because implicit prices for rubber are collinear.[2]

A set of equations (in the form of equation 1) was jointly estimated using iterative Seemingly Unrelated Regressions (SUR) but in order to ensure identification of the system, countries were aggregated into groups, following the same geographic lines of the previous section. Thus, Asiatic and Oceanic rubber suppliers were aggregated under "ASIA"; African producers were included in "AFR"; European rubber exporters aggregated under "EURO"; Brazil was taken separately as "BRZ"; the other Amazonian countries were included in "AMZ"; and finally Mexican and Central American countries were taken together as "MEX". The sample accounts for around 95% of total rubber imports into the UK and 99% of the total rubber imports into the USA in the period 1870-1910. Unspecified British and French colonies together with Canada, the USA (as an exporter of rubber to the UK) and unspecified American were the main entries missing. Estimation was then carried out for both the USA and Britain for 1870-1910 and the estimated systems of equations are presented in the Appendix. Even though statistical tests does not suggest symmetry (see next

[1] UK Data was obtained from Parliamentary Papers whereas USA data came from the Foreign Commerce and Navigation of the United States.

[2] Under high collinearity, small changes in data might produce wide swings in the parameter estimates which may have very high standard errors and low significance levels even in the case when they are jointly significant and the R^2 of regression is quite high. Furthermore, coefficients may present the "wrong" sign or implausible magnitudes. However, this does not seem to be the case here, as it will be clear later on, coefficients do show plausible magnitudes, expected sign and are quite robust. Moreover, collinearity increases the likelihood of Type II error, i.e, the likelihood of accepting the null hypothesis that a certain parameter is equal to zero increases. And, since this does not work in favour of the results here rather the contrary, it is possible in this case to simply disregard collinearity, especially because its correction would entail either dropping a variable or making the coefficients biased. Neither would help in the analysis: dropping a variable would embody losing information whilst biasing estimators would turn inferences from point estimators useless.

section), this condition was imposed in both systems to allow for unique cross price elasticity between any given pair of different rubber sources.

British Demand for Rubber

Equations registered a reasonably good fit. The best fit was found for EURO equation whose Adjusted-R^2 reached 0.80 compared to 0.62 for ASIA. BRZ and AMZ equations, in turn, registered an Adjusted-R^2 of 0.40 and 0.41, respectively, and the worst fit was found for MEX: 0.32. Durbin Watson statistic suggest positive serial correlation in all equations except for BRZ for which the test is inconclusive. This is possibly a result of omission of price expectations or inflexibility in the short run due to long run contracts between buyers and sellers. Augmented Dickey-Fuller tests on residuals in level for each equation (not reported here) indicated that the null hypothesis that the residuals follow a unit root is rejected for all equations except for BRZ, for which the null hypothesis is rejected in first difference.

Under AIDS, changes in real expenditure operate through the β_i coefficients: it is positive for a luxury good and negative for necessities. According to the equations estimated, Asiatic rubber is a necessity whereas European rubber is a luxury. This result seems to be in line with the previous section where it was highlighted that Britain was exporting more rubber to European countries than importing from them and it is likely that part of the imported rubber from the continent was just being re-exported to somewhere else, notably the USA. Asiatic rubber, in turn, was becoming more and more important as a source of rubber supply, following the spread of *hevea* plantations in the region.

From the parameters of the AIDS equation is possible to retrieve the implied price-elasticities of demand as well as the elasticity of substitution among all rubber suppliers. According to Alston *et. al.*[3], the compensated elasticity of demand for the *i*th good with respect to the *j*th price is defined as below:

$$\eta_{ij} = -\delta_{ij} + \frac{\gamma_{ij}}{w_i} - \frac{\beta_i}{w_i} w_j \tag{3}$$

where δ_{ij} is the Kronecker delta that is equal to one if $i = j$ and zero otherwise. The standard error of the elasticity is given by γ_{ij} divided by w_i. The elasticity of substitution is implicit in the AIDS estimated parameters and is defined as:

$$\sigma_{ij} = 1 + \frac{\gamma_{ij}}{(w_i w_j)} \tag{4}$$

where $i \neq j$, whose associated standard error is calculated as the standard error of γ_{ij} divided by $w_i w_j$.

Figure XXX below shows the implied price elasticities of British demand for different sources of rubber as well as their elasticities of substitution (along with the respective market share[4]). Shaded cells denote significance at, at least, 15% confidence level (the associated t-ratios are shown under each estimate).

Figure XXX: Implied Price Elasticities and Elasticities of Substitution of British demand for Rubber, 1870-1910

[3] Alston *et al.* (1994).

[4] Note that this market share might differ from the figures presented in the previous section. Whereas in the previous section, market share was computed from quantities of rubber imported into the UK, in Figure XXX, the value of rubber imports were used.

	Mkt Share	BRZ	AMZ	MEX	AFR	ASIA	EURO
BRZ	59.46%	-1.73	5.91	11.93	2.09	2.94	0.44
		-14.55	4.56	1.08	3.42	4.80	0.55
AMZ	3.97%		-1.51	-591.72	-7.99	6.10	8.77
			-1.80	-5.09	-1.42	1.22	1.06
MEX	0.40%			-7.56	88.65	40.88	11.09
				-1.52	1.94	0.98	0.17
AFR	14.78%				-0.98	-10.40	9.59
					-1.78	-3.95	2.71
ASIA	9.19%					0.36	-5.65
						1.17	-1.71
EURO	7.69%						-1.53
							4.13

According to Figure XXX above, all uncompensated price elasticities of demand were significant at, at least, 15% confidence level except for ASIA. Demand for African rubber is practically unit inelastic, meaning that a 1.00% price increase would lead to a decrease in rubber consumption of 0.98%. For all other sources the demand was relatively elastic where an increase in price would lead to a more than proportionate decrease in the British demand for rubber. In comparison, the most elastic source would be Mexican and Central American rubber where a 1.00% increase in price leads to a 7.56% decrease in its demand. The elasticities do make sense: Africa was the place where British interests were more present (after Asia) and Mexico and Central America were places outside British area of influence. Brazilian and Amazonian rubber were of good quality and could not be substituted fully before the advent of plantation. Therefore, even though they were price elastic, the elasticity was still close to unity. As explained earlier, the demand for European sources might have depended less on British domestic economic conditions and more with the role Britain played as an intermediary in crude rubber market, explaining the price elasticity of -1.53.

The positive cross-price elasticities indicate that Brazilian rubber is a complement of Amazonian, African and Asian rubber. Since *hevea* rubber was the most tensile source, British industries might have mixed it with other less tensile sources in order to achieve a minimum standard for a given rubber manufacture. Mexican (plus Central American) and Amazonian sources are taken as substitutes, an expected result given that they were producing very similar quality of rubber, mostly caucho from *castilloa* trees. African rubber is a substitute of Asian rubber, a result probably derived from the fact that Asia and Africa were competing for British capital. Indeed, several British-African rubber concerns had links with British-Asian rubber concerns. Finally, African rubber was a complement of both Mexican (and Central American rubber) and European rubber whereas the latter was a substitute of European rubber. For these last results, there is no apparent explanation and they were probably consequence of strategic decisions of rubber traders in Britain.

US Demand for Rubber

Equations computed from US data also registered a reasonably good fit, even better than those estimated from British data. The best fit was found for EURO equation whose Adjusted-R^2 reached 0.83 compared to 0.69 for AMZ and 0.66 for BRZ. In turn, MEX and AFR registered an Adjusted-R^2 of 0.33 and 0.36, respectively. Finally, for ASIA the fit was very poor: -0.33. Durbin Watson statistic suggest positive serial correlation in all equations and the explanation seems to be the same as for British data: omission of price expectations or inflexibility in the short run due to long run contracts between buyers and sellers. Augmented Dickey-Fuller tests on residuals in level for each equation (not reported here) indicated that the null hypothesis that the residuals follow a unit root is rejected for all equations at, at least, 10% confidence level.

The β_i coefficients indicate that Amazonian and Asian rubber were necessities whereas European and Brazilian rubber were luxuries. But why would rubber from the main rubber supplier (the one that additionally produced the best quality of rubber) be considered a luxury for the country that, as it will be shown soon, was more in need of this very same raw product? The explanation seems to rely on the fact that Brazil was the only country that was able to sustain and increase rubber production throughout the period under analysis here: *heveas* not only produced the best quality of rubber but also were the trees most suitable to regular tapping without damaging their barks. Therefore, it seems reasonable that whenever demand increased (and then the amount spent on rubber would increase), Brazil would increase its market share more than proportionally. [5] Furthermore, since European rubber was mainly comprised of British re-exports of rubber, it seems reasonable to believe that the main percentage of that rubber was rubber from Brazil (since Brazil was the main supplier to Britain as well). Therefore, Europe would be an indirect source to obtain the very same *hevea* rubber.

Figure XXX below shows the implied price elasticities of US demand for different sources of rubber as well as their elasticities of substitution (computed from equations 3 and 4 above). Shaded cells again denote significance at, at least, 15% confidence level (the associated t-ratios are shown under each estimate).

Figure XXX: Implied Price Elasticities and Elasticities of Substitution of USA demand for Rubber, 1870-1910

	Mkt Share	BRZ	AMZ	MEX	AFR	ASIA	EURO
BRZ	50.64%	-0.57	-8.02	2.20	1.80	-3.40	-0.52
		-5.75	-3.85	2.53	0.26	-1.46	-1.43
AMZ	4.26%		6.29	-1.29	-115.82	51.66	-10.52
			3.76	-0.09	-1.09	1.45	-2.32
MEX	5.28%			-1.19	232.59	54.89	-2.00
				-2.85	4.63	3.29	-0.98
AFR	0.28%				3.44	211.34	-33.45
					2.04	1.57	-2.03
ASIA	1.33%					-0.22	-9.81
						-0.30	-1.79
EURO	26.93%						0.78
							6.03

US demand for Brazilian rubber was very inelastic, -0.57, indicating that an increase in price of 1.00% would lead to a decrease in rubber imported from Brazil of only 0.57%. Given the market share of Brazil, there was clearly a room for Brazilian exporters to extract monopolistic rents from American buyers. Additionally, since American interests in Mexico were very significant, it was expected that the demand for rubber from Mexico and Central America would be relatively inelastic and, indeed, Figure XXX suggests a price elasticity of demand very close to unity: -1.19.

US demand for European rubber was also very inelastic but the coefficient turned to be positive, indicating that European rubber was a *Giffen Good* and so were Amazonian and African rubber, although demand for these latter sources was very much elastic in line with little American interests in these two regions. The fact that these three rubber sources were considered as *Giffen Goods* might indicate that Americans were not seeking for any type of rubber but for a high quality of rubber: they were buying more rubber from Europe, Africa and the Amazon whenever the quality of the product increased. In a context in which the USA was unable to meet all their needs for high quality rubber transacting directly with Brazil, they had to resort to European markets, notably the British market, for a secondary source. British position in crude market meant that they were also able to extract monopoly rents from American rubber consumers.

Rubber scarcity in the US market influenced the way American rubber buyers were managing their rubber supply. For the USA, Brazilian rubber was a substitute of both Asian and Amazonian sources. Since Brazilian rubber was scarce, Americans were probably looking for a decent quality of rubber that could fulfill their needs. In addition, given its low quality, investments in rubber production in Mexico were probably made to mix it up with Brazilian rubber: indeed, the positive

[5] Note that according to Irwin's (2003) results, US cotton was also considered as a luxury good for Britain in the antebellum period.

cross price elasticity indicate that these two types of rubber were complementary. African rubber was taken as complementary of Mexican (plus Central American) rubber whereas Asian rubber was complementary to Amazonian, Mexican (plus Central American) and African Rubber, suggesting that lower qualities of rubber were probably being mixed to achieve a minimum quality level but they were all substituted for European sources, whenever they were available. Therefore, it seems that European rubber was taken as a residual: first the USA imported as much rubber as they could from primary sources of rubber which were substituted for a higher quality obtained in Europe, especially from Britain. Once more, Britain was well positioned in crude rubber market where the country was probably able to exploit some market power.

The general conclusion drawn here is that estimates for the US demand for different sources of rubber do indicate that the country was very hungry for this raw product. The fact that the main source was taken as a luxury good and that several sources were considered *Giffen Goods* support this claim, as explained above. Moreover, the demand for the main rubber supplier, Brazil, was very much inelastic and far more inelastic than the British demand for the same source. British demand, in turn, seems to indicate a normal pattern in which all statistically significant coefficients suggested a relatively more elastic demand for crude rubber. This reflects the successful diversification policy of British demand, fuelled by investments made in the City, that secured the country a crude rubber supply higher than its own needs (even though the country was the second biggest crude rubber consumer from 1870 to 1910): Britain was then even supplying its main rival in rubber manufacturing with crude rubber and its position might have allowed the country to extract monopolist rents. In this context it is easy to understand why reclaimed rubber became increasingly important as a source of rubber supply in the USA: reclaimed rubber was a compounding ingredient and would only compete with crude rubber at times of high rubber prices.[6] Thus, at the turn of the nineteenth century, the United States was the only country where reclaiming was of real importance, although small quantities were manufactured in Great Britain and on the Continent.[7]

[6] Barker (1940, p. 39).
[7] Essex (1952, pp.83-88).

UK

Estimation Method: Seemingly Unrelated Regression
Date: 10/31/07 Time: 18:50
Sample: 1870 1910
Included observations: 41
Total system (balanced) observations 246
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(10)	1.273	0.277	4.590	0.00%
C(11)	-0.451	0.071	-6.375	0.00%
C(12)	0.116	0.031	3.787	0.02%
C(13)	0.026	0.027	0.988	32.43%
C(14)	0.096	0.054	1.786	7.55%
C(15)	0.106	0.033	3.166	0.18%
C(16)	-0.026	0.036	-0.710	47.82%
C(101)	-0.028	0.024	-1.155	24.94%
C(20)	-0.281	0.214	-1.312	19.11%
C(22)	-0.019	0.033	-0.579	56.29%
C(23)	-0.095	0.019	-5.095	0.00%
C(24)	-0.053	0.033	-1.595	11.21%
C(25)	0.019	0.018	1.023	30.72%
C(26)	0.024	0.025	0.941	34.79%
C(102)	0.026	0.019	1.370	17.20%
C(30)	-0.074	0.150	-0.496	62.05%
C(33)	-0.026	0.020	-1.320	18.84%
C(34)	0.052	0.027	1.917	5.66%
C(35)	0.015	0.015	0.959	33.85%
C(36)	0.003	0.020	0.154	87.81%
C(103)	0.014	0.013	1.056	29.20%
C(40)	-0.794	0.321	-2.476	1.41%
C(44)	0.013	0.082	0.164	86.95%
C(45)	-0.155	0.036	-4.335	0.00%
C(46)	0.098	0.040	2.425	1.62%
C(104)	0.074	0.028	2.642	0.89%
C(50)	1.568	0.194	8.065	0.00%
C(55)	0.111	0.028	3.997	0.01%
C(56)	-0.047	0.023	-2.012	4.55%
C(105)	-0.143	0.017	-8.398	0.00%
C(60)	-1.001	0.271	-3.692	0.03%
C(66)	-0.033	0.040	-0.839	40.25%
C(106)	0.094	0.023	4.129	0.01%

Determinant residual covariance **0.00**

Equation: BRZ_SHR = C(10) + C(11)*LOG(BRZ_PRC) + C(12)
*LOG(AMZ_PRC) + C(13)*LOG(MEX_PRC) + C(14)
*LOG(AFR_PRC) + C(15)*LOG(ASIA_PRC) + C(16)
LOG(EURO_PRC) + C(101)(LOG(X)-LN_PRICE)
Observations: 41

R-squared	0.51	Mean dependent var	0.46
Adjusted R-squared	0.40	S.D. dependent var	0.05
S.E. of regression	0.04	Sum squared resid	0.06
Durbin-Watson stat	1.64		

Equation: AMZ_SHR = C(20) + C(12)*LOG(BRZ_PRC) + C(22)
*LOG(AMZ_PRC) + C(23)*LOG(MEX_PRC) + C(24)
*LOG(AFR_PRC) + C(25)*LOG(ASIA_PRC) + C(26)
LOG(EURO_PRC) + C(102)(LOG(X)-LN_PRICE)
Observations: 41

R-squared	0.52	Mean dependent var	0.03
Adjusted R-squared	0.41	S.D. dependent var	0.03
S.E. of regression	0.02	Sum squared resid	0.02
Durbin-Watson stat	0.72		

Equation: MEX_SHR = C(30) + C(13)*LOG(BRZ_PRC) + C(23)
*LOG(AMZ_PRC) + C(33)*LOG(MEX_PRC) + C(34)
*LOG(AFR_PRC) + C(35)*LOG(ASIA_PRC) + C(36)
LOG(EURO_PRC) + C(103)(LOG(X)-LN_PRICE)
Observations: 41

R-squared	0.44	Mean dependent var	0.01
Adjusted R-squared	0.32	S.D. dependent var	0.01
S.E. of regression	0.01	Sum squared resid	0.00
Durbin-Watson stat	1.03		

Equation: AFR_SHR = C(40) + C(14)*LOG(BRZ_PRC) + C(24)
*LOG(AMZ_PRC) + C(34)*LOG(MEX_PRC) + C(44)
*LOG(AFR_PRC) + C(45)*LOG(ASIA_PRC) + C(46)
LOG(EURO_PRC) + C(104)(LOG(X)-LN_PRICE)
Observations: 41

R-squared	0.36	Mean dependent var	0.20
Adjusted R-squared	0.22	S.D. dependent var	0.07
S.E. of regression	0.06	Sum squared resid	0.13
Durbin-Watson stat	0.46		

Equation: ASIA_SHR = C(50) + C(15)*LOG(BRZ_PRC) + C(25)
*LOG(AMZ_PRC) + C(35)*LOG(MEX_PRC) + C(45)
*LOG(AFR_PRC) + C(55)*LOG(ASIA_PRC) + C(56)
LOG(EURO_PRC) + C(105)(LOG(X)-LN_PRICE)
Observations: 41

R-squared	0.73	Mean dependent var	0.11
Adjusted R-squared	0.67	S.D. dependent var	0.06
S.E. of regression	0.03	Sum squared resid	0.04
Durbin-Watson stat	1.27		

Equation: EURO_SHR = C(60) + C(16)*LOG(BRZ_PRC) + C(26)
*LOG(AMZ_PRC) + C(36)*LOG(MEX_PRC) + C(46)
*LOG(AFR_PRC) + C(56)*LOG(ASIA_PRC) + C(66)
LOG(EURO_PRC) + C(106)(LOG(X)-LN_PRICE)
Observations: 41

R-squared	0.84	Mean dependent var	0.11
Adjusted R-squared	0.80	S.D. dependent var	0.06
S.E. of regression	0.03	Sum squared resid	0.03
Durbin-Watson stat	1.19		

USA

Estimation Method: Seemingly Unrelated Regression
Date: 11/01/07 Time: 11:32
Sample: 1870 1910
Included observations: 41
Total system (balanced) observations 246
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(10)	-0.316	0.175	-1.805	7.25%
C(11)	0.265	0.050	5.313	0.00%
C(12)	-0.195	0.045	-4.331	0.00%
C(13)	0.032	0.023	1.378	16.97%
C(14)	0.001	0.010	0.115	90.89%
C(15)	-0.030	0.016	-1.892	5.99%
C(16)	-0.208	0.050	-4.158	0.00%
C(101)	0.088	0.012	7.332	0.00%
C(20)	2.651	0.230	11.525	0.00%
C(22)	0.304	0.071	4.263	0.00%
C(23)	-0.005	0.031	-0.168	86.69%
C(24)	-0.014	0.013	-1.102	27.18%
C(25)	0.029	0.020	1.422	15.64%
C(26)	-0.132	0.052	-2.537	1.19%
C(102)	-0.157	0.016	-9.574	0.00%
C(30)	-0.077	0.108	-0.712	47.75%
C(33)	-0.010	0.022	-0.464	64.28%
C(34)	0.035	0.007	4.609	0.00%
C(35)	0.038	0.012	3.231	0.14%
C(36)	-0.043	0.029	-1.474	14.21%
C(103)	-0.002	0.008	-0.286	77.52%
C(40)	0.063	0.040	1.563	11.96%
C(44)	0.013	0.005	2.631	0.91%
C(45)	0.008	0.005	1.561	12.01%
C(46)	-0.026	0.013	-2.091	3.77%
C(104)	-0.007	0.003	-2.312	2.17%
C(50)	0.144	0.072	2.013	4.53%
C(55)	0.010	0.010	1.029	30.48%
C(56)	-0.039	0.020	-1.978	4.92%
C(105)	-0.011	0.005	-2.138	3.37%
C(60)	-1.332	0.198	-6.736	0.00%
C(66)	0.503	0.073	6.920	0.00%
C(106)	0.085	0.014	6.025	0.00%

Determinant residual covariance **0.00**

Equation: BRZ_SHR = C(10) + C(11)*LOG(BRZ_PRC) + C(12)
*LOG(AMZ_PRC) + C(13)*LOG(MEX_PRC) + C(14)
*LOG(AFR_PRC) + C(15)*LOG(ASIA_PRC) + C(16)
LOG(EURO_PRC) + C(101)(LOG(X)-LN_PRICE2)
Observations: 41

R-squared	0.72	Mean dependent var	0.58
Adjusted R-squared	0.66	S.D. dependent var	0.07
S.E. of regression	0.04	Sum squared resid	0.06
Durbin-Watson stat	1.22		

Equation: AMZ_SHR = C(20) + C(12)*LOG(BRZ_PRC) + C(22)
*LOG(AMZ_PRC) + C(23)*LOG(MEX_PRC) + C(24)
*LOG(AFR_PRC) + C(25)*LOG(ASIA_PRC) + C(26)
LOG(EURO_PRC) + C(102)(LOG(X)-LN_PRICE2)
Observations: 41

R-squared	0.74	Mean dependent var	0.10
Adjusted R-squared	0.69	S.D. dependent var	0.12
S.E. of regression	0.07	Sum squared resid	0.15
Durbin-Watson stat	0.70		

Equation: MEX_SHR = C(30) + C(13)*LOG(BRZ_PRC) + C(23)
*LOG(AMZ_PRC) + C(33)*LOG(MEX_PRC) + C(34)
*LOG(AFR_PRC) + C(35)*LOG(ASIA_PRC) + C(36)
LOG(EURO_PRC) + C(103)(LOG(X)-LN_PRICE2)
Observations: 41

R-squared	0.45	Mean dependent var	0.05
Adjusted R-squared	0.33	S.D. dependent var	0.03
S.E. of regression	0.03	Sum squared resid	0.02
Durbin-Watson stat	0.63		

Equation: AFR_SHR = C(40) + C(14)*LOG(BRZ_PRC) + C(24)
*LOG(AMZ_PRC) + C(34)*LOG(MEX_PRC) + C(44)
*LOG(AFR_PRC) + C(45)*LOG(ASIA_PRC) + C(46)
LOG(EURO_PRC) + C(104)(LOG(X)-LN_PRICE2)
Observations: 41

R-squared	0.47	Mean dependent var	0.01
Adjusted R-squared	0.36	S.D. dependent var	0.01
S.E. of regression	0.01	Sum squared resid	0.00
Durbin-Watson stat	1.44		

Equation: ASIA_SHR = C(50) + C(15)*LOG(BRZ_PRC) + C(25)
*LOG(AMZ_PRC) + C(35)*LOG(MEX_PRC) + C(45)
*LOG(AFR_PRC) + C(55)*LOG(ASIA_PRC) + C(56)
LOG(EURO_PRC) + C(105)(LOG(X)-LN_PRICE2)
Observations: 41

R-squared	-0.10	Mean dependent var	0.02
Adjusted R-squared	-0.33	S.D. dependent var	0.01
S.E. of regression	0.01	Sum squared resid	0.01
Durbin-Watson stat	0.51		

Equation: EURO_SHR = C(60) + C(16)*LOG(BRZ_PRC) + C(26)
*LOG(AMZ_PRC) + C(36)*LOG(MEX_PRC) + C(46)
*LOG(AFR_PRC) + C(56)*LOG(ASIA_PRC) + C(66)
LOG(EURO_PRC) + C(106)(LOG(X)-LN_PRICE2)
Observations: 41

R-squared	0.86	Mean dependent var	0.24
Adjusted R-squared	0.83	S.D. dependent var	0.10
S.E. of regression	0.04	Sum squared resid	0.06
Durbin-Watson stat	1.10		