

Nuno Carlos Leitão¹

LONG-TERM EFFECTS IN INTRA-INDUSTRY TRADE

This study examines the long-term effects of IIT and its components – horizontal (HIIT) and vertical intra-industry trade (VIIT), applied to the study case of the United States. Using the panel data approach, the results show a negative correlation between endowments and intra-industry trade. These results indicate that intra-industry trade occurs more frequently among countries that are similar in terms of factor endowments. The findings support the thesis that there is no positive statistical association between HIIT and HO (Heckscher-Ohlin) variables. Our results also confirm the hypothesis that trade increases if transportation costs decrease.

Keywords: horizontal and vertical intra-industry trade; United States; comparative advantages.

Нуно Карлос Леітао

ДОВГОСТРОКОВИЙ ВПЛИВ ВНУТРІШНЬОГАЛУЗЕВОЇ ТОРГІВЛІ

У статті досліджується довгостроковий вплив внутрішньогалузевої торгівлі та її складових – горизонтальної та вертикальної внутрішньогалузевої торгівлі – на прикладі США. Використано метод панельних даних, за результатами виявлено негативну кореляцію між капіталом та внутрішньогалузевою торгівлею. Результати вказують на те, що внутрішньогалузева торгівля відбувається частіше між країнами, що є рівнозабезпеченими ресурсами. Також доведено гіпотезу про те, що між горизонтальною внутрішньогалузевою торгівлею та змінними Хекшера-Оліна немає статистично значущого позитивного зв'язку. Результати також підтверджують, що торговельний оборот зростає при зменшенні витрат на транспортування.

Ключові слова: горизонтальна та вертикальна внутрішньогалузева торгівля; США; конкурентні переваги.

Табл. 1. Форм. 7. Літ. 36.

Нуно Карлос Леітао

ДОЛГОСРОЧНОЕ ВЛИЯНИЕ ВНУТРИОТРАСЛЕВОЙ ТОРГОВЛИ

В статье исследуется долгосрочное влияние внутриотраслевой торговли и ее составляющих – горизонтальной и вертикальной внутриотраслевой торговли – на примере США. Использован метод панельных данных, результаты выявили негативную корреляцию между капиталом и внутриотраслевой торговлей. Результаты указывают, что внутриотраслевая торговля чаще происходит между странами, равнообеспеченными ресурсами. Также доказана гипотеза о том, что между горизонтальной внутриотраслевой торговлей и переменными Хекшера-Олина не существует статистически значимой позитивной связи. Результаты также подтверждают, что торговый оборот растет при уменьшении расходов на транспорт.

Ключевые слова: горизонтальная и вертикальная внутриотраслевая торговля; США; конкурентные преимущества.

Introduction. This article examines the intra-industry trade (IIT), horizontal and vertical intra-industry trade of United States with trade partners of NAFTA, European Union and ASEAN over the period of 1995-2008, using a dynamic panel data analysis (GMM-system estimator).

¹ Polytechnic Institute of Santarém, ESGTS, Portugal.

The intra-industry trade has been gaining "fans" in academia since the publication of Grubel and Lloyd (1975). The evolution and development of literature permit to reflect on IIT in new areas such as its extension to the marginal intra-industry trade, the New Geography models, migration and fragmentation.

The main objective of this study is to explain the long-term effects of IIT and its components – horizontal (HIIT) and vertical intra-industry trade (VIIT).

This paper presents 2 contributions. First, we use the GMM-system estimator because we intend to evaluate the long-term effects. Second, we use the Kandogan's methodology; this method is rather new in literature.

As far as we know, dynamic panel data analysis has not been used in the empirical studies of the U.S. intra-industry trade. However, it is important to refer that in 2007 Faustino and Leitão used the same methodology applied to Portugal.

Most empirical studies of IIT use static panel (Pooled OLS, fixed effects (FE) and random-effects). These estimators have problems of serial correlation, heteroskedasticity and endogeneity of some explanatory variables.

The structure of the paper is as follows. The next section presents the literature overview and development of hypothesis. In section 3 we present the methodology. Section 4 shows the econometric model. The final section provides conclusions.

Theoretical background and development of hypothesis. We begin this section by defining the concept of intra-industry trade. We also present a survey of theoretical models and mention some of the recent empirical studies. Subsequently we present the hypothesis to be tested by an econometric model.

The intra-industry trade (IIT) or two-way trade is defined as simultaneous exports and imports of a product within a country or a particular industry. Greenaway, Hilner and Milner (1994) and Abd-El-Rahaman (1991) introduced types of its differentiation (horizontal and vertical). Horizontal intra-industry trade (HIIT) occurs within similar products. In other words, the products are differentiated by attributes. VIIT intra-industry trade (VIIT) is explained by different quality of products (high and low quality).

The pioneering models of Krugman (1979) and Lancaster (1980) consider a monopolistic competition with increasing returns to scale to explain the IIT. Helpman and Krugman (1985) synthesized these type models called Chamberlin – Heckscher-Ohlin. These models combine monopolistic competition and the theory of Heckscher-Ohlin (differences in factor endowments and horizontal product differentiation). In vertical intra-industry trade we can refer to the contributions of Falvey and Kierzkowski (1987) and Shaked and Sutton (1984).

Falvey and Kierzkowski (1987) followed Linder (1961) theory. The authors consider that vertical differentiation could be explained by the differences between per capita incomes. Falvey and Kierzkowski (1987) concluded that countries which are capital abundant have higher productivity and higher wages.

In the Shaked and Sutton's article (1984) trade is studied in the context of a natural oligopoly, vertical product differentiation. The IIT is explained by different varieties of quality products (differences in income distribution: lower income country specializing in lower quality products, higher income specializing in quality products).

There are numerous empirical studies of intra-industry trade. We list the recent research on the topic: Faustino and Leitão, 2007; Türkcan and Ates, 2010; Yoshida et al., 2009; Zhang and Clark, 2009; Chang, 2009; Leitão et al., 2010.

Faustino and Leitão (2007) examine features and determinants of IIT, HIIT and VIIT between Portugal and EU15 using static and dynamic panel data analysis. The findings indicate that Portuguese VIIT increased significantly, that there is evidence supporting the explanation of VIIT by Heckscher-Ohlin (HO) theory. Portugal has comparative advantages in the low-quality differentiated products.

The study of Türkcan and Ates (2010) shows that VIIT is an important indicator for international fragmentation of production. The authors demonstrated that outsourcing has become an essential part of the U.S autoindustry.

Yoshida et al. (2009) analyse IIT development between Japan and 31 European countries. The authors find that IIT between European countries and Japan increases with their corresponding Japanese FDI, especially for new EU member countries, being important to measure a wider range of quality based on relative prices.

Zhang and Clark (2009) investigate HIIT and VIIT for the case of United States. This study uses both industry and country specific characteristics as explanatory variables. The study of Zhang and Clark (2009) show that HIIT will have relatively low factor adjustment costs when compared with the VIIT. The results support the new trade theories and the traditional theory (Heckscher-Ohlin model).

Chang (2009) examines the main factors of HIIT and VIIT including investment approaches of a firm in the industry of information technology at Asian, European and US markets. The results indicate that vertical intra-industry trade is playing a significant role at Asian and European markets while horizontal intra-industry trade is significant in Asia and the US.

The study of Leitão et al. (2010) analyses vertical intra-industry trade (VIIT) within Portugal's automobile parts and components industry. Leitão et al. (2010) add new empirical evidence on the international fragmentation of the production process. As trade partner countries, the authors choose the EU countries, the BRICS, and the US during the period from 1995 to 2005. According to the authors, automobile production in each country promotes higher VIIT of auto parts.

Hypothesis. Hypothesis 1: IIT and HIIT predominate between countries that are similar in terms of factor endowments.

Hypothesis 1(a): VIIT predominate among countries that are dissimilar in terms of factor endowments.

According to the literature the expected sign for the variable difference of income per capita is negative in the models of IIT and HIIT (Hummels and Levinshon, 1995, Chemspriong et al. 2009, Brulhart, 2009, and Leitão and Faustino, 2009) and positive in model VIIT (Greenaway et al.1994). The recent studies of Türkcan and Ates (2010), and Leitão et al. (2010) found a positive correlation between the variable difference of income per capita and VIIT. It should be mentioned that the recent study by Zhang and Clark (2009) found a negative relationship in the model of VIIT for the case study of North America.

Hypothesis 2: There is a positive relationship between lowest value of GDP per capita and IIT (HIIT and VIIT).

This variable is included to control for relative size effects. According to Helpman (1987) and Hummels and Levinsohn (1995), a positive sign is expected, which is consistent with the hypothesis of a positive correlation between the share of IIT (HIIT, VIIT) and dissimilarity in per capita GDP. The study of Yoshida et al. (2009) confirms this hypothesis.

Hypothesis 3: There is a negative relationship between highest value of GDP per capita and IIT (HIIT and VIIT).

This variable is also introduced to control for relative size effects. A negative sign is expected (Helpman, 1987, Hummels and Levinsohn, 1995, and Greenaway et al., 1994). The negative sign is consistent with the hypothesis of similarity between the countries. Leitão and Faustino (2008) found a negative correlation between highest value of GDP and IIT.

Hypothesis 4: There is a positive relationship between comparative advantages (inter-industry trade) and VIIT.

Following the literature (Grubel and Lloyd, 1975, and Kandogan, 2003, Lloyd, 2004) we expected a negative sign to IIT and HIIT models, and positive to VIIT model.

Hypothesis 5: Trade increases when partners are geographically close.

Balassa and Bauwens (1987) argue that IIT (HIIT) will be greater when trading partners are geographically close. There is a negative relationship between the share of IIT and geographical distance. Hummels and Levinsohn (1995) found a negative sign. Zhan and Clark (2009) also found a negative sign for the U.S case. The studies of Bandinger and Breuss (2008), and Brulhart (2009) also found a negative correlation between geographical distance and trade.

Hypothesis 6: The foreign direct investment influences the volume of trade.

Gray (1988) considers an ambiguous relationship between FDI and IIT. Greenaway, Hine, and Milner (1994) had a positive sign for the coefficient of this variable. Markusen (1984) considers that IIT, HIIT and VIIT shares will be positively associated with a trading partner's FDI inflows. The study of Leitão and Faustino (2008) demonstrates that FDI and IIT are complementary.

Methodology. It is usual to use the empirical studies using the unit prices of exports and imports to calculate HIIT and VIIT. This criterion was developed by Greenaway, Hine, and Milner (1994) and Abd-el-Rahman (1991). This technique has been criticized by several authors.

Most studies show that vertical intra-industry trade is inflated, when using the criterion of Greenaway et al. (1994).

The present study uses the methodology of Kandogan (2003) for separating IIT into its components (HIIT and VIIT). Grubel and Lloyd (1975) show that products are similar in HIIT and products with different types of quality are VIIT. A large part of total trade (TT) in industry is inter-industry trade (INT). Kandogan's methodology is summarized below:

$$TT_i = X_i + M_i \tag{1}$$

$$IIT_i = TT_i - |X_i - M_i| \tag{2}$$

$$INT_i = TT_i - IIT_i \tag{3}$$

$$HIIT_i = \sum (X_{ik} + M_{ik} - |X_{ik} - M_{ik}|) \tag{4}$$

$$VIIT_i = IIT_i - HIIT_i \tag{5}$$

Data collection and analysis. Intra-industry trade, vertical and horizontal intra-industry trade between United States and NAFTA, European Union and ASEAN for

the period between 1995 and 2008 are constructed from the OECD at the five-digit level of the Standard International Trade classification (SITC) in USD. Other explanatory variables are taken from World Development Indicators of the World Bank.

The estimator used (GMM-SYS) allows researchers solve the problems of serial correlation, heteroskedasticity and endogeneity for some explanatory variables. These econometric problems were resolved by Arellano and Bond (1991) Arellano and Bover (1995) and Blundell and Bond (1998, 2000), who developed the first-differenced GMM (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first-differenced and levels equations. The GMM-SYS estimator is an alternative to the standard first-differenced GMM estimator.

To estimate the dynamic model, we applied the methodology of Blundell and Bond (1998, 2000), and Windmeijer (2005) to small sample correction to have corrected standard errors of Blundell and Bond (1998, 2000). The GMM system estimator that we report was computed using DPD for OX (Doornik et al., 2002).

The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m2 statistics). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.

Explanatory Variables. Economic differences between countries (DGDP): this is difference in GDP (PPP, in current international dollars) between U.S. and a partner country:

$$|GDP^{U.S.} - GDP^{partner}|.$$

MinGDP: this is the lowest value of GDP per capita (PPP, in current international dollars) between U.S. and a partner country:

$$\text{Min}(GDP^{U.S.}, GDP^{partner}).$$

MaxGDP: this is the higher/highest value of GDP per capita (PPP, in current international dollars) between U.S. and a partner country:

$$\text{Max}(GDP^{U.S.}, GDP^{partner}).$$

INT: this is inter-industry trade, this proxy explains the comparative advantages.

DISTxDGDP: this is geographical distance multiplied by the DGDP between the U.S. and a partner country.

FDI is the foreign direct investment inflows.

Model Specification

$$y_{it} = \beta_0 + \beta_1 X_{it} + \delta t + \eta_i + \varepsilon_{it}, \quad (6)$$

where y_{it} is the intra-industry trade (IIT_{it}) horizontal IIT ($HIIT_{it}$) and vertical IIT ($VIIT_{it}$), X is the set of explanatory variables. All variables are in the logarithm form; η_i is the unobserved time-invariant specific effects; δt captures a common deterministic trend; ε_{it} is a random disturbance assumed to be normal, and identical distributed (IID) with $E(\varepsilon_{it}) = 0$; $\text{Var}(\varepsilon_{it}) = \sigma^2 > 0$.

The model can be rewritten in the following dynamic representation:

$$y_{it} = \rho y_{it-1} + \beta_1 X_{it} - \rho \beta_1 X_{it-1} + \delta t + \eta_i + \varepsilon_{it}. \quad (7)$$

Empirical results. In Table 1 we can observe the determinants of IIT, HIIT, and VIIT using GMM-system estimator. The models present consistent estimates, with no serial correlation (m1, m2 statistics). The specification Sargan test shows that there are no problems with the validity of instruments used. The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m2 statistics). The dynamic panel data are valid. We used the criterion of Windmeijer (2005) to small sample correction.

Table 1: GMM-system estimates

| Variables | IIT | HIIT | VIIT |
|-----------------------------------|-------------------|-------------------|-----------------|
| | Coefficient | Coefficient | Coefficient |
| Log(IIT;HIIT;VIIT) _{t-1} | 0.104 (7.06)*** | 0.193 (3.69)*** | 0.138 (8.50)*** |
| LogDGDP | -0.062 (-8.07)*** | -0.058 (-4.76)*** | 0.052 (13.9)*** |
| LogMinGDP | 0.060 (8.65)*** | 0.053 (4.77)*** | 0.053 (16.5)*** |
| LogMaxGDP | 0.035 (5.77)*** | 0.028 (2.42)** | 0.052 (6.85)*** |
| LogFDI | 0.076 (10.6)*** | 0.106 (5.02)*** | 0.031 (1.13) |
| LogINT | -0.053 (-5.09)*** | -0.017 (-0.558) | 0.148 (9.75)*** |
| LogDISTxDGDP | -0.251 (-8.08)*** | -0.233 (-4.75)*** | 0.211 (14.0)*** |
| C | -1.476 (-1.42) | -2.562 (-0.185) | 0.02 (1.36) |
| M1 | -1.321 [0.186] | -0.6754 [0.499] | -1.639 [0.101] |
| M2 | 0.2835 [0.777] | -0.1636 [0.870] | -0.8042 [0.421] |
| Sargan | 2.206 [1.000] | -2.549 [1.000] | -1.851 [1.000] |
| | Df=263 | Df=263 | Df=263 |
| Observations | 234 | 234 | 234 |

T-statistics (heteroskedasticity corrected) are in round brackets. The null hypothesis that each coefficient is equal to zero, is tested using second-step robust standard error. T-statistics (heteroskedasticity corrected) are in round brackets. ***indicates statistically significance, respectively at the 1% level.

P-values are in square brackets. Year dummies are included in all specifications (this is equivalent to transforming the variables into deviations from time means, i.e. the mean across the 14 countries for each period). M1 and M2 are tests for first and second-order.

The IIT model presents all significant variables (LogIIT_{t-1}, LogDGDP, LogMinGDP, LogMaxGDP, LogFDI, LINT, and LogDISTxDGDP). The instruments in levels used are LogIIT_{t-1}(3,8), LogDGDP (3,8), LogINT(3,8) for first differences. For levels equations, the instruments used are first differences all variables t-2. The results confirming the theoretical forecast proposed by the literature with exception the lowest value of GDP per capita (LogMinGDP). Our results show that United States IIT is negatively correlated with factor endowment (LogDGDP).

According to the theoretical model (Linder, 1961) we can conclude that countries which have similar demands will trade similar products. The study of Türkcan and Ates (2010), and Brulhart (2009) also found a negative sign. The recent studies of Ferto and Soós (2008), and Leitão and Faustino (2009) found a positive sign.

Our model of IIT also shows that inter-industry (LogINTER) is negatively correlated with IIT, this result is in accord with Grubel and Lloyd (1975), and Lloyd (2004).

A negative effect of the geographical distance (LogDISTXDGDP) on bilateral IIT was expected and the results confirm this, underlining the importance of neighbour partnerships for all trade. Zhan and Clark (2009), Brulhart (2009) also found a negative sign for this.

The HIIT model presents 6 significant variables (LogHIIT_{t-1}, LogDGDP, LogMinGDP, LogMaxGDP, LogFDI, and LogDISTxDGDP). The instruments in levels used are LogHIIT_{t-1}(3,8), LogDGDP (3,8), LogINT(3,8) for first differences. For levels equations, the instruments used are first differences all variables t-2. The lagged dependent variable is positive. The results reinforce the previous estimates. Once again we find the expected results in the literature.

For the model of VIIT all explanatory variables are significant at the 1% level (LogVIIT_{t-1}, LogDGDP, LogMinGDP, LogMaxGDP, LogINT, and LogDISTxDGDP), with exception of FDI. The instruments in levels used are LogVIIT_{t-1}(3,8), LogDGDP (3,8), LogINT(3,8) for first differences. For levels equations, the instruments are used all variables t-2 for first differences.

The difference between per capita incomes, in logs (LogDGDP) presents a positive sign. This result is according to literature (Gross and Helpman 2005; Kimura et al., 2007, and Wakasugi, 2007. Our findings suggest that VIIT predominate between countries with different factor endowments. Türkcan and Ates (2010) found a positive correlation for Turkish VIIT.

Following the empirical model of Helpman and Krugman (1985) and Hummels and Levinsohn (1995), the study also includes 2 variables to control the relative size effects. The variables are statically significant, but only the lower value of GDP (LogMinGDP) has an expected sign.

The positive influence of inter-industry trade (LogINT) on IIT is confirmed. Grubel and Lloyd (1975), Kandogan (2003), Lloyd (2004) suggest a positive sign for VIIT model.

The geographical distance (LogDISTxDGDP) presents a negative correlation confirming the results of Chemspriong et al. (2009), Bandiger and Breuss (2008), Kimura et al. (2007), and Clark (2006).

Conclusions. The main objective of this study was to analyze long-term effect of IIT and its components – horizontal (HIIT) and vertical (VIIT) intra-industry trade. For this the manuscript examined the intra-industry trade (IIT), horizontal and vertical intra-industry trade of the US with trade partners of NAFTA, European Union and ASEAN over the period of 1995-2008, using a dynamic panel data analysis (GMM-system estimator).

The variable (LogDGDP) used to evaluate the relative factor endowments shows that IIT and HIIT occurs more frequently among countries that are similar in terms of factor endowment.

Our results also show that the VIIT is explained by different factor endowments.

The variable of foreign direct investment (FDI) is according to the dominant paradigm, i.e, there is a positive relationship between FDI and IIT. The results show that FDI and trade are complementary.

The variable (LogINT) is used to analyse the inter-industry trade (Grubel and Lloyd 1975, and Kandogan, 2003) according to the literature. Vertical IIT is explained by comparative advantages; i.e there is a positive relationship between INT and vertical IIT (Lloyd, 2004). This is in accordance with the neo-Heckscher-Ohlin trade theory, which also explains VIIT by comparative advantages.

The literature attributes a negative sign to geographical distance, i.e. trade increases if partners are geographically close. Our findings support this hypothesis.

The study has however some limitations. In the future we need to include other control variables such as economic freedom, cultural similarity and globalization.

References:

Abd-el-Rahman, K. (1991). Firms' Competitive and National Comparative Advantages as Joint Determinants of Trade Composition, *Weltwirtschaftliches Archiv*, 127, (1): 83-97.

Arellano, M. and Bond, S. (1991). Some Test of Specification for Panel Data: Monte Carlo Evidence and An Application to Employment Equations, *Review of Economic Studies*, 58: 277-297.

Arellano, M. and Bover, O. (1995). Another Look at Instrumental Variable Estimation of Error-Components Models, *Journal of Econometrics*, 68: 29-51.

Balassa, B. and Bauwens, L. (1987). Intra-Industry Trade Specialization in a Multi-Country and Multi-Industry Framework, *Economic Journal* 97, (388): 923-939.

Badinger, H. and Breuss, F. (2008). Trade and productivity: an industry perspective. *Empirica*, 35 (2): 213-231.

Brulhart, M. (2009). An Account of Global Intra-Industry Trade 1962-2006, *The World Economy* 32, (3): 401-459.

Blundell, R. and Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models, *Journal of Econometrics Review*, 87, 115:143.

Blundell, R. and Bond, S. (2000). GMM Estimation with Persistent Panel Data: An Application to Production Functions, *Econometrics Review*, 19, 321: 340.

Clark, D. (2006). Country and industry-level determinants of vertical specialization based trade, *International Economic Journal*, 2: 211-225.

Chang, S.C. (2009). Horizontal and Vertical Intra-industry Trade and Firm's Investment Strategies: Evidence from the IT Industry in the Asian, EU and US Markets, *Global Economic Review*, 38, 63-76.

Chemsripong, S., Agola, F. and Lee, J. (2009). Regional Integration and Intra-industry Trade in Manufactures between Thailand and Other Countries, *The Singapore Economic Review*, 54(1): 135-148.

Doornik, J., Arellano, M., & Bond, S. (2002). Panel data estimation using DPD for OX. (<http://www.nuff.ox.ac.uk/Users/Doornik>).

Falvey, R.E., and Kierzkowski, H. (1987). Product Quality, Intra-Industry Trade and (Im)perfect Competition. In: H. Kierzkowski (eds), *Protection and Competition in International Trade*, Oxford, UK: Basil Blackwell.

Faustino, H.C. and Leitão, N.C. (2007). Intra-Industry Trade: A Static and Dynamic Panel Data Analysis, *International Advances in Economic Research*, 13, 3: 313-333.

Gray, H. (1988). Intra-Industry Trade: An Untidy Phenomenon, *Weltwirtschaftliches Archiv*, 124: 17-134.

Greenway, D., Hine, R. and Milner, C. (1994). Country specific factors and the pattern of horizontal and vertical intra-industry trade in UK, *Review of World Economic*, 130 (1): 77 100.

Grubel, H. and Lloyd, P. (1975). Intra-industry trade: the theory and measurement of international trade in different products, London: Macmillan.

Gross M. and E. Helpman. (2005). Outsourcing in a Global Economy, *Review of Economic Studies*, 72: 135-159.

Helpman, E. (1987). Imperfect Competition and International Trade: Evidence from Fourteen Industrial Countries. *Journal of the Japanese and International Economies*, 1: 62-81.

Helpman, E., Krugman, P. (1985). *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy*, 1st ed; London : MIT Press.

Hummels, D. and Levinsohn, J. (1995). Monopolistic competition and international trade: reconsidering the evidence, *Quarterly Journal of Economics*, 110(3): 799 836.

Kandogan, Y. (2003). Intra-Industry Trade of Transition Countries: Trends and Determinants, *Emerging Markets Review*, 4(3): 272-286.

Krugman, P. (1979). Increasing returns, monopolistic competition and international trade, *Journal of International Economics*, 9 (4): 469 479.

Kimura, F., Takahashi, Y., & Hayakawa, K. (2007). Fragmentation and parts and components trade: Comparison between East Asia and Europe. *North American Journal of Economics and Finance*, 18, 23-40.

Lancaster, K. (1980). Intra-industry trade under perfect monopolistic competition, *Journal of International Economics*, 10(2): 151 175.

Leitão, N.C. and Faustino, H. (2008). Intra-industry Trade in the Food Processing Sector: The Portuguese Case, *Journal of Global Business and Technology*, 4 (1): 49-58.

- Leitão, N.C., and Faustino, H.* (2009). Intra-industry Trade in the Automobile Components Industry: An Empirical Analysis, *Journal of Global Business and Technology*, 5 (1): 32-41.
- Leitão, N. C., Faustino, H., and Yoshida, Y.* (2010). Fragmentation, Vertical Intra-Industry Trade, and Automobile Components, *Economics Bulletin*, 30(2): 1006-1015.
- Linder, S.B.* (1961). *An Essay on Trade and Transformation*, New York: John Wiley.
- Lloyd, P.* (2004). How Intra-Industry Trade Changed Our Perception of the World Economy, *The Singapore Economic Review*, 49(11): 1-17.
- Markusen, J. R.* (1994). Multinational Multiplant Economies and the Gains from Trade, *Journal of International Economics*, 16 (3, 4): 205-226.
- Shaked, A. and Sutton, J.* (1984). Natural oligopolies and international trade. In: H. Kierzkowski (eds.). *Monopolistic competition and international trade*, Oxford University Press.
- Türkcan K. and Ateş A.* (2010). Structure and Determinants of Intra-industry Trade in the U.S. Auto-Industry, *Journal of International and Global Economic Studies*, 2(2): 15-46.
- Yoshida, Y., Leitão, N.C., and Faustino, H.* (2009). Vertical Intra-industry Trade and Foreign Direct Investment between Japan and European Countries, *Atlantic Economic Journal*, 37: 351-365.
- Windmeijer, F.* (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators, *Journal of Econometrics*, 26: 25-51.
- Zhang, Y. and Clark, D.P.* (2009). Pattern and Determinants of United States' Intra-Industry Trade. *The International Trade Journal*, 23(3): 325-356.

Стаття надійшла до редакції 29.11.2010.