

Predicting Individual Trade-Policy Preferences: A Factor Content Approach

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Abstract

Recent research on the sources of individual attitudes towards trade policy focus on an individual's factor endowment. In the absence of individual-level data on these attitudes, scholars often use measures of a geographic area's factor endowment as comparable figure. However, prior work in the field of economics has shown that a country's factor endowment only correctly predicts the direction of trade 50% of the time. In this paper I include a critical assumption from the Heckscher-Ohlin factor endowment model in my empirical strategy, which provides a better fit to the data than all prior studies on individual trade preferences. Instead of assuming that the abundant factor in an economy is used intensively in the production of export goods, I include the factor intensity and the direction of trade for each individual's industry of employment. I show that this factor content of trade approach better fits the data than a simple factor endowment approach. Moreover, although low-skilled labor exhibits consistent anti-trade preferences, the individual preferences of high-skilled labor depends largely upon the factor intensity of the individual's industry of employment.

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1 Introduction

Economists consistently advocate the general welfare gains from trade as if free trade were the panacea for economic growth; however, international trade is rarely free. Given the distributional consequences of trade, policy makers often protect vulnerable workers and/or politically-connected industries even though the costs of intervention often outweigh the benefits. For example, consider President Obama’s policy in 2009 of protecting tire manufacturing jobs in the US by imposing steep tariffs on Chinese tire imports for three years. The 35% ad valorem tariff duty on Chinese tires – 30% in the second year and 25% in the third year – cost American consumers approximately \$1.1 billion by 2011, while saving only 1,200 jobs. This put the cost per manufacturing job saved at approximately \$900,000.¹ An even higher profile case, albeit one that liberalized trade rather than restrict it, can be seen in US labor’s opposition to the 1994 North American Free Trade Agreement (NAFTA). Many labor unions vehemently opposed the trade agreement due to the increased competition from low-wage laborers in Mexico.² Regardless of union opposition, the trade bill was passed with overwhelming support from the business community.³ In the case of NAFTA, politicians directed trade policy towards a factor of production – high-skilled labor and owners of capital –, whereas in the case of tariffs on Chinese imports, politicians directed trade policy towards a single sector – tire manufacturing. This begs a fundamental question in the study of international political economy: how is trade policy created and to whom is it catered?

The international political economy literature on trade policy is vast with varying approaches and results.⁴ According to Dani Rodrik, in general there are four elements to a political-economy

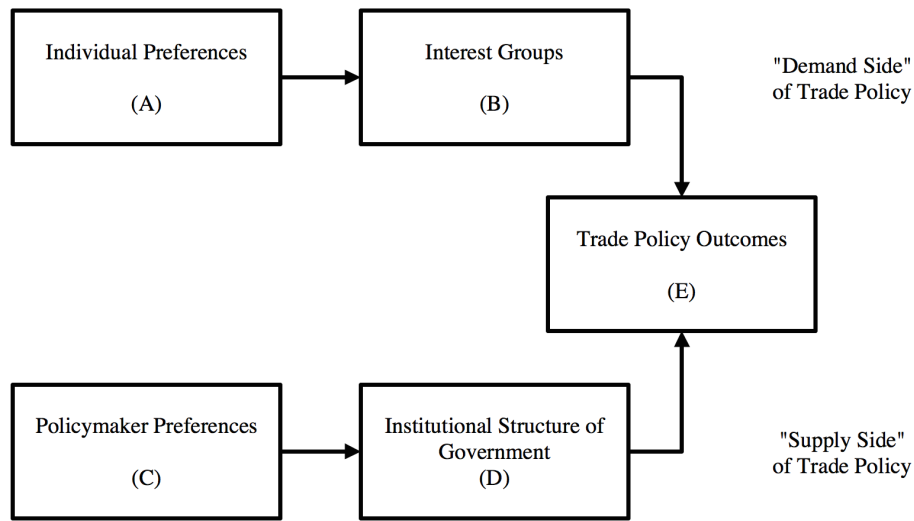
¹Gary Clyde Hufbauer and Sean Lowry, “US Tire Tariffs: Saving Few Jobs at High Cost,” *Peterson Institute for International Economics, Policy Brief Number PB12-9 April* (2012).

²Peter T. Kilborn, “Unions Gird for War Over Trade Pact,” *New York Times*, Oct. 4, 1993.

³The business community came together in support of NAFTA via a coalition of various business groups, including the National Association of Manufacturers and the US Chamber of Commerce. Owen Ullmann and Judith H. Dobrzynski, “Nafta Pro: A Trade Bonanza,” *Bloomberg Business*, September 12, 1993.

⁴The most succinct overview of this literature is Dani Rodrik’s handbook chapter “Political Economy of Trade Policy” in the *Handbook of International Economics, vol. III*, ed. Gene Grossman and Kenneth Rogoff (Amsterdam:

Figure 1: Elements of a Political-Economy Model of Trade Policy



model of trade policy as illustrated in Figure 1.⁵ On the *supply side* of trade policy, policymakers must formulate their preferences for trade policy (Box C) and then these preferences are aggregated in an institutional setting (Box D), for example, Congress, the executive, or in a multi-lateral institution such as the World Trade Organization.⁶ On the *demand side* of trade policy, individual preferences are considered to be determined by the distributional consequences of trade policy (Box A), which can be explained using two classic models of international trade. In Ricardo-Viner type models with comparative advantage effects and the assumption of labor immobility across sectors, policy preferences for trade liberalization depend on sector-specific skills, implying potential political cleavages along sectoral lines – e.g., US tire manufacturers. On the other hand, in the

Elsevier Science Publishers B.V., 1995), 1457-94.

⁵Figure 2.1, *Ibid.*, 1459.

⁶In most models of trade policy the preferences of policymakers are not taken as exogenous, as is assumed in this schematic, but are a response to the demands of voters, organized interest groups, and/or firms. Here, I simply want to impart that there are two distinct sides to trade policy – demand and supply – and I will focus solely on the demand side of trade policy in this paper.

Heckscher-Ohlin type models with complete labor mobility across sectors and varying endowments of the factors of production, – e.g., capital, labor, land – policy preferences for trade liberalization depend on your factor-type, implying potential political cleavages between factor owners – e.g., labor unions vs. the US Chamber of Commerce. The political arena provides the policy space for the losers from trade – i.e., import-competing industries in the Ricardo-Viner framework or owners of the scarce factor of production in the Heckscher-Ohlin framework – to seek protection from foreign competition through tariffs or non-tariff barriers to trade, and, likewise, for the winners from trade – i.e., exporting industries or owners of the abundant factor of production – to push for trade liberalization. These individual trade-policy preferences are aggregated and transmitted through organized interest groups who lobby for specific trade policies (Box B).

Rodrik refers to individual preferences over trade policy (Box A) as the “easiest part of the exercise, insofar as much of trade theory is devoted to analyzing the consequences of trade policy for individuals who derive their incomes from different factors of production or sectors.”⁷ However, predicting the trade-policy preferences of individuals is not such a straight-forward task. Over the previous two decades, a myriad of studies have examined the trade-policy preferences of individuals and there is mixed support for the Heckscher-Ohlin and Ricardo-Viner models – i.e., factor-endowment vs. specific-factor type models. In this paper, I will show that all of these studies assume away a fundamental condition of the Heckscher-Ohlin and Stolper-Samuelson framework, which affects their results and how we interpret individual trade preferences. The authors assume that the abundant factor of production will be used *intensively* in the production of goods (or services) and that trade liberalization will increase the marginal returns to the abundant factor due to increased market size, i.e., the good (or service) will be exported. Thus, the gains to the abundant factor are *conditional* on the export of goods that use intensively the abundant factor in produc-

⁷Rodrik, 1995: 1459.

tion. This conditionality leads to an interactive empirical specification of both the Heckscher-Ohlin and Ricardo-Viner models, where trade preferences are dependent on the factor type (capital vs. labor) as well as the direction of trade (exporting vs. import-competing) and the factor intensity in the sector of employment (capital-intense vs. labor-intense). This is by no means a new theory; rather, I am merely testing if the assumed components of the Heckscher-Ohlin model – i.e., factor abundance equates to intensive use of that factor in production for export markets, which creates gains from trade for the abundant factor – actually hold in the data and if this more complex interpretation of the theory has any added value in the study of individual trade preferences.

As I will illustrate in the following section, the literature on individual trade preferences assumes that the abundant factor in a country – i.e., capital or labor – is exported (and/or used intensively in production) and thus owners of this factor will support trade liberalization due to the marginal gains from trade. However, none of this literature directly takes into account the direction of trade for each factor or the magnitude – i.e., is the factor actually exported and by how much. Thanks to the pioneering empirical work of Harry Bowen, Edward Leamer, and Leo Sveikauskas in an attempt to confirm the well-known *Leontief Paradox*,⁸ we know that the Heckscher-Ohlin theory of abundant factors only correctly predicts the factor content of trade 50 percent of the time.⁹ The foundation of the Stolper-Samuelson theorem in the framework of the Heckscher-Ohlin model is that an increase in the relative price¹⁰ of a good due to trade liberalization will increase the return to the factor used most intensively in the production of said good. According to Wolfgang Stolper and Paul Samuelson’s extension of the Heckscher-Ohlin theorem:

⁸Leontief illustrated empirically that the U.S. actually imports capital intensive goods despite the country’s relative abundance of capital – completely opposite of the Heckscher-Ohlin predictions. Wassily Leontief, “Domestic Production and Foreign Trade: The American Capital Position Re-Examined,” *Proceedings of the American Philosophical Society* (1953): 332-49.

⁹Harry P. Bowen, Edward E. Leamer, and Leo Sveikauskas, “Multicountry, Multifactor Tests of the Factor Abundance Theory,” *American Economic Review* 77 (1987): 791-809.

¹⁰In the Heckscher-Ohlin framework the relative price of a good, that is, the domestic price relative to the price of the same good made in a foreign country, is used to measure the effects of trade.

A country will export those commodities which are produced with its relatively abundant factors of production, and will import those in the production of which its relatively scarce factors are important.[...] Assuming, as we shall throughout, that the total amounts of the factors of production remain fixed, it is clear from the Heckscher-Ohlin theorem that the introduction of trade must lower the relative share in the real or money national income going to the scarce factor of production. For the total return to a factor equals its price times the amount employed[...].¹¹

The leap forward in all prior research on individual trade-policy preferences is the assumption that the abundant factor will be used *intensively* in the production of *export* goods/services and the scarce factor will be imported; thus, the predicted trade-preferences of individuals may be misleading given the actual – i.e., measured – factor content of trade.

In this paper, I will test the predictive power of including the conditional components of the Heckscher-Ohlin model of individual trade preferences, which I call the *factor content of trade* approach, against the prior literature on individual trade preferences, namely, Scheve and Slaughter (2001), Hainmueller and Hiscox (2006), and Mayda and Rodrik (2005) whose data is most similar to mine. I will first replicate the baseline empirical specifications of each study as the benchmark for measuring the accuracy of my factor content of trade approach. Then, after calculating the direction of trade at the sectoral level for the two factors of production used in the prior studies – i.e., capital and labor – as well the amount of capital and labor used in each sector, I will interact these variables with each individual’s level of human capital measured by the education level attained by each survey respondent, which will act as a proxy for an individual’s factor of production – less educated individual’s are assumed to be low-skilled laborers, while college and graduate school educated individuals are assumed to be owners of capital, in this case, human capital, or high-skilled laborers. My results from a probit estimation show that the factor content of trade approach better fits the data and the predictions of the Heckscher-Ohlin model than all prior approaches for the case of high-skilled labor – high-skilled laborers are pro-trade conditional

¹¹Wolfgang F. Stolper and Paul A. Samuelson. 1941. “Protection and Real Wages.” *Review of Economic Studies* 9 (November): 58-9

on being employed in a sector that is capital-intensive; the direction of trade has minimal effects. On the contrary, low-skilled labor remains anti-trade across the population with minimal effects from the factor intensity or the direction of trade.

My approach, while more complex than the tractable Heckscher-Ohlin and Ricardo-Viner models of international trade, better predicts individual trade preferences in an increasingly complex globalized economy. In the late 19th and early 20th century when these two models were formulated, as well as into the early post-WWII global economy, international trade could be modeled as a simple exchange of final goods between trading partners. Today, however, trade is not only inter-industry but increasingly *intra*-industry, that is, the bi-lateral exchange of intermediate or finished goods that belong to the same industry. The field of economics has created new models that take into account the evolving trade environment that intra-industry trade generates, beginning with *new trade theory* in the 1980s¹² and followed by Marc Melitz's pioneering work in the 2000s, which introduced heterogenous productivity across firms¹³ and has spawned a new generation of trade models, unimaginatively named *new-new trade theory*. The economics field has updated its models with the growing complexity of the globalized trading environment, and yet the field of international political economy has yet to make any updates since Bowen, Leamer, and Sveikauskas illustrated almost thirty years ago that the abundant factor in an economy is not necessarily the factor exported.

The ability to accurately predict individual trade-policy preferences is especially important for understanding the determinants of trade policy and the cleavages trade policy creates. For example, in testing the Grossman-Helpman model of lobbying contributions and trade policy,¹⁴ a first step in the literature has been to determine the trade preferences of individuals, which are then aggregated

¹²See, for example, Helpman and Krugman (1985) and Krugman (1979, 1980).

¹³Marc J. Melitz, "The impact of trade on intra-industry reallocations and aggregate industry productivity," *Econometrica* 71, no. 6 (2003): 1695-1725

¹⁴Gene Grossman and Elhanan Helpman, "Protection for Sale," *American Economic Review* 84 (1994): 833-50.

to determine how an elected official *should* vote on a trade bill.¹⁵ The literature also considers the trade preferences of individuals in determining the domestic cleavages trade policy may form, which is assumed to depend on the mobility of labor within a country.¹⁶ If we assume that the preferences of individuals matter in the creation of trade policy, then determining the most accurate method for predicting these preferences is crucial for the study of international political economy.

In the following section, I will review the literature on predicting individual trade-policy preferences, beginning with an overview of the Ricardo-Viner, Heckscher-Ohlin, and Stolper-Samuelson theorems. Section 3 explains the data utilized for testing this theory on the factor content of trade, followed by my empirical specification and analysis in section 4. Section 5 concludes.

2 Individual Preferences and the Distributional Effects of Trade

The Ricardo-Viner and Heckscher-Ohlin models of international trade provide simple frameworks for understanding the distributional effects of trade. They mainly differ in their assumptions on the mobility of the factors of production. In the following section, I will explain the intuition behind these workhorse models of international trade, followed by how these models are tested empirically in the international political economy literature.

¹⁵See, for example, Pinelopi Koujianou Goldberg and Giovanni Maggi, “Protection for Sale: An Empirical Investigation,” *American Economic Review* 89 (1999): 1135-55; Kishore Gawande and Usree Bandyopadhyay, “Is Protection for Sale? Evidence on the Grossman-Helpman Theory of Endogenous Protection,” *Review of Economics and Statistics* 82 (2000): 139-52; Robert E. Baldwin and Christopher S. Magee, “Is Trade Policy for Sale? Congressional Voting on Recent Trade Bills,” *Public Choice* 105 (2000): 79-101; and Eugene Beaulieu and Christopher Magee, “Four Simple Tests of Campaign Contributions and Trade Policy Preferences,” *Economics and Politics* 16, no. 2 (2004): 163–87.

¹⁶See, for example, Ronald Rogowski, “Political Cleavages and Changing Exposure to Trade,” *American Political Science Review* 81 (1987): 1121-37; Ronald Rogowski, *Commerce and Coalitions: How Trade Affects Domestic Political Alignments* (Princeton, NJ: Princeton University Press, 1989); James E. Alt and Michael Gilligan, “The Political Economy of Trading States: Factor Specificity, Collective Action Problems, and Domestic Political Institutions,” *Journal of Political Philosophy* 2, no. 2 (1994): 165–192; and Michael J. Hiscox, *International Trade and Political Conflict: Commerce, Coalitions, and Mobility* (Princeton, NJ: Princeton University Press, 2002).

2.1 The Distributional Effects of Trade

In the Ricardo-Viner framework, factor mobility is assumed to be limited between sectors; thus, in the short-term, factors are stuck in their current sector of employment. The sector that uses intensively the abundant factor of production will have a comparative advantage over the sector that uses intensively the scarce factor due to lower relative marginal costs in production.¹⁷ In the short-term, trade liberalization will increase the returns to the comparative advantaged sector due to increases in price and demand, while returns to the comparative disadvantaged sector decrease due to decreasing prices and the subsequent contraction of the sector. An example will be illustrative of how these gains and losses translate into political cleavages. Imagine two economies (the US and Vietnam) each with two factors of production (high-skilled and low-skilled labor) and two sectors: a micro-chip sector, which is intensive in the use of high-skilled labor, and an apparel sector, which is intensive in the use of low-skilled labor. Now assume the US is a closed economy abundant in high-skilled labor and would like to open its borders to trade with Vietnam, a country abundant in low-skilled labor. The micro-chip sector in the US has a comparative advantage in the production of micro-chips relative to Vietnam due to the abundance of high-skilled labor in the US, while the apparel sector in Vietnam has a comparative advantage in the production of clothing due to its abundance of low-skilled labor. In moving from a closed economy to one with free trade, the micro-chip sector will flourish in the US due to the increase in demand and the subsequent increase in prices, and likewise, the real incomes for all workers employed in the micro-chip sector – high- and low-skilled labor – will increase. On the contrary, the apparel sector in the US will contract, thus driving down the real wages of workers employed in this comparative disadvantaged sector. Due to the mobility constraints of labor in this economy, a cleavage over trade policy will form between sectors rather than between factors of production.

¹⁷Note that each sector employs both factors of production; the difference lies in the intensity with which each sector uses the factors.

In the Heckscher-Ohlin framework, factor mobility is assumed to be fluid between sectors; thus, in the short- and long-term, factors of production can move seamlessly between sectors in response to shocks to a particular sector and/or the entire economy, for example, a shock from trade liberalization. The model states further that a country will *export goods that use intensively its relatively abundant factor of production* and *import goods that use intensively its relatively scarce factor of production*. Coupled with the simplest interpretation of the Stolper-Samuelson theorem, the model predicts that when a closed economy opens its borders to international trade, owners of the abundant factor will gain while owners of the scarce factor will lose, thus creating a cleavage between the factors of production.

The assumption of factor mobility in each of these models creates distinct cleavages between groups with respect to trade policy. In the Ricardo-Viner framework, factor immobility creates cleavages between exporting and import-competing sectors in the short-term, while the ability to move between sectors in the Heckscher-Ohlin framework (both in the short- and the long-term) creates cleavages between factors of production. So how do these theories match with the data on individual trade-policy preferences? Do preferences follow the sector-specific model or the factor-endowment model? The following section will introduce how these theories have been tested in the literature.

2.2 Individual Trade-Policy Preferences

Prior to the work of Kenneth Scheve and Matthew Slaughter¹⁸, individual trade-policy preferences were usually measured indirectly from some observed political actions – e.g., voting behavior, lobbying positions across sectors, or political coalition formation.¹⁹ Scheve and Slaughter

¹⁸Kenneth F. Scheve and Matthew J. Slaughter, “What Determines Individual Trade-Policy Preferences?” *Journal of International Economics* 54, no. 2 (2001): 267-92.

¹⁹See, for example, Rogowski, 1987 and 1989; Paul Midford, “International trade and domestic politics: improving on Rogowski’s model of political alignments,” *International Organization* 47 (1993): 535-564; William H. Kaempfer and Stephen V. Marks, “The Expected Effects of Trade Liberalisation: Evidence from US Congressional Action on

utilized the 1993 National Election Survey (NES) to directly measure individual preferences via responses to a survey question about support for new US trade barriers. They find evidence that the Heckscher-Ohlin factor-type model explains support for trade barriers better than the Ricardo-Viner specific-factor model. Lower-skilled survey participants – measured by years of education and average occupation wages – were strongly correlated with support for new trade barriers, whereas, an individual’s employment in an import-competing industry was not a strong predictor of support for new trade barriers. The authors provide the theoretical basis for the cleavages that emerge in the Heckscher-Ohlin framework: “In [the Heckscher-Ohlin] model it is *usually assumed* that protection is received by the sector which employ relatively intensively the factors with which the country is poorly endowed relative to the rest of the world. Thus a country’s abundant factors support freer trade while its scarce factors oppose it” (p. 272; emphasis added by author). In the empirical analysis the authors do not take this conditionality into account – i.e., neither factor is tested for its intensive use in production – thus causing potential omitted variable bias.²⁰

Anna Maria Mayda and Dani Rodrik²¹ extend the analysis of Scheve and Slaughter using two cross-country surveys – the International Social Survey Programme (ISSP) and the World Values Survey (WVS) – conducted across 23 countries in 1995 (ISSP) and 47 countries from 1995-1997 (WVS). Using a similar empirical specification to Scheve and Slaughter, they find a significant and robust correlation between an individual’s level of human capital and his/her trade-policy preferences – again, human capital is proxied with years of education. Moreover, the authors exploit their cross-country data set to test if this correlation holds in capital-rich countries and

Fast-Track Authority,” *The World Economy* 16, no. 6 (1993): 725-740; Douglas A. Irwin, “The political economy of free trade: voting in the British general election of 1906,” *Journal of Law and Economics* 37 (1994): 75-108.

²⁰Scheve and Slaughter also uncover a second finding, which is not included in standard trade models: support for new trade barriers is also correlated with home ownership in areas with comparative-disadvantage industries, independent of factor type or industry of employment. Separately, these two findings lend support to the Heckscher-Ohlin model of factor endowments as well as an asset-value approach. I will not test the latter finding as the data I utilize does not contain information on home ownership.

²¹Anna Maria Mayda and Dani Rodrik, 2005. “Why are some people (and countries) more protectionist than others?” *European Economic Review* 49 (6): 1393-1430.

capital-poor countries by interacting the education variable with a country's GDP per capita – a country with a high (low) GDP per capita is assumed to be abundantly endowed with high-skilled (low-skilled) labor, and thus high-skilled (low-skilled) labor in wealthy (poor) countries will support trade liberalization. They find that the correlation between levels of human capital and trade-policy preferences follows the predictions of the factor endowment model, that is, owners of capital in capital-scarce countries are more likely to support trade barriers than capital owners in capital-abundant countries.

Contrary to Scheve and Slaughter, Mayda and Rodrik also find support for the specific-factors model: individuals who are employed in comparative disadvantaged sectors are more likely to support trade protection.²² They attribute this finding to the time horizon with which individuals use to evaluate trade policy – i.e., those that evaluate trade policy over a longer time horizon are more in line with the factor-endowments model, whereas those who think in terms of both the short- and long-run evaluate trade policy in line with both the factor-endowments and the specific-factors model. While Mayda and Rodrik take into account the variation in factor endowments across countries, they do not take into account the direction of trade for each factor or the relative intensity with which it is used. Again, the authors assume that factor endowment is highly correlated with a country's wealth and that the abundant factor gains from trade liberalization in each country due to exporting goods made with the abundant factor of production.

While Scheve and Slaughter and Mayda and Rodrik assumed there was a linear relationship between education and support for trade barriers, Jens Hainmueller and Michael Hiscox²³ find,

²²They also find that an individual's relative economic status, as well as non-economic factors, such as attachment to the neighborhood/town/county and national pride, help explain the variation in trade-policy preferences. Jaekel and Smolka (2013) use a different cross-country survey which also covers 47 countries – 26 of which are developing countries – and also find consistent support for the factor endowment model. They also introduce a linear probability model in lieu of the probit model used in the other studies and the results hold.

²³Jens Hainmueller and Michael Hiscox. 2006. "Learning to Love Globalization: Education and Individual Attitudes Toward International Trade." *International Organization* 60(2): 469–498. For a comparable study, see Bruce A. Blonigen. 2011. "Revisiting the Evidence on Trade Policy Preferences." *Journal of International Economics* 86(1): 129–135.

using similar data as Scheve and Slaughter, that the relationship is actually non-linear: the sample of the population with some form of higher education support trade liberalization with similar magnitudes – i.e., college graduates and those with a graduate degree do not differ substantially in their trade preferences – whereas those with only a high school education support trade barriers. They attribute this relationship to education factors, not distributional factors as in Scheve and Slaughter and Mayda and Rodrik, because support for trade across education levels does not change between those that are employed, unemployed, or retired. The authors do not make any assumptions about factor endowments or the intensive use of the factors of production, thus I will not focus much attention on testing their theory. However, given the robustness of their findings, I will also take into account the non-linear nature of trade preferences across education levels in my empirical analysis.

This paper most-closely parallels the analysis of Mayda and Rodrik, utilizing a later iteration of the ISSP database. The following section explains the data and empirical specifications used in my analysis.

3 Data Overview

The empirical strategy for this analysis focuses on testing three separate models of predicting individual trade-policy preferences as outlined in the previous section against the factor content of trade approach. The 2003 International Social Survey Programme (ISSP) National Identity II module covers individual-level data on 45,993 survey respondents across 33 countries (more information on data can be found in the appendix). The data set contains information on each individual’s opinion on trade restrictions and other social policies as well as individual demographic and economic characteristics. In order to test the factor content of trade theory, I also require country-level data on the amount of capital and labor employed in each sector, as well as net

exports and value added; due to the availability of data on capital stock, several countries were dropped from the data set bringing the number of survey respondents to 11,530 individuals across 13 countries.²⁴

The dependent variable in this analysis is an individual’s trade-policy preference, which is determined by each respondent’s answer to the following question in the ISSP survey: “How much do you agree or disagree with the following statement? [Respondent’s country] should limit the import of foreign products in order to protect its national economy.” After dropping from the sample any response of “can’t choose” or “no answer, refused,”²⁵ I generated the dependent variable *Trade Opinion*, which ranges from responses of “agree strongly” (=1) to “disagree strongly” (=5). Thus higher values of *Trade Opinion* correspond to more pro-trade preferences and lower values to more protectionist preferences. Following Mayda and Rodrik, I also create two dichotomous variables: *Pro-Trade Dummy* equals unity if the respondent favors trade openness – i.e., replies “disagree” or “disagree strongly” – and zero otherwise; likewise, *Anti-Trade Dummy* equals unity if the respondent favors trade protection – i.e., replies “agree” or “agree strongly” – and zero otherwise. Table 2 presents summary statistics by country for the main dependent variables: *Trade Opinion*, *Pro-Trade Dummy*, and *Anti-Trade Dummy*.²⁶

Similar to the three previous studies of individual trade preferences, I use high-skilled and low-skilled labor as the only factors of production, which I measure using the respondent’s years of education: *education* refers to the years of education, with a maximum top-coding (introduced by me) of 20.²⁷ I also create two dummy variables to take into account the non-linear nature of education as shown in Hainmueller and Hiscox. *Low-skilled* = 1 if the survey participant’s highest

²⁴Australia, Austria, Czech Republic, Denmark, Finland, France, Israel, Netherlands, Norway, Poland, Spain, Sweden, and the United Kingdom.

²⁵Only 1,689 observations were deleted from the full sample of 45,993.

²⁶The United States and Germany are included in the summary table, but dropped from the analysis due to a lack of data on capital consumption. They are included in the table for readers who may want to compare Germany and the US to other countries in the sample.

²⁷The same maximum top-coding was introduced by Mayda and Rodrik, 2005.

Table 1

Statistic	N	Mean	St. Dev.	Min	Max
eduyears	11,407	12.669	3.648	0	20
sex	11,407	0.473	0.499	0	1
age	11,407	46.317	15.647	16	96
commun_type	11,407	2.594	1.228	1	5
employed	11,407	0.638	0.481	0	1
notemployed	11,407	0.174	0.379	0	1
retire	11,407	0.181	0.385	0	1
student	11,407	0.033	0.179	0	1
union_dum	11,407	0.326	0.469	0	1
junior_high	11,407	0.227	0.419	0	1
high_school	11,407	0.180	0.384	0	1
higher_ed	11,407	0.178	0.382	0	1
college	11,407	0.183	0.387	0	1

level of education attainment is at the secondary level, and 0 otherwise. *High-skilled* = 1 if the survey participant has some college education or has obtained a university degree or higher, and 0 otherwise. In order to replicate the results of Mayda and Rodrik, I also include GDP per capita (in 2003, PPP-adjusted) from the Penn World Tables 7.1 in order to proxy for the factor abundance in each economy: recall, countries with high GDP per capita are assumed to be abundant in capital, while poorer countries are assumed to be abundant in labor.

In order to test both the factor-endowment and the specific-factor models of trade, I also require data on the industry of employment for each respondent. This proved difficult given that the ISSP survey only asks for the respondent’s occupation, which is coded according to the International Standard Classification of Occupations (ISCO-88). In order to determine the sector of employment, I manually coded 431 of the 502 occupations to match with the International Standard Industrial Classification (ISIC), Rev. 3.1.²⁸ The 71 occupations with no industry classification were too vague to assign to any industry – e.g., “Business professionals,” ISCO code 2410 – and thus were dropped from the sample. Some occupations could be classified as belonging to several industries – e.g.,

²⁸See the data appendix for the ISCO-ISIC conversion table.

Table 2: Summary data on individual attitudes towards trade

Country	Trade Opinion	Pro-Trade Dummy	Anti-Trade Dummy	N
Australia	2.23	0.14	0.67	1,494
Austria	2.33	0.20	0.62	759
Czech Republic	2.63	0.26	0.52	846
Denmark	3.31	0.48	0.35	880
Finland	2.93	0.36	0.36	735
France	2.75	0.31	0.48	616
Germany	2.80	0.32	0.46	862
Israel	2.34	0.22	0.63	809
Netherlands	3.07	0.41	0.34	1,180
Norway	2.96	0.36	0.36	1,004
Poland	2.08	0.12	0.74	964
Spain	2.47	0.15	0.62	787
Sweden	3.11	0.35	0.29	737
United Kingdom	2.38	0.16	0.60	719
United States	2.32	0.17	0.63	905
Total	2.64	0.26	0.52	13,297

Notes: *Trade Opinion* is ranked from 1 to 5, with higher values corresponding to more pro-trade preferences. *Pro-Trade Dummy* = 1 if *Trade Opinion* = 4 or 5; 0 otherwise. *Anti-Trade Dummy* = 1 if *Trade Opinion* = 1 or 2; 0 otherwise.

“Housekeepers and related workers,” ISCO code 5121, falls under ISIC industries 55, 74, and 95, “Hotels and restaurants; Other business activities; and Private households with employed persons” – and thus aggregates of the industries are matched to the respondents’ occupation.

In order to test the specific-factors model, I also require trade data at the sector level. All bi-lateral trade for the countries in the sample come from the OECD’s Structural Analysis (STAN) database. My trade-exposure measure, *Net Export Share*, is the sector’s 2003 net exports as a share of output, measured as value added in 2003 USD.²⁹ Sectors with a negative net export share are import-competing (or comparative-disadvantage sectors) and expected to lose from trade liberalization, whereas sectors with a positive export share are comparative advantage sectors and thus likely to realize gains from trade liberalization. In my interaction model, I also include a dummy variable for sectors with a positive net export share: *Export Dummy* = 1 if the sector’s net

²⁹Due to a distribution skewed to the left, I use the natural log of the *Net Export Share*, which is obtained by adding 114,019 to each value – the minimum of the sample – and then taking the natural logarithm. Adding the minimum is necessary because the logarithm of a negative number is not defined.

export share is positive, and 0 otherwise.

Finally, in order to test the factor content of trade approach – i.e., factor type conditional on the sector’s intensive use of the factor and the net export share – I collected data from the OECD STAN database on employment and capital stock per sector. Employment is simply the number of persons engaged in a sector. Capital stock is determined using a modified perpetual inventory method (PIM): capital stock at the beginning of 2002 + gross fixed capital formation in 2002 – capital consumption in 2002. This gives the closest approximation of the capital stock in each sector in 2003. Together, these two variables give me the factor-intensity of each sector by dividing the capital stock by the total employment in each sector and then taking the natural logarithm in order to smooth the distribution. The average capital-to-labor ratio and net export share for each country in the sample are summarized in Table 3.

4 Empirical Specification and Analysis

As outlined in prior sections, in this analysis I will test the factor content of trade approach against three prior studies on individual trade preferences. The empirical strategy for all analyses includes the *Pro-Trade Dummy* as the dependent variable and a Probit model with robust standard errors clustered by country. Each empirical specification is briefly discussed below followed by an analysis of the baseline results.³⁰

I include the Akaike Information Criterion³¹ (AIC) score for each model specification, which measures the quality of each statistical model relative to the other models. The lower the score, the better the model fits the given data. The score takes into account the complexity of the model

³⁰By *baseline results* I mean analyzing the model without any control variables. I only include the baseline results in this analysis as I am only interested in testing the accuracy of the factor content approach against the previous approaches without adding any further complexities.

³¹Hiroto Akaike, “Information theory and an extension of the maximum likelihood principle,” In *Selected Papers of Hiroto Akaike* (New York, NY: Springer, 1998): pp. 199-213.

Table 3: Summary data on factor endowments and net export shares

Country	Capital-to-Labor Ratio (00,000)	$\frac{Exports - Imports}{GDP}$
Australia	4.67 (3.10)	-102.51 (312.32)
Austria	0.89 (2.92)	-41.95 (534.04)
Czech Republic	13.75 (28.10)	-331.89 (12399.27)
Denmark	11.55 (53.12)	-18.54 (3078.12)
Finland	1.17 (1.61)	16.67 (322.58)
France	0.95 (1.44)	5.40 (50.62)
Israel	10.71 (3.71)	43.32 (153.66)
Netherlands	1.58 (8.41)	1.84 (427.25)
Norway	10.80 (47.04)	-1057.98 (8513.31)
Poland	2.77 (2.71)	-252.50 (471.88)
Spain	0.57 (0.53)	-88.22 (560.24)
Sweden	13.03 (41.33)	-116.24 (6326.86)
United Kingdom	0.32 (0.30)	-58.00 (300.85)
Total	6.25 (28.19)	-171.32 (4780.91)

Notes: Each variable is the mean across all industries each in the country. Standard deviations are in parentheses.

and the number of parameters, penalizing for each additional parameter added to the model; thus, my more complex model will not have a lower score simply due to over-fitting.

4.1 Scheve and Slaughter (2001)

The authors test the Ricardo-Viner and Heckscher-Ohlin models of international trade and find significant support for the Heckscher-Ohlin model. In their empirical specification an individual's trade preferences are dependent on his/her factor of production – high-skilled or low-skilled labor

–, which is measured by *Education*. I also include the *Net Export Share* of individual i 's sector of employment j to test for Ricardo-Viner effects in the cross-country sample:

$$\text{Trade Opinion}_i = \alpha + \beta_1 \text{Education}_i + \beta_2 \text{Net Export Share}_{ij} + \epsilon \quad (1)$$

According to column (1) in Table 4, each additional year of education increases the probability of being pro-trade by 3%. This result is highly significant and as predicted by the Heckscher-Ohlin model. In contrast, the marginal effect of increasing the net export share by one unit decreases the probability of being pro-trade by 3%. This result is also significant at the 5% level, however, it does not follow the predictions of the Heckscher-Ohlin or Ricardo-Viner model. Intuitively, we would predict that an individual employed in an exporting industry would support trade liberalization. This finding provides the first evidence that the factor intensity of each sector may provide additional information that will help us understand individual trade preferences.

In order to visualize the marginal effects and to see if factor-intensity adds any value to the model, I plotted the marginal effects and the corresponding confidence intervals for *High-Skill Dummy* = 0 and *High-Skill Dummy* = 1 along the range of values for factor intensity. Figure 2 illustrates the probability of each factor being pro-trade for each value of factor intensity. The lack of movement in the marginal effects across factor intensity does not provide much indication that factor-intensity matters for predicting trade preferences, except for around the mean of factor-intensity. From the mean of the capital-to-labor ratio (0.41) to approximately a capital-to-labor ratio of three-to-one, the preferences of high-skilled labor are significantly different than that of low-skilled labor, albeit marginally. I will illustrate later that factor intensity does have a significant effect on trade preferences within each skill group, but only when the direction of trade is also taken into account.

Table 4: Probit results for baseline empirical specifications

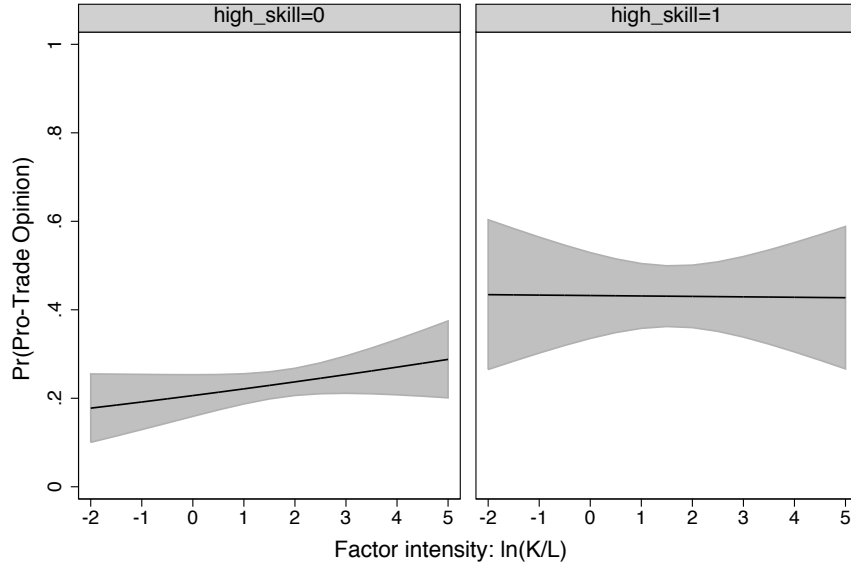
VARIABLES	(1) SS-2001	(2) HH-2006	(3) MR-2005 (1)	(4) MR-2005 (2)	(5) Baseline	(6) Model 1
Education (years)	0.029*** (0.0016)		0.027*** (0.0016)			
Junior High		0.050*** (0.016)				
High School		0.12*** (0.018)				
Some College		0.21*** (0.019)				
Bachelor's Degree +		0.30*** (0.017)				
ln(Net Export Share)	-0.031** (0.015)					
ln(GDP per capita)			0.11*** (0.019)	0.098*** (0.019)		
High-Skill Dummy				0.21*** (0.013)	0.22*** (0.035)	0.19*** (0.025)
Net Export Dummy						0.14*** (0.031)
ln(Capital-Labor Ratio)						0.017 (0.011)
AIC Score	7559.27	7529.587	7526.279	7556.323	7578.902	7497.823
Observations	6,668	6,668	6,668	6,668	6,668	6,668

Notes: The table contains the estimated marginal effect on the probability of being pro-trade, given an increase in the value of the relevant regressor, holding all other regressors at their mean value. Significance at the 1% level (***), 5% level (**), and 10% level (*). Robust standard errors clustered by country are in parentheses. The Akaike Information Criterion (AIC) measures the quality of each statistical model relative to the other models. The lower the score, the better the model fits the given data.

4.2 Hainmueller and Hiscox (2006)

The authors test their assumption that an individual's education will not provide a linear prediction for trade preferences. They use four separate categories for the highest level of education attained – *Junior High*, *High School*, *Some College*, and *Bachelor's Degree (or higher)* – and test these across four different subsamples – full sample, employed, unemployed, and retired. Their baseline specification for testing this non-linearity assumption is:

Figure 2: Adjusted predictions of *High-Skill Dummy* across capital-to-labor ratio



$$Trade\ Opinion_i = \alpha + \beta Education\ Level_i + \epsilon, \quad (2)$$

where *Education Level* is a vector of the four categories of education level attained. According to column (2) in Table 4 there appears to still be some linearity in the results; however, there is a clear difference between those individuals with less education and those with some college or more: those with a college education have a higher probability of being pro-trade than those with less education.

I also test this model across the three subsamples – employed, unemployed, and retired – and find similar results as Hainmueller and Hiscox: the magnitude and significance of each marginal effect remains consistent across subsamples. However, the retired subsample tends to decrease in support by a slight margin (see Table 5 in the data appendix). This is an interesting finding because it challenges the distributional consequences of trade that the Ricardo-Viner and Heckscher-Ohlin models claim. If the factor-type or sector of employment matter for trade preferences, why would

they matter to those who are not currently working? The authors claim that education is not just a proxy for factor-type – i.e., high- vs. low-skilled labor – but is actually a measure of the knowledge an individual contains about the general welfare gains from trade. I do not fully subscribe to this interpretation of their results; however, I do not have a better explanation for their findings and thus I will leave this to future research.

4.3 Mayda and Rodrik (2005)

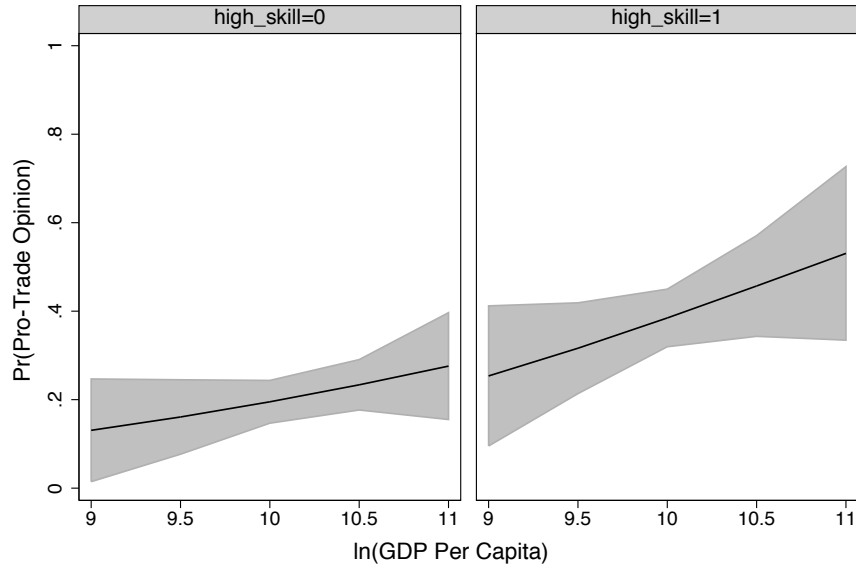
The authors exploit a cross-country survey on trade preferences – and other economic and political attitudes – by including a measure of each country’s wealth, GDP per capita. By including this variable as an interaction term in the model, the authors are testing the predictions of the Heckscher-Ohlin model that the abundant factor in any country k will support trade liberalization. Thus, a high-skilled laborer in a wealthy country and a low-skilled laborer in a poor country should have similar trade preferences. The model specification follows:

$$\text{Trade Opinion}_i = \alpha + \beta_1 \text{Education}_i * \ln(\text{Income})_k + [\dots] + \epsilon, \quad (3)$$

where “[...]” includes the interaction components separately. Column (3) in Table 4 provides evidence that the Heckscher-Ohlin model explains trade preferences across countries as predicted: an average individual in terms of both education and country-level income will increase in the probability of being pro-trade by almost 3% per year of additional education (holding GDP per capita constant) and likewise an increase of 10% per additional unit increase in $\ln(\text{GDP per capita})$ (holding years of education constant). When I take into account the non-linearity of education as in Hainmueller and Hiscox (column (4)) by using the *High-Skill Dummy*, the predicted probability of being pro-trade increases by almost 20 percentage points.

These results follow the predictions of the Heckscher-Ohlin model according to the marginal

Figure 3: Adjusted predictions of $High-Skill\ Dummy * \ln(GDP\ per\ capita)$



effects; however, as illustrated in Figure 3, the results are actually being driven by high-skilled labor. According to the Heckscher-Ohlin model, low-skilled labor should have pro-trade preferences in poorer countries (in this case, the lower bound of the income distribution is Poland) and these preferences should become more anti-trade as a country's wealth increases. Thus, the lefthand panel should be downward sloping. My hypothesis for why we do not see this trend amongst low-skilled labor is that a country's endowment of a factor of production is not the key element in predicting trade preferences, but rather we must take into account the intensity with which a factor is utilized. The following subsection will test this hypothesis.

4.4 Factor Content of Trade Approach

The assumptions of the Heckscher-Ohlin model state that an economy will export goods that are produced using intensively its abundant factor of production. Bowen, Leamer, and Sveikauskas (1987) have shown that factor abundance predicts the direction of trade only 50% of the time thus weakening a crucial assumption to the model. In the following empirical specification I account for

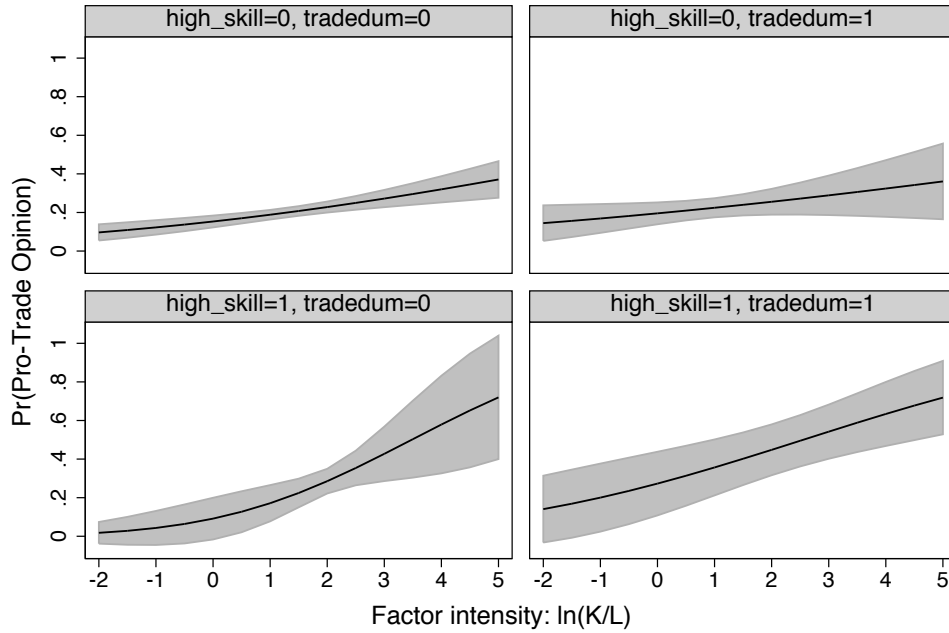
these assumptions explicitly in the model as a three-way interaction term:

$$Trade\ Opinion_i = \alpha + \beta_1 High\ Skill * \ln\left(\frac{K}{L}\right) * \ln(Net\ Export\ Share) + [...] + \epsilon, \quad (4)$$

where “[...]” again includes all components of the three-way interaction term, including the two-way interaction of each component. In this model specification, I take the natural log of the capital-to-labor ratio and the net export share in order to reduce the skewness in both variables. Columns (5) and (6) in Table 4 present the results of this model. Column (5) provides a benchmark from which to measure the effects of the interaction. According to column (5), an individual who shifts from being low-skilled to high-skilled will increase his/her probability of being pro-trade by over 20%. Note that the AIC score is actually higher than the four prior models, proving that this model specification is not preferred to the others.

Column (6) reports the marginal effects for the alternative approach that explicitly takes into account the factor intensity and direction of trade for each sector. First, note that the AIC score is lower than all previous models, despite the addition of extra parameters, thus showing the superior fit of the model. Second, the marginal effects for the main components of the model predict that a shift from low-skill and import-competing to high-skill and exporting increases the probability of being pro-trade by over 33%, and this probability increases by almost 2% for each unit increase in the natural log of the capital-to-labor ratio. These results hold when I substitute a dummy variable for capital-intense sectors and use the net export share as my continuous variable in the interaction – see the Table 6 in the appendix. Figure 4 plots these marginal effects for each dummy pairing of skill level and direction of trade for each sector. The bottom-right panel follows the predictions of the Heckscher-Ohlin model, that is, a high-skilled laborer in a labor-intense industry will be more anti-trade than a high-skill laborer in a capital-intense industry. The bottom-left panel

Figure 4: Adjusted predictions of $High\text{-Skill Dummy} * Trade\ Dummy * Factor\ Intensity$



follows a similar trajectory for import-competing sectors, which is a bit surprising. However, if we consider the increasing importance of intra-industry trade, it may be the case that capital-intensive sectors require intermediate goods from abroad, and thus a capital-intensive sector will support trade liberalization in order to access cheaper intermediate inputs even if it is an import-competing sector.

While the preferences for high-skilled laborers seems to follow the predictions of the Heckscher-Ohlin model, the preferences for the low-skilled laborers are less predictable. According to the plot of the marginal effects on the upper panels, low-skilled laborers will exhibit more anti-trade preferences when they are employed in a labor-intensive industry, that is, an industry that uses their factor of production intensively. My priors are that these results are a function of the relative scarcity of low-skilled labor compared to high-skilled labor in the sample of countries – recall that Poland is the poorest country in the sample. Thus, it may be the case that low-skilled

labor is anti-trade across all sectors in developed countries, while high-skilled labor follows the predictions of the Heckscher-Ohlin model. In order to provide further justification for the factor content approach, I require a distribution of countries that includes more low-income countries. Unfortunately, the current lack of data for some of the poorer countries in the ISSP data set – e.g., Bulgaria, Philippines, Uruguay, and Venezuela – makes this analysis unlikely. I will leave this to future research.

5 Conclusion

A potentially better title for this paper would be “*Another* Study on Individual Trade Preferences?” The international political economy literature is certainly not lacking on analyses that attempt to untangle how trade preferences are formed. However, to date there has not been a single study on individual trade preferences that tests the assumptions of the Heckscher-Ohlin model, that is, that the abundant factor will be used intensively in the production of export goods. My analysis of each study using the same data set shows that the factor content approach fits the data marginally better. As predicted by the Heckscher-Ohlin model, high-skilled laborers that are employed in capital-intensive industries are more pro-trade than high-skilled laborers that are employed in labor-intensive industries. In contrast to the Heckscher-Ohlin model, these effects do not change when the factor is employed in an exporting or import-competing industry. Surprisingly, low-skilled labor does not follow the predictions of the Heckscher-Ohlin model with regards to factor intensity, but rather exhibits consistent anti-trade preferences across factor intensity and direction of trade. This may be a result of the sample of countries used in this analysis, which are all members of the OECD. Thus, including a sample of low-income countries in future analyses would prove beneficial to testing this factor content of trade approach.

For over a decade the field of international political economy has been under the assumption

that the abundant factor in an economy will generally be pro-trade and the scarce factor will be anti-trade. However, this analysis provides evidence that high-skilled labor – an abundant factor in most of these countries³² – is not always pro-trade; we must consider the factor content of trade in each industry in order to correctly predict individual trade-policy preferences.

³²Poland and the Czech Republic are possible exceptions; however, according to Table 3, the average capital-to-labor ratios in both countries are higher than other countries in the sample.

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A Data Appendix

Countries (full sample):

- In this analysis: Australia, Austria, Czech Republic, Denmark, Finland, France, Israel, Netherlands, Norway, Poland, Spain, Sweden, United Kingdom (Great Britain in ISSP)
- In ISSP and OECD STAN, but no capital data (dropped): Chile, Canada, Hungary, Ireland, Japan, Korea, Portugal, Slovakia, Slovenia, Switzerland, Germany, United States
- Not in ISSP (dropped): Belgium, Estonia, Greece, Iceland, Italy, Luxembourg, Mexico
- Not in OECD STAN (dropped): Bulgaria, Latvia, New Zealand, Philippines, Russia, South Africa, Taiwan, Uruguay, Venezuela

Capital Stock Data:

Similar to Davis and Weinstein (2001), capital stock for 2003 is calculated using the perpetual inventory method. Data for all sectors were taken from the OECD STAN database and disaggregated at the ISIC Rev. 3 two-digit level. Gross fixed capital formation (GFCF) for sector i is given in current prices and national currencies and converted to current USD using the 2003 exchange rates from the Penn World Tables version 7.1

Labor Data:

The number of persons engaged in 2003 is taken from the OECD STAN database, disaggregated at the ISIC Rev. 3 two-digit level.

Trade Data:

Net trade data in 2003 is taken from the OECD STAN database, disaggregated at the ISIC Rev. 3 two-digit level and reported in current US dollars.

Value Added Data:

Value added in 2003 is taken from the OECD STAN database, disaggregated at the ISIC Rev. 3 two-digit level and converted to 2003 U.S. dollars using the 2003 exchange rates from the Penn World Tables version 7.1.

Table 5: Probit results for Hainmueller and Hiscox (2006) model

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Model 1 Full sample	Model 1 In paid work	Model 1 Not in paid work	Model 1 Retired	Model 2 Full sample	Model 2 In paid work	Model 2 Not in paid work	Model 2 Retired
Education (years)	0.026*** (0.0011)	0.027*** (0.0016)	0.025*** (0.0027)	0.016*** (0.0022)				
Junior High					0.066*** (0.013)	0.051*** (0.019)	0.082*** (0.029)	0.028 (0.023)
High School					0.14*** (0.013)	0.12*** (0.019)	0.13*** (0.030)	0.10*** (0.026)
Some College					0.20*** (0.013)	0.19*** (0.019)	0.18*** (0.029)	0.15*** (0.024)
Bachelor's Degree+					0.27*** (0.013)	0.26*** (0.018)	0.30*** (0.033)	0.19*** (0.027)
Observations	11,530	7,346	2,003	2,098	11,530	7,346	2,003	2,098

Notes: The table contains the estimated marginal effect on the probability of being pro-trade, given an increase in the value of the relevant regressor, holding all other regressors at their mean value. Significance at the 1% level (***), 5% level (**), and 10% level (*). Robust standard errors clustered by country are in parentheses. The Akaike Information Criterion (AIC) measures the quality of each statistical model relative to the other models. The lower the score, the better the model fits the given data.

Table 6: Probit results for factor content approach

VARIABLES	(1) Baseline	(2) Model 1	(3) Model 2
High-Skill Dummy	0.22*** (0.035)	0.19*** (0.025)	0.19*** (0.056)
Capital-Intensity Dummy			0.091*** (0.034)
ln(Net Export Share)			0.74 (0.71)
ln(Capital-Labor Ratio)		0.017 (0.011)	
Net Export Dummy		0.14*** (0.031)	
AIC Score	7578.90	7497.82	7570.09
Observations	6,668	6,668	6,668

Notes: The table contains the estimated marginal effect on the probability of being pro-trade, given an increase in the value of the relevant regressor, holding all other regressors at their mean value. Significance at the 1% level (***), 5% level (**), and 10% level (*). Robust standard errors clustered by country are in parentheses. The Akaike Information Criterion (AIC) measures the quality of each statistical model relative to the other models. The lower the score, the better the model fits the given data.

Table 7: ISCO-88 Occupations to ISIC Rev. 3.1 Industries Conversion Table

ISIC	Industry Description	ISCO	Occupation Description	N
1	Agriculture, hunting and related service activities	110	Farm-hands and labourers	174
2	Forestry, logging and related service activities	1000	Forestry and related workers	10
		1100	Forestry workers and loggers	27
		1110	Forestry labourers	44
1,2	Agriculture, Hunting and related service activities; Forestry, Logging and related service activities	8266	Agronomists and related professionals	18
		8269	Farming and forestry advisers	7
		8270	Motorised farm and forestry plant operators	14
1,2,5	Agriculture, Hunting and related service activities; Forestry, Logging and related service activities; Fishing, Operation of Fish Hatcheries and Fish Farms; Service activities incidental to Fishing	8271	Production and operations managers in agriculture, hunting, forestry and fishing	9
		8272	Managers of small enterprises in agriculture, hunting, forestry and fishing	34
1,5	Agriculture, hunting and forestry; Fishing	8273	Agricultural, fishery and related labourers	4
		8274	Fishery, hunting and trapping labourers	1
10-14	Mining and Quarrying	8278	Mining and metallurgical technicians	11
		8279	Miners and quarry workers	39
		8280	Shotfirers and blasters	2
		8281	Stone splitters, cutters and carvers	9
		8282	Mining and mineral-processing-plant operators	3
		8283	Mining plant operators	14
		8284	Mining and quarrying labourers	4
10-14,45	Mining and quarrying; Construction	8285	Mining and construction labourers	24
10-45		8286	Labourers in mining, construction, manufacturing and transport	40
13,14	Mining of metal ores; Other mining and quarrying	8290	Mineral-ore and stone-processing-plant operators	3
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying	1120	Well drillers and borers and related workers	4
15-37	Manufacturing	8300	Production and operations managers in manufacturing	71
		8310	Managers of small enterprises in manufacturing	51
		8311	Manufacturing labourers	212
		8312	Hand packers and other manufacturing labourers	3
15	Manufacture of food products and beverages	1130	Food processing and related trades workers	8
		1140	Butchers, fishmongers and related food preparers	63
		1142	Bakers, pastry-cooks and confectionery makers	91
		1143	Dairy-products workers	6
		1200	Fruit, vegetable and related preservers	2
		1210	Food and beverage tasters and graders	7
		1220	Food and related products machine operators	27
		1221	Meat- and fish-processing-machine operators	14
		1222	Dairy-products machine operators	6
		1223	Grain- and spice-milling-machine operators	4
		1224	Baked-goods, cereal- and chocolate-products machine operators	10
		1225	Fruit-, vegetable- and nut-processing-machine operators	4
		1226	Sugar production machine operators	1
		1227	Tea-, coffee- and cocoa-processing-machine operators	2
1228	Brewers, wine and other beverage machine operators	9		
1,15	Agriculture, hunting and related service activities; Manufacture of food products and beverages	8240	Market gardeners and crop growers	73
		8250	Field crop and vegetable growers	144
		8251	Gardeners, horticultural and nursery growers	31
		8252	Animal producers and related workers	16
		8253	Dairy and livestock producers	104
		8260	Poultry producers	5
		8261	Animal producers and related workers not elsewhere classified	11
		8262	Crop and animal producers	228
		8263	US:Farmers,NL:farm foreman	2
8264	US:Farm supervisors,NL:farmers nec	14		
8265	Hunters and trappers	1		
5,15	Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing; Manufacture of food products and beverages	9130	Aquatic life cultivation workers	3
		9131	Inland and coastal waters fishery workers	8
		9132	Deep-sea fishery workers	4
1,5,15	Agriculture, hunting and related service activities; Fishing; Manufacture of food products and beverages	8275	Skilled agricultural and fishery workers	63
		8276	Skilled agricultural and fishery workers	36
		8277	Fishery workers, hunters and trappers	1
16	Manufacture of tobacco products	1229	Tobacco production machine operators	4
17	Manufacture of textiles	1230	Fibre preparers	6
		1231	Weavers, knitters and related workers	21
		1232	Fibre-preparing-, spinning- and winding-machine operators	24
		1233	Weaving- and knitting-machine operators	31
		1234	Bleaching-, dyeing- and cleaning-machine operators	21

ISIC	Industry Description	ISCO	Occupation Description	N
18	Manufacture of wearing apparel; dressing and dyeing of fur	1235	Tailors, dressmakers and hatters	134
		1236	Furriers and related workers	2
		1237	Sewers, embroiderers and related workers	102
		1238	Upholsterers and related workers	13
		1239	Sewing-machine operators	56
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	1240	Textile, leather and related pattern-makers and cutters	12
		1250	Pelt, leather and shoemaking trades workers	6
		1251	Pelt dressers, tanners and fellmongers	5
		1252	Shoe-makers and related workers	37
		8330	Shoemaking- and related machine operators	12
17-19	Manufacture of textiles; Manufacture of wearing apparel; dressing and dyeing of fur; Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	8320	Handicraft workers in textile, leather and related materials	11
		8322	Textile-, fur- and leather-products machine operators	20
		8323	Textile-, fur- and leather-products machine operators not elsewhere classified	9
18,19	Manufacture of wearing apparel; dressing and dyeing of fur; Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	8324	Fur- and leather-preparing-machine operators	1
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1300	Handicraft workers in wood and related materials	7
		1310	Wood treaters, cabinet-makers and related trades workers	16
		1311	Wood treaters	14
		1312	Cabinetmakers and related workers	110
		1313	Woodworking machine setters and setter-operators	12
		1314	Basketry weavers, brush makers and related workers	2
		1315	Wood-processing-plant operators	10
		1316	Wood-products machine operators	19
		1317	Wood and related products assemblers	5
21	Manufacture of paper and paper products	1318	Paper-pulp plant operators	3
		1319	Papermaking-plant operators	5
		2000	Paper-products machine operators	11
		2100	Paperboard, textile and related products assemblers	2
20,21	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials; Manufacture of paper and paper products	8331	Wood-processing- and papermaking-plant operators	12
22	Publishing, printing and reproduction of recorded media	2110	Compositors, typesetters and related workers	38
		2111	Stereotypers and electrotypers	4
		2112	Printing engravers and etchers	6
		2113	Photographic and related workers	6
		2114	Bookbinders and related workers	15
		2120	Silk-screen, block and craft textile printers	4
		2121	Printing-, binding- and paper-products machine operators	5
		2122	Printing-machine operators	21
		2130	Book-binding-machine operators	1
21,22	Manufacture of paper and paper products; Publishing, printing and reproduction of recorded media	8332	Craft printing and related trades workers	17
23	Manufacture of coke, refined petroleum products and nuclear fuel	2131	Petroleum- and natural-gas-refining-plant operators	1
24	Manufacture of Chemicals and Chemical Products	2132	Pharmacologists, pathologists and related professionals	10
		2139	Crushing-, grinding- and chemical-mixing-machinery operators	3
		2140	Chemical-heat-treating-plant operators	5
		2141	Chemical-still and reactor operators (except petroleum and natural gas)	4
		2142	Chemical-processing-plant operators not elsewhere classified	10
		2143	Chemical-products machine operators	1
		2144	Pharmaceutical-and toiletry-products machine operators	10
		2145	Photographic-products machine operators	1
2146	Chemical-products machine operators not elsewhere classified	7		
23,24	Manufacture of coke, refined petroleum products and nuclear fuel; Manufacture of chemicals and chemical products	8333	Chemical-processing-plant operators	14
25	Manufacture of rubber and plastics products	2147	Rubber- and plastic-products machine operators	5
		2148	Rubber-products machine operators	15
		2149	Plastic-products machine operators	25

ISIC	Industry Description	ISCO	Occupation Description	N
26	Manufacture of other non-metallic mineral products	2200	Potters, glass-makers and related trades workers	6
		2210	Abrasive wheel formers, potters and related workers	8
		2211	Glass-makers, cutters, grinders and finishers	14
		2212	Glass engravers and etchers	2
		2213	Glass, ceramics and related decorative painters	11
		2220	Glass, ceramics and related plant operators	2
		2221	Glass and ceramics kiln and related machine operators	6
		2222	Glass, ceramics and related plant operators not elsewhere cl	6
27	Manufacture of basic metals	2223	Cement and other mineral products machine operators	8
		2224	Metal worker nec,NL:non-farm foreman	32
		2229	Metal-processing plant operators	8
		2230	Ore and metal furnace operators	7
		2300	Metal melters, casters and rolling-mill operators	6
		2310	Metal heat-treating-plant operators	5
28	Manufacture of fabricated metal products, except machinery and equipment	2320	Metal drawers and extruders	4
		2321	Tool-makers and related workers	114
		2322	Metal wheel-grinders, polishers and tool sharpeners	35
25,28	Manufacture of rubber and plastics products; Manufacture of fabricated metal products, except machinery and equipment	2330	Metal finishing-, plating- and coating-machine operators	6
		8334	Metal-, rubber- and plastic-products assemblers	12
27,28	Manufacture of basic metals; Manufacture of fabricated metal products, except machinery and equipment	8340	Metal moulders and coremakers	17
		9000	Welders and flame cutters	77
		9100	Sheet-metal workers	38
		9110	Blacksmiths, tool-makers and related trades workers	17
		9111	Blacksmiths, hammer-smiths and forging-press workers	24
29	Manufacture of machinery and equipment n.e.c.	2331	Machine-tool setters and setter-operators	66
		2332	Motor vehicle mechanics and fitters	194
		2340	Aircraft engine mechanics and fitters	9
		2350	Agricultural- or industrial-machinery mechanics and fitters	70
		2351	Machine-tool operators	79
		2352	Mechanical-machinery assemblers	26
31	Manufacture of electrical machinery and apparatus n.e.c.	2359	Electrical and electronic equipment mechanics and fitters	87
		2400	Electrical mechanics fitters and services	111
		2410	Electronics mechanics, fitters and servicers	18
		2411	Electronics engin nec,NL:skill manual	2
		2412	Electrical-equipment assemblers	22
32	Manufacture of radio, television and communication equipment and apparatus	2419	Electronic-equipment assemblers	23
33	Manufacture of medical, precision and optical instruments, watches and clocks	2420	Precision, handicraft, craft printing and related trades wor	3
		2421	Precision workers in metal and related materials	12
		2422	Precision-instrument makers and repairers	29
36	Manufacture of furniture; manufacturing n.e.c.	2429	Musical-instrument makers and tuners	4
		2430	Jewellery and precious-metal workers	20
		2431	Other machine operators not elsewhere classified	166
40	Electricity, gas, steam and hot water supply	2432	Power-production and related plant operators	9
		2440	Power-production plant operators	6
		2441	Steam-engine and boiler operators	10
		2442	Incinerator, water-treatment and related plant operators	7
45	Construction	2443	Production and operations managers in construction	30
		2444	Managers of small enterprises in construction	58
		2445	Decorators and commercial designers	89
		2446	Building frame and related trades workers	47
		2450	Builders	36
		2451	Bricklayers and stonemasons	172
		2452	Concrete placers, concrete finishers and related workers	31
		2453	Carpenters and joiners	161
		2454	Building frame and related trades workers not elsewhere classified	63
		2455	Building finishers and related trades workers	19
		2460	Roofers	14
		2470	Floor layers and tile setters	36
		3000	Plasterers	18
		3100	Insulation workers	9
		3110	Glaziers	12
		3111	Plumbers and pipe fitters	106
		3112	Building and related electricians	85
		3113	Building finishers and related trade workers not elsewhere classified	2
		3114	Painters, building structure cleaners and related trades workers	11
		3115	Painters and related workers	100
3116	Building structure cleaners	8		
3117	Construction and maintenance labourers: roads, dams and similar constructions	56		
3118	Building construction labourers	85		
9112	Structural-metal preparers and erectors	46		
9113	Riggers and cable splicers	2		
9120	Underwater workers	2		

ISIC	Industry Description	ISCO	Occupation Description	N
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	3119	Pharmacists	30
50-52	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	9133	Technical and commercial sales representatives	192
		9140	Models, salespersons and demonstrators	45
		9141	Shop, stall and market salespersons and demonstrators	1317
		9142	Stall and market salespersons	1
51,52		9150	Production and operations managers in wholesale and retail trade	28
		9151	Managers of small enterprises in wholesale and retail trade	299
55	Hotels and Restaurants	3120	Production and operations managers in restaurants and hotels	27
		3121	Managers of small enterprises of restaurants and hotels	61
		9152	Cooks	257
		9153	Waiters, waitresses and bartenders	274
60	Land transport; transport via pipelines	3122	Locomotive engine drivers and related workers	12
		3123	Locomotive engine drivers	14
		3130	Railway brakemen, signallers and shunters	19
		3131	Motor vehicle drivers	80
		3132	Car, taxi and van drivers	124
		3133	Bus and tram drivers	94
		3139	Heavy truck and lorry drivers	228
61	Water transport	3140	Shipsengineers	6
		3141	Shipsdeck officers and pilots	18
		3142	Shipsdeck crews and related workers	15
62	Air transport	3143	Aircraft pilots and related associate professionals	8
		3144	Air traffic controllers	5
		3145	Air traffic safety technicians	4
61,62	Water transport; Air transport	9311	Ship and aircraft controllers and technicians	13
63	Supporting and auxiliary transport activities; activities of travel agencies	3150	Travel consultants and organisers	14
		3151	Stock clerks	175
		3152	Transport clerks	66
		3200	Travel agency and related clerks	25
		3210	Travel attendants and related workers	13
		3211	Travel attendants and travel stewards	24
		3212	Transport conductors	22
		3213	Travel guides	8
64	Post and telecommunications	3220	Library, mail and related clerks	36
		3221	Library and filing clerks	49
		3222	Mail carriers and sorting clerks	90
		3223	Telephone switchboard operators	59
		3224	Telegraph and telephone installers and servicers	17
		3225	Electrical line installers, repairers and cable jointers	12
		3226	Messengers, porters, doorkeepers and related workers	3
		3227	Messengers, package and luggage porters and deliverers	74
60-64	Transport, storage and communications	9212	Transport labourers and freight handlers	137
		9213	Freight handlers	13
		9300	Production and operations managers in transport, storage and communications	26
		9310	Managers of small enterprises in transport, storage and communications	32
65	Financial intermediation, except insurance and pension funding	3228	Securities and finance dealers and brokers	44
		3229	Tellers and other counter clerks	105
66	Insurance and pension funding, except compulsory social security	3230	Insurance representatives	64
67	Activities auxiliary to financial intermediation	3231	Trade brokers	32
		3232	Clearing and forwarding agents	16
70	Real estate activities	3300	Estate agents	47
		3310	Buyers	46
		3320	Appraisers, valuers and auctioneers	21
72	Computer and related activities	3330	Computing services managers	23
		3340	Computer systems designers, analysts and programmers	96
		3400	Computer programmers	10
		3410	Computing professionals not elsewhere classified	26
		3411	Computer assistants	44
		3412	Computer equipment operators	16
		3413	Coding, proof-reading and related clerks	3
73	Research and Development	3414	Research and development managers	25
		3415	Physical, mathematical and engineering science professionals	28
		3416	Physicists, chemists and related professionals	10
		3417	Physicists and astronomers	7
		3419	Meteorologists	2
		3420	Chemists	17
		3421	Mathematicians, statisticians and related professionals	2
		3422	Mathematicians and related professionals	2
		3423	Statisticians	10
		3429	Social science and related professionals	28
		3430	Economists	79
		3431	Sociologists, anthropologists and related professionals	7
		3432	Philosophers, historians and political scientists	4
		3433	Philologists, translators and interpreters	31
		3434	Life science and health associate professionals	5
		3440	Life science technicians and related associate professional	15
		3441	Life science technicians	65
		3442	Agronomy and forestry technicians	9

ISIC	Industry Description	ISCO	Occupation Description	N		
74	Other business activities	3443	Advertising and public relations managers	14		
		3444	Geologists and geophysicists	17		
		3449	Architects, engineers and related professionals	104		
		3450	Architects, town and traffic planners	43		
		3451	Civil engineers	68		
		3452	Electrical engineers	31		
		3460	Electronics and telecommunications engineers	24		
		3470	Mechanical engineers	41		
		3471	Chemical engineers	23		
		3472	Mining engineers, metallurgists and related professionals	6		
		3473	Cartographers and surveyors	10		
		3474	Architects, engineers and related professionals not elsewhere classified	67		
		3475	Accountants	182		
		3480	Personnel and careers professionals	51		
		4000	Business professionals not elsewhere classified	145		
		4100	Legal professionals	19		
		4110	Lawyers	66		
		4111	Legal professionals not elsewhere classified	38		
		4112	Employment agents and labour contractors	33		
		4113	Administrative associate professionals	298		
		4114	Administrative secretaries and related associate professionals	104		
		4115	Legal and related business associate professionals	32		
		4120	Bookkeepers	186		
		4121	Statistical, mathematical and related associate professionals	8		
		4122	Office clerks	251		
		4130	Secretaries and keyboard-operating clerks	109		
		4131	Stenographers and typists	45		
		4132	Word-processor and related operators	22		
		4133	Data entry operators	28		
		4140	Calculating-machine operators	33		
		4141	Secretaries	512		
		4142	Numerical clerks	50		
		4143	Accounting and book-keeping clerks	298		
		4144	Statistical and finance clerks	100		
		4190	Production clerks	47		
		4200	Scribes and related workers	13		
		4210	Other office clerks	447		
		4211	Protective services workers not elsewhere classified	64		
		4212	Building caretakers, window and related cleaners	23		
		4213	Building caretakers	122		
		4215	Vehicle, window and related cleaners	18		
		4220	Doorkeepers, watchpersons and related workers	117		
		4221	Vending-machine money collectors, meter readers and related workers	9		
		65-74	Financial Intermediation; Real Estate, Renting and Business Activities	9312	Production and operations managers in business services	14
				9313	Managers of small enterprises in business services enterprises	57
				9320	Finance and sales associate professionals	125
		75	Public Administration and Defence; Compulsory Social Security	4222	Armed forces	108
4223	Legislators, senior officials and managers			94		
5000	Legislators and senior officials			12		
5100	Legislators and senior government officials			13		
5110	Senior government official			73		
5111	Traditional chiefs+heads of villages			6		
5112	HU:High-grade military officer			3		
5113	HU:Low-grade commissioned officer			4		
5120	Judges			9		
5121	Safety and quality inspectors			9		
5122	Building and fire inspectors			7		
5123	Safety, health and quality inspectors			45		
5130	Customs, tax and related government associate professionals			39		
5131	Customs and border inspectors			17		
5132	Government tax and excise officials			12		
5133	Government social benefits officials			16		
5139	Government licensing officials			16		
5140	Customs, tax and related government associate professionals not elsewhere classified			19		
5141	Police inspectors and detectives			46		
5143	NL:Police inspectors,detectives			4		
5149	HU,PL,NL:Armed forces non-commiss off			4		
5160	Protective services workers	23				
5161	Fire-fighters	29				
5162	Police officers	73				
5163	Prison guards	12				

ISIC	Industry Description	ISCO	Occupation Description	N
80	Education	5169	Teaching professionals	65
		5200	College, university and higher education teaching professionals	128
		5210	Secondary education teaching professionals	448
		5220	HU,NL:Sec school+academic teacher	11
		5230	HU,NL:Teacher in vocational traing	2
		6000	Primary and pre-primary education teaching professionals	100
		6100	Primary education teaching professionals	306
		6110	Pre-primary education teaching professionals	72
		6111	Special education teaching professionals	64
		6112	Other teaching professionals	17
		6120	Education methods specialists	6
		6121	School inspectors	11
		6122	Other teaching professionals not elsewhere classified	70
		6129	Teaching associate professionals	7
		6130	Primary education teaching associate professionals	166
		6132	Pre-primary education teaching associate professionals	96
		6133	Special education teaching associate professionals	20
6140	Other teaching associate professionals	120		
6141	Other associate professionals	35		
85	Health and Social Work	6150	Senior officials of special-interest organisations	1
		6151	Senior officials of employers workersand other economic-organisations	5
		6152	Senior officials of humanitarian and other special-interest organisations	6
		6153	Life science and health professionals	2
		6154	Health professionals (except nursing)	39
		7000	Medical doctors	111
		7100	Dentists	24
		7110	Veterinarians	10
		7111	Health professionals (except nursing) not elsewhere classified	14
		7112	Nursing and midwifery professionals	226
		7113	Psychologists	37
		7120	Social work professionals	94
		7121	Medical equipment operators	22
		7122	Health associate professionals (except nursing)	32
		7123	Medical assistants	37
		7124	Hygienists, health and environmental officers	4
		7129	Dieticians and nutritionists	12
		7130	Optometrists and opticians	9
		7131	Dental assistants	29
		7132	Physiotherapists and related associate professionals	50
		7133	Veterinary assistants	6
		7134	Pharmaceutical assistants	19
		7135	Health associate professionals (except nursing) not elsewhere classified	56
		7136	Nursing and midwifery associate professionals	54
		7137	Nursing associate professionals	258
		7139	Midwifery associate professionals	15
		7140	Social work associate professionals	112
7141	Child-care workers	149		
7143	Institution-based personal care workers	239		
90	Sewage and refuse disposal, sanitation and similar activities	7200	Garbage collectors and related labourers	9
		7210	Garbage collectors	9
91	Activities of membership organizations n.e.c.	7211	Religious professionals	44
		9330	Religious associate professionals	21
92	Recreational, cultural and sporting activities	7212	Archivists, librarians and related information professionals	15
		7213	Archivists and curators	9
		7214	Librarians and related information professionals	27
		7215	Writers and creative or performing artists	34
		7216	Authors, journalists and other writers	73
		7220	Sculptors, painters and related artists	36
		7221	Composers, musicians and singers	10
		7222	Choreographers and dancers	6
		7223	Film, stage and related actors and directors	14
		7224	Photographers and image and sound recording equipment operators	19
		7230	Broadcasting and telecommunications equipment operators	7
		7231	Artistic, entertainment and sports associate professionals	19
		7232	Radio, television and other announcers	5
		7233	Street, night-club and related musicians, singers and dancers	18
		7240	Clowns, magicians, acrobats and related associate professionals	4
		7241	Athletes, sports persons and related associate professionals	28
		7242	Bookmakers and croupiers	2

ISIC	Industry Description	ISCO	Occupation Description	N
93	Other Service activities	7244	Production and operations managers in personal care, cleaning and related services	6
		7245	Managers of small enterprises in personal care, cleaning and related services	16
		7300	Personal care and related workers not elsewhere classified	58
		7310	Other personal services workers	11
		7311	Hairdressers, barbers, beauticians and related workers	160
		7312	Undertakers and embalmers	3
		7313	Other personal services workers not elsewhere classified	70
		7320	Sales and services elementary occupations	7
		7321	Street vendors and related workers	19
		7322	Street vendors	11
		7323	Street vendors,non-food products	1
		7324	Door-to-door and telephone salespersons	22
		7330	Shoe cleaning and other street services elementary occupations	3
		7331	Hand-laundrerers and pressers	28
95	Private households with employed persons	7332	Home-based personal care workers	101
55,74,95	Hotels and restaurants; Other business activities; Private households with employed persons	9210	Housekeeping and restaurant services workers	77
		9211	Housekeepers and related workers	108
85,93,95		9322	Personal care and related workers	188
55,74,93,95	Hotels and restaurants; Other business activities; Other service activities; Private households with employed persons	9160	Domestic and related helpers, cleaners and launderers	116
		9161	Domestic helpers and cleaners	169
		9162	Helpers and cleaners in offices, hotels and other establishments	389

Table 8: ISCO-88 Occupations Dropped from Sample

ISCO	Occupation Description	N
7340	Corporate managers	13
7341	Directors and chief executives	193
7342	Production and operations managers	83
7343	Production and operations managers not elsewhere classified	276
7344	Other specialists managers	77
7345	Finance and administration managers	75
7346	Personnel and industrial relations managers	40
7400	Sales and marketing managers	96
7410	Supply and distribution managers	26
7411	Other department managers nec	1
7412	Other specialist managers not elsewhere classified	124
7413	US:Miscellaneous office supervisors	5
7414	HU:Miscellaneous officers	5
7415	Managers of small enterprises	40
7420	Managers of small enterprises	189
7421	Managers of small enterprises not elsewhere classified	138
7422	Professionals	22
7423	Computing professionals	140
7424	Life science professionals	7
7430	Biologists, botanists, zoologists and related professionals	19
7431	Other professionals	38
7432	Business professionals	45
7433	Public service administrative professionals	22
7434	Technicians and associate professionals	6
7435	Physical and engineering science associate professionals	47
7436	Physical and engineering science technicians	117
7437	Chemical and physical science technicians	33
7440	Civil engineering technicians	80
7441	Electrical engineering technicians	67
7442	Electronics and telecommunications engineering technicians	65
7510	Mechanical engineering technicians	45
7520	Chemical engineering technicians	21
8000	Draughtspersons	30
8100	Physical and engineering science technicians not elsewhere classified	72
8110	Computer associate professionals	43
8111	Industrial robot controllers	4
8112	Optical and electronic equipment operators	4
8113	Optical and electronic equipment operators not elsewhere classified	7
8120	Finance and sales associate professionals not elsewhere classified	112
8121	Business services agents and trade brokers	11
8122	Business services agents and trade brokers not elsewhere classified	28
8123	Clerks	68
8124	Material-recording and transport clerks	28
8130	Customer services clerks	14
8131	Cashiers, tellers and related clerks	44
8139	Cashiers and ticket clerks	101
8140	Debt-collectors and related workers	6
8141	Client information clerks	22
8142	Receptionists and information clerks	175
8143	Service workers and shop and market sales workers	4
8150	Personal and protective services workers	10
8151	Fashion and other models	6
8152	Craft and related trades workers	138
8154	Extraction and building trades workers	4
8155	Miners, shotfirers, stone cutters and carvers	9
8159	Metal, machinery and related trades workers	20
8160	Metal moulders, welders, sheet-metal workers, structural-metal preparers and related trade workers	31
8161	Machinery mechanics and fitters	82
8162	Handicraft workers in wood, textile, leather and related materials	4
8163	Other craft and related trades workers	11
8170	Textile, garment and related trades workers	16
8200	Plant and machine operators and assemblers	27
8210	Stationary plant and related operators	9
8211	Industrial robot operators	28
8212	Machine operators and assemblers	12
8220	Metal- and mineral-products machine operators	8
8221	Assemblers	40
8223	Drivers and mobile plant operators	1
8224	Agricultural and other mobile plant operators	22
8229	Earth-moving and related plant operators	44
8230	Crane, hoist and related plant operators	35
8231	Lifting-truck operators	39
8232	Sweepers and related labourers	15
9333	Elementary occupations	34