International trade in services and inequalities: Empirical evaluation and role of tourism services

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This study investigates the impact of the international openness in tourism services trade on wage inequality between highly skilled, semi-skilled and unskilled workers in the tourism industry. The sample covers 10 developed countries and expands over 15 years. A cointegrated panel data model and an Error Correction Model (ECM) were used to distinguish between the short- and long-run effects. The results are compared to those of openness of business services and manufactured goods. The findings point out that tourism increases wage inequality at the expense of the least skilled workers in the long and the short-run.

Keywords: inequality, openness trade, trade of tourism services, Error Correction Model (ECM), cointegrated panel model

JEL classification: C23, D31, F10, Z30

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Following the literature, international trade seems to have a significant impact on inequality in the case of developed countries, particularly through an increase in the wages of skilled workers relative to the wages of unskilled workers. However, the results depend of the sample of countries studied (Wood, 1994, 1995; Slaughter and Swagel, 1997; Harjes, 2007; Bahmami-Oskoee et al., 2008; and Bensidoum et al., 2011).

Roine et al. (2009) confirmed this difference between countries by using *top income shares*[1] data. More recently, Engelmann (2014) uses data from EU KLEMS, to assess the effect of trade for 11 UK manufacturing sectors on inequality. The results shows a structural change in the U.K. economy by the declined share of low-skilled workers and the increased share of medium-skilled and high-skilled workers over the years. These results should to incite us to take into account the different specificities of each industrial sector when we estimate the effect of international trade on inequalities. This fact is supported by the Cassette et al. (2012), who had estimated the specific impact of international trade in services on inequalities by using three interdeciles ratio (D9/D1; D5/D1 and D9/D5).

The link between trade of tourism services and inequality has not really studied. Most of the time, this question is indirectly approached (see for example Wattanakuljarus and Coxhead, 2008; Blake, 2008). This empirical study is an attempt to feel this gap by estimating the direct link between international trade in tourism services and wage inequality. This will require to measure the impact of trade liberalization in tourism on skill premiums in the tourism sector, between highly skilled and semi-skilled workers, semi-skilled and unskilled workers, and between highly skilled and unskilled workers. The advantage of using skill premiums in the tourism sector (and not a general inequality index as Gini index) is that it is certain that the estimated effect is due to the characteristics of the tourism sector rather than to an uncontrolled or misleading correlation effect.

Data and empirical strategies

Table A.1, in annex, summarizes the descriptive statistics and sources of the variables used for this article. Because there is limited data for the variables, we used a sample of 10 developed countries (Australia, Austria, Denmark, Finland, Italy, Japan, Netherlands, Spain, United Kingdom and United States) for the period 1980 -2005.

The EU KLEMS database is used in this econometric analysis. This database provides the number of hours worked and wage bill, for each sector, for three categories of people: unskilled, semi-skilled and highly skilled. Three indicators of skill premiums were developed between each category of workers. As it is possible to obtain the skill premiums by sector, these three indicators were calculated for the four aggregates of interest to us: total trade, trade in goods, trade in business services and the tourism trade[2].

Concerning the independent variable, we chose to use the traditional indicator of trade openness. CEPII'S CHELEM database distinguishes three categories of services: Transport services (air, sea and others, freight and passenger); Travel services; and "Other business services". The second aggregate includes catering, accommodation, entertainment and tour operators. The statements for this category relate to a very large part of tourism revenues and spending. The last category covers communications, construction, insurance, financial services, computers and information, licences and patents, other business services, cultural services and government. This category represents is used as a variable of trade in business services. We test the link between the 4 categories of international trade (total, goods, business services and tourism services) and inequality.

The control variables included in this study are the following:

Education: a variable for the supply of skills is used, $EDU_{j,t}$, representing the average number of years in education for the total population aged over 24. The level of education is assumed to reduce inequalities.

Gross domestic product per capita: GDP per capita, $GDP_{j,t}$, may have an impact on inequalities, according to the mechanism originally explained by Kuznets (1955).

Inflation: An inflation rate variable, $INFL_{j,t}$, is included to control the macroeconomic environment. Inflation erodes real wages and disproportionately affects low incomes thus increasing inequality (e.g. Romer and Romer, 1999).

Labour market - institutional context: Several variables were used to reflect the characteristics of the labour market and the influence of trade unions on wage formation. $NETDEN_{j,t}$ is the union density in a country. An indicator of government involvement in wage formation, $GOVIN_{j,t}$, is also used. Finally the Herfindhal index ($HERF_{j,t}$) is used to measure trade union concentration.

According to the Im-Pesaran-Shin test (table A.2, in annex), all the variables are stationary at difference, except the education and inflation variables that are also stationary at level. Given the presence of unit roots in the main variables of this article, Pedroni's (1999) panel cointegration tests were conducted to determine whether or not there is a long-term equilibrium between the variables. Testing the cointegration of a panel data model proceeds in two stages: first, a check to determine whether the dependent variable is cointegrated with each independent variable, then a test of cointegration between each independent variable, taken in pairs as it is not possible to use two independent cointegrated variables in a single regression with cointegrated panel methods. The test results are given in Table A.3 in the annex. They show that there is no long-term relationship between total trade openness and inequality between unskilled and highly skilled workers; between the openness of the tourism trade and inequality between unskilled and semi-skilled workers. Then, because only the GDP per capita variable, among the control variables, is I (1), there is no long-term equilibrium between inequality variables and other control variable. Moreover, the cointegration tests indicate that the GDP per

capita variable is cointegrated with trade openness variables. To obtain an unbiased estimator of long-term parameters, the DOLS method uses parametric adjustment of errors, by increasing the initial static regression based on the past, future and present of values of the regressors at first difference, which allows for control of the endogenous reactions (see Saikkonen, 1991). The standard deviations of the coefficients are obtained using the long-term variance of the residuals from the cointegration.

The second estimation step in this article involves estimating the long- and short-term relationships using a panel data model based on an ECM. This is used to establish the way in which the short-term varies from the long-term relationship and, more specifically, how the economy adjusts itself following disturbances over time.

The specification of the corrected error model is as follows:

$$\Delta INEG_{i,k,j,t} = \alpha \Delta INEG_{i,k,j,t-1} + \theta \Delta OP_{k,j,t} + \delta \Delta OP_{k,j,t-1} + \eta TCE_{k,j,t-1} + \varphi X_{k,j,t-1} + \psi_t \quad (1)$$

where $INEG_{i,k,j,t}$, dependent variable for i type inequalities, $i = \{UH, SH, US\}$[3] the trade aggregate k with $k = \{TOT, G, S, T\}$[4], the country j and the date t. OP is the trade openness variable and X is the control variables vector. The specific time effect, ψ_t is used to capture the aggregated shocks that may occur in any given year. The error correction term (TCE) comes from the residuals of the estimated long-term relationship by using the DOLS method. The corrected error term coefficient, η, provides the adjustment rate at which the short-term dynamics of the dependent variable converge towards the long-term relationship. Consequently, if η is negative and significantly different from 0, then the wage inequality/trade openness relationship is long-term and the error correction mechanism leads to inequalities to be adjusted to reduce the deviation from the long-term relationship, thus validating the specification of the ECM model.

Results and discussions

Tables 1 and 2 show the panel estimates by using the DOLS estimator for the entire country sample during the period 1980-2005.

Table 1: Results of DOLS estimates with fixed time effects for total trade and trade in goods

Independent variable	$INEG_{SH,TOT,j,t}$	$INEG_{US,TOT,j,t}$	$INEG_{UH,G,j,t}$	$INEG_{SH,G,j,t}$	$INEG_{US,G,j,t}$
Dependent variable	$OP_{TOT,j,t}$		$OP_{G,j,t}$		
TOTAL	0.7518*** (4.72)	0.7069*** (9.31)	0.1897 (0.84)	-0.1972 (1.20)	0.2709** (2.04)

*, ** and *** *are coefficients with Student statistics rejecting the null hypothesis at the 10% , 5% and 1% confidence intervals.*

Table 2: Results of DOLS estimates with fixed time effects for trade in business services and the tourism services trade

Independent variable	$INEG_{UH,S,j,t}$	$INEG_{SH,S,j,t}$	$INEG_{US,S,j,t}$	$INEG_{UH,V,j,t}$	$INEG_{SH,V,j,t}$
Dependent variable	$OP_{S,j,t}$			$OP_{T,j,t}$	
TOTAL	10.2840*** (8.25)	2.4919*** (3.26)	6.0589*** (14.13)	8.8514*** (3.71)	-2.1035* (1.92)

*, ** and *** *are coefficients with Student statistics rejecting the null hypothesis at the 10% , 5% and 1% confidence intervals.*

To begin, we see that total international trade significantly increases wage inequality in the long-run between highly skilled and semi-skilled workers and between semi-skilled and unskilled workers. However, the results for international trade in business services are much more settled as in Cassette et al. (2012). In fact, this entails higher wage inequality between each category of worker skills. Moreover, the coefficients are of much greater magnitude than for total trade and trade in goods. Note also that, unlike trade in goods, the coefficient is positive and significant for wage inequality between highly skilled and semi-skilled workers in business services sectors.

With regard to tourism, the development of trade in this sector has a clear impact on wage inequality between highly skilled and unskilled workers in the long-run. The coefficient is actually positive and significant at the 1 % confidence level. Note also that this coefficient (8.814) is slightly lower than trade in business services but significantly higher than trade in goods or total trade. However, note that at the 10% acceptance threshold, the international tourism trade reduces wage inequality between semi-skilled and highly skilled workers. This can be partly explained by the fact that tourism production is unskilled labour intensive.

Table 3 presents the results of estimates of the ECM models for the tourism sector while tables A.4, A.5 and A.6, in the annex, address estimates, respectively, of total trade, trade in goods and trade in business services (note that the multicollinearity has been controlled by a variance inflation factors analysis).

Table 3: Results of estimates of ECM models of the tourism sector

	Dependent variables	$INEG_{UH,V,j,t}$		$INEG_{SH,V,j,t}$		$INEG_{US,V,j,t}$	
	Fixed time effects	No	Yes	No	Yes	No	Yes
Independent variables	$INEG_{UH,V,j,t-1}$	-0.03287 (0.24)	-0.0251 (0.20)	-	-	-	-
	$INEG_{SH,V,j,t-1}$	-	-	-0.1714** (2.62)	-0.1539*** (2.89)	-	-
	$INEG_{US,V,j,t-1}$	-	-	-	-	0.5487*** (4.07)	0.5856*** (4.29)
	$OP_{T,j,t}$	10.9660* (1.77)	11.7282* (1.78)	-0.7111 (0.19)	-1.1528 (0.28)	5.8748* (1.74)	6.3261* (1.77)
	$OP_{T,j,t-1}$	-2.2804 (0.38)	-2.9696 (0.46)	3.0415 (0.82)	3.0071 (0.75)	-3.8587 (1.17)	-4.6376 (1.35)
	$TCE_{T,j,t-1}$	-0.0461*** (2.64)	-0.0485*** (2.97)	-0.2247*** (4.64)	-0.2350*** (4.53)	-	-
	$GDP_{j,t}$	0.0018 (1.10)	-0.0026 (0.46)	0.0006 (0.38)	0.0021 (0.33)	0.0023*** (2.58)	0.0040 (1.36)
	$EDU_{j,t}$	0.0060 (0.94)	0.0100 (1.22)	0.0176 (0.99)	0.0258 (1.04)	-0.0073** (1.97)	-0.0091* (1.78)
	$INFL_{j,t}$	-0.0025 (0.68)	-0.0050 (0.98)	0.0025 (1.05)	0.0041 (1.20)	0.0010 (0.46)	-0.0012 (0.49)
	$NETDEN_{j,t}$	-0.0545 (1.37)	-0.0544 (1.38)	0.0391 (0.28)	0.0218 (0.14)	0.0009 (0.31)	-0.0006 (0.04)
	$GOVIN_{j,t}$	0.0028 (0.79)	0.0028 (0.74)	0.0008 (0.31)	3.7e-7 (0,01)	-0.0005 (0.29)	0.0003 (0.22)
	$HERF_{j,t}$	-0.0794 (1.51)	-0.0728 (1.41)	0.0733 (0.81)	0.0796 (0.82)	-0.0302* (1.84)	-0.0186 (1.25)
	Observations	280	280	280	280	280	280
	R^2	13.06%	19.12%	17.98%	24.34%	39.81%	44.09%

, ** and * are coefficients with Student statistics rejecting the null hypothesis at the 10% , 5% and 1% confidence intervals.*

The most significant result concerning the link between international trade and inequality is for the tourism trade openness variable. It is the only openness variable that has an influence on inequality variables. The effect of the tourism trade on wage inequalities in the tourism sector is immediate, contrary to the other aggregates (see Tables A.4, A.5 and A.6). If this effect is repeated in each period, that would explain the significant long-term effect observed in the previous section.

These results indicate also that the lagged inequality variable is a significant factor in two out of three cases, which confirms the autoregressive form of the equation (1). For inequality between semi-skilled and highly skilled workers, the lagged variable coefficient is negative. Conversely, the lagged variable coefficient of inequality between semi-skilled and unskilled workers is positive. This means that wage differentials for unskilled workers, relative to semi-skilled workers working in tourism, are increasing while wage differentials between high-skilled and semi-skilled workers are reducing over time. This result can essentially be explained by the fact that tourist production is unskilled labour intensive. Accordingly, relative to unskilled workers, there are very few highly and semi-skilled workers. Wages differential therefore tend to reduce between these categories of workers. The development of trade in tourism between countries leads to a relative deterioration in the wages of the poorest individuals. Table 5 also helps to show that the coefficient of the error correction term is negative and significant[5], which validates the ECM models.

In light of these results it appears that the main factors behind wage inequality in the tourism sector are a form of inequality inertia and the immediate and long-term effect of tourism trade openness. The impact of international trade in tourism services on inequalities, as highlighted in this article, may suggest that the developed countries need to develop high-tech sectors

(requiring highly skilled labour). Otherwise, wage inequalities in the tourism sector may continue to grow in the coming years.

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Appendix

Table A.1: Summary of statistics and variables sources

Variable	Source	Name	Average	Standard deviation
Inequality variables	EUKLEMS	$INEG_{UH,TOT,j,t}$	2.2724	0.7595
		$INEG_{SH,TOT,j,t}$	1.6032	0.1823
		$INEG_{US,TOT,j,t}$	1.4365	0.5524
		$INEG_{UH,G,j,t}$	1.8743	0.4862
		$INEG_{SH,G,j,t}$	1.4946	0.2264
		$INEG_{US,G,j,t}$	1.2657	0.3862
		$INEG_{UH,S,j,t}$	2.0252	0.4143
		$INEG_{SH,S,j,t}$	1.4764	0.2111
		$INEG_{US,S,j,t}$	1.4010	0.3756
		$INEG_{UH,T,j,t}$	2.0140	0.6447
		$INEG_{SH,T,j,t}$	1.5130	0.3002
		$INEG_{US,T,j,t}$	1.3581	0.4970
Trade openness variables	CHELEM-CEPII	$OP_{TOT,j,t}$	0.2773	0.1315
		$OP_{G,j,t}$	0.2160	0.1030
		$OP_{S,j,t}$	0.0612	0.0334
		$OP_{T,j,t}$	0.0186	0.0131
Gross domestic product per capita (in $)	CHELEM-CEPII	$GDP_{j,t}$	17.873	8.3771
Inflation	IMF-International Financial Statistics	$INFL_{j,t}$	4.2806	3.9082
Education variable	Barro et Lee (1993/2000)	$EDU_{j,t}$	8.9851	1.6711

Trade union density	Golden et Wallerstien (2006)	$NETDEN_{j,t}$	0.3550	0.1953
Government involvement in wage setting	Golden et Wallerstien (2006)	$GOVIN_{j,t}$	5.6923	3.1741
Herfindahl index	Golden et Wallerstien (2006)	$HERF_{j,t}$	0.7032	0.2558

Table A.2: Im-Pesaran-Shin stationarity tests

T-bar statistics	Variables at level	Variables at first difference	Result
$INEG_{UH,TOT,j,t}$	-1.522	-3.612***	I(1)
$INEG_{SH,TOT,j,t}$	-1.929	-3.828***	I(1)
$INEG_{US,TOT,j,t}$	-1.427	-3.304***	I(1)
$INEG_{UH,G,j,t}$	-1.760	-3.643***	I(1)
$INEG_{SH,G,j,t}$	-2.021	-3.959***	I(1)
$INEG_{US,G,j,t}$	-2.151	-3.763***	I(1)
$INEG_{UH,S,j,t}$	-1.990	-3.411***	I(1)
$INEG_{SH,S,j,t}$	-1.881	-3.520***	I(1)
$INEG_{US,S,j,t}$	-2.092	-3.487***	I(1)
$INEG_{UH,T,j,t}$	-2.129	-4.019***	I(1)
$INEG_{SH,T,j,t}$	-2.209	-3.849***	I(1)
$INEG_{US,T,j,t}$	-1.735	-3.959***	I(1)
$OP_{TOT,j,t}$	-2.198	-3.975***	I(1)
$OP_{G,j,t}$	-2.258	-3.955***	I(1)
$OP_{S,j,t}$	-1.800	-3.273***	I(1)
$OP_{T,j,t}$	-1.878	-3.877***	I(1)
$GDP_{j,t}$	-2.388	-3.628***	I(1)
$INFL_{j,t}$	-3.525***	-3.825***	I(0)
$EDU_{j,t}$	-3.069***	-3.069***	I(0)

*Time fixed effects and trends are included in each ADF specification. The limit of the IPS test statistic follows a standard normal distribution. *, ** and * imply rejection of the unit root null hypothesis at the 10%, 5% and 1% confidence levels.*

Table A.3: Pedroni cointegration tests

Dependent variable	$INEG_{UH,TOT,j,t}$	$INEG_{SH,TOT,j,t}$	$INEG_{US,TOT,j,t}$	$INEG_{UH,G,j,t}$	$INEG_{SH,G,j,t}$	$INEG_{US,G,j,t}$
Independent variables	$OP_{TOT,j,t}$			$OP_{G,j,t}$		
Panel v stat	0.77661	2.10723**	2.43553**	2.58443***	1.27311	4.09133***
Panel rho stat	0.50626	-0.89077	-0.00566	-1.18838	-1.52127	-0.84233
Panel pp stat	-0.39628	-2.30458**	-0.83483	-2.25403**	-2.81099***	-2.18629**
Panel adf stat	0.17965	-2.04151**	-0.95436	-1.42749	-1.89180*	-1.81727*
Group rho stat	1.15341	0.37370	1.25973	0.32913	-0.41839	-0.30345
Group rho stat	-0.35243	-1.47094	0.04097	-1.34352	-2.57944***	-2.83009***
Group adf stat	0.52924	-1.54433	-0.09184	-0.37042	-2.01060	-2.15264

**, ** and * imply rejection of the unit root null hypothesis at the 10%, 5% and 1% confidence levels.*

Dependent variable	$INEG_{UH,S,j,t}$	$INEG_{SH,S,j,t}$	$INEG_{US,S,j,t}$	$INEG_{UH,T,j,t}$	$INEG_{SH,T,j,t}$	$INEG_{US,T,j,t}$
Independent variables	$OP_{S,j,t}$			$OP_{V,j,t}$		
Panel v stat	0.50778	0.16518	0.56352	-0.04299	-0.50628	0.66946
Panel rho stat	-0.99509	-1.07171	-1.24253	-0.78971	-1.19371	-0.18269
Panel pp stat	-1.63391	-1.69063*	-2.58537***	-2.45145**	-3.54465***	-1.25752
Panel adf stat	-2.12496**	-0.82250	-2.49823**	-1.84978*	-3.84724***	0.05926
Group rho stat	0.20552	0.06708	0.30389	0.03795	-0.37809	0.89113
Group rho stat	-1.14248	-1.27464	-1.48180	-2.92138***	-3.66582***	-0.57139
Group adf stat	-2.49970**	-0.74428	-1.72940	-2.949***	-4.18027***	-0.00006

**, ** and * imply rejection of the unit root null hypothesis at the 10%, 5% and 1% confidence levels.*

Dependent variable	$GDP_{j,t}$			
Independent variables	$OP_{TOT,j,t}$	$OP_{G,j,t}$	$OP_{S,j,t}$	$OP_{T,j,t}$
Panel v stat	-1.09912	-1.23368	3.01817***	2.07771**
Panel rho stat	0.89841	0.91317	-2.07140**	-0.73282
Panel pp stat	0.02985	-0.05000	-1.82827*	-0.60290
Panel adf stat	-0.27841	-0.64925	-2.55033	-1.41274
Group rho stat	1.96212**	1.95734*	-0.49832	0.34252
Group rho stat	0.7155	0.61453	-0.70129	-0.01340
Group adf stat	0.07859	-0.52526	-1.744096*	-2.33255**

**, ** and * imply rejection of the unit root null hypothesis at the 10%, 5% and 1% confidence levels.*

Table A.4: ECM model estimate for total trade

	Dependent variables	$INEG_{UH,TOT,j,t}$		$INEG_{SH,TOT,j,t}$		$INEG_{US,TOT,j,t}$	
	Fixed time effects	No	Yes	No	Yes	No	Yes
Independent variables	$INEG_{UH,TOT,j,t-1}$	0.7893*** (10.53)	0.8026*** (10.79)	-	-	-	-
	$INEG_{SH,TOT,j,t-1}$	-	-	-0.0581 (0.61)	-0.0788 (0.82)	-	-
	$INEG_{US,TOT,j,t-1}$	-	-	-	-	0.6782*** (5.83)	0.6820*** (5.82)
	$OP_{TOT,j,t}$	-0.2818 (1.45)	-0.2493 (0.85)	0.0201 (0.22)	-0.0294 (0.22)	-0.0582 (0.51)	0.0266 (0.19)
	$OP_{TOT,j,t-1}$	0.0781 (0.32)	-0.0116 (0.04)	0.0534 (0.61)	0.0707 (0.55)	0.0047 (0.04)	-0.1218 (0.90)
	$TCE_{TOT,j,t-1}$	-	-	-0.0171** (2.42)	-0.0194** (2.48)	-0.0082** (2.49)	-0.0087*** (2.65)
	$GDP_{j,t}$	0.0020* (1.75)	0.029 (1.02)	-0.003 (0.54)	-0.0015 (1.08)	0.0005 (1.06)	-0.0006 (0.44)
	$EDU_{j,t}$	-0.0020 (0.46)	-0.0023 (0.47)	0.0025 (1.03)	0.0034 (1.38)	-0.0005 (0.31)	0.0004 (0.19)
	$INFL_{j,t}$	0.0015 (0.76)	0.0016 (0.75)	-0.0001 (0.05)	0.0004 (0.29)	-0.0010 (0.95)	-0.0019 (1.47)
	$NETDEN_{j,t}$	-0.0310* (1.91)	-0.0242 (1.60)	-0.0223 (1.05)	-0.0180 (0.89)	-0.0068 (0.74)	-0.0102 (1.09)
	$GOVIN_{j,t}$	0.0006 (0.42)	0.0006 (0.43)	-0.0005 (0.66)	-0.0007 (0.88)	0.0009 (1.21)	0.0010 (1.48)
	$HERF_{j,t}$	-0.0326** (1.96)	-0.0288 (1.64)	-0.0066 (0.48)	-0.0022 (0.15)	-0.0044 (0.81)	-0.0024 (0.31)
	Observations	280	280	280	280	280	280
	R^2	64.78%	67.17%	9.23%	17.92%	72.64%	75.54%

, ** and * are coefficients with Student statistics rejecting the null hypothesis at the 10% , 5% and 1% confidence intervals.*

Table A.5: ECM model to estimate for trade in goods

	Dependent variables	$INEG_{UH,G,j,t}$		$INEG_{SH,G,j,t}$		$INEG_{US,G,j,t}$	
	Fixed time effects	No	Yes	No	Yes	No	Yes
Independent variables	$INEG_{UH,G,j,t-1}$	0.0486 (0.52)	0.0630 (0.67)	-	-	-	-
	$INEG_{SH,G,j,t-1}$	-	-	-0.2079** (2.53)	-0.2053** (2.44)	-	-
	$INEG_{US,G,j,t-1}$	-	-	-	-	0.5684*** (5.24)	0.6010*** (5.68)
	$OP_{G,j,t}$	-0.2458 (1.04)	-0.0321 (0.09)	-0.0483 (0.34)	0.1493 (0.62)	-0.2167* (1.95)	-0.0660 (0.38)
	$OP_{G,j,t-1}$	-0.2328 (0.98)	-0.3400 (0.93)	-0.0352 (0.25)	-0.0577 (0.25)	-0.0264 (0.24)	-0.0477 (0.28)
	$TCE_{G,j,t-1}$	-0.0214*** (3.68)	-0.0215*** (4.18)	-0.0249** (2.55)	-0.0212** (2.53)	-0.0120*** (2.89)	-0.0118*** (2.94)
	$GDP_{j,t}$	0.0023** (2.22)	0.0013 (0.54)	0.0009 (1.34)	0.0008 (0.56)	0.0008 (1.26)	0.0003 (0.17)
	$EDU_{j,t}$	-0.0049 (1.30)	-0.0041 (1.04)	-0.0038 (1.25)	-0.0028 (0.88)	-0.0003 (0.10)	0.0004 (0.13)
	$INFL_{j,t}$	-0.0024 (1.51)	-0.0031* (1.76)	-0.009 (0.82)	-0.0009 (0.65)	-0.0008 (0.82)	-0.0011 (1.06)
	$NETDEN_{j,t}$	-0.0166 (0.88)	-0.0175 (1.03)	-0.0260 (1.40)	-0.0279 (1.57)	-0.0016 (0.13)	0.0028 (0.26)
	$GOVIN_{j,t}$	0.0008 (0.53)	0.0012 (0.88)	0.0004 (0.34)	0.0002 (0.23)	0.0003 (0.36)	0.0006 (0.97)
	$HERF_{j,t}$	0.0252 (1.22)	0.0294 (1.44)	0.0199 (0.96)	0.0002 (0.90)	-0.0002 (0.03)	0.0016 (0.19)
	Observations	280	280	280	280	280	280
	R^2	22.70%	32.72%	12.09%	18.36%	54.65%	59.90%

**, ** and are coefficients with Student statistics rejecting the null hypothesis at the 10% , 5% and 1% confidence intervals.*

Table A.61: ECM model estimate for trade in business services

	Dependent variables	$INEG_{UH,S,j,t}$		$INEG_{SH,S,j,t}$		$INEG_{US,S,j,t}$	
	Fixed time effects	No	Yes	No	Yes	No	Yes
Independent variables	$INEG_{UH,S,j,t-1}$	0.0639 (0.63)	0.0727 (0.72)	-	-	-	-
	$INEG_{SH,S,j,t-1}$	-	-	-0.24405** (2.23)	-0.2656** (2.40)	-	-
	$INEG_{US,S,j,t-1}$	-	-	-	-	-0.0343 (0.37)	-0.0233 (0.24)
	$OP_{S,j,t}$	0.3614 (0.87)	-0.1970 (0.40)	0.0188 (0.09)	-0.2547 (1.15)	0.3923 (1.55)	0.2396 (0.84)
	$OP_{S,j,t-1}$	0.7876 (0.93)	0.7124 (0.79)	0.3079 (0.72)	0.1535 (0.34)	0.3746 (0.84)	0.1943 (0.40)
	$TCE_{S,j,t-1}$	-0.0293*** (5.22)	-0.0354*** (5.32)	-0.0322*** (3.09)	-0.0422*** (4.25)	-0.0459*** (5.65)	-0.0481*** (5.35)
	$GDP_{j,t}$	0.0013 (0.92)	-0.069* (1.95)	-0.0006 (0.76)	-0.0054*** (2.44)	0.0004 (0.68)	-0.0016 (1.09)
	$EDU_{j,t}$	-0.0033 (0.66)	0.0050 (1.12)	0.0010 (0.29)	0.0070* (1.92)	-0.0034 (1.27)	-0.0007 (0.31)
	$INFL_{j,t}$	-0.0010 (0.52)	0.0002 (0.08)	-0.0006 (0.48)	-0.0001 (0.04)	-3e-5 (0.03)	0.0006 (0.58)
	$NETDEN_{j,t}$	0.0028 (0.12)	0.0100 (0.45)	-0.0125 (0.93)	-0.0040 (0.31)	0.0089 (0.58)	0.0031 (0.22)
	$GOVIN_{j,t}$	-0.0049*** (2.74)	-0.0042** (2.51)	-0.0007 (0.71)	-0.0008 (0.83)	-0.0034*** (3.76)	-0.0023*** (3.37)
	$HERF_{j,t}$	0.0101 (0.47)	0.0352 (1.42)	0.0026 (0.18)	0.0143 (0.93)	0.0051 (0.57)	0.0123 (1.25)
	Observations	280	280	280	280	280	280
	R^2	20.17%	29.26%	10.84%	20.66%	23.62%	32.18%

, ** and * are coefficients with Student statistics rejecting the null hypothesis at the 10% , 5% and 1% confidence intervals.*

Endnotes

[1] *Top income shares* refers to the percentage of total national income held by the 10% (or 1%) of households with the highest incomes. For more detail, see Piketty (2001) or Leigh (2007).

[2] This aggregate includes catering, accommodation, tourist attractions and tour operators. This is the same aggregate as in the CHELEM database for trade openness.

[3] I.e. between unskilled and highly skilled, between semi-skilled and highly skilled and between unskilled and semi-skilled.

[4] I.e. total trade, trade in goods, trade business in services and the tourism trade.
[5] Recall that there is no error correction term in the regression for inequalities between semi-skilled and unskilled workers as there is no cointegration between these inequalities and tourist trade openness.