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The Effect of International Trade on Labor Demand in ASEAN5

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Abstract

This paper assesses the effects of ASEAN5's international trade on their level of employment. By applying the labor demand model of Greenaway et al. (1999), we classified ASEAN5's international trade into two cases: (1) intra-ASEAN5 trade and (2) trade with the world market. Our estimated results show that an increase in intra-ASEAN5 imports reduces their level of employment, but that intra-ASEAN5 exports have no effect on employment. In the case of world market trade, ASEAN5's world imports (exports) have a positive (negative) effect on employment depending on the sort of trade.

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1. Introduction

One of the main reasons behind the establishment of the Association of Southeast Asian Nations (ASEAN) was to improve its member countries' regional and international trade. The ASEAN members signed the ASEAN Free Trade Area (AFTA) agreement in 1992, aiming to increase their regional competitive advantage as a production base for the world market. The main goal of the AFTA is to liberalize trade through the elimination of tariffs and non-tariff barriers among the members. The expansion of intra-regional trade provides product varieties as well as better quality for members.

When the AFTA was signed, there were six members including Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Vietnam joined ASEAN in 1995, Lao PDR and Myanmar in 1997, and Cambodia in 1999. Currently, there are 10 ASEAN member nations. This paper focuses on five specific members of ASEAN: Indonesia, Malaysia, the Philippines, Singapore, and Thailand (known as ASEAN5). Brunei is excluded as it produces only crude oil and natural gas. The remaining four countries are omitted as they are less developed, being at a different stage in their economic development, and data from these countries are limited.

The AFTA agreement led to rapid growth in the international trade of ASEAN5. Data from the World Bank show that ASEAN5's exports to the world market increased from 219 billion USD in 1991 to 998 billion USD in 2012 (up 356%) and that ASEAN5's imports from the world market increased from 219 billion USD in 1991 to 909 billion USD in 2012 (up 315%). Data from the United Nations show that intra-ASEAN5 exports increased from 108.47 billion USD in 2003 to 201.55 billion USD in 2012 (up 85.82%), while intra-ASEAN5 imports increased from 86.53 billion USD in 2003 to 169.89 billion USD in 2012 (up 96.33%). Such a huge improvement in the international trade of ASEAN5 definitely affects the level of employment in its member countries.

The objective of this paper is to assess the effects of international trade on employment in ASEAN5. We classified ASEAN5 international trade into two categories: (1) intra-ASEAN5 trade and (2) trade with the world market. We apply the labor demand model based on the Cobb–Douglas production function as used in Greenaway *et al.* (1999) to our analysis, because they were the first to use this model and several studies have applied it with slightly different modifications.

The remainder of this paper is organized as follows. Section 2 discusses literature reviews. Section 3 describes the model and data used. Section 4 presents the econometrics method. Sections 5 and 6 present the results and conclusion, respectively.

2. Literature Review

Several studies have examined the effect of international trade on employment; however, no obvious directions have emerged from the literature so far. The different approaches presented different assessments and perspectives. Previous studies used industrial-level and country-level data. Examples of the developed countries that have been studied are the USA (Slaughter, 2001; Artuç *et al.*, 2010), the UK (Greenaway *et al.*, 1999), and France and Britain (Chetwin and Bairam, 2001; Biscourp and Kramarz, 2007). In the twenty-first century, this issue has been gaining more attention in developing countries, such as India (Sen, 2009; Hasan *et al.*, 2012) and Vietnam (Kien and Heo, 2009). Cross-country data have also been gathered on this issue, such as research on developing countries

(Harrison, 1994), the EU (Abraham and Brock, 2003), and on 97 different countries (Carrere *et al*., 2014).

Even though most of the previous studies indicated that there should be a negative (positive) relationship between imports (export) and labor demand, the recent study by Carrere *et al*. (2014) stated that the effect of trade liberalization on labor demand can be positive or negative depending on the correlation between comparative advantage and labor market frictions. This paper expands the literature in further explaining that the relationship between international trade and labor demand depends on the sort of imports and exports involved.

3. Model and Data

The model is classified into two cases: (1) intra-ASEAN5 trade and (2) trade with the world market. These models are based on Greenaway *et al*. (1999) but using cross-country data for ASEAN5. The details are as follows.

3.1 Intra-ASEAN5 Trade

The model in equation (1) investigates the impact of intra-ASEAN5 trade on those countries' labor demand.

$$\ln L_{it} = \beta_0 + \beta_1 \ln Intra\_M_{it} + \beta_2 \ln Intra\_X_{it} + \beta_3 \ln w_{it} + \beta_4 \ln Q_{it} + \beta_5 r_{it} + a_i + u_{it} \quad (1)$$

where the subscript *it* represents country *i* at time period *t*, *L* represents total employment (thousands of persons), *Intra_M* is intra-ASEAN5 imports (USD), *Intra_X* is intra-ASEAN5 exports (USD), *w* is adjusted net national income per capita (USD), which is used as the proxy of wage rate[1], *r* is the real interest rate used to represent the cost of capital, *Q* is real GDP (USD), *u* is an idiosyncratic disturbance term, and a_i is country *i*'s specific effects or unobserved variables.

The parameter β_1 represents the relationship between labor demand and intra-ASEAN5 imports. The sign of β_1 depends on the sort of ASEAN5 imports involved. If the imports are mostly intermediate goods (e.g., silver and metals), ASEAN5 tend to hire more labor to produce the final products (or $\beta_1>0$). However, if the imports are mostly substitutable to domestic products, ASEAN5 tend to hire less labor (or $\beta_1<0$).

The parameter β_2 represents the relationship between labor demand and intra-ASEAN5 exports. If intra-ASEAN5 exports are labor-intensive goods (e.g., agriculture and fisheries products), labor demand is expected to increase (or $\beta_2>0$). On the other hand, if intra-ASEAN5 exports are capital-intensive goods (e.g., automobile, electronic parts), there should be little or no effect on labor demand.

We expect the sign of β_3 to be negative (or $\beta_3<0$) since the lower wage rate increases labor demand. The sign of β_4 is expected to be positive (or $\beta_4>0$) since there is a positive relationship between economic growth and firm production, hence the labor demand.

[1] Since the limitation of wage data in the countries and average wages are closely correlated with national per capita income (Newfarmer and Sztajerowska, 2012), adjusted net income per capita is used as a proxy for the wage rate. Adjusted net income is calculated by subtracting from GNI, a change for the consumption of fixed capital and depletion of natural resources.

The parameter β_5 represents the relationship between labor demand and the real interest rate (or the cost of capital). If labor and capital are substitutable, when the cost of capital increases, firms would use less capital and more labor (or $\beta_5 > 0$). On the other hand, if labor and capital are complementary, when the cost of capital increases, firms would use less of both (or $\beta_5 < 0$).

The data used with equation (1) range from 2003 to 2012. *Intra_M* and *Intra_X* are obtained from the United Nations' UN Comtrade Database. The data of the other variables (*L*, *w*, *r*, and *Q*) are obtained from the World Bank's World Development Indicators.

3.2 ASEAN5's World Market Trade

The model in this section investigates the impact of ASEAN5's trade with the world market on their labor demand. The data set used in this model is taken from the World Bank's World Development Indicators from 1991 to 2012. Because of the AFTA agreement, the tariffs began to reduce in the year 1993; hence, the effect of AFTA implementation can be measured by adding dummy variables as shown in equation (2).

$$\ln L_{it} = \beta_0 + \beta_1 \ln World\_M_{it} + \beta_2 \ln World\_X_{it} + \beta_3 \ln w_{it} + \beta_4 \ln Q_{it} + \beta_5 r_{it} + \alpha_1 AFTA_t + \alpha_2 AFTA_t \cdot \ln M_{it} + \alpha_3 AFTA_t \cdot \ln X_{it} + a_i + u_{it} \quad (2)$$

where *World_M* is ASEAN5's world imports (USD), *World_X* is ASEAN5's world exports (USD), *AFTA* is 1 since 1993, and 0 otherwise, and the other variables are similar to the previous case[2]. The expected signs of β_1, β_2, β_3, and β_4 are similar to those in the first case. The expected signs of α_0, α_1, and α_2 are positive because we expect tariff reductions to enhance labor demand.

4. Estimation Method

The country-specific effects (a_i) in equations (1) and (2) represent the time-invariant unobserved effects in ASEAN5, such as the countries' geography, natural resources, languages, and religions. These might correlate to independent variables, such as imports and exports, which leads to bias estimation (Wooldridge, 2002). Fixed-effect estimation, allowing countries' specific effects to correlate with independent variables, should be applied to both equations to achieve unbiased estimators. We test for autocorrelation by using the regression $e_{it} = \rho e_{i,t-1} + error_{it}$, where e is the residuals from the fixed-effect estimation. If the null hypothesis ($\rho = 0$) is rejected, autocorrelation is present in the model. Heteroskedasticity is tested using the Breusch–Pagan test, where the squares of residuals from the fixed-effect estimation are regressed on the independent variables. If we fail to reject the null hypothesis that all coefficients in the regression are zero, heteroskedasticity is not present in our model.

5. Results

5.1 Intra-ASEAN5 Trade Results

The results of the fixed-effect estimation for equation (1) show that the parameter estimates of β_1, β_3, and β_4 are significant at the 0.01 level, while those of β_2 and β_5 are insignificant.[3] Because we found no problems of autocorrelation or heteroskedasticity in the

[2] Appendix A summarizes all the variables used in this study.
[3] See Table B1.

model, the *t*-statistics of the hypothesis tests can be said to be reliable. We removed the variables shown to be insignificant and then re-estimated; the results are shown in Table 1. Our final results show that the estimated parameters β_1, β_3, and β_4 are still significant at the 0.01 level and that their magnitudes are slightly different from the full model.

The parameter estimate of β_1 is negative; this implies that an increase in intra-ASEAN5 imports reduces the employment level. The main reason for this is that intra-ASEAN5 imports are mostly substitutable to domestic products, causing a reduction in domestic employment. This may be explained by the case that Thailand's agricultural products (e.g. rice, fruit, vegetable), which are favored by ASEAN5 members and can be cultivated at a cheaper cost, would be imported by ASEAN5. This might affect the employment of farmers who have cultivated the same products, ceteris paribus. The estimated parameter β_3 is negative and β_4 is positive, which correspond to demand theory.

5.2 ASEAN5's World Market Trade Results

Using fixed-effect estimation for equation (2), we found that all parameters, except β_5, are significantly different from zero at the 0.01 level. The model has problems of autocorrelation and heteroskedasticity. This means that the significances using the usual *t*-statistics are not reliable. Therefore, we corrected the problems by using heteroskedasticity-robust standard error to calculate the *t*-statistics.[4] We found that β_5 is still insignificant. We then removed r_{it} and re-estimate; the results are shown in Table 2.

The estimate β_1 is positive, which implies that ASEAN5's world imports increase the member countries' level of employment. This is mainly because ASEAN5's world imports are mostly intermediate goods; thus, ASEAN5 needs to hire more labor for the relevant production processes.

The estimate β_2 is negative, indicating that exports decrease the level of employment. This implies that ASEAN5's world exports are mostly capital-intensive goods and rely on technology production (e.g., automobiles, computers, electronic parts, machinery components). That is, ASEAN5's world imports are mostly intermediate goods to produce capital-intensive goods that will be exported to the world market. The estimates β_3 and β_4 are negative and positive, respectively. These correspond to demand theory, as in the previous case.

The estimate α_1 is positive, which indicates that the implementation of AFTA has enhanced labor demand. The estimates α_2 and α_3 are negative and positive, respectively. This means that the implementation of AFTA has improved ASEAN5's world exports and the demand for labor within those industries, while it has reduced its world imports and therefore also reduced demand for labor within those industries.

6. Conclusion

This paper studies the effect of ASEAN5's international trade on their level of employment. The model used in Greenaway *et al*. (1999) has been adopted. We classified ASEAN5's international trade into two cases: (1) intra-ASEAN5 trade and (2) world market trade.

[4] See Table B2.

The results show that the effect of international trade on employment in both cases depends on the sort of trade involved. In the first case, an increase in intra-ASEAN5 imports reduces the employment level because intra-ASEAN5 imports are mostly substitutable. Therefore, imports reduce the demand for domestic goods and thus labor demand. Intra-ASEAN5 exports have no effect on their employment levels because exports from these countries are capital-intensive goods. According to the UN Comtrade Database (United Nations, 2014), 45 percent of intra-ASEAN5 exports are from the following industries: machinery/electrical, plastic/rubbers, and chemical industries.

In the second case, ASEAN5 world imports and exports have positive and negative effects on their employment, respectively. This supports the fact that ASEAN5 world imports are mostly intermediate goods, while ASEAN5 world exports are mostly capital-intensive goods. Our conclusion is consistent with Carrere *et al*. (2014) in the sense that the relationship between international trade and labor demand can be either positive or negative.

References

Artuç, E., Chaudhuri, S., and J. McLaren (2010). Trade shocks and labor adjustment: A structural empirical approach. *American Economic Review*, 100, 1008–1045.

Abraham, F. and E. Brock (2003). Sectoral employment effects of trade and productivity in Europe. *Applied Economics*, 35, 223–235.

Biscourp, P. and F. Kramarz (2007). Employment, skill structure and international trade: Firm-level evidence for France. *Journal of International Economics*, 72, 22–51.

Carrere, C., Fugazza, M., Olarreaga, M., and F. Robert-Nicoud. (2014). Trade in Unemployment. *CEPR Discussion Paper,* No. 9916.

Chetwin, W. and E. Bairam (2001). *The effects of international trade on employment: heterogeneity among 2-digit ISIC manufacturing industries.* University of Otago, Economics Discussion Papers.

Greenaway, D., Hine, R. C. and P. Wright (1999). An empirical assessment of the impact of trade on employment in the United Kingdom. *European Journal of Political Economy*, 15, 485–500.

Harrison, A. (1994). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of Development Economics*, 48, 419–447.

Hasan, R., Mitra, D., Ranjan, P. and R. N. Ahsan (2012). Trade liberalization and unemployment: Theory and evidence from India. *Journal of Development Economics*, 97, 269–280.

Kien, T. N. and Y. Heo (2009). Impacts of trade liberalization on employment in Vietnam: A system generalized method of moments estimation. *The Developing Economies*, 47, 81–103.

Newfarmer, R. and M. Sztajerowska (2012). Trade and employment in a fast-changing world. In D. L. (ed.), *Policy Priorities for International Trade and Jobs* (pp. 5–73). Paris: OECD.

Sen, K. (2009). International trade and manufacturing employment: Is India following the footsteps of Asia or Africa? *Review of Development Economics*, 13, 765–777.

Slaughter, M. J. (2001). International trade and labour–demand elasticities. *Journal of International Economics*, 54, 27–56.

United Nations (2014), UN Comtrade Database. http://comtrade.un.org/db/ accessed on July 5, 2014.

Wooldridge, J. F. (2002). *Econometrics Analysis of Cross Section and Panel Data.* London: The MIT Press.

Yasmin, B. and A. H. Khan (2011). Trade openness: New evidence for labor-demand elasticity in Pakistan's manufacturing sector. *The Lahore Journal of Economics*, 16(2), 55–85

Table 1: Fixed-Effect Estimation of Equation (1)

Dep. Var* = ln *L	***Coefficients***	***Std. Error***
Constant	9.5196***	0.2849
ln *Intra_M*	–0.0653***	0.0172
ln *w*	–0.4075***	0.0710
ln *Q*	0.7671***	0.0491

Note: *** denotes significant at the 0.01 level, N=50

Table 2: Fixed-Effect Estimation of Equation (2) with Heteroskedasticity-Robust Standard Error

Dep. Var* = ln *L	***Coefficients***	***Hetero. Robust Std. Error***
Constant	9.3941***	0.2181
ln *World_M*	0.4997***	0.0454
ln *World_X*	–0.4910***	0.0849
ln *w*	–0.3510***	0.0693
ln *Q*	0.6926***	0.0891
AFTA	1.0216***	0.1669
*AFTA*ln_M*	–0.4194***	0.0284
*AFTA*ln_X*	0.3248***	0.0261

Note: *** denotes significant at the 0.01 level, N=110

Appendix A:

Data Clarification

Variable	Definition
L	Total employment (thousands of persons)
Intra_M	Intra-ASEAN5 imports (USD)
Intra_X	Intra-ASEAN5 exports (USD)
World_M	ASEAN5 world imports (USD)
World_X	ASEAN5 world exports (USD)
w	Adjusted net national income per capita (USD)
r	Real interest rate (%)
Q	Real GDP (USD)

Appendix B:

Fixed-Effect Estimation of Full Model in Equations (1) and (2)

Table B1: Fixed-Effect Estimation of Equation (1): Full Model

Dep. Var* = ln *L	***Coefficients***	***Std. Error***
Constant	9.5821***	0.2955
ln *Intra_M*	–0.0693***	0.0222
ln *Intra_X*	0.0244	0.0234
ln *w*	–0.4445***	0.0766
ln *Q*	0.7693***	0.0493
r	0.0010	0.0011

Note: *** denotes significant at the 0.01 level, N=50

Table B1: Fixed-Effect Estimation of Equation (2) with Heteroskedasticity-Robust Standard Error: Full Model

Dep. Var* = ln *L	***Coefficients***	***Hetero. Robust Std. Error***
Constant	9.3908***	0.227819
ln *World_M*	0.5043***	0.047209
ln *World_X*	–0.4897***	0.082467
ln *w*	–0.3576***	0.067019
ln *Q*	0.6851***	0.085602
r	0.0003	0.000475
AFTA	1.0312***	0.152794
*AFTA*ln M*	–0.4225***	0.028336
*AFTA*ln X*	0.3270***	0.025332

Note: *** denotes significant at the 0.01 level, N=110