THE IMPACTS OF INTERNATIONAL TRADE AND PROTECTION WITH HETEROGENEOUS WORKERS ON WAGES: EVIDENCE FROM THAI MANUFACTURING

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ABSTRACT

The study assessed the impacts of international trade and protection on wage premiums across Thai manufacturing industries by recognising that workers are heterogeneous in their skills.The author derived a theoretical model from Ohnsorge and Trefler (2007) that is the equilibrium model with heterogeneous skill bundles and estimated the model using micro data from Thailand. The results showed that tariffs and NTBs are indicators of protection that have negatively significant effect on wage premiums. Exports and imports are indicators of international trade measurement. Exports exert positively significant impacts whereas imports have negatively insignificant impacts on the wage premiums. The results are significant and consistent with the theorem that previous studies predicted.

Keywords: International trade, protection policies, wages, heterogeneous workers,skill bundles.

Tác động của thương mại quốc tế và bảo hộ đối với nhóm người lao động không đồng nhất tới tiền lương: Minh chứng từ các ngành sản xuất của Thái Lan

TÓM TẮT

Đây là nghiên cứu đánh giá tác động của thương mại quốc tế và bảo hộ tới tiền lương căn cứ bởi sự không đồng nhất trong những kỹ năng của người lao động qua các ngành công nghiệp sản xuất của Thái Lan. Tác giả xuất phát từ mô hình lý thuyết của Ohnsorge and Trefler (2007) – một mô hình cân bằng đối với sự khác biệt qua các kỹ năng và ước lượng mô hình sử dụng dữ liệu vi mô của Thái Lan. Các kết quả cho thấy thuế quan và hàng rào phi thuế quan là các chỉ tiêu đo lường bảo hộ có ý nghĩa tác động làm giảm tiền lương. Xuất nhập khẩu là các chỉ tiêu đo lường thương mại quốc tế. Xuất khẩu có ý nghĩa tác động làm tăng trong khi nhập khẩu không có ý nghĩa tác động làm giảm tiền lương. Những kết luận này có ý nghĩa lớn và đồng nhất với các nghiên cứu đã đưa ra trước đây.

Từ khóa: Thương mại quốc tế, chính sách bảo hộ, tiền lương, nhóm người lao động không đồng nhất, các gói kỹ năng.

1. INTRODUCTION

The framework of neoclassical trade theory–Heckscher–Ohlin (H–O) explained that a country will specialise in production of goods that use intensive factors. Those are abundantly endowed, and the country will export goods that use intensive factors and import relative goods under free trade. In addition, the Rybczynski (1955) theory states that an increase in a factor endowment will increase the output of the industry using it intensively, and decrease the output of the other industry. Correspondingly, when a country opens up to trade liberalisation, its most abundant factors gain and its scarce factors lose. Thailand is one of the fastest growing economies in the world, the country that has long recognised the importance of trade policy in development. International trade measurements have been an instrumental in

strength competitiveness of domestic manufacturing industries with the world market. Being a deep trade liberalisation economy, Thailand has actively participated in various international forums such as the Uruguay round of multilateral trade negotiations, the Asia-Pacific Economic Cooperation forum (APEC), and, the ASEAN Free Trade Area. Remarkably, Thailand acceded to the World Trade Organisation (WTO) early on 01 January 1995. Thai Government has implemented various measures in compliance with its commitments in the WTO. Most of the sectors are on the depth of liberalisation. In addition, quantitative restrictions on many sector products have already dismantled and replaced by tariff measures in lines with the process of agreements. As an abundant labour force, Thai labours should gain from higher demand in labour–intensive production due to deep trade liberalisation, hence they get higher wages.

In fact, each worker brings into the labour force with multi-dimension of skills so that workers are heterogeneous1. The feature issues of factor immobility and the heterogeneity have frequently appeared in the international trade studies. In the H–O model, factors are homogeneous and perfectly mobile. The previous studies assumed that workers are perfectly mobile across industries but heterogenous in terms of their productivities. Thus, the heterogeneity generates specificities even when workers are perfectly mobile. The mobile workers across industries following the sorting behaviour are given by skill bundles of workers which could be measured human capital. The theoretical study pointed out that international differences in the distribution of worker skill bundles have important impacts of international trade on wages. However, the

impacts of trade on wage earnings based on heterogeneous workers of skill bundles are motivations.

This study was attempted to propose the empirical extension of Ohnsorge and Trefler (2007)'s theoretical model by the calculating the ratio of worker two skill bundles to measure the impacts of international trade and protection with heterogeneous workers on wages. Given those, the main questions addressed in this study were whether workers with large ratio of two skill bundles earn higher wages than workers in less–ratio of skill bundles; workers in a heavily protected industry earn higher wages than workers in a less–protected industry across Thai manufacturing industries; And, the country will export goods that use factor-intensive under free trade. Thus, whether the hypothesis that the industry exports goods using factor-intensive pays higher wages than the import competition industry does. To answer these questions, the author estimated the worker specificity based on ratio of two skill bundles and controlling individual characteristics. Then, the author approached the inter-industry wage differentials by estimating wage premiums across industries technique. The study treated protection as an industry characteristic and endogeneity by the simultaneous equations model that previous studies suggested. The remainder of this study was organised as follows. Section 2 reviews existing evidences on international trade with heterogeneous workers and wages nexus, highlights the gap that these studies fill in the published literatures. Section 3 gives the model and econometric specification. Section 4 discusses the data using in this study. Section 5 and 6 report results and conclusions, respectively.

2. LITERATURE REVIEWS

The fact of workers is endowed with a bundle of skills that workers are heterogeneous in multiple dimensions. It has important influences for the way in which labour market

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[1]For concreteness of heterogeneous workers, let there are two industries and let t_j be the productivity of a worker in industry j. Worker heterogeneity means that different workers have different pairs (t_1, t_2). A worker with a high t_1/t_2 follows Ricardian's comparative advantage to sort into industry 1 and earn more.

operates. In particular, Roy's model (1951) was developed to explain occupational choices and its consequences for the distribution of earnings when workers differ in their endowments of occupations – specific skills. The diversity in the amount and type of worker skill bundles are central features of modern labour markets while improvement evidences on recognising worker diversity still ignore the heterogeneity in skills within the available of demographic categories.

Heckman and Sedlacek (1985) reported empirical estimates and tests of extended Roy Model in the sectorial demand for the aggregate task function of workers. They explored the empirical importance of aggregation bias in obscuring aggregate real wage movements. They also assessed the contribution of self-selection to differences in the distribution of the log wage rates. Their estimate arguments included conventional determinants of wages such as education, working experience, and working experience squared, Southern dummy to capture regional wages and different amenities using U.S data on wages and sectorial choices.

Gaston and Trefler (1994) investigated the effect of international trade policy on wages in U.S manufacturing industries. The data set combined micro labour market from Current Population Surveys (CPS) with comprehensive data on tariffs and non-tariff barriers which are indicators of protection. Their estimations related U.S wage premiums to international trade and protection cross-sectorial. They found a negative correlation between wage premiums which explain for inter–industry wage differentials and tariff protections. It means that workers in unprotected industry are paid more than in protected industry. The other finding was that export industries had higher wages than workers with similar observable characteristics in import industries. Galiani and Sanguinetti (2003) recognised the diversity of labour skills within crude demography – education groups and characteristics to postulate labour wages on distinctively

measured attributes owned by each worker characteristic under trade liberalisation regime across Argentina manufacturing industries.

Recent theoretical studied by Grossman and Maggi (2000) and Grossman (2004) had featured trade models of the worker sorting. In Grossman and Maggi (2000) study, machines are produced in long chains of production involving many workers. The machine is only reliable if it had each worker's input. This means that workers are paired with other ones who are having similar levels of the talent in equilibrium. In contrast, the software output depends on the input of most talented workers. Their main prediction is that the country with greater dispersion in worker talents will have a comparative advantage in the software. In Grossman's (2004) study, the machinery requires teamwork and the software does not. The Teamwork is subject to costly monitoring and incomplete contracting, it encourages talented workers to sort into the software sector. International trade causes the country with greater dispersion in talents to increase software production. Present approach model is driven from sorting behaviour based on worker skill bundles rather than incomplete contracting.

Ohnsorge and Trefler (2007) studied theoretical model of labour market to extend Heckman and Sedlacek (1985) and allowed continuous industries. Their model described the sorting behaviour of heterogeneous workers endowed with two attributes, for example, quantitative and communication skills. Workers were sorted across industries on the basis of Ricardian comparative advantage. Industries differ by skill requirements, and each worker sorts into the industry that pays the most for the worker's particular of skill bundles. The present study specificity was empirical in terms of higher distribution of worker skill bundles that represent correlation between worker professional skills and working experience.

Two skill bundles of heterogeneous workers have many implications for worker's wages.

Although workers are perfectly mobile, their earnings will differ across industries. This allows us to describe impacts of international trade on differentials in wages across industries. Following this argument, Rafael Dix Carneiro (2010) proposed the extension of Ohnsorge and Trefler (2007)'s model to an open economy. In his study, workers supply skills to representative firms of sectors. Workers have observable and unobservable skill bundles that make them more or less productive in different sectors. The specific skills of the sectors have a deterministic component that depends on the individual characteristics such as education, age and sector specific experience. At each period, workers receive different wage offers which depend on the product of a specific sector returning to skills and the amount of skills. Workers then sort into sectors by maximizing value of the utility associated to each possible choice. The importance of his model is that workers face with the cost of mobility and sector specific experience which also accumulated endogenously.

There was no empirical estimate for Ohnsorge and Trefler (2007)'s model that measures specificity of worker ratio of two skill bundles for an open economy, especially, in the case study of Thai manufacturing industries with deep trade liberalisation. To fill this gap, the author followed theoretical model of Ohnsorge and Trefler (2007) to propose the empirical study of the impacts of international trade and protection on wages across Thai manufacturing industries which control heterogeneous workers by ratio of two skill bundles.

3. THE MODEL AND ECONOMETRIC SPECIFICATION

3.1. The model

Following Ohnsorge and Trefler (2007), the study assumed that each worker brings a bundle of two skills to the workplace, H and L, called professional skills and working experience. A worker type (H, L) employed in industry j produces a task level of $T(H, L, j)$. An employer cannot unbundle worker's skill bundle and thus cares only about $T(H, L, j)$. The industry output is the sum of tasks performed by all workers in that industry. It implies that $T(H, L, j)$ is also a worker's marginal product. Workers are paid the value of their marginal product. The study assumed that T is subject to constant returns to scale in H and L so that earnings of a type (H, L) of the worker in industry j are given by the wage function as follows

$$W(H, L, j) = P(j)T\left(\frac{H}{L}, 1, j\right)L. \ (1)$$

Where $P(j)$ is the producer price and the study used constant returns to scale. The study defines

$$l = lnL; s = ln(H/L);$$

$$p(j) = lnP(j); t(s, j) = lnT(\frac{H}{L}, 1, j). \ (2)$$

Accordingly, the wage function can be written in terms of the logarithm as follows

$$w(s, l, j) = p(j) + t(s, j) + l. \ (3)$$

As it will be explained below, it is useful to think of s as determining a worker's comparative advantage for sorting. And, l as determining a worker's absolute advantage that l shifts $w(s, l, j)$ up and down by the same amount for all industries j.

There is a continuum of industries indexed by $j \in [0, 1]$. A worker type (s, l) chooses an industry that maximizes $w(s, l, j)$. Note that the optimal choice of an industry $j(s)$ depends on comparative advantage s, not on absolute advantage l. Suppose that the production function is Cobb-Douglas: $T = (\frac{H}{L})^{\beta(j)}L$. Equation (2) implies $t(s, j) = \beta(j)s$, and thus, equation (3) becomes

$$w(s, l, j) = p(j) + \beta(j)s + l. \ (4)$$

The author rearranges equation (2.4) to get

$$log\frac{W}{L}(s, l, j) = p(j) + \beta(j)s. \ (5)$$

With l held constant, we take the derivative equation (4) respect to s to get

$$w_s = \frac{\partial[p(j) + \beta(j)s + l]}{\partial s} = \beta(j). [2]$$

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[2] Rybczynski theorem that product prices $p(j)$ is holding constant

That is, workers with higher s produce more outputs and hence earn more. This is the worker productivity effect.

The sorting behavior is that a worker with large s has a comparative advantage in professional skills–intensive industries. And, workers with high s sort into professional skills–intensive industries. Given s, a worker with large l has an absolute advantage in all industries, that is productive in all industries. To see this, recall $h = lnH$, for a given $s = h - l$, a large l implies a large h and hence an abundance of both skill bundles. Another way to consider this point is that in equation (3) and (4), l shifts up or down the wage function by the same amount for all industries j. Indeed, the sorting rule depends only on comparative advantage s, not on absolute advantage l.

3.2. Econometric specification

The study proposed methods for estimates of the function of individual's wages by ratio of two skill bundles and controlling characteristics. The study adopted previous studies which suggested a regression of impacts of international trade and protection on wages across industries using the inter–industry wage differential method to define wage premiums[3].

Individual's wages

In the first stage, the author estimated the wage function and generated wage premiums. Let i is index of each worker working in industry j, the estimate equation (5) can be written as below

$$Log \frac{W_{ijt}}{L_{ijt}} = \alpha + f_t(s_{ijt}) + \beta_1 age_{ijt} +$$
$$\beta_2 gender_{ijt} + \beta_3 region_{ijt} + D_j w_{jt}^* + \epsilon_{ijt}. \ (6)$$

Where W_{ijt} and L_{ijt} are real hourly wages and the logarithm of years of experience of an individual i working in industry j at time t,

respectively; $f_t(s_{ijt}) = s_{ijt} + s_{ijt}^2$ which is a linear time–varying function of ratio of two skill bundles (s) and ratio of two skill bundles (s) squared; $gender_{ijt}$ and $region_{ijt}$ are dummy variables indicating the gender and region of an individual i working in industry j, respectively; D_j is a dummy for industry j, w_{jt}^* is the industry coefficient which is the wage premium of industry j, and ϵ_{ijt} is an error term. The dependent variable is a division of the logarithm of hourly real wages with the logarithm of years of experienceof the individual i in the industry j. The author adopts previous studies to estimate equation (6) by OLS.

Wage premiums

The author also adopted the wage premiums to determine whether workers in more heavily protected industries are paid higher wages, ceteris paribus. The study regressed wage premiums on industry characteristics of international trade and protection. In this estimation, tariffs and NTBs measure protection were treated as endogenous.

The endogeneity evidence was provided by Baldwin (1985), Trefler (1993), Gaston and Trefler (1994, 1995) who found that policy–makers consider average industry wages to decide whether to protect an industry. To examine the endogeneity, the author run 2SLS to simultaneously estimate wages, tariffs, and NTBs equations below (7)

$$w_{jt}^* = \alpha + \beta_1 tariffs_{jt} + \beta_2 NTBs_{jt} + \beta_P P_{jt} + \epsilon_{wj}$$
$$tariffs_{jt} = \alpha_t + \beta_{wjt} w_{jt}^* + \beta_{zjt} Z_{jt} + \epsilon_{jt}$$
$$NTBs_{jt} = \alpha_n + \beta_{wjt} w_{jt}^* + \beta_{zjt} Z_{jt} + \epsilon_{jt}.$$

Let w_{jt}^* be the wage premiums of each industry j at time t; P_{jt} be a vector of characteristics of industry j at time t which includes measures of international trade. P_{jt} includes imports and exports scaled by industry outputs, import growth and intra–industry trade; Z_{jt} is a vector of the determinants of tariffs and NTBs in industry j at time t as suggested by protection studies that

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[3]A wage premium is portion of a wage that cannot be explained by the worker's characteristics (such as human capital, demographics, and occupation) but can be explained by the worker's industry of affiliation (Gaston and Trefler 1994, pp.576).

argued whether to protect an industry. The study identifies the tariff and NTB equations by excluding tariffs from the NTB equation and NTBs from the tariff equation. The 2SLS estimate of the wage premium equation, however, are unaffected by these exclusion restrictions. The 2SLS estimation of the wage premium equation is equivalent to instrumental variables estimation using P_{jt} and Z_{jt} to instrument tariffs and NTBs. The study considers a set of instruments of vector Z_{jt} that consists of characteristics data averaged over individuals in each industry. The argument is that politicians consider the composition of workers employed in an industry such as average worker age of industry, industry fraction of male workers, industry fraction of workers living in urban and so on (Gaston and Trefler 1994).

4. THE DATA

The study used Thai Labor Force Surveys (LFSs) for worker characteristic variables across 120 manufacturing industries at 4-digit of International Standard Industrial Classification (ISIC). The author constructed the final sample of 63.550 individual surveys for the year 2003. The author selected this year to investigate after Asian crisis in 1997 and consistent with the available data of the industry characteristics. The study used years of schooling to measure professional skills (H).The author calculated across industries for each worker to get ratio of two skill bundles (s) that is the logarithm of the division of years of schooling (H) with years of experience (L).

The Data of industry characteristics came from several sources. Tariffs and non-tariff barriers (NTBs) data were from UNCTAD database on Trade Control Measures. NTBs were reported as a trade restriction which includes price-control measures, finance-control measures, and quantity-control measures. The data indicated that NTBs be measured as coverage ratios of an industry's imports subjected to a NTB. Tariffs were measured as

import–weighted averages of the tariffs on all tariff-line items feeding into the industry. Imports and exports were collected from WTO Trade Database at 4-digit ISIC. Import growth is the calculation of imports in present year less imports in previous year. Intra-industry trade is defined in the usual way as $1 - \frac{|x_j - m_j|}{x_j + m_j}$, where x_j is exports and m_j is imports for industry j.

5. ESTIMATION RESULTS

This section presents estimated results of the individuals' wages controlling heterogeneous workers and wage premiums across industries. The estimated coefficients shown in Table 1 reported individual's wages based on characteristics that were estimated using equation (6) with industry dummies by OLS method that its coefficients being wage premiums. The positive coefficient of ratio of two skill bundles of worker (s) (=0.7281) implied that workers with high s earn more. In other words, it is positively increased in s for worker individual's wages function. An increase 1% of s measure will significantly increase 0.7281 Thai Bath in worker real hourly wages. The coefficients of male workers and workers living in urban are positively significant. In contrast, the coefficient of worker ages has negative significant effect on wages with identically observable worker characteristics. It seems to fit with the older workers accumulated higher working experience(l) – lower (s) and sorted into l–intensive industries, therefore, got lower wages. The author plotted wage premiums and s across manufacturing industries of 27 sectors. The wage premiums fluctuate quite similar to s for most industries (Fig. 1), suggesting the rule those industries with large or low s have equivalent increase or decrease in wage premiums.

- Industry dummy coefficients are not reported

The wage premium results report in Table 2, the wage premium is dependent variable which is generated by worker individual's wages

estimation based on worker characteristics. The author estimates the equation (7) by 2SLS for wage premiums at the industry level where vector Z_{it} includes: Average age of workers, fraction of male workers, and fraction of urban workers in each industry across 120 manufacturing industries of the year 2003. The results are reported in column (1), table 2 below.

Table 1. The log real hourly wage estimation results: Controlling individual characteristics

Independent Variables	Coefficients
Ratio of two skill bundles of worker (s)	0.7281 ***
	(0.0022)
Ratio of two skill bundles of worker (s) square	0.2402 ***
	(0.0011)
Male worker dummy	0.0501 ***
	(0.0032)
Age	-0.0080 ***
	(0.0002)
Urban dummy	0.0348 ***
	(0.0031)
Intercept	1.6938 ***
	(0.0107)
R-Squared	0.8305
Observations	63,550

*Note: - *** Significance at 1% conventional; Standard errors are in parenthesis.*

Table 2. The wage premium estimation results

	Dependent Variable: Wage Premiums	
Independent Variables	Estimated Coefficient	
	(1) 2SLS	(2) OLS
Tariffs	- 0.0299 (0.0039) ***	-0.0075 (0.0070)**
NTBs	- 0.0400 (0.0023) ***	-0.5111 (0.0045)***
Imports	- 0.0051 (0.0190)	-0.0175 (0.0009)
Exports	0.0308 (0.0151) **	0.0410 (0.0008)**
Import growth	0.0119 (0.0376)	-0.0685 (0.0037)**
Intra-industry trade	0.1160 (0.0505) **	0.1902 (0.0035) **
Intercept	0.2387 (0.0643) ***	-0.3134 (0.0032)***
R–squared	0.7736	0.8167
Observations	120	120

*Note: - *** and ** are significant at 1% and 5% conventional, respectively.*
- Standard errors are in parenthesis; The Coefficients of vector Z_{it} results are not reported.
- The variables are calculated at the industry average over 63.550 LFSs to be the sample of 120 observations of the year 2003.

Tariffs and NTBs are indicators of protection that have negative effect on wage premiums. The estimated coefficients were -0.0299 and -0.0400, respectively. It means that workers at high protected industry earn lower than less–protected industry. When the author examined the null hypothesis that is consistent due to the endogeneity of tariffs and NTBs, the author reported the Hausman test. The test failed to reject the null hypothesis that P > $\chi_4^2(28.2) = 0.0000$ at conventional. Thus, the endogenous protection problem does not lead to inconsistent and bias estimates. Those results are consistent with the fact of Thai market that was of deep trade liberalisation and early acceded to WTO in 1995. There were a lot of tariff lines and NTBs reduced – decreasing protection due to free trade agreements. The enterprises innovated to be competitive in the open economy. Therefore, it might have gained from trade liberalisation that industries had better opportunities to export to the world markets. To explain further, the impact of exports on wage premiums also showed that industries with high level of exports have significant increase in wages. The coefficient of exports is 0.0308 indicating that an increase of 1% of exports level increased 0.0308 Thai Bath in worker real hourly wages for those industries. In contrast, the coefficient of imports (-0.0051) now has negative impact, but the statistically insignificant. The results of the estimation without using instrumental variables are reported in column 2 (Table 2) that wage premiums regress on tariffs and NTBs, exports and imports, import growth and intra-industry trade by OLS. The purpose was to compare with the results of estimated equation (7) by 2SLS[4]. The estimated coefficient of tariffs and NTBs, exports and imports are similar to the estimated equation (7) by 2SLS.

[4]Gaston and Trefler (1994) also estimated wage premiums by two-steps: In the first stage, log wages are regressed on individual characteristic variables with industry dummies to generate wage premiums. In the second stage, the wage premiums are regressed on indicators of trade and protection across industries.

Hence, wage premiums are generated by ratio of worker two skill bundles (*s*) and workers characteristics estimation. These results are consistent with the theorem that under H–O, the country exports *H*–intensive goods and imports *l*–intensive goods. Workers with high *s* are sorted into *H*–intensive industries and earned more than workers found in *l*–intensive[5]. The country imported *l*–intensive goods, it made higher competition with Thai products and reduced domestic production of industry goods using *l*–intensive workers. Thus, decrease in wage premiums explains differentials in wages across industries of these workers type. Furthermore workers with low *s* sorted into *l*–intensive industries such as wood, furniture, plastic, glass have exactly lower wage premiums. While industries such as textile, footwear, and leather with higher wage premiums are in *l*–intensive industries group. It could be explained t that those sectors were importing intermediate goods to outsource or assemble which used abundant labour in Thailand. It is interesting that these results are consistent with the theoretical prediction and the situation of Thai open economy.

6. CONCLUSION

In this study ,the empirical approach based on Ohnsorge and Trefler (2007) theoretical model predicted impacts of international trade and protection that policy makers take into consideration of heterogeneous workers on wages to decide whether to protect an industry. The study also presented a further regression approach of endogenous protection that previous studies suggested using the simultaneous equations model of the wage premium across industries. As predicted by the theoretical model, the individual wages regression showed positive significant effect of ratio of worker two skill bundles(*s*) on wages.

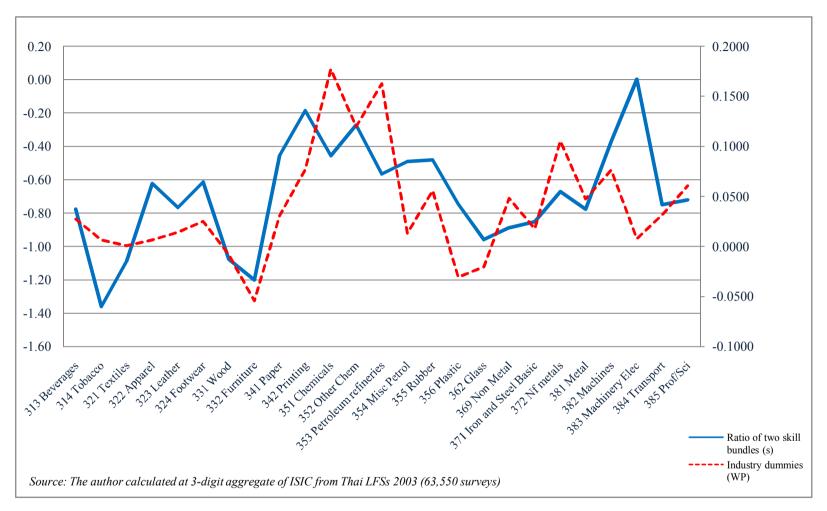[5]Ohnsorge and Trefler (2007)'s theoretical model predicted.

**Figure 1. Estimated Coefficients of industry dummy (wage premiums)
and Ratio of two skill bundles of worker (s) by Sector 2003**

It indicated that workers with high *s* were sorted into professional skill (H)-intensive industries and earned more than workers found in experience (*l*)–intensive industries. Tariffs and NTBs are indicators of protection that have significant negative effect on wage premiums. The Hausman test result concluded that tariffs and NTBs are endogenous in the estimation. In addition, exports and imports are indicators of international trade measurement. Exports showed positively significant impacts on wage premiums. It indicated that Thailand exported professional skills (*H*)-intensive goods and paid higher wages for workers in those industries under free trade. In contrast, imports are negative correlated with wage premiums. It explains workers with lower s are found in experience (*l*)–intensive industries and under trade liberalisation, the country imported experience (*l*)–intensive goods and, hence paid lower wages. But, this was not statistically significant.

These findings could benefit Thai policy–makers or developing countries in general to consider labour market in the context of trade liberalisation process. It should be realised that liberalised trade policies by the dismantled non-tariff barriers and reduced tariff lines following the schedule of free trade commitments are important for increasing wages of the workers in Thai manufacturing industries. There should be a need to issue policies on improving professional skills for workers *l*–intensive industries. Those industries might have weak competition with oversea goods in domestic market due to the productivity of workers under trade liberalisation in Thailand.

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