



EUROPEAN UNIVERSITY INSTITUTE
DEPARTMENT OF ECONOMICS

EUI Working Paper **ECO** No. 2004 /35

**Potential Welfare Losses for
Financial Autarky and Trade Sanctions**

ALEXIS ANAGNOSTOPOULOS

BADIA FIESOLANA, SAN DOMENICO (FI)

All rights reserved.
No part of this paper may be reproduced in any form
Without permission of the author(s).

©2004 Alexis Anagnostopoulos
Published in Italy in December 2004
European University Institute
Badia Fiesolana
I-50016 San Domenico (FI)
Italy

Potential Welfare Losses from Financial Autarky and Trade Sanctions*

ALEXIS ANAGNOSTOPOULOS[†]

LONDON BUSINESS SCHOOL AND EUROPEAN UNIVERSITY INSTITUTE [‡]

December 7, 2004

ABSTRACT. This paper investigates frictions in the international financial and goods markets and assesses the welfare implications these frictions have. It is found that the reduction in goods trading, which results from the presence of trade costs, significantly reduces consumer welfare compared to the first best where trade is free and costless. By contrast, a complete prohibition of international financial asset trade has a small effect on welfare. This result has important implications for the policies on debt repayment and sovereign default. It implies that an exclusion from international financial markets might not be a sufficient threat to ensure sovereign debt repayment. Instead, a much more potent instrument of enforcement might be a threat of trade sanctions such as tariffs or even a trade embargo.

JEL classification: F41, F34

Keywords: welfare, financial autarky, trade sanctions, business cycles

*I have benefited from comments and suggestions by Wouter DenHaan and Morten Ravn. All errors and omissions are mine.

[†]*Correspondence:* European University Institute, Villa San Paolo, Via della Piazzuola 43, 50133 Florence, Italy. *Email:* alexis.anagnostopoulos@iue.it, *Webpage:* <http://phd.london.edu/aanagnostopoulos>

[‡]I wish to acknowledge financial support by the European Commission, MAPMU network under contract HPRN-CT-2002-00237.

1. INTRODUCTION

This paper focuses on the business cycle properties of the international macro-economy and compares the importance of enhancing cross-country trade in goods vis-a-vis financial market integration. It is found that financial market integration can provide minimal welfare improvement for a wide range of realistic parameter choices. In contrast, a reduction of frictions in goods' trade, modelled as linear transportation costs, can have a substantial positive effect on consumer welfare. The explanation lies in the differing roles that the two markets perform in this context. Specialisation in production of imperfectly substitutable goods implies that foreign goods are demanded at home even in the absence of exogenous disturbances. There is an optimal mix of home and foreign produced goods and this is altered in the presence of transport costs, which essentially increase the price of imports. This is contrasted with the role of financial markets which is to smooth the cycle across time and across states of nature. In the absence of uncertainty, no asset trade takes place. When uncertainty is introduced, financial markets help to smooth the cycle and, given concavity of preferences (risk aversion), improve welfare.

From a policy perspective, the importance of comparing welfare effects of goods versus financial market frictions is twofold. Even though it is commonly accepted that financial integration and free trade are both goals worth pursuing, it is not clear which of the two has a higher impact on consumers and, consequently, which one should be the priority. In this respect, this paper is unambiguous in its recommendation - integration of international financial markets is of secondary importance compared to the promotion of unimpeded international trade of goods. But the findings of this paper have also implications for the manner in which financial integration could be achieved. It is well known that one of the main contributors to financial market incompleteness is the absence of direct mechanisms for the enforcement of sovereign debt repayment. Current enforcement mechanisms can be thought of as 'indirect' in the sense that they attempt to enforce debt repayment by way of a threat of sanctions in case of default. Both in theory and in practice, the sanctions involve reduced access to international financial markets. This has not stopped countries repeatedly defaulting on their debts. In light of the welfare calculations carried out here, this is not surprising since the punishment involved can have only minimal welfare effects on the country under consideration. This paper suggests that a much more potent instrument for the enforcement of debt repayments could be trade sanctions.

Lucas (1987) presented a wide ranging analysis of the importance of business cycle smoothing. His findings have haunted the business cycles literature ever since. He clearly showed that, even if it were possible to remove all cyclical variability, the impact on welfare would be insignificant. This led him to conclude that policy makers should aim at not making serious mistakes that would exacerbate the cycle rather than attempting to fine tune their policies so that they eliminate the remaining variability. A number of researchers¹ have followed Lucas' example and evaluated the welfare importance of risk sharing. Kim, Kim and

¹The following is a non-exhaustive list.

Levin (2003) show that the welfare gains from risk sharing depend crucially on consumer patience and income persistence. Kubler and Schmedders (2001) point out that proper calibration dictates that increased patience should be accompanied by increased income persistence, reflecting the varying assumptions about the length of the period. Using this principle in their calibration, they find that gains are substantial. Note though that their measure of the gains is relative to the overall gains of moving from autarky to full integration. Given Lucas' findings, these substantial *relative* gains are consistent with negligible *absolute* gains measured, for example, as equivalent consumption variations. Tesar (1995) investigates business cycle model predictions under various assumptions. She can generate substantial gains from risk sharing when her model includes an uncertain endowment of non-tradable goods and there is strong complementarity between tradables and non-tradables. Even in this case, when capital accumulation is introduced to the economic setup, gains are substantially reduced. Most striking of all is the result of Cole and Obstfeld (1991), who find that when countries produce differentiated goods, movements in the terms of trade can provide complete insurance endogenously so that the first best can be achieved even under financial autarky². This paper differs from the Cole and Obstfeld setup because it assumes a preference for the home produced good. More importantly, it extends the results in Cole and Obstfeld by considering a model where production is endogenous³.

In the business cycles literature, less attention has been given to the welfare implications of trade frictions. In one of the first open economy business cycle models, Backus, Kehoe and Kydland (1992) briefly considered the effects of introducing transportation costs. Given that their model has a single good, it is not surprising that they find gains from trade to be very small. Goods trade is indistinguishable from asset trade in their specification since its role consists in smoothing consumption. The present study assesses the importance of trade costs in an environment where goods trade arises from complementarity of goods so that trade takes place even in the absence of uncertainty.

The rest of the paper is organised as follows. Section 2 presents the basic model and its variants used in the calculations. Section 3 discusses the different roles played by goods and financial markets and their importance for consumer welfare. Section 4 discusses the quantitative predictions in the presence of uncertainty and, finally, Section 5 concludes.

2. MODEL ECONOMY

The analysis in this section follows closely the one in Backus, Kehoe and Kydland⁴ (1994) with the added feature of iceberg costs of transportation. The world comprises of two countries. Within each country, residents are identical in their

²This extreme result depends on the elasticity of substitution between goods being equal to one. Their experiments with alternative parameterisations show positive but insignificant benefits from financial integration.

³The same model as here was presented by Backus, Kehoe and Kydland (1994) but their focus was on the cyclical behaviour of the terms of trade and the trade balance rather than welfare.

⁴Henceforth BKK.

preferences and in the uncertainty they face. Thus, we treat each country as one (representative) consumer whose aim is to maximize the expected sum of his discounted future utilities. All variables are indexed by country ($i = 1, 2$) and time period ($t = 0, 1, \dots$). The representative household in each country derives utility from consumption, c_{it} , and leisure, l_{it} . The functional form of the period utility is assumed to be of the CRRA family

$$u(c_{it}, l_{it}) = \frac{(c_{it}^\mu l_{it}^{1-\mu})^{1-\gamma} - 1}{1-\gamma} \quad (1)$$

There is a single final good in each country, that is used both for consumption and investment. This final good is produced by the final good firms that operate in a perfectly competitive environment. The inputs to this production are two 'intermediate' goods, a and b , which are combined using a CES technology. So final goods production is given by

$$\begin{aligned} G_1(a_{1t}, b_{1t}) &= [\omega_1 a_{1t}^{\frac{\sigma-1}{\sigma}} + \omega_2 ((1-\tau)b_{1t})^{\frac{\sigma-1}{\sigma}}]^{\frac{\sigma}{\sigma-1}} \\ G_2(a_{2t}, b_{2t}) &= [\omega_2 ((1-\tau)a_{2t})^{\frac{\sigma-1}{\sigma}} + \omega_1 b_{2t}^{\frac{\sigma-1}{\sigma}}]^{\frac{\sigma}{\sigma-1}} \end{aligned}$$

where w_1 and w_2 are weights that determine the steady state level of trade and σ is the elasticity of substitution between the two goods. Intermediate good a (b) is produced by 'intermediate goods firms' in the home (foreign) country. Transportation of these goods from one country to the other is costly and the cost is linear in the amount transported (iceberg cost). This is the role of τ - the transportation cost. For example, the home country buys an amount b_{1t} of the foreign good but only a fraction $(1-\tau)b_{1t}$ actually arrives at its destination and can be used for production. The production of intermediate goods is achieved using a Cobb-Douglas technology that combines labour n_{it} and capital k_{it} . This production is subject to exogenous random productivity disturbances z_{it} in the following manner

$$y_{1t} = e^{z_{1t}} k_{1t}^\theta n_{1t}^{1-\theta} \quad (2a)$$

$$y_{2t} = e^{z_{2t}} k_{2t}^\theta n_{2t}^{1-\theta} \quad (2b)$$

Labour and capital are rented from the consumers at w_t and r_t respectively. Given that this sector is also perfectly competitive, it is straightforward to show that we can equivalently assume that the households are actually the producers of the intermediate goods. That is assumed in what follows. Note that the total amount of good a (b) is split into the part used locally a_{1t} (b_{2t}) and the part exported a_{2t} (b_{1t})

$$y_{1t} = a_{1t} + a_{2t} \quad (3a)$$

$$y_{2t} = b_{2t} + b_{1t} \quad (3b)$$

2.1. Asset Market Structure. Alternative asset market structures can be introduced in the households' budget constraints. In the presence of a complete

set of contingent claims which can be used to insure against all idiosyncratic risk, the households' budget constraints are

$$c_{1t} + i_{1t} + \int_{s \in S} p_t(s) b_{1t}(s) ds = q_{1t}^a y_{1t} + b_{1,t-1} \quad (4a)$$

$$c_{2t} + i_{2t} + \int_{s \in S} p_t(s) b_{2t}(s) ds = q_{2t}^b y_{2t} + b_{2,t-1} \quad (4b)$$

Here, i_{it} denotes investment, q_{it}^a and q_{it}^b are the prices of good a and b respectively in terms of the final good in country i . As mentioned above, the assets $b_{it}(s)$ are contingent claims bought at price p_t that promise one unit of the final good in period $t + 1$ if state $s \in S$ occurs. S is the set of states of nature that is assumed to remain constant across periods. When financial markets are absent the budget constraints reduce to

$$c_{1t} + i_{1t} = q_{1t}^a y_{1t} \quad (5a)$$

$$c_{2t} + i_{2t} = q_{2t}^b y_{2t} \quad (5b)$$

Finally, investment adds to the capital stock according to the standard capital accumulation rule

$$k_{i,t+1} = (1 - d)k_{it} + i_{it} \quad (6)$$

where d is the capital depreciation rate, and the total time endowment is normalised to 1 so that

$$l_{it} + n_{it} = 1 \quad (7)$$

To summarise the workings of the economy under complete markets, the representative household in each country i chooses $\{c_{it}, k_{it}, b_{it}(s)\}_{t=0}^{\infty}$ to maximise

$$E_0 \sum_{t=0}^{\infty} \beta^t u(c_{it}, l_{it})$$

subject to its budget constraint (4), its production technology (2), the capital accumulation rule (6) and the time endowment constraint (7). Under financial autarky, household behaviour is identical except that the choice variables are now only $\{c_{it}, k_{it}\}_{t=0}^{\infty}$ and the appropriate budget constraint is given by (5). Regardless of market structure, firms in each country solve a static maximisation problem, choosing a_{it} and b_{it} so as to maximise profits

$$\max_{\{a_{it}, b_{it}\}} [G_i(a_{it}, b_{it}) - q_{it}^a a_{it} - q_{it}^b b_{it}]$$

Equilibrium prices will be such that final goods markets clear

$$c_{it} + i_{it} = G_i(a_{it}, b_{it}) \quad i = 1, 2$$

and (3) hold so that intermediate goods markets also clear.

In the analysis that follows, three versions of the model economy are used. Model FB (first best) will refer to the economy with frictionless trade in both assets and goods. Model TC (trade costs) assumes perfect financial integration but costly goods trading and Model FA (financial autarky) assumes transport costs are 0 but no financial assets are available for trading.

3. WELFARE CONSIDERATIONS

The models presented in the previous section are concerned with fluctuations around trend. Calibration will further restrict the focus on business cycles fluctuations. Therefore, all measures of welfare refer to the cost of business cycles and abstract from the (important) issue of growth⁵. In this context, the virtue of financial markets lies solely in the possibility these markets provide for reduction of consumption and leisure variability. In other words, financial markets allow households to smooth consumption across time and across states of nature but have no effect on the long run steady state *level* of consumption and leisure. This is not true with regard to the extent of goods markets frictions. The presence of a transportation cost alters the steady state level of exports and imports and, as a result, steady state consumption allocations are also affected. It is instructive to consider what would happen in the present setup if all goods trade was prohibited. The technology used to combine home and foreign produced goods implies some degree of complementarity between these two goods. A prohibition on trade leaves firms only with the home good to be used in production. Depending on the level of complementarity between goods this situation could be disastrous for final goods firms. To see this, consider the limit of final goods production as the imported good tends to 0

$$\begin{aligned} \lim_{b_{1t} \rightarrow 0} [\omega_1 a_{1t}^{\frac{\sigma-1}{\sigma}} + \omega_2 ((1-\tau)b_{1t})^{\frac{\sigma-1}{\sigma}}]^{\frac{\sigma}{\sigma-1}} &= w_1^{\frac{\sigma}{\sigma-1}} a_{1t}, \text{ if } \sigma > 1 \\ &= 0, \quad \text{if } \sigma \leq 1 \end{aligned}$$

If there is sufficient complementarity between the two goods ($\sigma \leq 1$), there can be no production at all. This is an extreme result that should not be taken literally⁶. It merely illustrates the importance of goods trading in the presence of complementarities in production. It is worth remembering that a similar ban on financial asset transactions has relatively minor effects, as shown by Cole and Obstfeld (1991) and more recently, Gourinchas and Jeanne (2003). More plausibly, consider a situation where trade is allowed but is costly. Assume also that there is no uncertainty present, for example productivity is constant and equal to its mean. If the economy starts at its rest point (the non-stochastic steady state), then none of the variables will ever change. Financial markets are redundant (no asset trade is needed) and welfare is unaffected by financial market structure. Transport costs, on the other hand, do have an effect on steady state consumption and leisure and therefore on welfare.

In comparing the welfare effects of financial and trade frictions, I will use the standard measures of welfare, namely compensating variations. When utility is only derived from consumption, these measures are unambiguous. In the current setting, where utility depends on leisure as well as consumption, there are a couple of alternative measures one could use. Focusing on compensating variations, one

⁵Maurice Obstfeld (1994) provides a theoretical framework that links financial markets to growth and evaluates the welfare importance of asset market structure.

⁶This is particularly true in light of the fact, which Cole and Obstfeld (1991) point out, that the case $\sigma < 1$ implies 'immiserizing growth'.

could compute the proportion by which one needs to increase consumption in the suboptimal economy (SE)⁷ so that the welfare is equal to the welfare in the first best. This would be τ_1^{CV} such that

$$E \sum_{t=0}^{\infty} \beta^t u(c_{it}^{FB}, l_{it}^{FB}) = E \sum_{t=0}^{\infty} \beta^t u((1 + \tau_1^{CV})c_{it}^{SE}, l_{it}^{SE})$$

Alternatively, one could compute the proportion by which one needs to reduce both consumption and leisure in the SE

$$E \sum_{t=0}^{\infty} \beta^t u(c_{it}^{FB}, l_{it}^{FB}) = E \sum_{t=0}^{\infty} \beta^t u((1 + \tau_2^{CV})c_{it}^{SE}, (1 + \tau_2^{CV})l_{it}^{SE})$$

Given the choice of utility function in 1, it is not surprising that the first of those measures depends on μ , which determines the elasticity of substitution between consumption and leisure, while the second does not. Letting the unconditional expectation of the value functions under the first best and under the suboptimal economy be denoted by V^{FB} and V^{SE} respectively, the measures are given by⁸

$$\begin{aligned} \tau_1^{CV} &= \left(\frac{V^{FB} + \frac{1}{(1-\beta)(1-\gamma)}}{V^{SE} + \frac{1}{(1-\beta)(1-\gamma)}} \right)^{\frac{1}{\mu(1-\gamma)}} - 1 \\ \tau_2^{CV} &= \left(\frac{V^{FB} + \frac{1}{(1-\beta)(1-\gamma)}}{V^{SE} + \frac{1}{(1-\beta)(1-\gamma)}} \right)^{\frac{1}{1-\gamma}} - 1 \end{aligned}$$

Both of these measures are computed but only τ_1^{CV} is reported in what follows. Obviously, the second measure, τ_2^{CV} , is smaller in magnitude in all models considered but relative welfare magnitudes (welfare in TRC relative to welfare in FA) are practically the same.

4. QUANTITATIVE RESULTS

4.1. Calibration and numerical solution. I fix parameters to match the calibration of BKK(1994), so a period should be thought of as one quarter. Thus the discount factor is set at $\beta = 0.99$, which corresponds to a quarterly interest rate of approximately 1%. The depreciation rate is set to $d = 0.025$ and the share of capital in total income is set to $\alpha = 0.36$. The utility parameter μ determines the steady state level of labour. It is set equal to $\mu = 0.34$, which implies that approximately 1/3 of time is devoted to market activities. Risk aversion, γ , is set equal to 1 so that utility is logarithmic. These five parameters are left unchanged

⁷Model TC or Model FA.

⁸When $\sigma = 1$ utility is logarithmic and the corresponding expressions are

$$\begin{aligned} \tau_1^{CV} &= \exp \left(\frac{(1-\beta)}{\mu} (V^{FB} - V^{SE}) \right) - 1 \\ \tau_2^{CV} &= \exp ((1-\beta)(V^{FB} - V^{SE})) - 1 \end{aligned}$$

throughout the experiments⁹. The elasticity of substitution between goods, σ , is set to $3/2$, but will be allowed to vary subsequently. Finally, whenever there are no trade frictions ($\tau = 0$), the constants w_1 and w_2 in the Armington aggregator are set so that, at steady state, 85% of home production (of the intermediate good) is used by final good firms at home and 15% is exported. The same values for these constants are used in the economies with trade frictions, where they obviously imply a smaller level of imports/exports. The rationale of the calibration is thus as follows: We assume financial and goods markets are fully integrated and calibrate our model to match long run means of the observed variables. Then, the effect of an introduction of transportation costs (or the closure of international financial markets) is assessed. Mazzenga and Ravn (2002) estimated that mean transport costs were 10% in 1994. As they point out, this is likely to be an underestimate of the total cost of trade since it excludes administration costs, informational costs and tariffs. On the other hand, transportation costs are found to be decreasing over time. Consequently, I use a 10% trade cost in the benchmark parameterisation but also consider the effects of lower (5%) and higher (20% and 30%) costs.

The exogenous productivity shocks, z_{it} , are assumed to be normally distributed, following a bivariate $VAR(1)$ process given by

$$\begin{bmatrix} z_{1t} \\ z_{2t} \end{bmatrix} = A \begin{bmatrix} z_{1t-1} \\ z_{2t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix}$$

where $A = \begin{pmatrix} 0.906 & 0.088 \\ 0.088 & 0.906 \end{pmatrix}$, $Var(\varepsilon_{1t}) = Var(\varepsilon_{2t}) = 0.00852^2$ and $Corr(\varepsilon_{1t}, \varepsilon_{2t}) = 0.258$.¹⁰

The numerical procedure used to obtain solutions for all economies is a version of the Parameterized Expectations Algorithm (PEA) explained in DenHaan and Marcet (1990). Thus the functions approximated by the numerical algorithm are the expectations appearing in the first order conditions. These are estimated as exponentiated log polynomials. The value function is specified as a polynomial in the logarithms of the state variables. Once the rational expectations equilibrium has been computed, simulated data are used to compute the unconditional expectation of the value function.

4.2. Welfare comparison. Table 1 reports welfare measures for the trade cost and financial autarky economies. The welfare measure is compensating variation (τ_1^{CV}) and it is computed for a range of values for the elasticity of substitution between goods (σ) and for trade cost (τ). In the benchmark parameterization, the elasticity of substitution between goods is 1.5 and trade costs are at 10%. This case is reported in the fifth row, second column of Table 1. It is found that consumption has to be increased by 2.64% to make agents as well off as under the first best. The corresponding value of the compensating variation measure for the financial autarky economy is 0.002%. Thus the effect of a ten percent trade cost on average

⁹A previous version of the paper considered also the effects of changing γ which provided no significant additional insights.

¹⁰These are taken from Backus, Kehoe and Kydland (1994).

consumption is several orders of magnitude larger than the effect of a complete closure of international financial markets. This huge difference is true throughout parameterizations and remains true even in the case of low trade costs (5%). The magnitude of the difference is striking given the nature of frictions that are being considered. Whereas in the goods market an empirically plausible level of friction is assumed, in the financial market the assumption is one of extreme friction - namely total absence of financial markets.

Predictably, welfare costs are increasing in the level of trade costs. Also, the higher the substitutability between goods, the lower are the effects of trade costs on welfare. When it is relatively easy to substitute between goods, then an increase in trade frictions prompts agents to substitute heavily towards the home produced good and this is achieved with little welfare loss. Conversely, when the goods are close to complementary, agents cannot respond to the increase in the trading friction by reducing imports without incurring heavy welfare losses. The extreme case of perfect substitutability is considered in BKK(1992). In that case, the role of goods markets reduce to pure consumption smoothing and trade costs have relatively small effects. Note that, even though increasing the elasticity reduces the welfare costs, the rate of this reduction is decreasing (see Figure 1). In other words, the degree of substitutability would have to be raised to unrealistically high levels to obtain something similar to the result in BKK (1992). Related to this point is the observation that elasticity has little effect on welfare losses for small level of trade costs where the compensating variation is moderate (first column of Table 1). But when costs are high, then the degree of complementarity is crucial for determining the welfare importance of the friction (fourth column of Table 1).

One last observation referring to the effect of the elasticity of substitution on welfare under financial autarky. Cole and Obstfeld (1991) find that welfare costs are increasing in this parameter (for $\sigma \geq 1$). Interestingly, the relationship here is non-monotonic (last column of Table 1). In particular, welfare costs do not tend to 0 as $\sigma \rightarrow 1$. There are two differences between the financial autarky model considered here and the one in their paper. First, I am assuming preference for the home produced good in each country whereas they assume one of the two goods is preferred in both countries (same good across countries). Second, theirs is an endowment economy whereas here production is endogenous - there is the added feature of investment dynamics and labour choice. It is straightforward to show that their result of perfect risk sharing holds also under the assumption of home preference. Thus it is necessarily the second feature that produces this deviation from full risk sharing even when $\sigma = 1$. Further work is needed in order to clarify the mechanism at work.

5. CONCLUSION

A lot of research has been conducted on the welfare importance of financial markets. In contrast there is little theoretical evidence on the welfare importance of goods markets. This paper attempted to fill this gap. A two-country general equilibrium model was set up and calibrated and the effects of the introduction of trade frictions were assessed. It was found that transportation costs of the magnitude observed in practice have a highly detrimental effect on consumer wel-

fare. The worst case of financial frictions, namely a complete closure of financial markets, was then studied and its effects on welfare was compared to the trade cost effects. It was found that trade frictions result in welfare losses of far greater magnitude than those arising out of international financial market segmentation. This finding suggests that policies aimed at promoting free trade should be given priority over policies focusing on the integration of financial markets. In addition, it suggests that trade sanctions would be more effective in ensuring sovereign debt repayments than financial sanctions.

REFERENCES

1. Backus, D. , Kehoe, P. and Kydland, F. "International Real Business Cycles". The Journal of Political Economy, August 1992, 100(4).
2. Backus, D. , Kehoe, P. and Kydland, F. "Dynamics of the Trade Balance and the Terms of Trade: The J-Curve?". American Economic Review, March 1994, 84 (1).
3. Cole, H. and Obstfeld, M. "Commodity Trade and International Risk Sharing: How Much Do Financial Markets Matter?". Journal of Monetary Economics, August 1991, 28(1), pp. 3-24.
4. Den Haan, W. and Marcet, A. "Solving the Stochastic Growth Model by Parameterising Expectations". Journal of Business and Economic Statistics, January 1990, 8(1).
5. Gourinchas, P.-O. and Jeanne, O. "The Elusive Gains from International Financial Integration". CEPR Discussion Papers 3902, 2003.
6. Lucas, R. E., Jr. "Models of Business Cycles". Yrjo Jahnsson Lectures series London and New York: Blackwell, 1987.
7. Kim, J., Kim, S. H. and Levin, A. "Patience, Persistence and Welfare Costs of Incomplete Markets in Open Economies". Journal of International Economics, December 2003, v. 61, iss. 2, pp. 385-96.
8. Kubler, F. and Schmedders, K. "Incomplete Markets, Transitory Shocks and Welfare". Review of Economic Dynamics, October 2001, v. 4, iss. 4, pp. 747-66.
9. Mazzenga, E. and Ravn, M. O. "International Business Cycles: The Quantitative Effect of Transportation Costs", June 2002.
10. Obstfeld, M. "Risk-Taking, Global Diversification, and Growth". American Economic Review, December 1994, 84(5).
11. Tesar, L. "Evaluating the Gains from International Risksharing". Carnegie-Rochester Conference Series on Public Policy, June 1995, v.42, iss. 0, pp. 95-143.

		Compensating Variations (% Consumption)				
		Model TRC				Model FA
trade cost		0.05	0.1	0.2	0.3	0
elasticity						
4		1.22	2.36	4.37	6.02	0.0031
3		1.25	2.47	4.80	6.95	0.0025
2.5		1.27	2.53	5.03	7.49	0.0022
2		1.28	2.59	5.28	8.09	0.0019
1.5		1.29	2.64	5.54	8.74	0.0021
1.428571		1.30	2.65	5.58	8.84	0.0023
1.25		1.30	2.67	5.68	9.09	0.0028
1		1.31	2.70	5.82	9.46	0.0046

Table 1: Values reported are compensating variations (τ_1^{CV}) for the economy with trade costs (Model TRC) and the financial autarky economy (Model FA).

