

Full Length Research Paper

The short and long run fluctuation effects of Brazilian agricultural exports

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The major objective of this article was to evaluate the impact of the exchange rate and the world income on the Brazilian agricultural export value. The analyzed period was annual quarters from January of 1980 to September of 2011. The chosen period was due to several turbulence and exchange rate regime changes experienced by the Brazilian economy, as well as the world crisis of 2008. Unitary root test, Johansen's co-integration test, auto-regression vector model, correction error model and answer-impulse function were used in the study. The results indicated that the variables analyzed were co-integrated. The long run real exchange rate and world income elasticities were less than one, that is, relatively inelastic. The estimated coefficients of the model presented results compatible with the economic theory. The paper concludes that Brazilian agricultural exports respond well to the exchange rate and to world income variations.

Key words: Brazilian agricultural exports, exchange rate, world income, co-integration, auto-regression vector model.

INTRODUCTION

In recent years, Brazil reached a top position among major world agricultural commodities producers and exporters. Brazilian agricultural exports performance presents two major phases: From the 2000 to 2003 period, where Brazilian agricultural exports increased 14% per year; and from the 2004 to 2010 period, where its agricultural export sector had an extraordinary development with an annual increase rate of 12% per year. Exports practically doubled, from US\$ 43 billion in 2004 to US\$ 76 in 2010¹. However, between 2008 and 2009, exports declined from US\$ 72 billion to US\$ 65 billion. This decrease could be in part be explained by the fall in prices of most international commodities.

After the 2008 crisis, Brazilian agricultural exports had a strong recover in 2010, achieving the amount of US\$76 billion. However, this significant rise in exports was basically a result of the increase that occurred in the

quantity exported (Figure 1).

The major importers of Brazilian agricultural products were: the European Union, China, United States, Russia and Japan. From 2009 to 2010, China increased its export value to Brazil in 23%, importing the equivalent of 15% of all Brazilian agricultural exports (Figure 2).

In view of the world financial crisis that begun by the end of 2007, with the US recession and by most considered the second world great depression, one can expect that possible price and demand oscillations would indeed affect the trade flux from international commerce negotiations.

The crisis generated a decline in world demand, creating a Brazilian export value reduction expectation and therefore, causing a decrease in the balance of trade surplus. Hence, this decline could be partial or totally compensated by a possible increase of the exported value, in view of an exchange rate depreciation that makes the domestic product more attractive in the foreign market. However, would the exchange rate depreciation be sufficient enough to compensate the decline in world income and therefore maintain the increase level of exports?

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¹ See SECEX/MICT (2012).

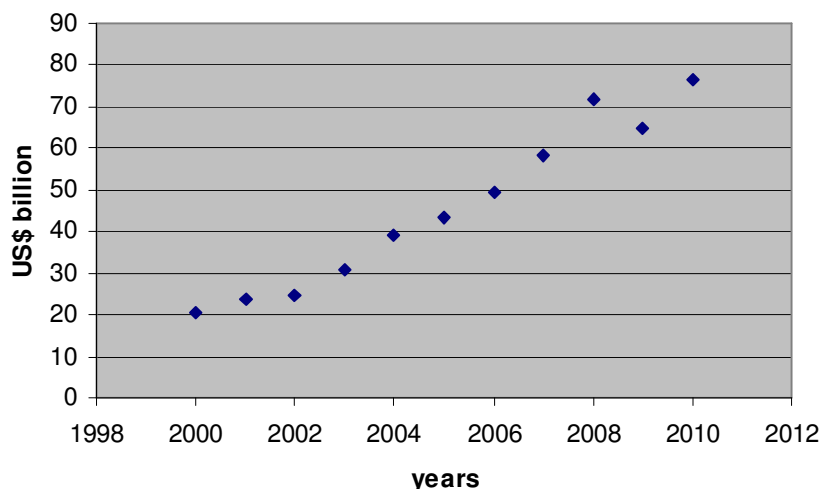


Figure 1. Brazilian Agricultural Exports. Source: SECEX/MIIC.

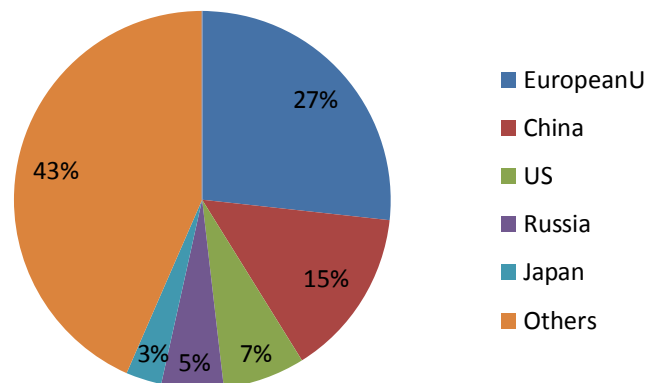


Figure 2. Major Destiny of Brazilian Agricultural Exports. Source: SECEX/MIIC.

The major objective of this paper was to identify the impact of the exchange rate and the world income on the Brazilian agricultural exports from January, 1980 to September, 2011. Additionally, its goal was also to find out if the relation among Brazilian agricultural exports, world income and real exchange rate were unchanged during the analyzed period. In order to identify and to evaluate the relevance of major variables that affect Brazilian agricultural exports, a co-integrated test was done, as well as an Error Correction Model (ECM) in the short and long run was used to verify how they react to changes in relation to long run equilibrium.

LITERATURE REVIEW

Alves and Bacchi (2004) estimated a Brazilian sugar export supply function using a Vector Auto-Regression Model (VAR) with data for the October, 1995 to December, 2002 period. The specified equation to

evaluate the impacts in exports variation was based in a theoretical model supposing that the explanatory variables were in large part what exceeds from the domestic market demand. The integration and co-integration proprieties of the series were considered in the analysis. The results showed that an increase in export price and exchange rate devaluation causes a significant increase in Brazilian exports. On the other hand, an increase in domestic income and domestic price had a negative impact on the exported quantity. The effects of domestic income were more expressive on the sugar export quantity as a result of a same perceptual variation in export explanatory variables.

An export supply function was estimated by Rezende and Godoy (2005), using an auto-regression vector methodology (VAR), for the January, 1968 to December, 2002 period. The study evaluated the effects of world income, real exchange rate and the Brazilian GNP on Brazilian exports (exported *quantum*). The long run coefficients were significant at the 5% level, except for the exchange rate variable coefficient. The world income coefficient was estimated at 0.78, in other words, this means that an increase of 10% in world income generates an increment of 7.8% in the exported *quantum*. The estimated real exchange rate variable coefficient was low, however, with the expected sign. The short run analysis showed that the disequilibrium was corrected in a relatively fast manner. The -0.49 coefficients indicated that economic agents compensated in the average 49% of the disequilibrium of the previous period.

The impact of the exchange rate regime change of January, 1999 and the resulted transformations in the Brazilian agricultural sector was evaluated by Ferreira et al. (2006). The study's main objective was to analyze the Brazilian commercial trade balance in relation to the Total gross domestic product (GDP), the agricultural GNP, the world income and the real exchange rate for the 1980/2006 period (up to the first annual quarter). Its major

conclusions were that the exchange rate policy bands of the *Plano Real* had a negative effect on exports and favored imports. With the liberation of the Brazilian exchange rate from 1999 on the estimated relations, even though not statistically significant, appeared to have a positive net effect on the commercial trade balance.

Silva (2009a) analyzed how Brazilian exports responded to real exchange rate changes and to the Canadian gross domestic product (GDP) in the 1981/2008 period. The methodology used in the study was the Vector Auto-Regression (VAR) developed by Johansen and Juselius (1990). The utilization of this methodology permitted the impact elasticity estimation for n periods ahead. In general, the estimated error correction model showed that the short run effects of the explanatory variables variations indicated changes in the Brazilian exports to Canada. Even though an explanatory study, these results showed that the variables were co-integrated. The long run elasticities, the real exchange rate and the Canadian gross domestic product estimated were greater than one, that is, they were relatively elastic. The estimated exchange rate elasticity indicated that, for a constant Canadian gross domestic product variable, an increase of 1% in the exchange rate resulted in an increase of 1.6096% in Brazilian exports. Additionally, the Canadian gross domestic product behavior was also important in the determination of the Brazilian commodities exports, where an increase of 1% in the Canadian GNP implied in an increase of 1.4338% in Brazilian exports. The short run analysis revealed that the disequilibrium was slowly corrected. This meant that the exchange rate and the Canadian gross domestic product presented lower short run adjusted coefficients, in other words, a lower adjusted velocity for each variable in the long run.

Barros et al. (2002) also applied the auto-regression vector method (VAR) developed by Johansen and Juselius (1990), the error correction term and the co-integrated tests. This method of analysis was punctually used in case studies of poultry, soybean flour, refrigerated and frozen beef, industrialized beef, sugar, cotton, coffee and orange juice. The data used in the study was for the January, 1992 to the December, 2000 period, except for sugar, which was for the January, 1995 to the December, 2000 period, and for industrialized beef which was for the September, 1994 to the December, 2000 period. The study major conclusions were: (a) the impacts of the Brazilian economy growth on the analyzed export products were expressive; (b) the exchange rate was a determinant factor in the agribusiness exports, especially in soybeans (and derivatives) and sugar; (c) the export prices were relevant in the cases of sugar, soybeans and industrialized beef. Silva (2009b) examined the rural credit, research expenses, paved road and irrigation land effects in the total factor productivity of the Brazilian agriculture for the 1975/2007 periods. The integration and co-integration properties of the series utilized in the model were considered in the analysis, as well as the

variance decomposition and the impulse-answer function analysis. The positive signs obtained for the short run explanatory variable estimated coefficients of the model, were coherent with the modernization process of Brazilian agriculture. The results showed that the variables were co-integrated, even though the long run rural credit and research expenses elasticity were less than one, that is, they were relatively inelastic. Additionally, the estimated irrigated land elasticity in the study indicated that if other explanatory variables were kept constant, an increase of 1% in irrigated land would lead to an increase of approximately 1.84% in agricultural total factor productivity.

A study estimating a Brazilian soybean export function for the 1980 to 2001 period was done by Figueredo and Silva (2004). Given the greater open economy level of the Brazilian economy in the period, the export dynamic of this product was analyzed with emphasis on the decade of 1990 and the exchange rate fluctuation impacts were verified in the agricultural exports determinants. The proposed model used in the export estimation function was the error correction model (ECM) that appeared to be well adjusted to the specified variables and according to the expected relations for the estimated parameters. Hence, the elasticities obtained were high and significant, indicating that exports react to the foreign prices, domestic prices and domestic income variations. The exchange rate also showed significant and positive elasticities expressing the devaluation of the exchange rate fluctuation in the considered period promoting soybeans exports.

Monte and Brasil (2009) applied the co-integration test and the error correction model (ECM) to identify the major coffee exports determinants for the State of Espírito Santo². The following relevant coffee export variables were used: Real exchange rate, Canelon coffee price, domestic price, Espírito Santo coffee production, world coffee production and Brazilian coffee stock; for the January, 1995 to June, 2006 period. All estimated parameters of the explanatory variables were significant at the 1% level. The real exchange rate variable was the most important one in coffee export determination. The exchange rate elasticity estimate indicated, that keeping other variables constant, an increase of 1% in the exchange rate, would result in a 6.24% coffee export variation. The correct error term coefficient of -0.7444, indicated that the short run disequilibria of the Espírito Santo coffee exports are corrected at a velocity of 74.44%, that is, a fast adjustment in the direction of the long run equilibrium.

METHODOLOGY

Empirical model and data

To accomplish the papers objective, an econometric analysis using

²Espírito Santo is one of the 26 states of the Federative Republic of Brazil.

a Vector Auto-Regression Model (VAR) was developed to evaluate the existence and intensity effect among Brazilian agricultural exports, world income and exchange rate. It must be observed that the VAR Model proposed by Sims (1980), implies that all variables used in the model should be treated in a simultaneous and symmetric form.

The VAR Model can be expressed by the following equation:

$$X_t = A_0 + A_1 X_{t-1} + \dots + A_p X_{t-p} + B_0 Z_t + B_1 Z_{t-1} + \dots + B_p Z_{t-p} + e_t \quad (1)$$

Where: A_0 is an $n \times 1$ vector of the intercept; A_1, \dots, A_p is an $n \times n$ coefficient matrix that relates lagged values of endogenous variable to current values of those variables; B_0, \dots, B_p is an $n \times m$ coefficient matrix that relates current and lagged values of exogenous variables to current values of endogenous variables; and e_t is an $n \times 1$ vector of error.

Each X and Z variables are explained by its lagged value. The Schwarz's Information (SIC) and the Akaike's Information (AIC) criteria's, took into consideration the residual square sum; the observed number and the parameter estimators, were used in order to select the best VAR Model, which are important to determine the number of lags to be included in the model. Hence, the smaller their values the better will be the model.

The Augmented Dickey-Fuller (ADF) Test³ was used to test the series stationary, to verified the integration order of the interested variables, so that the existence or not of unity roots in the temporal series could be verified. The Augmented Dickey-Fuller (ADF) tests consisted on the estimation of the following equations using the Method of Ordinary Least Square (OLS):

Without a constant and tendency

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=1}^{p-1} \delta_i \Delta Y_{t-i} + \epsilon_t \quad (2)$$

With a constant and without tendency

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \sum_{i=1}^{p-1} \delta_i \Delta Y_{t-i} + \epsilon_t \quad (3)$$

With a constant and with tendency

$$\Delta Y_t = \alpha + \beta t + \gamma Y_{t-1} + \sum_{i=1}^{p-1} \delta_i \Delta Y_{t-i} + \epsilon_t \quad (4)$$

Where Δ is the first difference operator ($\Delta Y_t = Y_t - Y_{t-1}$); α , the intercept term; t , the tendency; δ ($= \rho - 1$), the test coefficient for the presence or not of the unitary root; ΔY_{t-1} , self dependent variable, differentiated and lagged, which objective was to eliminate the possibility of the presence of autocorrelation of the residuals; and ϵ_t , the error structure, assumed to have mean zero, constant variance and no autocorrelation.

The null and alternative hypothesis tested in the estimated Equations (2), (3) and (4), were $H_0 : \gamma = 0$ and $H_1 : \gamma < 0$, respectively. If the ADF statistic were greater than the critical value, the non stationary hypothesis of the temporal series would be rejected.

Based on the results of the ADF test, the integration order of a determined series can be identified, that is, the differentiation order that makes a series stationary [I(1)] indicates that the series is stationary in its first difference.

In order to define the number of lags in the ADF tests, the Schwarz Information Criteria (SIC) is used to minimize the possible presence of autocorrelation of the residuals.

The next phase was to test the existence of co-integration among the analyzed variables. The co-integration identifies if non stationary processes presents a long run equilibrium relation, that is, if two or more non stationary temporal series co-integrate with a stable long run relation of stationary residuals. Co-integration tests among two or more temporal series permits the acceptance or the rejection the existence of a long run relation among these variables. The Johnsen and Juselius (1990) method was used to verify the existence of co-integration among a set of economic variables. This method is based on the following modified version of a VAR model:

$$\Delta y_t = \Gamma_1 \Delta y_{t-1} + \dots + \Gamma_{p-1} \Delta y_{t-p+1} + \Pi y_{t-1} + \phi d_t + \mu + \epsilon_t \quad (5)$$

Where: y_t is a vector with k variables; d_t is a vector of binary variables to capture seasonal changes; and ϵ_t is the random error.

Given that r is the post of matrix π , than π has r eingevalues or auto values statistically different from zero. Three situations may occur: (a) if $r = k$, than y_t is stationary, therefore the co-integration question will not be the case; (b) if $r = 0$, than Δy_t is stationary and hence there will be no co-integration relation among the variables; and (c) if $0 < r < k$, there will be r co-integration relations that will yield y co-integration vectors, that is, the existence of α and β matrices of $k \times r$ dimension, such as, $\pi = \alpha\beta'$ and the βy_t vector is stationary. Where α represents the velocity of adjustment of the parameters matrix in the short run, while β is a long run co-integration coefficient matrix, and Γ_i is the coefficient matrices that define the short run dynamic.

Therefore, the trace statistic (λ_{trace}) and the auto value maxim statistic (λ_{max}) were used to test the co-integration of the temporary series. The trace test was given by $\lambda_{trace} = -T \sum_{i=r+1}^n \ln(1 - \lambda_i)$.

The hypothesis was formulated to verify the existence of an (r) co-integrated vector number, that is, $H_0 : r_0 \leq r$ (null) and $H_1 : r_0 > r$ (alternative).

The maximized auto value test was given by: $\lambda_{max} = -T \ln(1 - \lambda_{r+1})$. The hypothesis were formulated to verify the exact number of the co-integrated vectors, that is, $H_0 : r_0 = r$ (null) and $H_1 : r_0 > r + 1$ (alternative).

The λ_i are the estimated values of the characteristic roots obtained from the estimated matrix Π and T is the number of observations. If the calculated values of λ_{trace} and λ_{max} are greater than the critical values, then the no co-integrated null hypothesis is rejected.

The so far described proceedings were useful to determine the long run equilibrium relation among variables. Hence, Engler and Granger (1987) demonstrated that, even presenting a long run equilibrium relation among non stationary variables (in level), a short run disequilibrium may occur, that is, the short run dynamic is influenced by the deviation magnitude in relation to the long run

³See Dickey and Fuller (1981)

equilibrium. The mechanism that conducts variables to equilibrium is known as the Error Correction Model (ECM), so that by the ECM it is possible to determine the velocity by which the short run disequilibrium is eliminated.

The EVIEWS 7.0 Statistic Package was used to run the unitary root and co-integration tests and to estimate the VAR Model.

Estimation of the Brazilian agricultural export function

According to economic theory positive relations are expected among the specified variable pairs of the econometric model. Given the objectives of this paper, the following Brazilian agricultural export function was used:

$$Export_t = Const.Rmundial_t^\alpha.Cambio_t^\beta \varepsilon_t \quad (6)$$

$Export_t$ is the annual quarter value in US\$-FOB of Brazilian agricultural exports; $Rmundial_t$ is the world income (a proxy used was the US annual quarter gross domestic product in index number, 2006=100); $Cambio_t$ is the annual quarter effective real exchange rate (Index number, 2006 = 100); α and β = are the elasticities; and ε_t is the random error term.

The expected signs for the empirical tests are:

$$\frac{\partial EXPORT}{\partial Rmundial} > 0 \quad \frac{\partial EXPORT}{\partial Cambio} > 0$$

What means that the world income and the exchange rate variations affect positively the Brazilian agricultural exports.

A Log-linear Model was used with the necessary transformation of the log of its variables with a stochastic component (ε_t), follows that:

$$LExport = Const + \alpha LRmundial + \beta LCambio + \varepsilon_t \quad (7)$$

where, $LExport$ is the logarithm of the Brazilian agricultural export values, $Const$ is the constant term, $LRmundial$ is the logarithm of world income and $LCambio$ is the exchange rate.

Data source

To capture the world income and real exchange rate effects on Brazilian agricultural exports the model was estimated with quarter data from the January, 1980 to September, 2011 period, generating 127 observations.

The data on Brazilian agricultural export values in US dollars were obtained from the Secretaria de Comércio Exterior do Ministério do Desenvolvimento, Indústria e Comércio Exterior [SECEX/MDIC (2012)] and were deflated by the U.S. whole sale price index (IPA) published by the International Monetary Fund [IMF-IFS (2012)], using constant prices of December, 2006. The real exchange rate index was obtained from IPEADATA (2012), from the Instituto de Pesquisa Econômica Aplicada, considering December, 2006 as base. The world income was used as a proxy for the US GNP and also obtained from IPEADATA (2012), where the values were deflated and transformed into an index, also considering December 2006 as base. To reduce variance, as usual, logarithm variable was used according to Figures 3 to 5.

RESULTS AND DISCUSSION

Unitary root tests

The first step in the analysis was to check how the series stochastic generator process behaved along time, that is, to identify if the used variables were stationary or not. Therefore, the stationary or unity root hypothesis tests could play an important role, because they can help to evaluate the non stationary nature that most economic series present. On the other hand, if the presence of unitary root is detected differentiated temporal series should be used and not in level.

To begin the co-integration tests among the considered variables (Brazilian agricultural exports, world income and real exchange rate) the data should first be tested for stationary by the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) tests. Given the results obtained, only the Augmented Dickey-Fuller (ADF) tests with constant and tendency were used.

The results presented in Table 1 indicated that for the series in level the presence of unitary roots could not be rejected at a level of significance of 5%. Therefore, all series have unitary roots and were not stationary, that is, they were not integrated of zero order I (0).

The tests developed for the series in first difference indicated that for a level of significance of 5%, the presence of the unitary root can be rejected. Therefore, all series in difference have the same integration order I (1).

The next step was to determine the lag number (p) of the VAT Model using the Akaike (AIC), Schwarz (SC) and HQ (Hannan-Quinn) information criteria. The VAR Model was adjusted assuming four lags for the variables in first difference. The results are presented in Table 2.

Co-integration tests

The trace tests usually indicated by λ_{trace} and the maximum eigenvalues tests indicated by λ_{max} were used to determine the co-integration vector number. The results are presented in Tables 3 and 4. Both tests suggested the existence of three co-integration vectors. The tests adopted a critical value for a level of significance of 5%. Based on the long run function all parameter signs of the estimated equation were quite satisfactory when compared with those expected by the theoretical model. The results showed that the estimated coefficients were all significant at the 5% level. It was possible to reject the null hypothesis that the coefficients were not equal to zero (Table 5).

The estimated exchange rate elasticity indicated that if the world income variable were kept constant, an increase of 1% in the exchange rate would induce an increase of 0.5814% in the Brazilian agricultural exports.

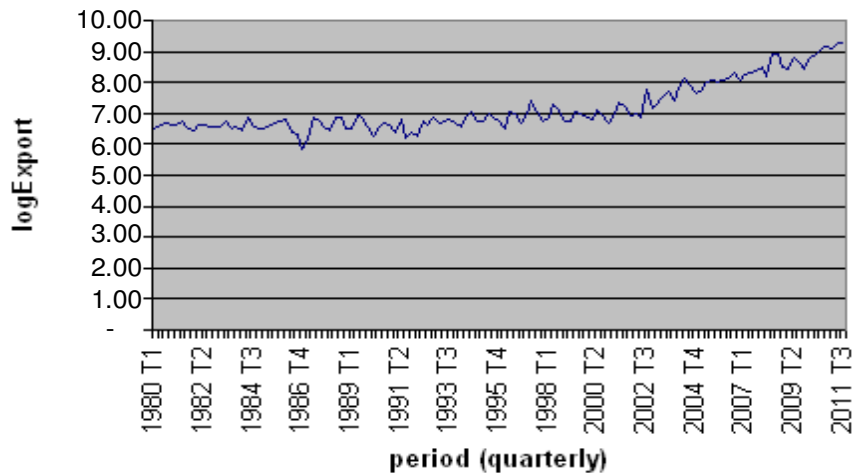


Figure 3. Logarithm series of Brazilian agricultural exports.

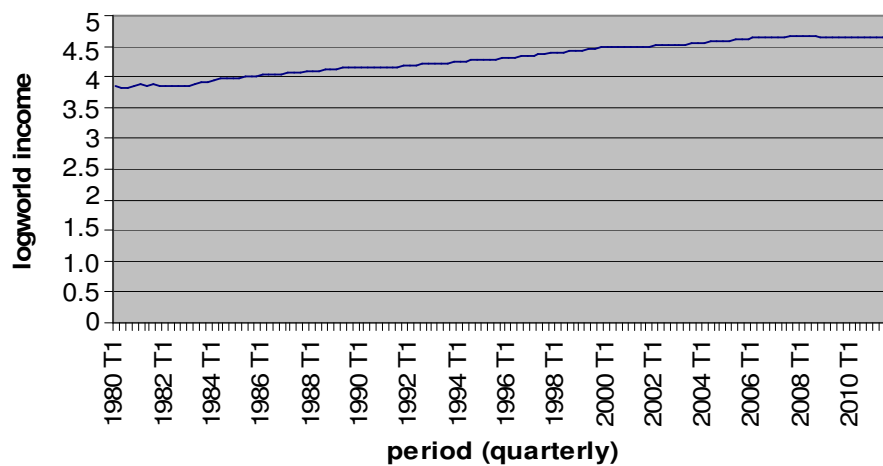


Figure 4. Logarithm series of world income.

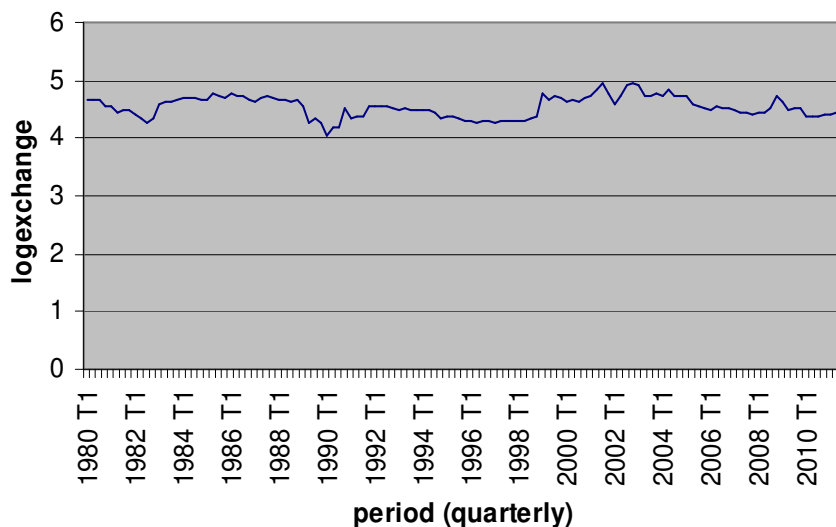


Figure 5. Logarithm series of exchange rate.

Table 1. Unitary root test (ADF).

Variable	Lags	Constant	Tendency	ADF statistic	Critical value (5%)	Séries
Lexport	3	Yes	Yes	- 0.4031	- 3.4468	At level
Lrmundial	0	Yes	Yes	- 0.0106	- 3.4459	At level
Lcambio	0	Yes	Yes	- 2.8770	- 3.4459	At level
DLexport	2	Yes	Yes	-14.0475	- 3.4468	At 1 st difference
DLrmundial	0	Yes	Yes	-10.3511	- 3.4462	At 1 st difference
DLcambio	0	Yes	Yes	- 11.4890	- 3.4462	At 1 st difference

The “D” letter in the beginning of the three last variables refers to the first difference.

Table 2. Lag number of the VAR model.

Lags	LogL	AIC	SC	HQ
0	-52.04075	0.925055	0.9951	0.9535
1	514.6031	-8.447111	-8.1668*	-8.3333
2	524.5774	-8.463486	-7.9730	-8.2643
3	540.3847	-8.577894	-7.8772	-8.2933
4	560.2156	-8.759926*	-7.8491	-8.3900*
5	565.4681	-8.696943	-7.5759	-8.2417
6	573.8948	-8.687308	-7.3561	-8.1468
7	582.8447	-8.686465	-7.1451	-8.0605
8	585.8376	-8.585505	-6.8339	-7.8742

Source: Research data. *, Values indicating the number of necessary lags per criteria.

Table 3. Vector number determination of the JOHANSE-JESELIOUS co-integration vector test – trace test.

Null hypothesis H_0	Alternative hypothesis H_1	Statistic test λ_{trace}	Critical Value (5%)	Conclusion H_0
$R = 0$	$R > 0$	79.0054	29.7971	Reject
$R \leq 1$	$R > 1$	40.7732	15.4947	Reject
$R \leq 2$	$R > 2$	13.9446	3.8415	Reject

Source: Research data.

Table 4. Auto value maximum test.

Null hypothesis H_0	Alternative hypothesis H_1	Statistic test λ_{trace}	Critical value (5%)	Conclusion H_0
$R = 0$	$R = 1$	38.2323	21.1316	Reject
$R = 1$	$R = 2$	26.8286	14.2646	Reject
$R = 2$	$R = 3$	13.9446	3.8415	Reject

Source: Research data.

It could also be observed that the Brazilian exports coefficient value in relation to the exchange rate in the long run was inelastic.

The adjusted coefficient of the exported value in relation to the world income was equal to 0.4972, which indicates that when the exchange rate variable was kept

constant, an increase of 10% in the world income should increase the exported value around 4.972% in the long run.

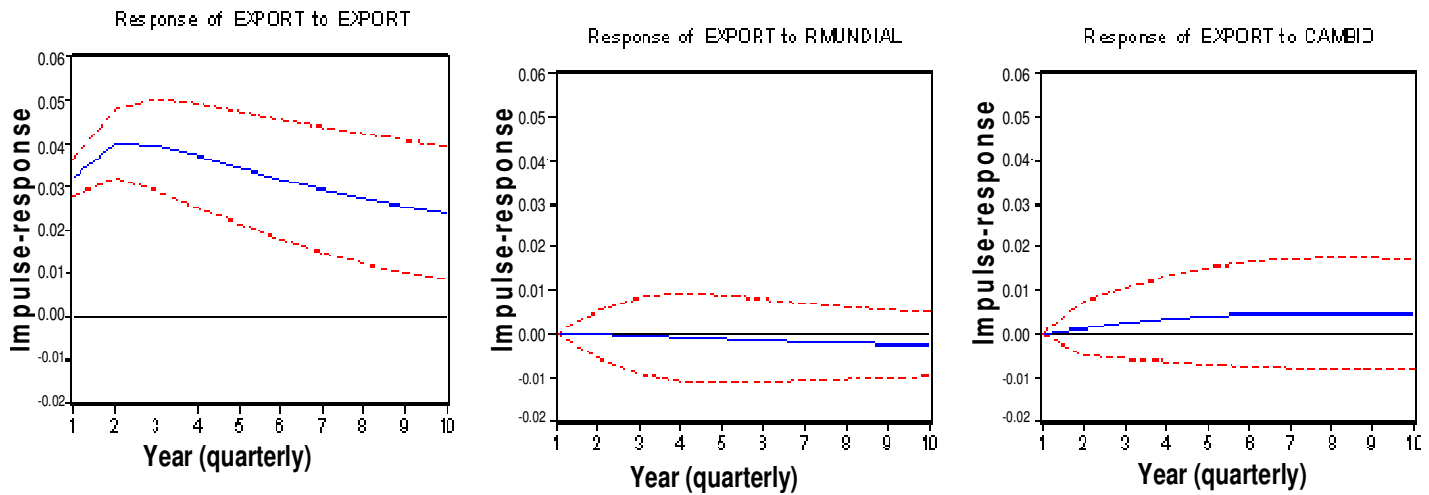
The short run estimated coefficient values show the velocity of the adjustment of the respective variables in the long run equilibrium direction. More specifically, in

Table 5. Short and long run coefficient estimates of the co-integration analysis.

Variable	Short run coefficient (α)	Long run coefficient (β)
Lexport	-0.5118 (0.0810) [-6.318]	1.0000
Lrmundial	0.0062 (0.0013) [4.769]	0.4972 (0.1369) [3.632]*
Lcambio	0.1894 (0.0330) [5.557]	0.5814 (0.2293) [2.536]*

Source: Research data from the EViews 7.0 Statistic Package. *, (standard deviation) and [t statistic].

Response to Cholesky One S.D. Innovations ± 2 S.E.

**Figure 6.** Impulse-answer functions.

face of a transitory equilibrium (short run), a high value for α indicates that a fast adjust velocity in the long run equilibrium direction. Therefore, a small value of α show that the velocity is low and consequently, the change of short run disequilibrium to a long run equilibrium situation would tend to be slowly corrected.

In the short run, the coefficient value of the “agricultural export variable (Lexport)” was equal to 0.5118. Hence, a transitory disequilibrium for this variable was corrected in a velocity of 51.18%, that is, the short run disequilibrium was relatively corrected in a fast manner.

The exchange rate variable showed to be an extremely important determinant of Brazilian agricultural exports. This result is consistent with those presented by studies developed by Barros et al. (2002), Figueredo and Silva (2004), Silva (2009a) and Monte and Brasil (2009).

Answer-impulse function analysis

After the conclusion of the estimation and identification phase of the VAR Model with the error correction, the obtained answer-impulse functions were analyzed to verify majorly the world income and the exchange rate shock impact on the Brazilian agricultural exports value. Figure 6 shows the impact answers of the world income

and the exchange rate on Brazilian agricultural export values. Hence, the first result observed is that a shock in world income implied for the four first quarters in a stationary effect on the export values. After the fourth quarter, the impact becomes negative, persisting on up to the tenth quarter. However, the exchange rate shock resulted in a positive and persistent impact on the Brazilian agricultural export values. In other words, indicating a favorable movement in relation to an exchange rate change, resulting in an increase in exports from the first to the tenth quarter.

Conclusion

The main objective of this paper was to analyze the short and long run fluctuation effects of the world income and the effective real exchange rate on the Brazilian agricultural exports, during the 1980/2011 period (up to the third annual quarter).

The value of the Brazilian agricultural exports coefficient in relation to the exchange rate was inelastic in the long run (0.5814). On the other hand, the exported value adjusted coefficient in relation to the world income was 0.4972, indicating that keeping the exchange rate variable constant, an increase of 10% in the world income

should increase the exported value around 4% in the long run.

The short run analysis revealed that the exchange rate and the world income variables presented short run adjusted coefficients lower than one, which means that a lower adjustment in the long run equilibrium direction of each variable.

The basic conclusion was that Brazilian agricultural exports respond well to the exchange rate and to world income variations. It should be emphasized that world income is exogenous in terms of economic domestic economic policies. In other words, Brazilian policy makers have no way of influencing world income behavior and can only act on the exchange rate policy.

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