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The Political Economy of Trade Policy in the United States and Canada: Political Cleavages and the Labor Market.

Eugene Charles Beaulieu

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Graduate School of Arts and Sciences

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ABSTRACT

The Political Economy of Trade Policy in the United States and Canada: Political Cleavages and the Labor Market.

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This dissertation consists of three empirical essays examining the political economy and distributional consequences of international trade policy. The first essay examines whether people's positions on free trade are determined by where they work or by the skills they possess. This serves as an indirect empirical examination of the Stolper-Samuelson theorem. If factors are mobile between sectors, the Stolper-Samuelson theorem predicts that cleavages over trade policy would form along factor lines. Conversely, if factors are immobile, cleavages would form along industry lines. This chapter tests these two hypotheses empirically using micro-data from a survey conducted during the 1988 Canadian federal election. Because the only major issue was ratification of the Canada-US Free Trade Agreement (CUSTA), the election was a de facto referendum on free trade. The election, therefore, provides an excellent opportunity to observe whether cleavages over trade policy were formed along factor or industry lines. I find that positions on free trade were drawn along factor lines. Industry of employment only weakly affected positions on free trade, and these effects are not robust to model specification. Labor is mobile enough to ensure that the distributional consequences of trade policy are independent of industry employment. Contrary to earlier literature, this provides indirect empirical support for the Stolper-Samuelson prediction.

The second essay examines U.S. Congressional voting patterns on implementing legislation for the CUSTA, the North American Free Trade Agreement (NAFTA) and the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). The results provide empirical evidence that constituents' economic interests help determine a representative's voting behavior on international trade issues. It is not clear from the results, however, whether the underlying model is the sector (Stolper-Samuelson), or factor model. Both the skill and industry composition of districts help determine House voting patterns on CUSTA and NAFTA. However, neither the factor nor sector models do a very good job of explaining House voting patterns on CUSTA, NAFTA and GATT. As in Canada, political support for the CUSTA appears to be stronger among more the highly skilled.

The third essay takes a direct look at how trade policy affects labor markets, focusing on the differential impact on skilled and unskilled labor. Recent evidence from Canada suggests that the CUSTA had almost no effect on wages and was a small but contributing factor to the observed employment decline in the tradeables sector. There is no empirical evidence on whether the CUSTA affected the relative earnings and employment of skilled and less-skilled workers in Canada. This essay analyses the extent to which the tariff reductions mandated in the CUSTA affected the employment and earnings of skilled and less-skilled workers in the Canadian labor market from 1983 to 1993. I find that Canadian tariff reductions did not affect the earnings of nonproduction or production workers independently. I also find that Canadian tariff reductions lowered employment disproportionately among production workers.

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define success. And they taught me this through love and by example. I only hope that I can pass on some of what they have taught me to Sierra. Thank you Mom and Dad.

To Catherine and Sierra and to my parents, Marcel and Dianne.

Chapter I: Introduction

> The first message is: "Don't take trade theory too seriously". In practice this means "Estimate, don't test"....Our second piece of advice points in the opposite direction: "Don't treat the theory too casually". In practice this means: "Work hard to make a clear and close link between the theory and the data".
>
> Edward E. Leamer and James Levinsohn (1995, pp. 1341)

A large literature has grown out of the desire to understand the relationship between two observed facts: an increased earnings differential (measured in a number of different ways) between skilled and unskilled workers in many industrialized economies and an increase in trade with less-developed countries. The rapid growth of literature examining this issue has resulted in an excellent survey of the literature by Burtless (1995) as well as several symposia addressing the issue including: one published by *The World Economy* (1992); one held by the Federal Reserve Bank of New York (1995); and another one published in *The Journal of Economic Perspectives* (Summer 1995). The literature is dichotomized between theoretical and empirical discourses. This dissertation empirically analyses the relationship between international trade policy and the distribution of income. Although it consists of three empirical studies, an attempt is made to heed Leamer and Levinsohn's advice, and hold the empirical evidence up to the scrutiny of theory.

An important lesson concerning the theoretical and empirical link between trade and factor prices is provided by Deardorff and Hakura (1994): the volume of trade and the level of wages are simultaneously determined in general equilibrium trade models and

therefore it is incorrect to examine the effect of one upon the other. There is not a causal link between trade (volumes) and wages (factor prices) but a relationship that must hold under certain conditions. It is important to ask the proper question. The best approach to the question: "How does trade affect wages?" is to answer the question: "How does a decrease in tariff rates affect wages?" In this case, commercial policy is treated as exogenous. All three essays in this dissertation focus on the distributional consequences of trade policy per se, not on some measure of openness.

The first two essays (Chapters II and III) take an indirect approach to examine the distributional consequences of international trade policy. The Stolper-Samuelson Theorem assumes that factors of production are perfectly mobile between industries and predicts that changes in relative prices due to a change in trade policy have the same effect on returns to factors regardless of the industry in which the factor is employed. This result is known as the *factor-industry detachment corollary*.[1] Alternatively, when factors are completely immobile between industries, a tariff reduction will reduce the real return to all factors employed in import competing industries and increase the real return to those employed in exporting sectors.

The factor-industry detachment corollary implies a stark contrast in the predicted response of factors facing proposed changes in tariff policy. If factors are mobile between sectors, the economic interests of trade policy will cut across industries and be drawn

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[1] See Leamer and Levinsohn (1995), p. 1348.

along factor lines; if immobile, interests will cut across factors and be drawn along industry lines. This contrast in predicted effects on economic interests led Magee (1980) to examine the relative empirical validity of the predictions based on testimony of interest groups appearing before the Ways and Means Committee concerning a comprehensive trade reform act. The insight of looking at political behavior to reveal preferences of economic interests surrounding trade policy is an important one because it is extremely difficult to directly examine the empirical relevance of the predictions from the two models.

Chapter II of this dissertation takes a slightly different approach to the same question. It looks at voting patterns surrounding elections where the key issue was free trade. Chapter II examines whether cleavages were drawn along industry or factor lines in the positions of individual Canadians on the Canada-U.S. Free Trade Agreement (CUSTA). It finds evidence that political cleavages over a free trade agreement with the United States were drawn along factor, not industry lines. This is evidence in support of the factor-industry detachment corollary: factor markets in Canada are sufficiently mobile to ensure that the distributional consequences of trade policy are independent of industry employment.

Two important and perhaps surprising results from Chapter II are that: 1) support for the Stolper-Samuelson Theorem is found in the political economy of trade policy between two similar countries engaged primarily in intra-industry trade; and 2) skilled

workers in Canada were more likely than their less-skilled counterparts to support the CUSTA. The first result provides empirical evidence confirming that the factor-industry detachment corollary is a general result based on the zero-profit assumption and holds even when trade is primarily intra-industry in nature. This is important to keep in mind, but should not be surprising. The second result implies that Canada has a comparative advantage in skilled workers vis à vis the United States. This result is also important but is more surprising.

Several puzzles remain. Does the political economy of trade policy unfold differently when it involves trade between two similar countries, as opposed to two differently endowed countries? If less-skilled workers in Canada opposed the CUSTA, what was the position of less-skilled workers in the United States? To address these puzzles, Chapter III examines whether congressional roll-call voting patterns on the CUSTA, NAFTA and GATT implementing legislation reflects constituent interests the way the factor-industry detachment corollary predicts.

Chapter III analyses the cross-sectional voting patterns of congressional representatives merged with census data on constituent characteristics to examine whether the representative's voting decision reflects the economic interests of constituents. It then examines whether the economic interests that are represented by legislative voting patterns are consistent with the economic interests predicted by the Stolper-Samuelson Theorem. Although there have been several studies examining the determinants of congressional

voting patterns on various trade bills, there have been no attempts to examine whether voting patterns on trade legislation observed on the floor of the United States congress reflect political cleavages predicted by the Stolper-Samuelson Theorem.

The third paper (Chapter IV) takes a more direct approach by examining the effect of CUSTA on the wage differential between skilled and unskilled workers as well as the relative employment effect on the two groups of workers. A number of studies have examined the extent to which international trade has contributed to the observed increased wage differential between skilled and unskilled workers in the United States. A consensus seems to be forming that international trade likely had a small impact on the skill-premium and that the primary determinant of the increased premium is technological change which increased the demand for skilled workers. Most of the studies examine the relationship between the skill-premium and measures of openness to international markets and ignore the impact of trade policy per se. More recently, researchers have examined the impact of trade policy on labor market adjustment. Gaston and Trefler (1994) examine the implication of GATT and CUSTA tariff reductions in the United States on wages, employment and the skill-premium in the U.S. manufacturing; and Hanson and Harrison (1995) examine the effect of trade reform on the Mexican labor market.

Chapter IV examines the distributional consequences for Canada of the trade liberalization within North America. One goal of this chapter is to document the main employment and wage outcomes in Canada from 1983 to 1993. The primary focus is on

the difference in labor market outcomes for skilled and unskilled workers over this period. The other goal of Chapter IV is to examine the extent to which the CUSTA affected the relative wages and employment levels of skilled and unskilled workers.

The data are an 11 year panel of 19 manufacturing industries from 1983 to 1993 from the census of manufacturing with employment and earnings data on production and nonproduction workers. The key results are that the Canadian tariff rate reductions mandated by CUSTA did not affect average annual earnings in the manufacturing industries. The tariff rate reductions did reduce employment in manufacturing industries and the employment reductions were disproportionately among production workers.

Chapter II: Who Supported the Canada-U.S. Free Trade Agreement: Factor or Industry Cleavages in Trade Policy?

II.1. Introduction.

Alternative political economy models examine different mechanisms through which economic and political actors determine trade policy. Brock and Magee (1978), Feenstra and Bhagwati (1982) and Findlay and Wellisz (1982) analyze the idea that intergroup conflict expressed through lobbying activity determines trade policy outcomes. Baldwin (1982,1985) and Mayer (1984), on the other hand, examine the role played by individual voters. The common thread in these models is that political "cleavages" are determined by the distributional consequences of trade policy, which in turn depend on the underlying model of international trade.

In the standard Heckscher-Ohlin-Samuelson (HOS) model of international trade with perfect factor mobility, Stolper and Samuelson (1941) showed that an import tariff will increase or decrease the real return to each factor of production across all sectors depending on the country's relative factor endowments. The Stolper-Samuelson theorem predicts, therefore, that distributional effects of tariff changes depend entirely on the type of factor ownership, not on the industry of employment. Political cleavages are formed along factor lines.

The polar opposite model is the all-factor-specific model (AFS) where factors are completely immobile between sectors of the economy.[1] If factors are specific to the sector in which they are employed, the real return to a factor increases (decreases) in sectors that are positively (negatively) affected by trade policy. The expected distributional

1. Bhagwati and Srinivasan (1984, Ch. 8) provide an excellent summary of the literature on factor mobility and coin the term "all-factor-specific."

consequences of tariff changes depend entirely on the industry of employment, not on the type of factor ownership. Political cleavages are formed along industry (sector) lines.

The distinction between these polar cases, therefore, is important for understanding the impact of trade policy on the distribution of income among domestic factors of production.[2] The important question for the analyst is: are factors of production mobile enough to allow sufficient factor market arbitrage to ensure that the distributional consequences of trade policy do not depend on industry of employment? The current answer to this question in the literature is no. This view stems largely from the work of Magee (1980), who examined the observed political alignments from business- and labor-lobby positions toward a 1973 comprehensive trade bill before the U.S. Congress. He concluded that political lobbying activity is organized along sector, rather than factor, lines. Irwin (1994, 1996) examined political cleavages over trade policy from the 1906 and 1923 British general elections, which were essentially referenda on free trade. He analyzed the county voting patterns from these elections to examine factor mobility and also concluded that cleavages are drawn along sector, not factor lines. Other studies have looked at the relationship between stock market returns and import prices (Grossman and Levinsohn (1989), or stock market returns and the Canada-U.S. Free Trade Agreement (Brander (1991) and Thompson (1993,1994)). These studies have found capital to be industry-specific.

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2. Intermediate cases exist and are discussed in the next section. The general result is that if both factors are highly mobile, factor markets will be sufficiently arbitraged to ensure that the consequences of trade policy are independent of sector.

The empirical studies to date, therefore, suggest that factors are not sufficiently mobile to ensure that the distributional consequences of trade policy are independent of industry employment. But deficiencies of the earlier studies make it difficult to draw inferences about the correct model. The Magee study is short-run (it is based on U.S. trade policy with a four-year horizon) and therefore biased against finding factor mobility; Irwin's study has some data limitations and is based on early 20th century England when factors were less mobile than they are today; the stock market return studies focus exclusively on one factor, capital, which is generally considered industry-specific in the short run. In fact, there is some evidence that the AFS result is overturned in the long run. Rogowski (1987) examines historical episodes of global change in exposure to international trade and finds evidence that political cleavages are drawn along factor lines in the long run. The choice of models, therefore, is still an open and important empirical question.

This paper provides evidence on the political cleavages of trade policy in the long run. Unlike Magee, who looked at lobby positions, this paper examines individual positions on a specific piece of trade legislation. Because the only major issue was ratification of the Canada-U.S. Free Trade Agreement (CUSTA), the 1988 Canadian general election was a de facto referendum on the agreement. The election, therefore, is an exceptional opportunity to study the distributional consequences of international trade and commercial policy in the long run.[3] Examining the voting patterns in referenda on specific

3. Although volumes of studies have examined the effects of the CUSTA, few have addressed the distributional consequences of the agreement. The only econometric analysis of this issue is by Gaston and Trefler (1994.

issues has long been an accepted and insightful approach in the public choice literature.[4] As Fischell (1979) points out, the election process provides the electorate with information about how the proposed policy will affect them and provides some incentive for voters to reveal their true preferences. The problem with applying this approach to trade policy is that trade policy is rarely determined directly by ballot. So, the 1988 Canadian general election provides an exceptional opportunity.

This paper uses survey data to examine the attitudes of the Canadian electorate toward trade policy. The type of factor ownership is defined by embodied human capital: skilled and unskilled labor. The definition of factor ownership is limited to human capital considerations primarily because ownership of physical capital and land is not observed in the data.

The main finding from the analysis is that skill type was an important determinant of voters' positions on the CUSTA; political cleavages in the 1988 election on the CUSTA were drawn along factor lines. Industry of employment had a statistically significant effect on free trade positions in some specifications of the model. The industry effect, however, is a weak one, and is not robust to model specification. Specifically, the significance of the industry effect is not robust when the model controls for other variables such as age, region, union membership and party affiliation. The result, that the

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1997). They study the employment and wage trends in Canada and the United States before and after the implementation of CUSTA. They find that tariff reductions from the agreement account for a small share of total job losses in the Canadian manufacturing sector during the period, but had almost no effect on wages.

4. See, for example, studies on the demand for public goods (Deacon and Shapiro (1975), Bergstrom, Rubinfeld and Shapiro (1982)), on environmental policy (Fischell (1979), Kahn and Matsusaka (1995)) and on property taxes (Moomau and Morton (1992)).

type of factor is a statistically significant determinant of position on the CUSTA, is robust to model specification. The empirical results suggest that labor in Canada is sufficiently mobile to ensure that the distributional consequences of trade policy are independent of industry employment. Contrary to previous literature, this is indirect evidence in support of the Stolper-Samuelson-type prediction that cleavages in trade policy will be formed along factor lines.

The next section provides the theoretical background and an overview of indirect empirical studies of trade policy and factor mobility. Section 3 sets out the empirical framework and discusses the data and the empirical model. Section 4 presents the results and the final section summarizes the conclusions.

II.2. Political Alignments and Trade Policy.

II.2.1 Theoretical background.

The Stolper-Samuelson theorem makes two assertions: that relative commodity price changes produce unambiguous changes in real factor rewards; and that the direction of the latter can be predicted from relative factor intensities.[5] This paper does not attempt to examine either of these assertions. Rather, the focus here is on the more limited but still important Stolper-Samuelson prediction that, if factors are sufficiently mobile, the distributional consequences of trade policy are independent of industry employment. Throughout this paper, this is referred to, for convenience, as the Stolper-Samuelson or SS prediction. It is important to understand that the true underlying model of trade

5. See Ethier (1982).

between Canada and the United States is one of intraindustry trade, not the Heckscher-Ohlin-Samuelson (HOS) model. However, for illustrative purposes, this section discusses alternative predictions for the distributional consequences of commercial policy within an HOS framework. It then reminds the reader that the SS prediction is not limited to an HOS framework.

Perfect factor mobility implies that factor market arbitrage ensures that the distributional consequences of trade policy are independent of sector employment. The almost trivial, extreme polar case is one in which both factors are completely immobile between sectors. This is the alternative model examined empirically by Magee and Irwin, who found that factors of production tend to vote with the industry in which they are employed. This model is interpreted as a very short-run model in which both labor and capital inputs are specific to their industry. Both of these models, along with intermediate models, are summarized in Table 1.

In the intermediate specific-factors (SF) model, developed by Jones (1971), Mayer (1974), and Mussa (1974), each sector employs a factor that is completely specific to that sector and one factor which is perfectly mobile between sectors. In this case, the fortune of a specific factor is tied to its sector of employment and that of the mobile factor is ambiguous, depending on consumption patterns. What is not ambiguous, however, is that the fortunes of the mobile factor do not depend on the sector of employment. This model suggests that we should find the specific factor voting along industry lines and the mobile factor voting as a coalition. More general models assume factors are partially mobile

between sectors. Mussa (1982) and Grossman (1983) develop models in which one factor is partially mobile and the other factor is either completely mobile (Grossman) or completely immobile (Mussa). Grossman's model captures a range of capital mobility from perfect mobility to complete immobility. When capital is perfectly mobile, the result is the Stolper-Samuelson prediction that one factor gains and the other loses from protection; and, when capital is completely immobile, capital owners support protection of their own industry and oppose protection of the other (the SF model). When capital is imperfectly mobile, however, there is an ambiguous effect of commercial policy on the return to capital located in different sectors. If the protected sector is capital intensive, and capital is relatively (but not perfectly) mobile, the labor/capital ratio in the unprotected sector can increase enough for capital located in that sector to avoid an unambiguous loss from protection. The relevant point is that, when one factor is perfectly mobile and the other factor is partially mobile, the effect of trade policy on the perfectly mobile factor does not depend on industry; the effect on the partially mobile factor may or may not depend on sector of employment. This sets the partial-factor mobility models apart from the SF model.

In Mussa (1982), the mobile factor (labor) is an imperfect substitute for units of the "same" factor (labor) employed in other industries. When the degree of labor mobility is low (the elasticity of the convex input transformation curve is small), the wage received by labor in each industry is closely tied to that industry's output price. Therefore, for low levels of labor mobility, there is a divergence of interests between workers in the two

industries. Since capital is assumed completely immobile in this model, the interests of capital owners are also tied to their industry. This gives the same empirical implication as the AFS model; cleavages are drawn along sector, not factor, lines. Depending on the degree of mobility and the size of factor-intensity differentials between sectors, however, the fortunes of the partially mobile factor may or may not be determined by sector.

All of these models are generalized by Hill and Mendez (1983) in a model where both factors are partially mobile. Mobility is parameterized by elasticities of substitution between industries. In a two-sector, two-factor model, there are potentially four different factor markets: one for each factor in each sector. As the inter-sectoral elasticities of substitution approach infinity (factors approach perfect mobility), there are two factors, as in the Stolper-Samuelson model. As the inter-sectoral elasticities of substitution approach zero (factors approach complete immobility), there are four factors, as in the AFS model. The empirical implication of a model in which both factors are partially mobile is that there may exist interactions between factors and industry of employment. If both factors are partially mobile, fortunes can be tied to both industry and factors, depending on whether both factors are equally mobile and on whether factor input ratios are similar across sectors.[6]

Much of the trade between Canada and the United States is intra-industry trade. In fact, prior to the 1988 election, scale economies were predicted to be a major factor in

6. Strictly speaking, there may be interactions between factors and industries within the AFS model as well. That is, it is possible that a change in goods prices affects factor prices within a given sector to different degrees. In the AFS model, however, the effect will be in the same direction for both factors within the same industry.

determining the effects of the CUSTA on the Canadian economy. What do scale economies and intra-industry trade imply for the theoretical possibility of a Stolper-Samuelson type prediction? Krugman (1981) and Helpman and Krugman (1985) show that, in trade between similarly endowed countries, where scale economies are important, it is possible that all factor owners may share in the gains from trade. In this integrated model, where trade based on comparative advantage and scale economies coexist, the SS prediction that cleavages will develop along factor lines holds if, and only if, the comparative advantage effect dominates the scale effect.[7] Whether the SS prediction holds in the context of trade between similar countries is an empirical, not a theoretical, issue. The empirical analysis presented in this paper provides evidence on whether the distributional consequences of trade policy are independent of industry -- even between two similar countries such as Canada and the United States. Thompson (1994) provides empirical evidence that both scale economies and comparative advantage are relevant to Canada-U.S. trade.

II.2.2 The empirical literature.

There are few, if any, direct empirical studies of the distributional consequences of trade policy. As Magee (1980) points out, there is a good reason for this: the enormous difficulty of conducting such an empirical examination. Careful examination of this issue would require information on factor intensities, factor elasticity of substitution, and determinants of inter-industry factor mobility, such as discount rates, moving costs, and

7. Ethier (1982) presents an elegant analysis of the distributional consequences of trade in these types of models.

government adjustment assistance. The two main indirect approaches are to examine the distributional consequences of trade policy using political alignments; and to examine the effect of trade policy on the return to capital using stock market returns. I review the political alignments literature here because it is more relevant for this paper.[8]

The first attempt to use political alignments to analyze trade policy and factor mobility was Magee (1980). As Magee points out, the original Stolper and Samuelson (1941) article suggests this indirect test of the two models. To this end, Magee conducted three empirical tests using American lobbying activity with respect to the Trade Reform Act of 1973. He compared the lobbying activity of labor unions and trade associations (representing capital) that testified on the trade reform bill before the Committee on Ways and Means in the U.S. House of Representatives. In particular, he tested whether, in a two-factor world: 1) capital and labor in the same industry were on opposing sides of the free trade issue; 2) each factor lobby was unanimous across all industries in either its support for, or opposition to, the trade policy; and 3) the position taken on free trade by either factor of production in an industry was independent of whether the industry is export- or import-oriented. Rejection of any of these tests is evidence against the SS predictions. He found that: in 19 of 21 industries, capital and labor lobbies were on the same side in the trade policy debate; neither capital nor labor lobbies were unanimous in their position on free trade across sectors; and lobby positions were a function of the trade orientation of the industry with which they were affiliated. He concluded, therefore, that

8. As mentioned in the introduction, several studies provide evidence on the degree of capital mobility: Grossman and Levinsohn (1989), Brander (1991), and Thompson (1993,1994).

factors are not perfectly mobile between industries because of sector-specific human capital and high-technology physical capital.

Although Magee introduces a clever test of the SS theorem, there are empirical and theoretical issues that weaken his analysis, and render his results suggestive rather than compelling. Magee points out that the first test can be interpreted differently if labor and capital are complementary to other unobserved factors of production, such as land and skilled labor. In addition, he uses the lobby position of trade associations as a proxy for "capital's" position on trade policy. To the extent that trade associations represent a broad-based constituency within particular industries (including factors of production in addition to capital) it is not surprising that the capital lobbies and labor unions held the same positions within given industries. Moreover, Magee interprets each lobby's position on the Trade Reform Act as a broad position on freer versus more restricted trade per se, rather than as the lobby's position on specific items in the bill or on some form of rent seeking by different industries. Empirically, he has very few observations, only 29 trade associations (business lobbies) and 23 labor unions covering 33 industries. Joint observations on trade associations and labor unions are available for only 21 industries.

Magee (1994) argues that the 1980 results are biased against the Stolper-Samuelson theorem because, for institutional reasons, the observed lobby positions had a short time horizon. U.S. trade legislation is renewed every four years. Because Magee's findings reflect the behavior of lobbies with a four-year time horizon, they are not necessarily contrary to SS long-run predictions. Magee (1994) and Magee, Brock and

Young (1989) argue that a specific-factor model characterizes the political alignment over trade policy in the short run and that the Stolper-Samuelson theorem characterizes trade policy positions in the long run.

Magee's results are consistent with the view that factors are not perfectly mobile between sectors. His results, however, are also consistent with other interpretations which are not contrary to Stolper-Samuelson. One interpretation is that, in the presence of intermediate goods, both labor and capital may lobby to reduce tariffs on imported intermediates. Another interpretation, pointed out by Magee, is that lobbying costs and free rider problems are lower for industry lobbies than for factor lobbies. It is perhaps for these reasons that the lobbies in Magee's sample represented industry rather than factor interests. Both interpretations are consistent with Magee's results but do not rule out factor mobility. Although there are several problems with Magee's study, the most critical problems are the short-run nature of the analysis and the inherent problems inferring individual preferences from lobby positions.

Rogowski (1987) takes a long-run perspective and finds empirical support for the Stolper-Samuelson theorem. Rogowski examines historical episodes of global change in exposure to international trade (caused by "transportation revolutions") and finds that these changes affected domestic political cleavages between landholders, capitalists and laborers in the manner predicted by the Stolper-Samuelson theorem.[9] Rogowski's analysis

9. Note that the "transportation revolutions" substantially lowered transportation costs, which is indistinguishable in effect from an across-the-board decrease in tariffs.

is another approach to examining the empirical implications of Stolper-Samuelson and highlights the potential bias of the inherently short-run analysis undertaken by Magee.

More recently, Nollen and Quinn (1994) use voting patterns from the U.S. Congress to examine the coalitions of support for or against trade legislation over the 1987-88 period. Although they do not test international trade theory directly, they interpret their results -- that western members opposed protection and southern members supported it -- as being consistent with Stolper-Samuelson predictions. They base this interpretation on the argument that the United States has a comparative disadvantage in labor-intensive industries which are located in the south. Note, however, that they also find that lobbying positions of trade associations depend on the domestic or international market orientation of the businesses they represent. This could be interpreted as evidence of imperfect factor mobility. Moreover, as the authors point out, roll call vote analysis is fraught with well-documented problems.[10]

Irwin (1994,1996) avoids the problem of inferring individual preferences from lobby positions by using voting data to analyze how voters organize around an election over free trade. He examines the British general elections of 1906 and 1923. Arguing that the elections were based on a single issue, free trade, he treats the election results as the electorate's revealed preferences toward free trade. He tests whether voters' preferences were formed based on the sector in which they were employed or on the

10. See Nollen and Quinn (1994, p. 508) for references on roll call vote analysis. Destler and Odell (1987) and Milner and Yoffie (1989) also find evidence that lobbying positions of trade associations depend on the market orientation of the firms they represent.

occupation in which they work and finds that sector affiliation better explains the voting decision. He concludes, therefore, that labor is not perfectly mobile between sectors. Irwin's studies were based on voting patterns on long-run trade policy, therefore, he avoids the short-run bias inherent in Magee's results.

Due to data constraints, Irwin uses occupation type to identify industry affiliation. For example, mine workers are assigned to the mining industry. As Irwin himself acknowledges, this approach is not entirely satisfactory because there is not a one-to-one mapping between occupations and industry affiliation. For example, several occupations such as clerk, laborer and engineer are not assigned to an industry. This is not a serious problem because these types of occupations involve general, rather than industry-specific, skills, and thus are relatively mobile across sectors.

Irwin's results, however are not conclusive and are limited by the available data. The data available for early 20th century England limited his analysis to mapping county voting results to industry and occupation groups. Moreover, Irwin's ecological approach relies on county-level data to make inferences about individual preferences. Problems associated with ecological inference are well known in the public choice literature; using survey data avoids these problems.

I use survey data from a single-issue election on a comprehensive trade agreement. The unit of analysis is the individual. This approach avoids the problems associated with drawing inferences on individual preferences from lobbying activity and the ecological inference problems from using county-level data. The CUSTA is long run, so there is no

institutional bias toward short-run results as in the Magee case. We turn now to the empirical framework.

II.3. The Empirical Strategy.

This section sets out the modeling strategy and discusses the data employed. It then addresses three issues: 1) the possibility of omitted variables; 2) an overview of the CUSTA arguing that the election was a de facto referendum on the CUSTA; and 3) measurement issues associated with the data.

The empirical strategy is as follows. The first step takes trade theory seriously and treats the two extreme models -- SS and AFS-- as non-nested alternatives. That is, Stolper-Samuelson predicts that only factor ownership determines attitudes toward trade policy. Since the only observable factors in the survey data are different types of labor based on type of human capital, the null hypothesis is that the probability of supporting the CUSTA is only a function of skill type:

$$1. \qquad H_0: \ \mathrm{P(support)} = \sum_{J=1}^{J} \beta'_J \, skill_J + u_0 \qquad u_0 \sim IN(0, \sigma_0^2)$$

Support is an indicator variable for supporting the agreement (support=1). Skill_j are J indicator variables for ownership of skill j. In the results reported in the empirical section, there are two skill categories -- high skill and low skill -- and hence, J=1. The summation over skill types reduces to a single term (as in Table 1).

If factors are sector-specific, the probability of supporting the CUSTA is only a function of industry affiliation:

$$2. \quad H_1: \; P(\text{support}) = \sum_{i=1}^{I} \alpha'_i ind_i + u_0 \quad u_1 \sim IN(0, \sigma_1^2)$$

Ind_i are I indicator variables for employment in industry i.

The Davidson and MacKinnon J-test is a procedure for testing the non-nested hypotheses: H_0 against H_1, i.e., the hypothesis that positions on the CUSTA are determined solely by skill against the hypotheses that only industry affiliation determines positions on free trade.[11] The test is conducted by embedding the alternative models in one general model and testing the significance of the mixing parameter, λ:

$$3. \quad P(\text{support}) = (1-\lambda)\sum_{j=1}^{J} \beta'_j skill_j + \lambda \sum_{i=1}^{I} \alpha'_i ind_i + u \quad u \sim IN(0, \sigma^2)$$

A test of $\lambda=0$ is a test against H_1: industry matters. But it is not possible to estimate λ in this model, therefore, it is not possible to test its statistical significance. The J-test of H_0 against H_1 where H_0 is the maintained hypothesis is conducted by replacing the unknown $\alpha'_i ind_i$ with the predicted value of P(support) from equation 2. Then, since the predicted P(support) is independent of the error term u, the standard t-test can be used to test $\lambda=0$. Therefore, the estimating equation is:

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11. Davidson and MacKinnon (1981). Also see Judge et al. (1985), pp. 884-85 or Maddala (1992), pp. 514-21.

$$4. \quad P(\text{support}) = (1-\lambda)\sum_{j=1}^{J} \beta'_j \, skill_j + \lambda phat + u$$

where phat = the predicted probability of supporting the CUSTA from equation 2.

The analogous model allows a test of H_1 against H_0 where H_1 is the maintained hypothesis. The problem with this approach is that it can reject or fail to reject both hypotheses. If both models are rejected, there is no conclusion. If neither model is rejected, we will want to consider a comprehensive model of positions on free trade which includes both factors and sectors. The comprehensive model is the empirical counterpart to the partial factor mobility models (described in Table 1).

II.3.1 Some empirical issues.

Before considering the empirical results, three issues must be addressed. First, a more general version of the two models represented by equations 1 and 2 includes additional factors that may help determine positions on the CUSTA. If these variables are omitted and are not orthogonal to the skill or industry variables in equations 1 and 2 then the estimators from those equations will be biased. The next sub-section discusses the inclusion of other factors.

Second, the empirical approach described above is premised on the assertion that the election galvanized public interest in the contested commercial policy and mobilized affected parties to form coalitions around the issue. This assertion is substantiated in a brief overview of the 1988 election. The overview establishes that the election was essentially a referendum on the CUSTA. Moreover, if the assertion is true, a close

relationship between voting behavior and position on the CUSTA should be observed. This is shown to be the case in Section 3.2.2.

Third, two pieces of information are required to test whether voters align themselves along sector or factor lines: the sector (industry) in which the respondents are employed and the factor of production that they embody. An important limitation of the data used in this study is that it does not report the industry in which a respondent is employed. The lack of information on industry affiliation potentially renders the data silent on the issue of whether the electorate voted along industry lines and is similar to the data limitation faced by Irwin. The saving grace, in this case, is that the dataset does include detailed information on occupations from which an industry mapping was constructed. This issue is discussed in more detail in Section 3.2.3.

II.3.1.1 Other potential determinants of positions on the CUSTA.

Other potential determinants of positions on the CUSTA include region, age, union membership, and party affiliation. Harris (1985) finds that both winning and losing industries are concentrated in Ontario and Quebec. East and west regions were expected to be small net gainers from the agreement. To the extent that unions provide rents to their members, union members will likely oppose increased competition and therefore oppose the CUSTA. The CUSTA implied a great deal of transition in the labor market. Therefore, given an increased probability of facing job displacement, those with more costly adjustments will be less likely to support the CUSTA. Those with relatively high adjustment costs are older and married (if job displacement means relocating residence).

The trade agreement would affect older workers not in the labor force most directly through consumption, however, rather than through resource allocation effects. Therefore, a priori, older voters (over 65 years) may be expected to favor the agreement to the extent that the CUSTA was expected to benefit consumers, and to the extent that older voters would be affected more through consumption than through trade-induced resource allocation.

Party affiliation may also have affected positions on the CUSTA. The CUSTA was closely tied to the Conservative government and its re-election campaign in the 1988 election. Meanwhile, as discussed below, free trade was not the exclusive domain of the Conservative Party. One theme of the Liberal Party campaign platform was that it opposed the particular deal struck with the Americans, not bilateral free trade in principle. Those with strong party allegiance might tow the party line and stated positions on the CUSTA could in part reflect this. By controlling for party affiliation, it is possible to focus on Peltzman's (1990) marginal voter, who is essentially indifferent between political parties.[12] Affiliation with the Conservative Party is expected to increase the probability of supporting the CUSTA.

Econometrically it is straight forward to include these additional variables. Denoting the additional explanatory variables by the matrix X, equations 1 and 2 can be re-written as:

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12. This is turning Peltzman's argument on its head. Peltzman develops a voting model in which the marginal voter, who is essentially indifferent between parties, bases his/her voting decision on welfare changes and new information that is related exclusively to policies. Here, strong party affiliation may affect the voter's position on the CUSTA.

$$1'. \quad H_0: \ \mathrm{P(support)} = \sum_{j=1}^{J} \beta'_j \, skill_j + + \gamma' X + u_0 \quad u_0 \sim IN(0, \sigma_0^2)$$

$$2'. \quad H_1: \ P(\mathrm{support}) = \sum_{i=1}^{I} \alpha'_i \, ind_i + \gamma' X + u_1 \quad u_1 \sim IN(0, \sigma_1^2)$$

The non-nested test is conducted in the same way as described above for equations 1 and 2.

II.3.1.2 Background: Ratifying the CUSTA in Canada.

The events of the signing of the CUSTA and the 1988 Canadian general election are well documented elsewhere.[13] This overview highlights two features of Canadian politics and trade policy which underlay the CUSTA negotiations, the ratification process, and the ensuing general election. These two features are: 1) negotiating trade agreements with the United States is not the exclusive political domain of either of the main federal political parties in Canada; and 2) the events surrounding the ratification of the CUSTA in Canada meant that the 1988 national election was essentially a referendum on free trade.

Trade negotiations with the United States were by no means the exclusive domain of the Conservative Party. The Liberal Party was negotiating sectoral agreements with the American government prior to their electoral defeat in 1984 and it was a Liberal commissioned report that recommended pursuing comprehensive bilateral trade negotiations. Moreover, it is plausible that it was external events, such as fears of burgeoning U.S. protectionism and the recognition that structural change was needed in

13. Johnston et al. (1992) and Clarke et al. (1991) provide excellent accounts of the 1988 election. Johnston et al. use the 1988 Canadian National Election Study (the same data I use) to examine the dynamics of the 1988 campaign as well as provide an historical account of trade policy and politics in Canada.

Canada, rather than the election of a Conservative government in 1984 that led to the initiation of the trade negotiations.[14] These external factors suggest that the Canadian government, independent of which party was in power, may have pursued a trade agreement with the United States. Since a free trade agreement was not historically a salient partisan issue (at least not with respect to Conservatives and Liberals) and since the majority of the Canadian electorate approach each election with weak partisan positions, it is possible that a general election could become a vehicle for letting the electorate directly determine trade policy.[15]

The events of the ratification process leading up to the election linked the CUSTA to the election outcome. The Canadian and American governments entered formal negotiations on September 26, 1985. After some setbacks at the negotiation table, the two sides reached an eleventh hour agreement and signed the CUSTA on October 3, 1987. Before the agreement could become law, both countries had to ratify it. Unlike the United States, ratification of the agreement became an enormous political battle in Canada.[16] In Canada, the implementation of an international agreement is the

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14. Johnston et al (1992), p. 76, note that two factors prompted the Canadian government to enter negotiations on a comprehensive trade agreement. First, an increasingly protectionist United States Congress frightened exporters concerned with access to their largest market. Some exporters were already being affected by various trade disputes. Second, a case to pursue a trade agreement with its massive (and increasingly protectionist) neighbor to the south was made in the final report of the Royal Commission on the Economic Union and Development Prospects for Canada (the MacDonald Commission) released on September 5, 1985. This independent source supporting free trade is notable both because of its origins at the hands of an earlier Liberal government and the fact that its chairperson, Donald MacDonald, helped orchestrate the Liberal government's nationalist policies in the 1970s. Johnston et al argue that the Liberal Party would not have agreed to such a comprehensive agreement.
15. It is widely accepted that the majority of the Canadian electorate approach elections with no strong partisan positions. See Clarke et al. (1991, Ch. 3, p. 46-68) and LeDuc (1991).
16. Contrast this to the "non-issue" in Canada of including Mexico in the agreement (NAFTA) and the huge political battle in the United States over inclusion of Mexico.

responsibility of the federal government and by constitutional convention must be tabled in the House of Commons. As the debate over the CUSTA intensified, some opponents to the deal argued that the Government of Canada should let the people resolve the debate in a general election. In fact, John Turner, leader of the Liberal Party and the Official Opposition, instructed the Liberal-dominated Senate (Canada's appointed Upper House) to block passage of the implementing legislation for the CUSTA and demanded that the Prime Minister "let the people decide!"[17] The Progressive Conservative government called a general election to take place on November 21, 1988. The leaders of both opposition parties vowed to abrogate the CUSTA if elected, and the Senate leaders agreed to pass the agreement into legislation if the Conservative Party won a majority of seats in the lower house.[18]

Certainly the historical-institutional account of the 1988 election suggests that the election was an opportunity for the Canadian electorate to directly and effectively contribute to trade policy.[19] Some observers, however, see this interpretation as too simplistic. Pammett (1989, p. 122-5) concludes that the CUSTA was only one factor in the election and that the 1988 election was determined the same way most elections in Canada are determined -- by a combination of decisions based on current rather than

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17. See Johnston et al. (1992) and Pammett (1989).
18. Until the most recent election (1993), the three major political parties at the Federal level in Canada were the Progressive Conservative Party, the Liberal Party, and the New Democratic Party.
19. Clarke and Kornberg (1992, p. 39) argue that, even given the historical context outlined above, it was not obvious at beginning of the election that the CUSTA would dominate the issue agenda. The Conservatives initially planned to run on their own record. It was only through the dynamics of the campaign that the contending parties pushed the CUSTA to the top of the agenda; this is an argument that the political parties "primed" the electorate or "controlled the agenda."

longer term considerations. These considerations were often negative, with voters choosing the lesser of two evil alternatives. LeDuc (1991, p. 351) argues that the 1988 election was just that, an election, not a referendum on free trade: "Canadian voters did not deliver a positive 'mandate' on free trade."

The evidence from the surveys presented in Table 2 contradicts LeDuc's interpretation of the 1988 election. Unlike any policy issue in recent Canadian elections, the electorate overwhelmingly considered the CUSTA to be the most important issue in 1988. The CUSTA was considered the first or second most important issue of the campaign by 88 percent of those surveyed, verses 5 percent who considered leadership one of the two most important issues. Moreover, only 5 percent considered 1988 to be an election with "no issue," down from 22 to 30 percent who did not identify an issue in previous elections. It is unusual for even 50 percent of those surveyed to identify a single issue as the most important issue in a general election. This sets the 1988 election apart from other Canadian general elections.[20]

Citing the CUSTA as the most important issue is a necessary but not a sufficient condition for treating the 1988 election as a referendum on the CUSTA. Some voters may have considered the CUSTA the most important issue in the election, but were simply not issue-driven voters -- their voting decision may have been determined by party

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20. In the data used in this paper, 64 percent said that the CUSTA was the most important issue, and 12 percent thought that there were no important issues. These figures are not directly comparable with the figures in Table 2 because Table 2 reports the first two most important issues, and the data used in this paper reports the single most important issue. Nonetheless, it confirms the idea that voters overwhelmingly considered the CUSTA to be the most important issue affecting their voting decision.

affiliation, local candidates or leadership issues.[21] It is necessary, therefore, to examine whether voting patterns were strongly associated with positions on the CUSTA.

How did voter positions on the CUSTA affect voting decisions? According to Table 3, approximately 71 percent of CUSTA supporters voted for the Conservative Party and 81 percent of those opposed voted for one of the two parties opposed to the CUSTA.[22] The Pearson χ^2 rejects the null hypothesis of statistical independence between voting patterns and positions on the CUSTA. This supports the claim that voters' positions on the CUSTA were highly correlated with their voting decisions.

The result that a voter's position on the CUSTA was highly correlated with choice of party in the polling booth suggests that it is reasonable to treat the 1988 general election as a de facto referendum on the CUSTA. Therefore, one could use voting results, rather than opinions on the CUSTA, to examine factor mobility and the CUSTA. The result also supports the premise that voting coalitions were based on trade policy positions. Thus, it is reasonable to assume that the electorate was well-informed about the consequences of the CUSTA and had incentive to "vote their pocket-books."

II.3.1.3 Overview of the Data.

I use individual level survey data from the Canadian National Election Study (CNES). The CNES contains socio-economic data as well as information on the voting

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21. This point is stressed by Clarke et al. (1991, pp. 146-47).
22. These results are from the Canadian National Election Study (CNES) described in the Data Appendix.

behavior and political attitudes of Canadians from surveys conducted before and after the 1988 election. The data are described in more detail in the Data Appendix.

Measuring industry of employment

Two pieces of information are required to test whether voters align themselves along sector or factor lines: the sector (industry) in which the respondents are employed and the factor of production that they embody. An important limitation of the CNES is that it does not report respondents' industry of employment.

Industry affiliation is derived from the occupation codes. Occupations are coded at the four-digit Standard Occupation Classification (SOC) level which includes industry identifiers for many occupations. However, several occupations, such as clerk, engineer and accountant cannot be mapped to a particular industry. Occupations were mapped to industries only where the mapping was unambiguous. For example, "Supervisors: sales: commodities" and "Laboring and other elemental: Mining and Quarrying" are unambiguously affiliated with the "Retail and Wholesale Trade" and "Mining" industries, respectively. In contrast, "Supervisors: stenographic and typing" does not have an unambiguous industry affiliation and therefore was assigned to the generic "Clerical and Secretarial" category. The resulting distribution of workers employed in each industry is presented in the first three columns of Table 4. Overall, just over 67 percent of the sample were mapped to particular industries. Any occupations that did not map directly to an industry were classified into one of four relatively homogenous factor groupings: Management, Accountants, Scientists (including Social Scientists and Engineers), and

Clerical/Secretarial. These factors account for approximately 26 percent of the sample. Students, housewives, others outside the labor market, and occupations not elsewhere classified (NEC) were grouped together, making up about 7 percent of the sample.

This mapping procedure potentially introduces three kinds of bias. First, it under-represents some industries; in particular, manufacturing industries appear to be poorly represented (the panel on the right of Table 4 compares the CNES distribution to the Canadian labor force). Second, the group of uncoded occupations is high-skill intensive and therefore, including the uncoded occupations as an industry may bias the results toward finding a spurious industry effect. Third, because the group of "uncodables" appears to be disproportionately from manufacturing and are high-skill intensive, the skilled workers in manufacturing industries are under-represented.

Measurement error associated with identifying industry of employment is dealt with several ways. Different models were specified and the results were found to be robust to the different specifications. In particular, the models were estimated both including and excluding the "uncodable" group. The results are robust to both specifications. The only difference is that the indicator variable for the "uncodable" group turns out to be a statistically significant predictor of positions on the CUSTA. Including "uncodables" as a separate industry biased the results toward finding a statistically significant industry effect. To further check the robustness of the industry results, the models were estimated at different levels of industry aggregation. Again the results were

robust to these different specifications. I discuss these issues in more detail in the next section.

Measuring factor type

Factor ownership in this analysis is based on the skill level. Two different measures of skill are used: one based on the highest level of education attained and the other based on the implied skill level of the occupation.[23] High skill occupations are defined by employment in the following occupations: self-employed professionals, employed professionals, high-level managers; skilled clerical and sales persons, skilled crafts persons and farmers (excluding farm laborers).

Since the industry mapping was based on occupation codes and occupation-based definitions of skill are highly correlated with industry, the education-based measure of skill is preferred for the purposes of this exercise. Other factors, such as tenure, are important determinants of differential returns in the labor market which reflect different levels of marginal productivity, and therefore are important determinants of skill category. The CNES, however, does not provide information on employment histories. At the very best, an imperfect measure of potential experience (age minus approximate years of schooling) could be constructed from the CNES. In the results presented in the next section, skill is

23. A third definition of skill was examined based on a white-collar/blue-collar (or non-production/production worker). This definition was in keeping with several studies in the trade and wages literature. While this definition of skill may be reasonably correlated with "skill" within manufacturing sectors, it is not suitable in this context, where all industries are included in the analysis. In this case, blue collar workers are not distributed across all industries. Thus a "collar" based definition is highly correlated with industries in this sample.

defined as either the highest level of education attained or the skill level implied by the type of occupation.

An alternative method of identifying factor ownership is to use income levels. Kenen (1965) suggests treating returns to physical and human capital in the same way and identifying factor ownership by using income earned above that of an uneducated worker as a measure of embodied human capital. Unfortunately, the CNES does not contain information on individual income (only family income is reported and is top-coded at $80,000). Therefore, it is not possible to measure factor ownership in this way.

II.4. Empirical Results.

II.4.1 Canadian Voting Patterns and the CUSTA: Taking Theory Seriously.

The first step in the empirical analysis is to take the theory seriously and report the results from estimating the SS and ASF models separately. The next step is to formally test the two non-nested hypotheses. The results from estimating the two models separately are reported in the two panels of Table 5. The striking result from Table 5 is that the type of factor is an important and statistically significant determinant of position on the CUSTA. This result is robust to different model specifications. The other striking result is that industry effects are weak and the joint significance of the industry dummy variables is not robust to model specification.

Different specifications of the two models were estimated and the results were examined for robustness. First, different versions of equations 1 and 2 were estimated without controlling for other variables that may affect positions on the CUSTA. The

results from this specification are reported in "No Controls" columns. Both models were re-estimated after controlling for other variables that may affect positions on the CUSTA (age, region, union membership, and party affiliation). The results from this specification are reported in the "Controls" columns. In order to focus on the results from the two models, the coefficient estimates of the control variables are not reported in Table 5. The results from the control variables will be discussed later.

The SS-model

First, consider the SS model without controls. Both education- and occupation-based measures of skill are statistically significant determinants of position on the CUSTA. In Model 1, the indicator variable skill is equal to one for those with some post-secondary education; in Model 2, the indicator variable skill is equal to one for those employed in high-skill occupations. How important is skill type? The coefficients reported in Table 5 are the effects of the variable on the log-odds ratio of supporting the CUSTA. Thus, in Model 1, the coefficient of 0.37 on the education variable indicates that those with at least some post-secondary education were more likely than those with less education to support the agreement. In fact, post-secondary education increased the predicted odds of supporting the CUSTA by 145 percent. The predicted probability of supporting the CUSTA was 0.43 among those with less education and 0.52 among those with more education.

In the models with no controls, the model χ^2 statistic and the significance of the coefficients on the skill variables indicate that skill is a significant variable in predicting

support of the CUSTA. In fact, skill is significant at the 1 percent level of significance. This is consistent with the SS prediction that positions on the tariff policy depend on the type of factor ownership. Before concluding that skill is economically important, however, it is important to consider the appropriateness of the fitted model and the inclusion of other potentially important variables. One measure of the goodness-of-fit of the logistic model is the McFadden pseudo-R^2 reported in the last line of each model in Table 5. The pseudo-R^2 is very small for the SS models that exclude the control variables. This indicates that the model explains very little of CUSTA positions and suggests that relevant independent variables have been excluded from the model. Unless the omitted variables are orthogonal in the sample to the skill variable, the estimator is biased.

When other factors are controlled for, both the χ^2 statistic and the goodness-of-fit measure increase substantially. The χ^2 statistic now measures the joint significance of all the explanatory variables. The SS model, with controls, is an important determinant of positions on the CUSTA. The model, including controls, explains a great deal more of positions on the CUSTA than the model excluding the controls. Note however, that both skill measures remain statistically significant predictors of the CUSTA after the inclusion of the control variables. Controlling for age, region, union membership and party affiliation actually increases the coefficient estimate for the education level. Therefore, skill level was an important determinant of positions on the CUSTA and this result is robust to model specification. What about industries?

The AFS-model

The striking result from estimating equations 2 and 2′ (reported in the right panel of Table 5) is that only a few individual industries have statistically significant effects on the probability of supporting the CUSTA. Note that coefficient estimates on industry dummy variables must be interpreted relative to the omitted industry, agriculture. The statistical insignificance of an industry dummy variable, therefore, is properly interpreted as no statistically significant difference in position on CUSTA between those employed in that industry and those employed in agriculture. Therefore, the joint significance of the industry indicator variables is important.

The industry indicator variables are jointly significant when there are no controls, but not when the control variables are included. Table 5 presents the results from estimating the AFS equations (both with and without controls) at two levels of aggregation. In all cases, only a few of the industries had a statistically significant effect on the probability of supporting the CUSTA.

In both models without controls, the χ^2 statistic indicates that overall, industry employment is a significant predictor of positions on the CUSTA. This is consistent with the all-factors-specific model and is similar to the results found by Magee and Irwin. As in the SS models without controls, however, the AFS models are not very good predictors of positions on the CUSTA. As indicated by the very low pseudo-R^2 statistics, the AFS models without controls do not fit the data very well. As in the SS case, adding the controls results in a very large increase in the pseudo-R^2. Unlike the SS models, however,

industry of employment is no longer a statistically significant determinant of position on the CUSTA.

Before drawing any conclusions about which model is a better predictor of positions on free trade, consider the results from formally testing the two hypotheses and from examining specification issues.

Testing the Non-nested Hypotheses.

The Davidson and MacKinnon J-tests were based on the models presented in Table 5. The results from these tests are summarized in Table 6. The overall conclusion from this table is that neither the SS nor the AFS models can be rejected. That is, the λ in equation 4 is significant when either alternative model is embedded as the alternative hypothesis. According to Table 6, Models 1 (SS with skill defined by education) and 4 (AFS with disaggregate sectors) are never rejected. Model 2 (skill defined by education) is rejected when the models control for other variables and Model 3 (aggregated sectors) is rejected when the null hypothesis is Model 2 and controls are included in the models.

The results reported in Table 6 suggest that a comprehensive model be used to explain the probability of supporting the CUSTA as a function of human capital (or skill category) and industry affiliation. The comprehensive model can be thought of as the reduced form equation for the partially mobile factors (PMF) model summarized in Table 1.

II.4.2 The Comprehensive Model.

The most general specification of the comprehensive model is the partial mobile model:

$$5.\ \text{Prob(support)} = F(\beta_0 + \sum_{j=1}^{J} \beta_j skill_j + \sum_{i=1}^{I} \alpha_i ind_i + \sum_{j=1}^{J}\sum_{i=1}^{I} \alpha_{ij} skill_j * ind_i)$$

where the variables are defined above. Attempts to estimate this model led to rejecting the significance of the two main effects and the interaction terms. There are two problems with estimating this model. First, due to the skill and industry classifications, there is very high multicollinearity in the model. Second, the sample size becomes too small to identify the interaction effects. Different model specifications were analyzed, including aggregating the factors and sectors as much as possible and using continuous versions of the skill variable. In all cases, both main effects and interaction terms were rejected by the likelihood ratio tests. Therefore, a more restricted version of the comprehensive model was estimated:

$$6.\ \text{Prob(support)} = F(\beta_0 + \sum_{j=1}^{J} \beta_j skill_j + \sum_{i=1}^{I} \alpha_i ind_i)$$

As in the previous section, I estimated several specifications of equation 6. The main result is that the differences in positions on the CUSTA between skilled and unskilled workers is robust when the model controls for industry affiliation. That is, the type of factor ownership is a statistically significant and important determinant of preferences on trade policy. As before, this result is robust to the different measures of human capital and

to the different model specifications. The industry variables are jointly significant even after controlling for factor type. As before, however, the industry variables are not significant when the model controls for other variables.

The first two columns of Table 7 present the results from estimating equation 6 for disaggregate industries using the education- and occupation- based definitions of skill. The estimation results for the aggregate sectors are reported in Table 8. The third model presented in Tables 7 and 8 include the coefficient estimates of the control variables. The third model is based on the following specification of the model:

$$7.\quad \text{Prob(support)} = F(\beta_0 + \sum_{j=1}^{J} \beta_j skill_j + \sum_{i=1}^{I} \alpha_i ind_i + \sum_{a=1}^{A} \delta_a age_a + \sum_{r=1}^{R} \gamma_r region_r + \phi \text{union} + \pi \text{party84})$$

where:

age_a a = 1,...,A are A dummy variables indicating age: 18-29 years (age1=1); 30-49 years (age2=1); 50-64 years (age3=1); and 65 and over (age4=1). age4 is the omitted category.

$region_r$ r = 1,.,R are R dummy variables indicating the geographic regions: Atlantic (region1=1); Quebec (region2=1); Ontario (region3=1); and West (region4=1). region4 is the omitted category.

union is a dummy variable indicating union membership (union=1).

party84 is a dummy variable indicating that the party voted for in the previous (1984) election was the Conservative Party (party84=1).

The results are very similar to those obtained by estimating the two models (SS and AFS) separately. In all specifications, the skill level has a significant and sizable effect on CUSTA positions. For example, Model 1 in Table 7 uses education level as a measure of human capital. The coefficient estimate (0.43) (significant at the 1 percent level) indicates that, holding industry affiliation constant, having some post secondary education increases the predicted odds of supporting the agreement by 154 percent.

Tables 7 and 8 show qualitatively similar results for high- versus low-skilled occupations. The differences in the probability of supporting the CUSTA are not as large for the occupation definition of skill as they are for the education definition, but are still important. For example, being among the high-skilled workers increases the odds of supporting the CUSTA by about 125 percent. The smaller effect of skill on the probability of supporting the CUSTA when the skill variable is based on occupation may reflect higher collinearity between these measures of skill and industry categories than between education and industry categories.

Few of the industry dummy variables are statistically significant. This is consistent with the results from estimating the AFS model separately and with Thompson (1993,1994), who finds few significant effects of news about the CUSTA on stock prices. The industry dummies are jointly significant even after controlling for skill. This is seen by considering the last row of Tables 7 and 8 which presents the chi-squared statistics on the joint significance of the industry variables. As before, however, the joint significance of the industry variables is not robust when the model controls for other variables.

It is important to point out that the only control variable that affects the significance of the industry variables is party affiliation and not union membership or region. Party affiliation alone eliminates the joint significance of the industry variables.

II.4.3 Who supported the CUSTA?

Factors

Skilled workers were more likely to support the CUSTA than unskilled workers. This result is robust for different definitions of skill and for different model specifications. This suggests that Canada is relatively abundant in skilled workers. This result is surprising, since prior evidence suggests that the United States has a comparative advantage in skilled workers. Therefore, for this to be a test of Stolper-Samuelson, the CUSTA would have to have created an expectation that the prices of skilled-labor-intensive goods would rise relative to the prices of other goods. This does not appear to be the case based on empirical evidence of comparative advantage between the two countries (see Harris (1985)). Moreover, evidence presented in Chapter III shows that congressional representatives from skill-abundant districts supported the CUSTA.

An alternative explanation is that the CUSTA expected to lead to growth in high technology (skill-intensive) industries, or that the agreement was expected to induce skill-biased technological change. Another explanation is that the CUSTA was predicted to lead to rationalization in Canadian manufacturing industries. This was expected to involve plant closings and layoffs in industries intensive in unionized, uneducated, blue-collar workers. These workers were found to oppose the CUSTA. The results reported here

are consistent with these scenarios. Skill-biased technological change, however, will only benefit all skilled workers if factors are sufficiently mobile to ensure that the distributional consequences from trade-induced technological change are independent of industry employment. Moreover, the CUSTA may have been expected to adversely affect industries intensive in unionized, uneducated workers. But absent sufficient factor mobility, we would expect to find that all factors employed in those industries to oppose the agreement.

From the indirect approach adopted here, it is impossible to determine the mechanism through which the CUSTA will affect factor markets. But one thing is clear, positions on the CUSTA were determined along factor, not industry lines.

Industry patterns

One surprising result from looking at the industry effects from the aggregated industries (Table 8) is that construction workers were most likely to support the CUSTA, followed by agricultural workers and those in the omitted services sector. Workers in manufacturing industries and in primary industries were much less likely to support the agreement. It is also surprising that workers employed in forestry, fishing and mining in resource-abundant Canada, were opposed to the agreement. Moreover, those employed in the nontraded-goods industry, construction, are the strongest supporters of the agreement. Although this result may seem surprising at first glance, it turns out to be consistent with theory and was predicted by a pre-election study on the anticipated consequences of the CUSTA by Magun et al. (1988). Anticipated adjustment to the

CUSTA agreement involving building some plants and re-tooling others was good news for Canada's construction industry. Simulations from a CGE model conducted by Magun et al. (1988) predicted that Canada's construction industry stood to be among the largest gainers from the CUSTA.

The results are very similar for the less aggregated group of industries. The industries that are statistically different from agriculture are construction, finance, insurance, real estate, and retail trade. Those employed in the high-skill-intensive industries of finance, insurance, real estate, and law were the strongest proponents of the deal. The industry with the highest proportion of workers with some university is the non-commercial services industry. The non-commercial services industry includes health, legal, educational, and social services. Workers employed in this industry were more likely than public administrators to support the agreement. Workers employed in the food, mining, and forestry/fishery industries were the least likely to support the agreement.

One final experiment was conducted in an attempt to comprehend the industry effects. Industries were grouped according to how they were expected, a priori, to be affected by the CUSTA. Different measures were used to group industries. Industries were grouped according to lobby positions and published documents about the expected effects; in addition tariff rates, and trade exposure measures were used to categorize industries. A summary of the industry categories is presented in Table 9. The a priori industry position is desirable because it includes all industries, but it also involves a great deal of noise. The other measures may be more precise measures of expected industry

effects of the CUSTA, but they cover only manufacturing industries which represent only a small subset of the sample. Attempts to estimate models with these alternative industry classifications yielded no fruit. There was no statistically significant relationship between positions on the CUSTA and measures of expected industry effects.

The Control Variables

Model 3 in Tables 7 and 8 present the results from estimating equation 7. How did the control variables affect the probability of supporting the CUSTA? When other factors are controlled for, age dummies are not individually significant. This is evidence contrary to the job displacement and human capital story that with all else constant, faced with an increased probability of job displacement, workers who were more mobile will be less likely to oppose the agreement.

With other factors held constant, voters were more likely to support the agreement if they lived in western Canada than if they lived in the Atlantic provinces or Ontario. Voters in Quebec were more likely than those in the west to support the agreement, but the difference is not statistically significant. The regional effects are not inconsistent with expectations. As expected, union members opposed the agreement and those who voted for the Conservative Party in 1984 tended to support the agreement.

II.5. Conclusion.

This paper examines whether attitudes toward a comprehensive trade agreement are drawn along sector or factor lines. This analysis serves as an indirect empirical examination of the Stolper-Samuelson theorem along the lines of Magee (1980) and Irwin

(1994,1996). The main finding is that skill type was an important determinant of voters' positions on the CUSTA; political cleavages in the 1988 election on the CUSTA were drawn along factor lines. Industry of employment had a statistically significant effect on free trade positions in some specifications of the model. The industry effect, however, is a weak one, and is not robust to model specification. Specifically, the significance of the industry effect is not robust when the model controls for other variables such as age, region, union membership and party affiliation. The result that the type of factor is a statistically significant determinant of position on the CUSTA is robust to model specification.

The empirical results suggest that labor in Canada is sufficiently mobile to ensure that the distributional consequences of trade policy are independent of industry employment. Contrary to previous literature, this is indirect evidence in support of the Stolper-Samuelson-type prediction that cleavages in trade policy will form along factor lines. The analysis reported here is long-run and avoids the short-run bias of Magee's work. Canadian labor in 1988 is much more mobile than British labor the early 1900s studied by Irwin. Labor in Canada is more mobile than the capital stock studied by and Grossman and Levinsohn (1989), Brander (1991) and Thompson(1993, 1994).

Data Appendix

The Canadian National Election Study (CNES) contains socio-economic data as well as information on the voting behavior and political attitudes of Canadians obtained from a panel of telephone surveys conducted immediately before and after the 1988 election.[24] The sample for the CNES was designed to represent the population of eligible voters (those 18 years of age or older who are Canadian citizens) who reside in private homes in one of the ten provinces (excluding the Yukon and Northwest Territories). The data were collected by telephone survey; therefore, the approximately 1.8 percent of the Canadian households without a telephone were eliminated from the sample population. The survey was designed to minimize sampling biases. Rather than drawing numbers from a telephone book, the survey used random digit dialing to give all households an equal probability of selection.

The first wave of surveys, the Campaign Period Survey (CPS), is a sample of 3609 Canadians, released as a rolling cross section where, each day of the campaign, a sample of the Canadian population was interviewed; the second wave of surveys, the Post Election Survey (PES) resulted in 2922 re-interviews (81 percent) of the CPS

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24. Three surveys have been used to study the Canadian electorate with respect to the 1988 election: 1) the Canadian National Election Study (CNES) (Johnston et al. (1988)); 2) the 1984-88 Canadian Election Panel Study; and 3) Political Support in Canada, 1983-88. None of these surveys contain direct information about industry affiliation. Of the three surveys, the CNES contains the most detailed occupation information. Therefore, the CNES is used in this analysis. The Canadian Election Panel Study includes post-election surveys from a panel of voters from the 1984 and 1988 elections. With a panel mortality rate of over 60 percent, the results from studies employing this panel study should be taken with caution. The Political Support in Canada data (ICPSR #09874) includes a panel of pre- and post-1988 election survey questions.

respondents.[25] A re-interview rate of 81 percent means that some sample selection bias exists due to panel mortality. That is, the sample used in the analysis is the group of successful re-interviews who tend to be more politically engaged than the overall sample from the CPS wave.

The sample was reduced further by dropping individuals with "poor links" between the CPS and PES. Although steps were taken to ensure that the same person completed both waves of the survey, there is evidence to suggest that, in some cases, a different person was interviewed in the second telephone survey. The quality of the link between the two surveys was established by comparing two variables common to both surveys. A record was deemed a "poor link" and consequently dropped if the sex variable differed between the CPS and PES (2 cases) or if the date of birth differed by more than two years (60 cases). The end result is a sample with 2860 records.

The CNES dataset contains sampling weights designed to adjust for unequal probabilities of being selected within households, a language over sample to represent minority language speakers, and the disproportionate sample allocation among the provinces. Due to the potential biases introduced through the sampling procedure, the distributions across the sample of voter turnout, voter choice, and occupation category are compared to national averages. The comparison is made for both unweighted and

25. Note that a third wave of surveys was conducted during the post-election period. This consisted of a Mailback Survey with 2115 of the PES respondents (59 percent of the CPS sample). The empirical analysis reported in this paper is based on the Campaign Period Survey and the Post Election Survey and none of the results are based on the self-administered mailback survey with extreme "panel mortality."

weighted data and presented in Table 10. Notice that the weights make little difference in the employment distributions.

How representative is the CNES of the population? The CNES sample over-represents voter turnout and under-represents the percent of the electorate voting for the three main parties, especially the Liberal party. As Table 10 shows, 88 percent of the sample reported that they voted in the election, whereas the actual voting turnout was 75 percent of the electorate. On the question of party choice, approximately 10 percent of the survey respondents (who voted) did not know, or refused to specify for whom they voted. The result is that 84 percent of the sample voted for one of the 3 major parties, whereas 95 percent of voters voted for one of the 3 parties according to the official poll results. Excluding those who refused to answer the question or could not recall their voting choice, approximately 94 percent of the sample voted for one of the major political parties. Excluding the approximately 10 percent of the survey in the "Don't Know/Refused" category, approximately 46% voted Conservative, 29% voted Liberal, 19% voted NDP, and 6% voted for other parties. The distribution of votes across parties is representative of the national figures.

The distribution across occupation categories is also representative of the national averages. In both the weighted and unweighted data, there is some over-representation of managers, professionals, and primary occupations; and some under-representation of clerical, service, and processing and machining occupations in the CNES sample. Although the weights adjust the sample distribution in the correct direction for primary,

processing and machining occupations, the weights make little difference in the distribution.

In the survey, the wording and ordering of questions was varied randomly to reduce potential biases introduced along that dimension. Of particular interest for the analysis presented in this paper is the robustness of opinions on the CUSTA to different wording and ordering of the question: "All things considered, do you support the agreement or do you oppose it?" In the CPS, the preamble to this question was randomized, and was: "As you know, [Canada (when r=0), the Mulroney government (when r=1)] reached a free trade agreement with the United States." It turns out that respondents' positions on the CUSTA are statistically independent from the wording of the preamble. In the PES, there was no preamble to the question, but the ordering of the question was randomized. In some cases this question was preceded by opinions on statements about the expected impact of the CUSTA; in other cases opinion on the CUSTA preceded the statements.[26] Opinions on the CUSTA were statistically independent from the ordering of questions.

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26. Respondents were asked their opinions (strongly agree, agree, disagree, strongly disagree) on five statements: 1. The agreement is necessary to make sure we have a large market for our products; 2. Under the agreement, Canada will lose its ability to control key industries, such as energy; 3. The agreement will threaten our social programmes, such as Medicare; 4. This agreement will defend us against American protectionism; 5. Because of this agreement, many Canadians will lose their jobs.

Table 1: Summary of Models with Different Assumptions about Factor Mobility and the Implied Reduced Form Empirical Model.

Mobility	One factor	Two factors
Perfect mobility	Grossman (1983): one factor is completely mobile, the other factor is partially mobile. The reduced form for this model is captured by the PMF model.	Stolper-Samuelson (SS): Stolper and Samuelson (1941), Jones (1965). Both factors are perfectly mobile. Only factors determine positions on free trade. Implied reduced form equation: $P(support) = \beta' skill + u_0$
Partial mobility	Mussa (1982): one factor is perfectly immobile, the other factor is partially mobile. The reduced form for this model is captured by the PMF model.	Partially mobile factors (PMF): Hill and Mendez (1982). Both factors have some degree of mobility. Both industries and factors determine position on free trade. Implied reduced form equation[a]: $P(support) = \beta' skill + \alpha' ind + \theta' skill * ind + u_0$
Complete Immobility	Specific-factors model (SF): Jones(1971), Mayer(1974), Mussa(1974). One factor is perfectly mobile, the other is completely immobile. For the mobile factor, position on free trade is independent of industry; for the immobile factor industry matters. Implied reduced form equations[a,b]: Case 1: Factor 2 is perfectly mobile. $P(support) = \beta_2 skill_2 + \sum_{i=1}^{I} \beta_{1_i} skill_1 * ind_i + u_0$ Case 2: Factor 1 is perfectly mobile $P(support) = \beta_1 skill_1 + \sum_{i=1}^{I} \beta_{2_i} skill_2 * ind_i + u_0$	All-factors-specific model (AFS): both factors are completely immobile. Only industry determines positions on free trade. Implied reduced form equation[a]: $P(support) = \alpha' ind + u_0$

Notes: This table represents a two-factor, two-industry world. Therefore there is a single categorical variable for factor type and a single variable for industry.
a. Support is an indicator variable for supporting the agreement (support=1). Skill is an indicator variable for type of factor. The indicator variable for factor is called skill because factors are defined as high-skilled and low-skilled labor (rather than the traditional capital and labor). Ind is an indicator variable for employment in industry I (ind=1).
b. In the SF model, $skill_2$ denotes skill type 2 and $skill_1$ denotes skill type 1.

Table 2: The Most Important Election Issues: 1974-88.

	1974	1979	1980	1984	1988
Economic Issues					
The economy in general	5	11	9	17	2
Inflation, cost of living, wage and price controls	46	14	14	2	0
Taxes	3	8	3	3	4
Government spending, the deficit, the budget	3	4	17	12	7
Unemployment, jobs	3	10	4	36	2
Free trade	0	0	0	0	88
Other economic issues	3	1	1	3	0
Confederation Issues	6	28	13	5	8
Resource Issues	2	9	32	2	9
Social Issues: Housing, health, medicare, pensions etc.	12	5	2	11	14
Other issues					
Foreign policy, defense	2	2	3	3	1
Leaders, leadership	6	14	15	8	5
Change, the parties, retrospective evaluations	1	8	8	14	1
Trust, patronage, majority government, the polls	7	1	4	4	1
All other issues	3	2	2	4	3
None, No Important Issues, Don't Know	**30**	**28**	**22**	**25**	**5**
Number of observations	2445	2668	1786	3377	1202

Notes: This table was adapted from Clarke et al. (1991) Table 4.1, page 70. Percentages are rounded and do not add up to 100% because two responses were coded for some respondents.

Table 3: The Relationship Between Position on the CUSTA and Party Voted For.

		Position on the Free Trade Agreement			
Party Voted for:		**Support**	**Oppose**	**Indiff-erent**	**Total**
Conservative	Row percent	85.8	4.9	9.3	100.0
	Column percent	70.6	5.1	25.3	39.5
Liberal		15.3	67.6	17.1	100.0
		8.4	47.4	31.1	26.5
NDP		19.7	68.0	12.3	100.0
		7.7	33.6	15.8	18.6
Other/Don't Know		40.8	33.5	25.8	100.0
		13.3	13.9	27.8	15.6
Total		47.9	37.6	14.9	100.0
		100.0	100.0	100.0	100.0

Pearson $\chi^2(6) = 754.6$***

Notes: The table is based on the CNES after dropping observations where there is no industry affiliation and where there is no answer to the question of party voted for. Therefore, this table is based on 1659 observations instead of the full sample of 2797. The contingency table is very similar for the entire sample where the χ^2 test statistic also rejects the null hypothesis of statistical independence at the 99% level.

Row percent: is the percent of those who, given they voted for party i, have position j on the CUSTA.

Column percent: is the percent of those who, given position j on the CUSTA, voted for party i.

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10 % level.

Table 4. Distribution of Industry Affiliation.

Sectors	CNES Sample: Frequency	Distribution (%)	Cumulative Distribution (%)	Comparison of CNES to Labor Force: Percent of those classified in CNES		Percent of total employed in Canadian labor market	
Good-producing industries:					**32.9**		**30.2**
Agriculture	154	5.51	5.51	8.2		3.6	
Forestry	19	0.68	6.19	1.0		0.6	
Fishing and trapping	20	0.72	6.91	1.1		0.3	
Mining*	24	0.86	7.77	1.3		1.7	
Manufacturing					**10.6**		**17.2**
Non-durable goods					**5.2**		**8.7**
Food and beverage	33	1.18	8.95	1.8		2.1	
Tobacco	0	0	8.95	0.0		0.1	
Rubber, plastics	9	0.32	9.27	0.5		0.8	
Leather	1	0.04	9.31	0.1		0.2	
Textile	25	0.89	10.20	1.3		0.5	
Clothing	3	0.11	10.31	0.2		1.0	
Paper	7	0.25	10.56	0.4		1.1	
Printing and publishing	18	0.64	11.20	1.0		1.4	
Chemical products	2	0.07	11.27	0.1		0.8	
Misc. manufacturing	0	0	11.27	0.0		0.7	
Durable goods					**5.4**		**8.5**
Wood	11	0.39	11.66	0.6		1.1	
Furniture and fixture	3	0.11	11.77	0.2		0.5	
Primary metal	9	0.32	12.09	0.5		1.1	
Metal fabricating	33	1.18	13.27	1.8		1.3	
Machinery	16	0.57	13.84	0.8		0.6	
Transportation equip.	11	0.39	14.23	0.6		2.0	
Electrical & electronics	14	0.50	14.73	0.7		1.3	
Non-metal minerals	4	0.14	14.87	0.2		0.4	
Construction	174	6.22	21.09	9.2		5.9	
Other utilities	31	1.11	22.20	1.6		1.1	
Service industries					**67.1**		**69.8**
Transp. & communication	165	5.90	28.10	8.8		6.3	
Trade: Wholesale/Retail	190	6.79	34.89	10.1		17.7	
Finance, insur. & real estate	133	4.76	39.65	7.1		5.9	
Commercial services	355	12.69	52.34	18.8		17.0	
Non-commercial serices	352	12.58	64.92	18.7		16.1	
Public administration	69	2.47	67.39	3.7		6.6	
No industry affiliation							
Management	200	7.15	74.54				
Accountants	151	5.40	79.94				
Scientists and engineers	121	4.33	84.27				
Clerical	234	8.37	92.64				
Students	69	2.47	95.11				
NEC	137	4.90	100.00				
Total	2797	100.00	100.00	100.0		100.0	

Notes: The correlation between the CNES industry distribution and the Labor Force distribution is 0.92.

Sources: CNES and Labour Force Annual Averages, Statistics Canada Catalogue 71-220.

Table 5: The Probability of Supporting CUSTA: Stolper-Samuelson and All-Factors-Specific Predictions[a]

Stolper-Samuelson predictions			All-factors-specific predictions[c]		
Model 1: Skill defined by education[b]			**Model 3: Aggregate sectors**		
	No Controls	**Controls[d]**		**No Controls**	**Controls[d]**
Post-secondary education	0.369 ***	0 421 ***	Primary	-0 662 **	-0 301
	(0 094)	(0.116)		(0.310)	(0 371)
Constant	-0 281 ***	-0 935 ***	Construction	0 135	0 231
	(0 061)	(0 178)		(0.222)	(0 270)
			Manufacturing	-0.374 ***	-0 138
				(0.216)	(0 255)
			Services	-0.174	-0 098
				(0 171)	(0 201)
			Constant	0 039	-0 760 ***
				(0 162)	(0 235)
			Joint sign. of industries (χ^2)	10 56 **	3 54
Log Likelihood	-1292.21	-952 70	Log Likelihood	-1294 54	-957 59
χ^2	15 41 ***	236 44 ***	χ^2	10 75 **	226 66 ***
Pseudo R^2	0 006	0 110	Pseudo R^2	0 004	0 106
Model 2: Skill defined by occupation[c]			**Model 4: Disaggregate sectors**		
	No Controls	**Controls[d]**		**No Controls**	**Controls[d]**
High skill occupation	0 316 ***	0 278 ***	Forestry/Fishing	-0 619 *	-0 080
	(0 094)	(0 112)		(0 371)	(0 466)
Constant	-0.263 ***	-0 947 ***	Mining	-0 732	-0 603
	(0 061)	(0 182)		(0 462)	(0 517)
			Construction	0 135	0 214
				(0.222)	(0 271)
			Food	-0 872 **	-0 603
				(0 412)	(0 460)
			Textiles/Apparel	-0 475	-0 658
				(0 419)	(0 486)
			Wood/Furniture	-0 193	0 211
				(0 360)	(0 426)
			Chemicals/Rubber	-0 119	-0 073
				(0 432)	(0 511)
			Fabricated Metals	-0 222	-0 021
				(0 385)	(0 456)
			Machinery/Electronics	-0 384	0 095
				(0 356)	(0 415)
			Commun/Telephone	-0 390 *	-0 437 *
				(0 217)	(0 258)
			Retail/Wholesale	0 141	0 145
				(0 218)	(0 255)
			Finance,insurance,etc	0 436 *	0 306
				(0 241)	(0 281)
			Commercial	-0 440 **	-0 313
				(0 195)	(0 232)
			Noncommercial	-0 164	-0 020
				(0 194)	(0 228)
			Public Administration	-0 302	-0 270
				(0 292)	(0 343)
			Constant	0 039	-0 770
				(0 162)	(0 236)
			Joint sign. of industries (χ^2)	37 99 ***	20 67
Log Likelihood	-1294 24	-956 28	Log Likelihood	-1280 43	-948 86
χ^2	11 35 ***	229 28 ***	χ^2	38 98 ***	244 13 ***
Pseudo R^2	0 004	0 107	Pseudo R^2	0 015	0 114

Notes: a. The dependent variable is "Position on the CUSTA" from the post-election survey. Other specifications (not reported here), used "Position on the CUSTA" from the campaign period survey, and party voted for in the election, yielded similar results. The sample size is 1881 for the "No controls" regressions and 1548 for the "Controls" regressions.

b. A dummy variable indicates some post-secondary education. Several specifications of the education variable did not change the results.

c. High-skill occupation is a dummy variable (=1) indicating employment in the following occupations: self-employed professionals, employed professionals, high-level managers; skilled clerical and sales, skilled crafts and farmers (excludes farm laborers).

d. Age, region, union membership and party affiliation variables were used as controls under this specification. The coefficient estimates for these variables were not reported here because they are not of interest for the current purpose of evaluating the two models. The estimates of the control variables are reported in Tables 7 and 8.

e. The omitted category in the AFS model is agriculture.

*** Significant at 1% level; ** Significant at 5% level; and * Significant at 10% level.

Table 6: The Davidson and MacKinnon J-test of non-nested hypotheses (Chi-squared statistics reported).

Stolper-Samuelson predictions			All-factors-specific predictions		
H_0: Model 1 – Skill defined by education			**H_1: Model 3 – Aggregate sectors**		
	No Controls	**Controls**		**No Controls**	**Controls**
H_1: Model 3	10.21 ***	4.56 **	H_0: Model 1	15.95 ***	15.22 ***
H_1: Model 4	34.20 ***	16.57 ***	H_0: Model 2	7.53 ***	0.70
H_0: Model 2 – Skill defined by occupation			**H_1: Model 4 – Disaggregate sectors**		
	No Controls	**Controls**		**No Controls**	**Controls**
H_1: Model 3	6.58 ***	2.06	H_0: Model 1	13.26 ***	10.98 ***
H_1: Model 4	31.13 ***	16.70 ***	H_0: Model 2	4.27 **	0.65

Notes: This table reports the Chi-squared statistics from conducting the Davidson and MacKinnon J-test of non-nested hypotheses described in Section 3. Statistical significance implies that the alternative model cannot be rejected. For example, Model 3 cannot be rejected as a non-nested alternative to Model 1, but Model 3 with controls is rejected as an alternative to Model 2 with controls. Combinations of the four models analyzed in Table 5 are tested. The models and controls are described in the notes to Table 5. *** Significant at 1% level; ** Significant at 5% level; and * Significant at 10% level.

Table 7: The Probability of Supporting the CUSTA.

	Model 1		Model 2		Model 3	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
University	0.43 ***	0.12			0.39 ***	0.15
High skill			0.22 **	0.11		
Agriculture	0.31	0.29	0.24	0.29	0.27	0.34
Forestry/Fishing	-0.27	0.41	-0.23	0.42	0.22	0.51
Mining	-0.41	0.50	-0.32	0.50	-0.32	0.56
Construction	0.47 *	0.29	0.44	0.29	0.51	0.34
Food	-0.54	0.45	-0.46	0.45	-0.31	0.50
Textiles/Apparel	-0.13	0.46	-0.08	0.46	-0.35	0.53
Wood/Furniture	0.12	0.40	0.10	0.40	0.48	0.48
Chemicals/Rubber	0.21	0.47	0.25	0.47	0.23	0.55
Fabricated Metals	0.13	0.43	0.02	0.43	0.29	0.50
Machinery/Electronics	-0.05	0.40	-0.05	0.40	0.39	0.46
Commun/Teleph.	-0.06	0.28	-0.02	0.28	-0.14	0.33
Retail/Wholesale	0.41	0.28	0.51 *	0.29	0.38	0.34
Finance,insurance,etc	0.66 **	0.30	0.70 **	0.30	0.48	0.35
Commercial	-0.15	0.27	-0.08	0.27	-0.06	0.31
Noncommercial	-0.06	0.27	0.11	0.27	0.05	0.32
18-29 years					-0.12	0.21
30-49 years					0.16	0.18
50-64 years					0.05	0.20
Atlantic					-0.29 *	0.17
Quebec					0.19	0.15
Ontario					-0.18	0.15
Member of a union					-0.20 *	0.12
Voted PC in 1984					1.53 ***	0.11
Constant	-0.32	0.24	-0.37	0.25	-1.07 ***	0.34
Number of observations	1881		1885		1548	
chi2	50.75		42.97		251.02	
Pseudo R2	0.02		0.02		0.12	
Log Likelihood	-1274.5		-1281.3		-945.4	
Test joint significance of industry dummies chi2(15)	36.49 ***		30.95 ***		18.83	

Notes: Omitted categories are: Models 1-2: Public Administration; Model 3: Public Administration, 65 years and over, West, Nonunion, Voted other than PC (PC is the acronym for the Progressive Conservative Party, the governing party at the time).

*** Significant at 1% level; ** Significant at 5% level; and * Significant at 10% level.

Table 8: The Probability of Supporting the CUSTA: Aggregate Industries.

	Model 1		Model 2		Model 3	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
University	0.42 ***	0.11			0.43 ***	0.13
High skill			0.27 ***	0.10		
Agriculture	0.25	0.17	0.06	0.18	0.17	0.20
Primary	-0.38	0.27	-0.40	0.27	-0.09	0.33
Construction	0.41 *	0.16	0.27 *	0.16	0.44 **	0.20
Manufacturing	-0.10	0.16	-0.19	0.15	0.07	0.18
18-29 years					-0.10	0.21
30-49 years					0.17	0.18
50-64 years					0.05	0.19
Atlantic					-0.31 *	0.17
Quebec					0.17	0.15
Ontario					-0.17	0.14
Member of a union					-0.26 **	0.12
Voted PC in 1984					1.52 ***	0.11
Constant	-0.26 ***	0.07	-0.24 ***	0.07	-0.97 ***	0.19
Number of observations	1881		1885		1548	
chi2	24.92		18.61		237.15	
Pseudo R2	0.01		0.01		0.11	
Log Likelihood	-1287.5		-1293.5		-952.3	
Test joint significance of industry dummies chi2(4)	36.49 ***		30.95 ***		18.83	

Notes: Omitted categories are: Models 1-2: Services; Model 3: Services, 65 years and over, West, Nonunion, Voted other than PC (PC is the acronym for the Progressive Conservative Party, the governing party at the time).

*** Significant at 1% level; ** Significant at 5% level; and * Significant at 10% level.

Table 9: Industry Characteristics: Industry Positions on CUSTA; High and Low Tariffs, Imports and Exports by Industry.

		CNES sample			Industry characteristics		
Code	Industry	Number of observations	Univer. educ. (%)	CUSTA supporters (%)	Industry position[a]	Industry type[b] High	Low
1	Agriculture	154	13.07	51.30	-		
8	Forestry	19	0.00	42.11	+		
9	Fishing	20	5.00	30.00	+		
10	Mining	24	8.33	33.33	+	x	t,m
15	Construction	174	7.51	54.60	NT		
20	Food and beverages	33	6.06	30.30	-		m,x
22	Textile mill products	25	4.00	44.00	-	t	x
23	Apparel & other text prod.	3	0.00	0.00	-	t	m,x
24	Lumber and wood	11	0.00	18.18	+	x	t,m
25	Furniture and fixtures	3	33.33	100.00	-	t,x	
26	Paper and allied products	7	0.00	42.86	+	x	t,m
27	Printing	18	22.22	55.56	-		t,m,x
28	Chemicals & allied prod	2	50.00	50.00	M		
30	Rubber & plastic products	9	11.11	44.44	-	t,m	
31	Leather footwear	1	0.00	0.00	-	t,m	x
32	Stone, clay & glass prod	4	0.00	75.00	-	m	t,x
33	Primary metal industries	9	0.00	44.44	+	m,x	t
34	Fabricated metal products	33	3.03	45.45	-	t	m,x
35	Industrial mach. & equip	16	0.00	43.75	M	m,x	
36	Electronic & electric equip	14	7.14	28.57	M	t,m	
37	Transport equipment	11	18.18	54.55	M	m,x	t
40	Other utilities	31	6.45	38.71	NT		
49	Commun/Transportation	165	9.09	41.82	NT		
52	Retail/Wholesale	190	22.75	54.21	+		
60	Fin,ins,real estate	133	34.59	61.65	NT		
70	Commercial	355	17.23	40.28	NT		
80	Noncommercial	352	60.23	46.88	NT		
91	Public Administration	69	14.49	43.48	NT		
	Totals (overall mean)	1885	44.04	48.41			

Notes: a. Industry position refers to positions of trade associations from Litvak (1986). The MacDonald Commission column is from Thompson (1993), Table 3, p. 262. + and - are industries expected to support and oppose, respectively, the CUSTA; M are industries with mixed expected positions; NT are considered nontraded industries.

b Industry types are based on bilateral Canadian imports (m), exports (x) and tariffs (t) with respect to the U.S. The data used were provided by Gaston and Trefler (1995).

Table 10: How Representative is the (CNES) Survey of the Canadian Electorate?[a]

	Survey Sample Unweighted (%)	Survey Sample Weighted (%)	The Canadian Electorate (%)
1. Did You Vote in this Election?			
Voted	88.0	88.9	75
Did Not Vote	11.9	11.0	25
Refused	0.1	0.1	
2. If you voted: What Party Did You Vote For?[b, c]			
Conservative	40.8	42.4	43
Liberal	26.0	25.8	32
NDP	17.4	17.1	20
Other	5.3	5.1	5
Don't know/Refused	10.5	9.6	
3. What is your family's principal wage earner's main occupation?[d]			
Managerial and other professional	35.1	35.4	29.3
Clerical	13.9	13.6	16.9
Sales	9.0	9.5	9.5
Service	8.5	8.4	13.1
Primary occupations:	8.2	6.6	5.0
Farming etc.	5.8	4.8	3.7
Fishing and trapping	0.8	0.4	0.3
Forestry and logging	0.7	0.7	0.4
Mining and quarrying	0.9	0.8	0.5
Processing, machining and fabr.	10.6	11.5	13.2
Construction	6.6	6.7	5.7
Transport equipment operating	4.0	4.2	3.7
Material handling and other crafts	2.8	2.8	3.5
Other occupations	1.1	1.2	

Notes: a. The figures in the table are based on the total number of Post-Election Survey respondents, 2861.

b. The number of respondents to this question was 2517 (344 missing observations).

c. Note that the reported relative frequencies include approximately 10 percent of respondents who "Did not know" or "Refused" to answer the question. Excluding the Don't Know/Refused category, approximately 46% voted Conservative, 29% voted Liberal, 19% voted NDP, and 6% voted for other parties.

d. Calculated from 2796 observations as a percent of employed persons (177 respondents were not in the labor force, or were not coded). Note that the "Canadian Electorate" column in this case reflects the Canadians 15 years of age and older (compared to the CNES which surveyed those 18 years of age and older).

Sources: Canadian National Election Study, 1988. Chief Electoral Officer; Labour Force Annual Averages, Statistics Canada Catalogue 71-220.

Chapter III: An Empirical Investigation of the Stolper-Samuelson Theorem: Evidence from Congressional Voting Patterns on CUSTA, NAFTA, and GATT

III.1. Introduction

Chapter II examines whether cleavages were drawn along industry or factor lines in the positions of individual Canadians on the Canada-U.S. Free Trade Agreement (CUSTA). It is found that political cleavages over a free trade agreement with the United States were drawn along factor, not industry lines. This is evidence in support of the factor-industry detachment corollary: factor markets in Canada are sufficiently mobile to ensure that the distributional consequences of trade policy are independent of industry employment.

Two important and perhaps surprising results from Chapter II are that: 1) support for the Stolper-Samuelson Theorem is found in the political economy of trade policy between two similar countries engaged primarily in intra-industry trade; and 2) skilled workers in Canada were more likely than their less-skilled counterparts to support the CUSTA. The first result provides empirical evidence confirming that the factor-industry detachment corollary is a general result based on the zero-profit assumption and holds even when trade is primarily intra-industry in nature. This is important to keep in mind, but should not be surprising. The second result implies that Canada has a comparative advantage in skilled workers vis à vis the United States. This result is also important but is more surprising.

Several puzzles remain. Does the political economy of trade policy unfold differently when it involves trade between two similar countries, as opposed to two differently endowed countries? If less-skilled workers in Canada opposed the CUSTA,

what was the position of less-skilled workers in the United States? To address these puzzles, this chapter examines whether congressional roll-call voting patterns in the U.S. on the CUSTA, NAFTA and GATT implementing legislation reflects constituent interests the way the factor-industry detachment corollary predicts.

To the extent that congress faces binding constraints from electoral considerations, the voting behavior of its members will tend to reflect the nature of constituent preferences.[1] That is, in order to get reelected, a representative's voting decisions on legislation must reflect the economic (and ideological) interests of constituents. This paper analyses the cross-sectional voting patterns of congressional representatives merged with census data on constituent characteristics to examine whether the representative's voting decision reflects the economic interests of constituents. It then examines whether the economic interests that are represented by legislative voting patterns are consistent with the economic interests predicted by the Stolper-Samuelson Theorem. Although there have been several studies examining the determinants of congressional voting patterns on various trade bills, there have been no attempts to examine whether voting patterns on trade legislation observed on the floor of the United States congress reflect political cleavages predicted by the Stolper-Samuelson Theorem.

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[1] There is a long list of convincing empirical studies which show that constituent interests are systematic determinants of congressional voting behavior. Whether legislators' voting decisions are based partly on their own ideologies is somewhat controversial. See McArthur and Marks (1988). Kalt and Zupan (1984) provide an early survey of literature on empirical legislative voting patterns.

The next section sets out the hypotheses to be tested and reviews previous literature that examines congressional voting patterns on trade policy. Section 3 sets out the empirical approach and discusses the data. Section 4 analyses the voting patterns on the three pieces of legislation and Section 5 presents the empirical results. Conclusions are drawn in Section 6.

III.2. Literature review and hypotheses

Several authors have looked at political cleavages to examined the empirical validity of the Stolper-Samuelson Theorem. Magee (1980) examines lobby positions; Rogowksi (1987) examines historical episodes of transportation revolutions (which are equivalent in effect of lowering tariffs); Irwin (1994, 1996) examines county voting patterns on an election about trade policy; and Chapter II examines individual positions on a trade policy issue determined in a general election. Another literature examines the determinants of roll-call voting patterns on trade policy issues. In fact, analyzing congressional roll-call voting patterns has been widely used in the public choice literature. However, there have been no attempts to empirically examine whether the political cleavages predicted by the Stolper-Samuelson Theorem are reflected in the voting patterns on trade legislation observed on the floor of the United States congress.

III.2.1. Factor-Industry Detachment

Two hypotheses are examined: 1) coalitions around trade policy are determined by factor ownership; and 2) coalitions around trade policy are formed along industry, or

sector lines. Typically factors of production include capital, labor and land. In this paper, following Irwin (1994, 1996) and Chapter II, factors of production represent different skill endowments, i.e. skilled and less-skilled workers. The unit of analysis is the congressional district. The first hypothesis implies that the skill composition of districts helps determine the voting pattern of congressional representatives. The second hypothesis implies that the sectoral composition of districts is what matters.

There is a body of theoretical and empirical literature which considers other determinants of congressional voting patterns on trade policy issues. Before turning to the empirical analysis this literature is reviewed and the other potential explanatory variables are discussed. The modeling strategy is to examine the factor and sector models separately and then control for the other possible explanatory variables discussed below.

III.2.2. The economic and political interests of trade policy

Table 1 provides a summary of previous studies that have examined the determinants of roll-call voting patterns on international trade legislation. One approach along these lines is to examine whether the economic interests of constituents are reflected in the cross-section voting patterns on industry specific trade bills such as protection to the textile industry (Tosini and Tower (1987)) or the automobile industry (Coughlin (1985), McArthur and Marks (1988). Others have compared voting patterns of industry specific legislation to across-the-board generic trade legislation (Nollen and Iglarsh (1990)) or the determinants of voting on different types of trade bills such as protectionist, fair trade and free trade type legislation (Nollen and Quinn (1994)). Still others have examined issues of

"legislative shirking" in legislative voting on trade policy (McArthur and Marks (1988), Srinivasan (1996)).

Tosini and Tower (1987) examine the House and Senate voting patterns on the Textile Bill of 1985. They use state level data on constituent characteristics rather than congressional districts because the employment data is reported by state and they argue that logrolling is prevalent among a state's representatives. In addition, representatives from 26 states voted as a block on this piece of legislation, so district level data would not be explaining very much additional variation in voting preferences. They find that the state unemployment level, Republican party representatives, and the percent of the state workforce employed in textiles increased the probability of supporting the protectionist legislation in the Senate. These were also statistically significant factors determining the House votes. In addition, campaign contributions from textile interests increased the probability of House representatives supporting the agreement and the percent of the workforce employed in export industries lowered the probability of supporting the legislation. The percent of the workforce in unions did not affect the voting decision.

Tosini and Tower also examine whether the percentage of the total term left before the Senator is up for reelection affected their voting decision. They expect to find a negative relationship between time before reelection and the probability of supporting the protectionist legislation because the longer a representative has before reelection the more he or she can afford to weigh the long term benefits of free trade against the short-term benefits of protection. There is evidence that the propensity for engaging in so-called

"legislative shirking" increases as the security in office increases.[2] Moreover, there is general consensus that the electorate myopically ignore any information beyond the recent past (i.e. prior to the election year).[3] Therefore, it is reasonable to examine whether the amount of time before facing reelection affects the representatives' propensity to shirk. This is not examined in this paper which focuses on the House voting patterns, but will be considered when examining Senate voting patterns in future research.

Coughlin (1985) and McArthur and Marks (1988) examine the determinants of House voting patterns on The Fair Practices in Automotive Products Act of 1982 (HR 5133). This was a protectionist piece of legislation compelling car and light truck manufacturers selling in the United States to incur specified minimum percentages of the labor and parts costs in the United States. Both studies found that the presence of automobile and steel interests, labor PAC contributions, and membership (the representative's) in the Democratic party, increased the probability that legislators supported the bill. A higher unemployment rate also increased the probability of supporting the legislation in Coughlin's research. McArthur and Marks (1988) make two

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[2] Kalt and Zupan (1990) and Zupan (1990) find convincing evidence that the extent to which legislators represent their constituents' interests is negatively related to the legislator's security in office. As the authors point out, there is a simultaneity bias: greater security in office may lead to more "legislative shirking" by elected representatives and more shirking diminishes a representative's security in office. This bias works against finding that security in office affects weights on constituent interests in voting behavior. Moreover, Zupan (1990) attacks the simultaneity issue directly by examining the extent to which Senator voting behavior reflects underlying constituent interests in the last two years in office for retiring Senators. He finds that the decision to retire does affect a politician's voting behavior: there is greater amount of legislative shirking after deciding to quit political office.

[3] See Peltzman (1990) p. 27 and references cited there.

important innovations to Coughlin's work: 1) they examine whether constituents opposed to the legislation influence the legislator's voting decision; 2) and they take advantage of a special institutional characteristic of the vote -- it was a "lame duck" Congress -- to look for evidence of legislative shirking.

In the first case they find that the interests of consumers (measured by the number of registered car owners by state) and farmers did not significantly affect voting patterns. However, the share of export employment in the district did reduce the probability of legislator opposition to the bill. This is consistent with the fact that more diffuse interests (consumers and those indirectly affected (farmers in this case)) have little or no influence on their representative's voting behavior; but more concentrated and better defined interests do. In the second case, they find that representatives who had not been reelected were more likely to oppose the legislation than those who had been. They interpret this result as evidence that as the opportunity cost of shirking decreases (not reelected), shirking increases (vote against the bill).

Nollen and Quinn (1994) examine voting patterns on all trade bills tabled in the 100th (1987/88) Congress to analyze institutional and ideological influences - as well as economic interests - that motivate trade policy legislation. They assess the role of the US executive in determining trade policy. An important contribution of this paper is that they present and empirically examine a typology that distinguishes among types of trade policy: fair trade, free trade, strategic trade, and protectionism. Supporters of fair trade bills are liberals, and received money from international business; supporters of protectionist bills

received money from domestic businesses and labor unions and represent constituencies with high unemployment or comparative cost disadvantage. They conclude that fair trade and strategic trade are not simply protectionism in disguise.

There may be discernible and important regional patterns in voting patterns on trade agreements. For example, if a large share of labor force in the southern states are employed in textile and apparel manufacturing industries, then we expect the representatives from those districts to support legislation that positively impacts those industries. There may also be regional differences based on the proximity of the state or district to Canada or Mexico.[4] The southern states were considered potential gainers from the CUSTA because textiles and apparels industries produce a large share of state output, employ a large percent of the workforce and are lower cost producers than their Canadian-based competitors.[5]

III.2.3. Capture and Ideology

Kau and Rubin (1982) study congressional voting patterns and find that ideology is the strongest and most significant variable explaining congressional voting. Kalt and Zupan (1984) focus on Senate voting on a single issue, coal strip mining, and find that ideology plays a predominant role in explaining representative voting patterns. They find, moreover, that a significant part of that ideological influence is explained by "ideological

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[4] See Smith and McGillivray (1996) for a discussion about the border states' positions on NAFTA. Smith and McGillivray also look at predicted job loss/gain by state.

[5] The south are: Alabama, Arkansas, Florida, Kentucky, Lousiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tenessee, Texas and Virginia.

shirking" a term used to describe utility maximizing behavior on the part of representatives.

There is evidence that ideological preferences are much stronger predictors of legislators' voting patterns on more general pieces of legislation than they are for votes on pieces of legislation that more directly impacts identifiable groups. Srinivasan (1997) analyzes the determinants of Senatorial voting on "generic" (as opposed to industry specific) trade bills that seek to impose restrictions on the lowering of tariffs.[6] He examines the issue of "legislative shirking" with respect to international trade legislation. Results show the growing influence of state specific factors and the diminishing role of party and personal ideology on senatorial response. Nollen and Quinn (1994) find that ideology was a substantial influence on trade votes in the 100th Congress (1987-88).

III.2.4. Summary of the hypotheses

The two alternative hypotheses examined are that congressional voting behavior on CUSTA, NAFTA and GATT are determined by the skill composition of the district and that the votes are determined by the industrial composition. Other researchers have shown that the unemployment rate, PAC contributions from different groups, committee membership, regional location, the representative's party, and the representative's "ideology" may have a role to play in determining roll-call voting decisions on trade policy. These factors are also examined and controlled for and the results on the factor and sector models are examined for robustness.

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[6] Based on the trade expansion acts of 1962 and 1974.

III.3. Empirical approach

III.3.1. The econometric model

The empirical strategy is as follows. The first step takes trade theory seriously and treats the two extreme models -- the factor (or Stolper-Samuelson) model and the sector model -- as non-nested alternatives. That is, Stolper-Samuelson predicts that only factor ownership determines attitudes toward trade policy. In the empirical analysis the only observable factors are different endowments of human capital, the null hypothesis is that the probability of supporting a free trade agreement is only a function of human capital, or skill:

$$1. \quad H_0: \; P(\text{support}) = \sum_{i=1}^{I} \alpha'_i \, skill_i + u_0 \qquad u_0 \sim IN(0, \sigma_0^2)$$

Support is an indicator variable for voting in favor of the agreement (support=1). $Skill_i$ is the proportion of a district's population with skill-type i. In the empirical examination, skill is measured in two different ways: by education level attained and by occupation (i.e. high- versus low-skill occupations).

If factors are sector-specific, the probability of supporting the FTA is only a function of industry:

$$2. \quad H_1: \; P(\text{support}) = \sum_{j=1}^{J} \alpha'_j \, ind_j + u_1 \qquad u_1 \sim IN(0, \sigma_1^2)$$

Ind_j is the proportion of a district's population employed in industry j.

These two models are examined separately and then the Davidson and MacKinnon J-test procedure is performed to test the non-nested hypotheses: H_0 against H_1, i.e., the hypothesis that voting patterns are determined solely by skill against the hypotheses that only industry employment determines positions on free trade.[7] The analogous model allows a test of H_1 against H_0 where H_1 is the maintained hypothesis. The problem with this approach is that it can reject or fail to reject both hypotheses. If both models are rejected, there is no conclusion. If neither model is rejected, we will want to consider a comprehensive model of positions on free trade which includes both factors and sectors.

III.3.2. The Data

III.3.2.1. The 100th Congress

A summary of the data for the 100th Congress is presented in Table 2. The Political Action Committee (PAC) contributions, unemployment, export employment, and committee membership data for the 100th Congress are from Nollen and Quinn (1994). The PAC data are: contributions from international corporate PACs (the 100 largest US corporations in terms of foreign sales or the 50 largest exporters during any year from 1983-88); domestic corporate PACs (i.e. corporate PACs other than international) and labor union PACs as a percentage of total PAC contributions. Nollen and Quinn obtained the PAC data from the Federal Election Commission (FEC) data tapes.

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[7] See Davidson and MacKinnon (1981). Chapter II summarizes the J-test in more detail and provides an application.

The unemployment data are unemployed persons as a percent of the labor force in 1986: since district level data are not available for 1986, 1980 district unemployment data were used and rescaled to 1986 statewide levels, assuming constant change from 1980 to 1986 across districts. Export employment data measure employment directly related to manufactured exports as a percentage of total manufacturing employment in 1986, by state. Committee membership data indicate membership on three international trade House subcommittees: the International Economic Policy and Trade Subcommittee of the House Foreign Affairs Committee; the Trade Subcommittee of the House Ways and Means Committee; and the International Development, Finance, Trade and Monetary Policy Subcommittee of the House Banking, Finance, and Urban Affairs Committee.

Data on district characteristics are from the 1980 Census. These data include: employment shares in different industries, education attainment, and occupation. At this point, the data have not been scaled up from 1980 to 1986 levels. The roll-call voting data are from the ICPSR electronic data.

III.3.2.2. The 103rd Congress

A summary of the data for the 103th Congress is presented in Table 3. Data on district characteristics (unemployment rate, share of labor force in different industries, occupation, and education) are from the 1990 Census. The data have not been scaled up from 1990 to 1992 levels. The roll-call voting data are from the Report on Congress published by the AFL-CIO.

III.3.3. Problems with studying trade votes in the US Congress

Studies that examine one or a few trade votes often produce very different findings from other studies that examine a few other trade bills (Nollen and Quinn (1994)). Moreover, vote trading and log rolling make the practice of studying one trade bill more tenuous. Examining only one trade bill ignores the interdependence of one set of trade bills on the entire set of trade bills. Because of these concerns, Nollen and Quinn (1994) examine the entire voting record of both bodies of the 100th Congress using identical explanatory variables for each contested trade vote.

Looking at a cross-section of legislative voting patterns raises some issues that looking at voting patterns around referendum avoids. In particular, it is difficult to draw inferences about the economic interests of constituents based on legislative voting patterns per se. It is not clear whether the observed voting patterns reflect the ideology of the legislators, pressure from special interest groups, logrolling and strategic voting, or the economic interests of the constituents. However, the empirical strategy makes it possible to rule out some of these as dominant influences.

III.3.4. Roll-call vote analysis

There are several well known problems with analyzing roll-call votes (Nollen and Quinn, p. 508). First, roll-call analysis assumes the same weight of intensity for each congressional member's revealed preferences based on observed voting decisions. This is not a serious problem and is common to all public choice type analyses based on voting. Nollen and Quinn argue that trade legislation has very broad interest, affecting consumers

and producers everywhere. The assumption of comparable intensity of interest may be less of a problem for trade votes, than for other kinds of legislation.

Second, roll-call analysis does not control for vote trading and logrolling (see Hall and Grofman (1990) and Stratmann (1992)).[8] Stratmann finds that widespread vote trading is less of a problem on trade votes than on narrower bills such as amendments to agricultural bills (dairy, sugar, peanut etc.). Also, bills settled by wide margins limits vote trading and logrolling activity. Thus CUSTA (368-40) and GATT (288-134) may be less affected by these practices than the NAFTA (234-200) vote.

Third, roll-call analysis is biased against finding the influence of interest groups working at the committee level where some legislative decisions are made (and never appear on the floor for a vote). Trade issues are examined in many committees therefore it is difficult for lobbyists to block trade legislation from coming to the floor (i.e. bill selection for the floor agenda, etc.).

So, the problems associated with examining roll-call votes are somewhat mitigated in the context of trade legislation. Moreover, the empirical work controls for various political factors in order to isolate the economic interests of the constituents.

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[8] The term "logrolling" comes either from the practice of American settlers cooperating to move logs off property to be used for farming; or from a game of skill among lumberjacks, whereby two peolpe cooperatively maintain their balance on a floating log as they spin it with their feet. As early as the beginning of the 19th century it had come to mean mutual aid among politicians. In 1870, Congressman B. F. Butler said "If you will vote for my interest, I will vote for yours. That is how these low tariffs are logrolled through." This is from Wilson and DiIulio (1995). See Miller (1977).

III.4. House Voting Patterns on CUSTA, NAFTA and the GATT

It is useful to examine both the Senate and House voting patterns on the bills. The advantage of the Senate is that there is a natural structure with two senators from each state. Both senators have the same constituents and therefore, any factors that systematically make the constituents of a state either support or oppose a trade bill will affect the voting decisions of both senators. It is not possible to econometrically examine the Senate voting patterns on the CUSTA implementing legislation because only nine Senators opposed the agreement. There are sufficient observations of votes against NAFTA and GATT for econometric analysis of Senate voting patterns on these bills, but that is not done in this paper.

III.4.1. CUSTA

It is difficult to identify coalitions because of the overall general support for the agreement. The House overwhelmingly approved the treaty (368-40) on August 9, 1988 (100th Congress) and the Senate passed the implementing legislation by a similarly large majority (83-9). In fact, approximately 90 percent of representatives who voted, supported the agreement in both chambers. This is in contrast to the votes on NAFTA and GATT where, proportionately the support was much stronger in the Senate.

Nollen and Quinn (1994) (and sources cited by them) point out that Congress plays less of a role in forming US trade policy than the does the executive. However, Congress exerts authority through the committee system and decisions of members of congressional trade subcommittees influence final congressional outcomes.

Representatives on these committees are generally considered nationally oriented and are less responsive to narrow constituent interests.[9] An alternative hypothesis is that representatives seek committee assignments to protect important constituent interests. However, it is not possible to include membership on any of the three main House committees that examine trade policy as independent variables explaining congressional voting patterns on CUSTA because membership on any of these committees perfectly predicts a vote in favor of the CUSTA.[10] That is, all 11 members of the Foreign Affairs Subcommittee, 15 members of the Banking Subcommittee and 15 members of the Ways and Means Subcommittee voted in favor of the legislation.

III.4.2. NAFTA and GATT

Both chambers of the 103rd Congress (1993-94) voted on, and passed, bills implementing the NAFTA and the Uruguay Round GATT treaties. As Table 4 shows, the House narrowly approved the NAFTA implementing legislation (234-200) on November 17, 1993 and on November 20 the Senate voted 61-38 in favor of the bill.[11] The

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[9] Nollen and Quinn (1994), p. 504.

[10] The three main house committees are: the International Economic Policy and Trade Subcommittee of House Foreign Affairs Committee; the International Development, Finance, Trade, and Monetary Policy Subcommittee of the House Banking, Finance and Urban Affairs Committee; and the Trade Subcommittee of the House Ways and Means Committee.

[11] Note that four congressional districts changed representatives between the two votes on NAFTA and GATT. Natcher, a Democrat from Kentucky in 1993 opposed NAFTA was replaced by Lewis, a Republican who opposed GATT; Henry, a Republican from Michegan did not vote on NAFTA and was replaced by another Republican (Ehlers) who supported GATT; Inhofe, a Republican from Oklahoma voted against NAFTA was replaced by another Republican (Largent) who opposed GATT; and English, a Democrat from Oklahoma who supported NAFTA was replaced by a Republican (Lucas) who opposed GATT.

legislation implementing the GATT passed in the House (246-188) and in the Senate on December 1, 1994 (76-24). Notice that the House votes on both bills were closer than the Senate votes. This difference was more dramatic in the NAFTA vote, where 54 percent of the House (who voted) were in favor of the bill, versus 62 percent in the Senate.

An interesting aspect of the House voting patterns on GATT and NAFTA is revealed in Table 5. Congressional representatives who voted in favor of NAFTA were very likely to support GATT (85 percent of those voting in favor of NAFTA voted in favor of GATT). This was not the case for those opposing NAFTA. Forty five percent of those who voted against NAFTA voted in favor of the GATT.

The vote on NAFTA was highly visible and contentious and generated a large amount of public debate and pressures from all sides. It was what Mayhew (1974, pp. 67) called **a showdown vote**: a rare single roll-call vote that achieves a high salience among the public. Kalt and Zupan (1985) argue that the legislative constraints affect legislator voting primarily on bundles of issues, not specific votes. However, for prominent issues, like NAFTA, political constraints can be more important at the time of the vote.[12] For this reason, we may find a stronger effect of constituent interests on congressional voting decisions with respect to NAFTA than for the votes on GATT (or CUSTA).

Nollen and Iglarsh (1990) examine determinants of Senate voting patterns on two types of trade legislation: generic protectionism and commodity-specific interests. They find that ideology is a more important determinant of voting patterns for legislation on

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[12] This point is made by McArthur and Marks (1988), pp. 466.

generic protectionism and that constituent interests are more important for commodity-specific issues. It seems likely that economic interests from a preferential trade agreement are more concentrated and easier to identify than a multilateral trade agreement. Therefore, we may find the constituent interests more important in the CUSTA and NAFTA votes than in the GATT vote. Unfortunately, with the census data used in this analysis it is not possible to clearly identify interested parties. One way to get at this question would be to use state level data with information on trade patterns with Canada and Mexico.

Organized labor opposed both agreements. The opposition to NAFTA was based on the threat of US manufacturing operations moving to Mexico (i.e. investment location decisions). Whereas opposition to GATT was based primarily on the threat of increased imports from "unfair" trading partners. The AFL-CIO's opposition to NAFTA was primarily based on the argument that throughout the 1980s a growing number of American manufacturing firms began closing plants located in the US and setting up new plants in Mexico. The NAFTA was expected to give greater protection to investments American firms had already made in Mexico and "eliminated or reduced tariffs and duties on products made in Mexico (and Canada), giving US firms an even larger incentive to ship their jobs to Mexico."[13]

The AFL-CIO's opposition to GATT was based on the following arguments: they projected the loss of tens of thousands of textile and apparel industry jobs as a result of the

[13] AFL-CIO Report on Congress: 1993.

GATT; the GATT weakens US trade laws designed to combat unfair trade practices; and the subjugation of US trade policy and some US laws to decisions of the World Trade Organization (WTO). Moreover, they argued that the GATT will not alleviate the enormous US trade deficit and limits the US government to adopt policies designed to relieve growing trade deficits. They argued that "for many Americans, the agreements will mean enormous economic disruption and job loss."[14]

Table 6 presents the distribution of votes on CUSTA, NAFTA and the GATT between and within states. It is striking that House legislators from 29 out the 50 states voted unanimously on CUSTA, 19 states were unanimous on the NAFTA vote and 14 for the GATT vote. In many of the other states, there is only one dissenting district. Since there is not very much variance in the dependent variable within states and since more timely data on employment and trade are more readily available at the state level, it would be worthwhile to examine the same issues using state level constituents characteristics.

III.5. Results.

III.5.1. CUSTA

III.5.1.1. The factor model

The results from estimating the "factor model" of House roll-call votes on CUSTA are reported in Table 7. The table has three panels for different specifications of the factor model depending on the definition of skill. The first two panels define the skill

[14] AFL-CIO Report on Congress: 1994, p. 4.

composition of a district based on the proportion of the population with different levels of educational attainment (for those over 25); the third panel defines the district skill set based on occupations. Within each panel are two columns, one reports the results from estimating the model without controlling for other variables and one reports the results of the model that includes the controls.

There are three striking results in Table 7. First, it appears that the skill composition of districts does have some affect on the House voting patterns on CUSTA. But the interpretation is not clear. It seems clear that representatives from districts with a high proportion of skilled workers were more likely to support the legislation, but so were representatives with a large proportion of unskilled workers. There are large and statistically significant coefficients on the proportions of both high and low skill groups, across model specifications.

In order to interpret the results on the skill composition of the districts it is important to realize that the explanatory variables are proportions of the district within a particular category. Since including all categories leads to collinearity problems, categories have been omitted. The way to interpret the coefficient estimates, then, is analogous to the interpretation for categorical variables -- the results are relative to the omitted category. For example, the first panel includes three categories: those with no high school degree, those with college degrees and those with a graduate or professional degree. The omitted category is those with a at least a high school degree and at most some college. The coefficient estimates are from the logit regression. Therefore, the

coefficient of 11 on no high school degree, means that a one percent increase in the share of the district's population with no high school and one percent decrease in the share of those with a high school degree and some post secondary education increased the predicted log odds of voting "Yea" on CUSTA by 0.11.[15] Or equivalently, the one percent increase in the share of the district's population with no high school multiplied predicted odds of voting "Yea" by 1.11.

The second striking result from the results reported in Table 7 is that the factor model by itself does very poorly in fully explaining the House voting patterns. When the controls are included, the explanatory power of the model increases substantially. The third result is that the skill composition of the district continues to be an important determinant of the voting patterns, even when controlling for the other factors -- which increase the explanatory value of the model substantially.

Before considering the sector model, consider what other variables are important determinants of the House votes on CUSTA. The western states were opposed to the agreement in all specifications, and the south supported the agreement in one specification. The robust result on western states likely reflects the industrial composition of that geographic region. The western states were concerned about increased exposure to imports of agricultural and primary products from Canada. This threat had led to a number of trade actions brought to the United States Trade Commission in the early 1980s

[15] The dependent variables on share of population are not in percent terms, but as a share. To convert to marginal effects in terms of percent changes, divide the coefficient by 100 (to get the proper units).

on behalf of different timber and agricultural groups. Southern districts did not have significantly different voting patterns when education is used to define skill, but it is when occupations are used (column 6).

The other variable with an important, and robust, impact on voting patterns was the percent of labor PAC contributions. The effect is significant and robust across specifications. A one percent increase in labor PAC contributions lowers the predicted log odds of voting in favor of CUSTA by 0.03 (or multiplies the predicted odds of voting in favor of CUSTA by 0.97). The unemployment rate has a statistically significant negative effect on the probability of supporting the agreement in one specification. This is consistent with other studies. But the effect of higher unemployment on the probability of supporting the bilateral trade agreement is not robust to model specification.

III.5.1.2. The sector model

The results from the sector model are reported in Table 8. A striking result from estimating the sector model is the large, statistically significant negative effect of the proportion of primary employment (those employed in agriculture, mining, forestry and fishing) on the voting decision. Table 8 confirms the speculation in discussing the factor model, that the negative coefficient on the western region likely reflects the concentration of primary industries in that area. However, the coefficient on the west categorical variable is not significant in this model.

Another striking result is that, as in the factor model, adding the control variables significantly improves the fit of the model. The estimation results for the sector model are

not significantly altered with the inclusion of the control variables. Finally, a second measure of industry or sector interests is the percent of employment in the exportables industries. The coefficient on export employment is not very precisely estimated without the controls; with the controls it has a statistically significant positive affect on the support for the CUSTA.

The labor PAC contribution has a statistically significant negative impact on supporting the CUSTA in all specifications except the last column of Table 8 -- where the industry model is based on export employment. None of the other control variables are individually significant across models. In particular, there is not a strong party effect or a strong effect of unemployment. There was also no significant impact of ADA scores on voting patterns on CUSTA.[16]

III.5.2. NAFTA and GATT.

III.5.2.1. The factor model

The odd numbered columns of Table 9 report the results from estimating the factor model for NAFTA and GATT without controlling for other factors. The most striking result from this model is how poorly it performs in explaining the House vote on the GATT. The fit for the NAFTA model is similar to that in the CUSTA case: the explanatory power is low without the controls and improves considerably after controlling for unemployment, southern region, and party.

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[16] The ADA score was tried in other specifications not reported here.

Representatives from districts with a high proportion of college graduates tended to support NAFTA and those with a high proportion of "some high school" and those with graduate and professional degrees were more likely to oppose NAFTA. The results for those with less than a high school degree and those with a college degree are consistent with the Stolper-Samuelson Theorem which would predict increased real wages for skilled workers and a decrease for unskilled workers from expanding trade with low-skill abundant Mexico. It is not clear why representatives from districts with a large proportion of the highest educated people opposed NAFTA.

Using occupation to measure the skill composition of the district yields the same result: that the higher the proportion of skilled workers, the more likely the representative will support the agreement. The second panel of Table 10 presents the result from estimating NAFTA and GATT votes when the skill composition is measured by "white collar". In this case, the skill composition helps explain the voting pattern on GATT. The higher the proportion of white collar workers, the more likely that the representative supported GATT. But "white collar" is not robust to models that control for unemployment, the south, or party membership of the representative.

Representatives from southern districts Republicans had a higher probability of supporting NAFTA, but not GATT. Higher unemployment lowered the probability that a representative will vote for GATT but did not affect the NAFTA voting decision.

III.5.2.2. The sector model

The results from estimating the sector model are presented in Table 10. In stark contrast to CUSTA, districts with a large proportion of primary industry workers supported the NAFTA. This result likely reflects the large expected gains in US exports to Mexico of field crops (corn, wheat, and soybeans) and processed food.[17] There was no similar effect of primary industry interests in the GATT vote.

As in the factor model, however, the model does not do a very good job of explaining the vote on GATT. Notice that districts with a high proportion of construction workers were more likely to support NAFTA. The direction of the construction influence was the same for the vote on CUSTA, but was not significant. This is a fascinating result. It was found in Chapter II that Canadian construction workers were among the strongest supporters of CUSTA. This result is consistent with the idea that a change in the trade regime was expected to lead to a large amount of adjustment, which is good for the construction industry. The most surprising result is the large influence that the proportion of workers in the retail and wholesale trade industries had on voting patterns.

The strong positive effect of Republican representatives and southern districts is present in the sector model. This means that being in the south increased support for NAFTA, independent of its industrial composition. Regional location did not affect voting patterns on GATT, but did affect voting patterns on NAFTA and CUSTA. Perhaps there are some border effects, as would be predicted by gravity models of trade.

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[17] See Hufbauer and Schott (1992).

Unemployment did not affect the probability of supporting NAFTA, but as in the factor model, it did lower the probability of supporting GATT.

III.5.3. Nonnested tests

Recall that the J-test will test the nonnested hypotheses: 1) the factor model is the correct model; 2) the sector model is the correct one. The results from these tests are that for CUSTA and NAFTA, neither model is rejected. For GATT, the industry model cannot be rejected but the factor model is rejected.

III.6. Conclusion.

This study confirms some basic insights that are known from the literature. One is that it is difficult to draw general conclusions about the determinants of congressional voting patterns on trade issues by examining a single piece of legislation. There are substantial idiosyncratic determinants of voting patterns across bills. However, it is possible to draw some conclusions by comparing votes on different pieces of legislation.

The results reported here provide additional support that constituents' economic interests help determine a representative's voting behavior on international trade issues. It is not clear from the results, however, whether the underlying model is the sector (Stolper-Samuelson), or factor model. Both the skill and industry composition of districts help determine House voting patterns on CUSTA and NAFTA. The nonnested J-test was not able to reject either model for CUSTA or NAFTA, but it did reject the factor model for

the GATT vote. The CUSTA and NAFTA result is consistent with a partial factor mobility model of trade.[18]

Neither the factor nor sector models do a very good job of fully explaining House voting patterns on CUSTA, NAFTA and GATT. On the other hand, both the skill composition and the industrial composition of the labor force had an important impact on House voting decisions with respect to CUSTA and NAFTA. The share of white collar workers increased the probability of supporting GATT, but the educational attainment composition did not have an effect. The result that the skill and industry compositions mattered for House voting patterns on preferential trading agreements but did not help explain votes on the multilateral agreement is consistent with political economy theory which predicts that free rider problems associated with more disperse and poorly defined returns to trade policy imply little ability to affect policy. The parties most affected by CUSTA and NAFTA were more concentrated and easily identifiable than the groups affected by GATT.

Another important result is that regional interests were important for CUSTA and NAFTA but not for GATT. These regional interests appear to be independent of industrial composition and therefore suggest that there are border effects implied by gravity models of trade. This hypothesis should be examined more closely. In particular, more distance and location information can be brought to bare on the comparison of House voting patterns on regional trade agreements (CUSTA and NAFTA) to multilateral

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[18] See Hill and Mendez (1983).

agreements (GATT). To do this properly care must be taken to better identify and measure industrial and skill compositions as well as regional (state or district) trade patterns with the trading partners. The next step will be to examine exports by 2-digit industry and by state to Canada, Mexico, and the World.

Along these lines, it may be better to use state level demographic and economic data than the census data by district. The state-level data are much richer and since there little variation in voting patterns within states, little information will lost.

Future work should look at a larger cross-section of trade votes and include the Senate roll-call votes in the analysis. It would be worthwhile to try and measure the extent that other factors are interested in trade issues. For example, use measures of arable land to measure the land endowment and non-wage income to measure capital's interest.

Table 1: Summary of Studies Examining Rollcall Voting Patterns on Trade Policy

Study	Legislation	Unit of Analysis	Key Results
Baldwin (1985)	Trade Act of 1974: authorized the Tokyo Round of GATT (generic free trade legislation)		**Significant coefficients:** democrat; labor PAC contributions (-), share of import-sensitive industries (-). **Insignificant coefficients:** share of exporting industries.
Coughlin (1985)	The Fair Practices in Automotive Products Act of 1982 (HR 5133): cars and light trucks must incur specified minimum percentages of costs in the US	House	**Significant positive coefficients:** Auto employment (+), steel employment (+), unemployment rate (+), share of PAC contributions from labor (+), democrats (+), ADA rating* (+).
Tosini and Tower (1987)	Textile Bill of 1985 (HR 1562 and S 1730): quotas on imported textiles (protectionist, sector specific).	House and Senate	**Significant coefficients:** Only House: share of campaign contribution from textile interests (+), % of workforce in exports (-). House and Senate: unemployment rate (+), % workforce in textiles (+), republican (+). **Insignificant coefficients:** Only Senate: campaign contributions from textile interests, % of workforce in exports; time left in term. House and Senate: percent workforce in union
McArthur and Marks (1988)	The Fair Practices in Automotive Products Act of 1982 (HR 5133): cars and light trucks must incur specified minimum percentages of costs in the US	House	**Significant coefficients:** Auto employment (+), steel employment (+), share of PAC contributions from labor (+), democrats (+), ADA rating* (+), union membership (+), export employment (-), lame duck legislator (+). **Insignificant coefficients:** unemployment rate, farm emplyment, number of autos registered (consumer demand).

Notes: * ADA rating is the measure of "liberalism" based on the percentage of times the member voted for the position of the Americans for Democratic Action for selected votes. + indicates a positive coefficient; - indicates a negative coefficient.

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Table 1 (continued): Summary of Studies Examining Rollcall Voting Patterns on Trade Policy

Nollen and Iglarsh (1990)	1984 Omnibus Trade Bill (HR 3398): generic bill on unfair trade practices; 1985 Textile Import Quotas Bill (HR 1562): sector specific protection; 1987 Omnibus Trade Bill (HR 3, S 1420).	Senate	Ideology is more important in determining generic protectionist bills; local constituent interests are more important in determining commodity-specific issues.
Nollen and Quinn (1994)	All trade legislation in the 100th (1987/88) congress: free trade, fair trade, strategic trade and protectionism.	House and Senate	**Significant coefficients:**
Krueger (1996)	Proposed child labor law; NAFTA and GATT	House	**Significant coefficients:** Ban on child labor: share of HS dropouts (-), union (+), pro-NAFTA/GATT (-), proNAFTA/antiGATT, ADA (+) NAFTA and GATT (support): share of HS dropouts (-), union (+). **Insignificant coefficients:** Democrat, vote94, number of terms in office.
Srinivasan (1997)	Trade Expansion Act (1962) and Trade Expansion Act (1974): generic protectionist legislation (impose restrictions on lowering tariffs)	Senate	**Significant coefficients:** 1962 Act: democrat (-), ADA (-); 1974 Act: share employed in import-senstitive industries (+), shae employed in export-oriented industries (-), ADA (+).

Notes: * ADA rating is the measure of "liberalism" based on the percentage of times the member voted for the position of the Americans for Democratic Action for selected votes. + indicates a positive coefficient; - indicates a negative coefficient.

Table 2: Summary of House Data for CUSTA Analysis (100th Congress)

Variable description	Obs	Mean	Std. Dev.	Min	Max
Roll call vote on CUSTA	396	0.90	0.30	0.00	1.00
Proportion with no high sch deg	422	0.23	0.06	0.09	0.41
Proportion with high sch degree	422	0.26	0.04	0.15	0.36
Proportion with some college	422	0.13	0.03	0.05	0.23
Proportion with college degree	422	0.06	0.02	0.01	0.18
Proportion with grad/prof degree	422	0.05	0.02	0.01	0.18
Proportion with any college	422	0.23	0.07	0.09	0.50
Proportion in primary	422	0.02	0.02	0.00	0.09
Proportion in construction	422	0.03	0.01	0.01	0.06
Proportion in manufacturing	422	0.10	0.04	0.02	0.23
Proportion in trans/comm	422	0.03	0.01	0.01	0.06
Proportion in Retail/Wholesale	422	0.09	0.01	0.04	0.14
Proportion in Services	422	0.15	0.03	0.08	0.31
Proportion in Public Service	422	0.02	0.01	0.01	0.12
Proportion management	422	0.04	0.02	0.01	0.12
Proportion clerical	422	0.07	0.02	0.03	0.14
Proportion craft	422	0.06	0.01	0.02	0.09
Proportion labor	422	0.02	0.00	0.01	0.04
proportion in blue collar job	422	0.20	0.03	0.11	0.31
proportion in white collar job	422	0.23	0.06	0.11	0.45
Unemployment rate 1986	422	6.79	2.66	1.00	18.00
Dummy vrble for south	422	0.29	0.45	0.00	1.00
Dummy vrble for north east	422	0.25	0.43	0.00	1.00
Dummy vrble for west	422	0.19	0.40	0.00	1.00
Member is on the For Aff Subcom	422	0.03	0.17	0.00	1.00
Member is on the Banking Sub	422	0.04	0.19	0.00	1.00
Member is on Ways & Means	422	0.03	0.18	0.00	1.00
% employed in mfg exports (stat	422	5.83	2.34	1.00	33.33
ADA rating	422	48.18	34.93	0.00	100.00
International corp PAC contribu	422	2.58	1.80	0.00	10.68
Domestic corp PAC contribution	422	23.32	11.57	0.00	67.20
Labor union PAC contribution	422	22.50	20.83	0.00	83.83

Table 3: Summary of House Data for NAFTA and GATT Analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
Roll call vote on NAFTA	434	0.54	0.50	0.00	1.00
Roll call vote on GATT	434	0.66	0.47	0.00	1.00
Share No high school degree	435	0.21	0.07	0.07	0.48
Share Some high school	435	0.12	0.03	0.04	0.23
Share high school degree	435	0.25	0.05	0.12	0.39
Share college	435	0.16	0.03	0.06	0.24
Share college degree	435	0.11	0.04	0.02	0.25
Share grad/prof degree	435	0.06	0.03	0.01	0.21
Share all college	435	0.32	0.09	0.10	0.60
Share primary	435	0.02	0.02	0.00	0.14
Share construction	435	0.04	0.01	0.01	0.08
Share manufacturing	435	0.11	0.04	0.03	0.26
Share trans/commun	435	0.04	0.01	0.03	0.09
Share retail/wholesale	435	0.13	0.02	0.07	0.20
Share public service	435	0.03	0.02	0.01	0.14
Share blue collar	435	0.25	0.05	0.12	0.38
Share white collar	435	0.35	0.08	0.17	0.58
Unemployment rate	435	0.07	0.03	0.03	0.29
Representative's party (Repub=1	435	0.41	0.49	0.00	1.00
Representative's party (Repub=1	435	0.41	0.49	0.00	1.00
Southern region	435	0.29	0.45	0.00	1.00

Table 4: Summary of House Rollcall Votes on CUSTA, NAFTA and GATT

	The Distribution of Votes in the House of Representatives.					
	CUSTA		NAFTA		GATT	
Votes	Number	Percent	Number	Percent	Number	Percent
Nay	40	9.8	200	46.08	146	33.64
Yea	368	90.2	234	53.92	288	66.36
Total	408		434		434	
	The Distribution of Votes in the Senate.					
Nay	9	9.8	38	38.4	24	24.0
Yea	83	90.2	61	61.6	76	76.0
Total	92		99		100	

Table 5: Comparison of Congressional Voting Patterns on the NAFTA and GATT

	Roll-call vote on NAFTA		
Roll-call vote on GATT	**Nay**	**Yea**	**Total**
Nay: frequency	109	34	143
Nay: percent	76	24	100
% of Nay/Yea on NAFTA & Nay to GATT	55	15	33
Yea: frequency	89	198	287
Yea: percent	31	69	100
% of Nay/Yea to NAFTA & Yea to GATT	45	85	67
Total NAFTA vote	198	232	430
Percent NAFTA vote	46	54	100

Notes: Excludes representatives that did not vote on both bills including congressional districts that changed representatives between the two votes.

Table 6: Distribution of Congressional Rollcall Votes on CUSTA, NAFTA and GATT: Within and Between States

Distribution of Congressional Rollcall Votes on CUSTA, NAFTA and GATT: Within and Between States												
State	Rollcall votes on CUSTA				Rollcall votes on NAFTA				Rollcall votes on GATT			
	Nay	Yea	Total	Unanimous*	Nay	Yea	Total	Unanimous	Nay	Yea	Total	Unanimous
AK	0	1	1	1	1	0	1	1	1	0	1	1
AL	0	7	7	1	5	2	7	0	5	2	7	0
AR	0	4	4	1	0	4	4	1	2	2	4	0
AZ	1	4	5	0	0	6	6	1	1	5	6	0
CA	3	36	39	0	21	31	52	0	18	34	52	0
CO	0	6	6	1	0	6	6	1	3	3	6	0
CT	0	3	3	1	3	3	6	0	0	6	6	1
DE	0	1	1	1	0	1	1	1	0	1	1	1
FL	0	15	15	1	10	13	23	0	7	16	23	0
GA	0	6	6	1	5	6	11	0	5	6	11	0
HI	0	2	2	1	2	0	2	1	1	1	2	0
IA	0	6	6	1	0	5	5	1	0	5	5	1
ID	1	1	2	0	2	0	2	1	1	1	2	0
IL	2	18	20	0	9	11	20	0	6	14	20	0
IN	1	9	10	0	8	2	10	0	2	8	10	0
KS	0	5	5	1	1	3	4	0	1	3	4	0
KY	2	5	7	0	4	2	6	0	3	3	6	0
LA	1	5	6	0	2	5	7	0	3	4	7	0
MA	1	10	11	0	5	5	10	0	3	7	10	0
MD	1	7	8	0	4	4	8	0	2	6	8	0
ME	2	0	2	1	2	0	2	1	2	0	2	1
MI	4	14	18	0	10	5	15	0	7	9	16	0
MN	1	7	8	0	5	3	8	0	3	5	8	0
MO	0	7	7	1	6	3	9	0	4	5	9	0
MS	0	4	4	1	2	3	5	0	3	2	5	0
MT	2	0	2	1	1	0	1	1	1	0	1	1
NC	1	10	11	0	4	8	12	0	5	7	12	0
ND	1	0	1	1	1	0	1	1	0	1	1	1
NE	0	3	3	1	0	3	3	1	0	3	3	1
NH	0	2	2	1	1	1	2	0	1	1	2	0
NJ	0	13	13	1	9	4	13	0	4	8	12	0
NM	3	0	3	1	0	3	3	1	2	1	3	0
NV	1	1	2	0	2	0	2	1	1	1	2	0
NY	1	28	29	0	21	10	31	0	11	20	31	0
OH	1	20	21	0	10	9	19	0	6	13	19	0
OK	0	6	6	1	1	5	6	0	3	3	6	0
OR	1	4	5	0	2	3	5	0	1	4	5	0
PA	3	19	22	0	14	7	21	0	4	17	21	0
RI	1	1	2	0	1	1	2	0	0	2	2	1
SC	0	5	5	1	5	1	6	0	4	2	6	0
SD	1	0	1	1	1	0	1	1	0	1	1	1
TN	0	7	7	1	0	9	9	1	1	8	9	0
TX	1	24	25	0	6	24	30	0	5	25	30	0
UT	0	3	3	1	1	2	3	0	0	3	3	1
VA	0	8	8	1	4	7	11	0	3	8	11	0
VT	0	1	1	1	1	0	1	1	1	0	1	1
WA	0	7	7	1	1	8	9	0	1	8	9	0
WI	1	8	9	0	4	5	9	0	6	3	9	0
WV	2	2	4	0	3	0	3	1	3	0	3	1
WY	0	1	1	1	0	1	1	1	0	1	1	1
Total	40	356	396	29	200	234	434	19	146	288	434	14

Notes: * Unanimous = 1 if the state's representatives voted unanimously on the legislation

Table 7: Analysis of House Roll-call Votes on CUSTA: The Factor Model

	Column 1	Column 2		Column 3	Column 4		Column 5	Column 6
No HS degee	11.346 ***	8.643	No HS degree	11.635 ***	13.331 **	Management	71.774 ***	50.927 *
	(4.181)	(5.840)		(4.610)	(5.802)		(25.304)	(29.547)
College degree	47.623 **	-24.878	Any college	17.027 ***	17.936 ***	Clerical	8.419	35.215 **
	(23.313)	(29.611)		(5.024)	(6.104)		(14.763)	(18.124)
Grad/Prof. degree	17.766	73.478 ***				Craft	-34.16 *	-41.038 *
	(23.039)	(28.095)					(20.403)	(22.798)
						Labor	133.951 **	105.406 *
							(55.404)	(58.029)
Unemployment		-0.19 **			-0.132			-0.015
		(0.088)			(0.083)			(0.101)
South		0.481			0.153			1.161 *
		(0.707)			(0.691)			(0.640)
Northeast		-0.791			-0.6			-0.372
		(0.527)			(0.517)			(0.505)
West		-1.108 **			-1.264 **			-0.875 *
		(0.537)			(0.549)			(0.513)
Republican		0.176			0.123			0.131
		(0.615)			(0.604)			(0.611)
PAC - inter. bus.		-0.138			-0.109			-0.069
		(0.140)			(0.137)			(0.143)
PAC - domes bus.		-0.011			-0.012			-0.03
		(0.027)			(0.028)			(0.030)
PAC - labor		-0.03 *			-0.029 *			-0.039 *
		(0.018)			(0.018)			(0.020)
Constant	-3.599 **	1.589		-4.135 **	-2.03		-1.955	0
	(1.620)	(2.446)		(1.969)	(2.559)		(1.457)	(2.521)
N	396	396		396	396		396	396
Log Likelihood	-120.02	-109.43		-122.62	-110.94		-117.02	-104.93
Chi2	19.17	40.37		13.99	37.34		25.18	49.37
Pseudo R-squared	0.07	0.16		0.05	0.14		0.1	0.19

Notes: The dependent variable is an indicator variable = 1 for a Yea vote.
*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10 % level.

Table 8: Analysis of House Roll-call Votes on CUSTA: The Sector Model

	Column 1	Column 2		Column 3	Column 4
Primary	-23.607 **	-37.824 ***	**Export employment**	0.135	0.266 **
	(9.988)	(12.838)		(0.101)	(0.110)
Construction	36.694	-6.309			
	(27.228)	(35.653)			
Manufacturing	5.202	-1.396			
	(5.624)	(6.764)			
Trans/Commun	15.283	49.42			
	(27.513)	(33.005)			
Retail/Wholesale	20.366	-2.233			
	(14.224)	(21.061)			
Unemployment		-0.126			-0.186 *
		(0.099)			(0.067)
South		1.017			1.078 *
		(0.707)			(0.615)
Northeast		-0.569			-0.292
		(0.566)			(0.478)
West		-0.526			-0.992
		(0.569)			(0.493)
Republican		0.218			0.29
		(0.597)			(0.591)
PAC - inter. bus.		-0.098			-0.13
		(0.140)			(0.139)
PAC - domes bus.		-0.051 *			-0.018
		(0.030)			(0.027)
PAC - labor		-0.052 ***			-0.026
		(0.020)			(0.017)
Constant	-0.91	5.674 **		1.427 **	3.459 ***
	(1.299)	(2.822)		(0.578)	(1.340)
N	396	396		396	396
Log Likelihood	-120.88	-107.69		-128.55	-112.7
Chi2	17.47	43.84		2.12	33.82
Pseudo R-squared	0.07	0.17		0.01	0.13

Notes: The dependent variable is an indicator variable = 1 for a Yea vote.
*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10 % level.

Table 9: Analysis of House Roll-call Votes on NAFTA and GATT: The Factor Model

	NAFTA		GATT			NAFTA		GATT	
	Column 1	Column 2	Column 3	Column 4		Column 5	Column 6	Column 7	Column 8
Elementary	5.136 *	5.407	1.657	4.469	White collar	4.055 ***	2.494	4.806 ***	2.665
	(3.008)	(3.553)	(3.015)	(3.362)		(1.234)	(1.741)	(1.353)	(1.726)
Some HS	-12.417 **	-15.87 **	-6.023	-1.452					
	(5.291)	(6.355)	(5.131)	(5.793)					
College degree	23.607 ***	15.675 **	5.935	4.478					
	(7.066)	(7.857)	(6.856)	(7.172)					
Grad/Prof degree	-29.255 ***	-20.341 **	-0.69	0.849					
	(7.705)	(8.383)	(7.916)	(8.209)					
Unemployment		-0.298		-14.113 ***			-5.657		-10.544 **
		(5.803)		(5.351)			(5.051)		(4.729)
South		1.071 ***		-0.096			0.977 ***		0.028
		(0.283)		(0.260)			(0.250)		(0.234)
Republican		1.377 ***		-0.153			1.416 ***		-0.163
		(0.242)		(0.231)			(0.235)		(0.228)
Constant	0.401	0.304	0.68	1.037		-1.252 ***	-1.128	-0.97 **	0.574
	(1.067)	(1.233)	(1.059)	(1.148)		(0.438)	(0.900)	(0.469)	(0.869)
N	434	434	434	434		434	434	434	434
Log Likelihood	-277.84	-250.81	-271.16	-267.35		-293.87	-261.19	-270.4	-267.72
Chi2	43.3	97.37	12	19.63		11.24	76.60	13.46	18.89
Pseudo R-squared	0.07	0.16	0.02	0.04		0.02	0.13	0.02	0.03

Notes: The dependent variable is an indicator variable = 1 for a Yea vote.
*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10 % level.

Table 10: Analysis of House Roll-call Votes on NAFTA and GATT: The Sector Model

	NAFTA		GATT	
	Column 1	**Column 2**	**Column 3**	**Column 4**
Primary	22.099 ***	18.577 ***	-1.482	-0.689
	(6.677)	(6.804)	(6.128)	(6.414)
Construction	20.236 *	-3.643	-6.07	-14.552
	(11.736)	(13.125)	(11.564)	(12.637)
Manufacturing	1.789	1.581	-1.328	-2.465
	(2.522)	(2.741)	(2.583)	(2.661)
Trans/Comm	-4.568	-2.67	-9.934	-10.001
	(11.532)	(12.471)	(11.431)	(11.476)
Retail/Wholesale	30.528 ***	23.434 ***	25.695 ***	15.983 *
	(7.505)	(9.155)	(7.153)	(8.407)
Unemployment		-4.182		-12.537 **
		(5.421)		(5.053)
South		0.911 ***		0.013
		(0.253)		(0.237)
Replublican		1.300 ***		-0.192
		(0.240)		(0.234)
Constant	-4.961 ***	-3.602 **	-1.764 **	0.864
	(0.968)	(1.510)	(0.885)	(1.404)
N	434	434	434	434
Log Likelihood	-277.21	-254.76	-269.78	-266.5
Chi2	44.57	89.46	14.76	21.33
Pseudo R-squared	0.07	0.15	0.03	0.04

Notes: The dependent variable is an indicator variable = 1 for a Yea vote.
*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10 % level.

Chapter IV: The Canada-U.S. Free Trade Agreement and Labor Market Adjustment in Canada

IV.1. Introduction.

The Canada-United States Free Trade Agreement (CUSTA) was expected to lead to the rationalization of production in manufacturing industries in Canada and lead to the reallocation of workers from high- to low-cost producers. The free trade agreement between Canada and its largest trading partner, therefore, was supposed to lead to specialization and trade creation with an expansion in industries with a comparative advantage vis à vis the United States and a contraction in industries with a comparative disadvantage. Recently, Gaston and Trefler (1997) show that employment contracted across all manufacturing industries between 1989 and 1993 and that the CUSTA tariff reductions can account for only 15 percent of the observed employment decline. But they do not consider the distributional consequences of CUSTA. This chapter examines the effect of CUSTA on the wage differential between skilled and unskilled workers as well as the relative employment effect on the two groups of workers.

A number of studies have examined the extent to which international trade has contributed to the observed increased wage differential between skilled and unskilled workers in the United States. A consensus seems to be forming that international trade likely had a small impact on the skill-premium and that the primary determinant of the increased premium is technological change which increased the demand for skilled workers. Most of the studies examine the relationship between the skill-premium and measures of openness to international markets and ignore the impact of trade policy per

se. More recently, researchers have examined the impact of trade policy on labor market adjustment. Gaston and Trefler (1994) examine the implication of GATT and CUSTA tariff reductions in the United States on wages, employment and the skill-premium in the U.S. manufacturing; and Hanson and Harisson (1995) examine the effect of trade reform on the Mexican labor market.

This chapter examines the distributional consequences for Canada of the trade liberalization within North America. One goal of this chapter is to document the main employment and wage outcomes in Canada from 1983 to 1993. The primary focus is on the difference in labor market outcomes for skilled and unskilled workers over this period. The other goal of this chapter is to examine the extent to which the CUSTA affected the relative wages and employment levels of skilled and unskilled workers.

This chapter analyses an 11 year panel of 19 manufacturing industries from 1983 to 1993. The data are from the census of manufacturing with employment and earnings data on production and nonproduction workers.[1] The production/nonproduction classification may not seem to be the most appropriate typology for analyzing income distribution between skilled and unskilled workers because both groups represent a broad range of skill levels. However, it turns out that (at least in the United States) there is a

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[1] Production and related workers in manufacturing activity include those employees engaged in processing, assembling, storing, inspecting, handling, packing, maintenance, repair, janitorial, and watchman services and working foremen. The nonproduction workers are administrative, office, and other non-manufacturing employees.

high correlation between type of occupation (production/nonproduction) and other measures of skill such as education attainment.[2] The next section summarizes the CUSTA agreement, the economic climate during the period of analysis, and what is currently known about adjustments in the Canadian labor market over this period of time. The third section analyses the wages and employment of skilled and unskilled workers before and after the implementation of CUSTA.

The key results from this study are that the Canadian tariff rate reductions mandated by CUSTA did not affect average annual earnings in the manufacturing industries. The tariff rate reductions did reduce employment in manufacturing industries and the employment reductions were disproportionately among production workers. There is some evidence that lower Canadian tariffs did increase the wage differential between skilled and unskilled workers.

IV.2. Labor Market Adjustment and the CUSTA.

IV.2.1 *Summary of the CUSTA*[3]

The Canada-United States Free Trade Agreement, implemented on January 1, 1989, established a free trade area encompassing Canada and the United States.[4] The

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[2] See Berman, Bound and Griliches (1994) for a look at the relationship between occupation and education attainment in the United States. For a dissenting view see Leamer (1994).

[3] This section draws from Magun et al (1988).

major objectives of the CUSTA were somewhat broader than just a reduction in bilateral tariffs. The objectives were to:

- eliminate barriers to trade in goods and services between the two countries;
- facilitate fair competition;
- liberalize conditions for investment and trade in services;
- establish an effective framework for avoiding and resolving bilateral trade disputes; and
- lay the foundation for cooperation to expand and enhance the benefits of this agreement.

The agreement removed all tariffs between the two countries over a ten year period ending in January, 1999. Although the tariffs on a majority of tariff items will be eliminated over the ten year period, tariffs on some products were eliminated immediately and others were eliminated over the first five years. Table 1 shows the Canadian tariff rates and the tariff rate changes for 1987, 1990 and 1998. The average tariff declined from 3.8 percent in 1987 to 2.8 percent in 1990 and to zero by 1998. The highest tariffs in 1987 were on goods in the apparel (17.2 percent), tobacco (16 percent), leather (12 percent), textiles

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[4] The CUSTA was later replaced by the North American Free Trade Agreement (NAFTA) between Canada, the United States and Mexico which was implemented on January 1, 1994. This paper examines the labor market adjustment from 1986 to 1990, which covers the implementation of the CUSTA but not the NAFTA.

(9.9 percent), and rubber (8.9 percent) industries. The largest percentage point declines in tariffs between 1987 and 1990 were on goods in the leather industry (8.1 percentage points).

The agreement also removed some non-tariff barriers (NTBs), such as quantitative restrictions, technical barriers, and duty remission programs. NTBs are concentrated in the agriculture and food and beverage industries. The agreement increased the openness of government procurements to bidding by firms from the other country. It also included provisions for "national treatment" for new measures in the services industries and the removal of barriers to trade and investment in financial services sectors. Finally, a dispute settlement mechanism is included in the agreement.

This chapter focuses exclusively on the tariff reduction component of the CUSTA primarily because the nontariff components of the CUSTA are difficult to quantify. Moreover, the impact of NTBs on the labor market is likely to be small.[5] In any case, it is important to understand how tariff changes affect the labor market.

IV.2.2 *Predicted impact of CUSTA on the Labor Market*

In theory, a bilateral free trade agreement generates increased trade between the two countries. However, immediately following the CUSTA, there was "trade

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[5] Magun et al (1988), Chapter 4.

destruction" -- trade between the two countries declined.[6] The decline in trade flows between the two countries was the consequence of recessions in both countries, which lowered each country's demand for imports. Nevertheless, the trade agreement increased export opportunities to Canadian firms and industries with a competitive advantage and potentially decreased the opportunities for firms and industries that are less competitive than their American counterparts. In theory at least, the trade agreement was expected to increase imports putting downward pressure on Canadian employment and increase exports putting upward pressure on Canadian employment. We should expect to see, therefore, expansion and increased employment in some industries and contraction in other industries.

What are the distributional consequences of trade policy? Tariff protection reduces imports and therefore increases demand for factors employed in the production of protected industries. If factors of production are not very mobile between industries, we expect to see a reduction in the returns to all factors employed in those industries. If factors of production are highly mobile between industries, we expect to see no change in the relative wages between industries. We would however, predict a change in the relative returns paid to different factors of production. That is, if there are skilled and unskilled labor, a reduction in protection on unskill-intensive industries will lower the wage for unskilled workers across all industries and increase the wage paid to skilled workers.

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[6] Gaston and Trefler (1997).

As mentioned, there is some evidence of the CUSTA affects on the aggregate numbers of net jobs and wages in the manufacturing sector (Gaston and Trefler (1994a,1997); there is no evidence of the incidence on Canadian workers with different skill sets.

IV.2.3 The Facts: Labor Market Adjustment and the CUSTA

Freeman and Needles (1991) compare the labor market performance of Canada and the US. They find that the earnings gap between skilled and unskilled workers increased much less in Canada than in the United States. They argue that one possible explanation for a more modest increase in Canada is the greater expansion in the relative number of college educated workers (supply) in that country. They speculate that other factors such as unionization, trade, growth of real output and technological change may in part account for the differences between the two countries.

Before examining the effect of the CUSTA on Canadian labor markets it is important to understand the macroeconomic situation of the Canadian economy during the implementation period. The following are important factors to keep in mind while considering the impact of CUSTA on the Canadian economy:

1. The Canadian economy, along with other industrial economies, was going through a period of deindustrialization.

2. There was a recession in Canada starting in the second quarter of 1990 and a recession in the United States.

3. The implementation of CUSTA followed a period of deteriorating labor productivity and rising labor costs in Canada.

4. The Bank of Canada had a policy targeting a very low inflation rate which led to high interest rates (and a large interest rate differential between Canada and the United States) and an appreciated Canada-U.S. exchange rate (the Canadian dollar reached its highest level in 20 years (peaking in 1991)).

5. The strong dollar increased the relative cost of Canadian export goods.

IV.2.4 Trade induced labor market effects

Have there been employment losses in import-competing industries and expansions in export-oriented sectors of the Canadian economy? Trefler and Gaston (1997) compare the labor market patterns across the tradeables-sector industries for Canada and the United States between 1988 and 1993.

The key insights from this comparison are that: 1) the average tariff decline was 3.8 percent in Canada and 2.2 percent in the US; 2) the high tariff industries in Canada experienced a 6.1 percent decline, whereas the low tariff industries experienced only a 1.2 percent decline; 3) employment declined in both countries over this period, though much more in Canada (19.6 percent) than in the US (8.3 percent); 4) the Canadian employment

declined proportionately more in high tariff industries (24.2 percent) than in low tariff industries (14.8 percent); 5) there were only small changes in average earnings, with no discernible difference between high and low tariff industries.

Another labor outcome to keep in mind is that there was a disproportionate decline in employment among heavily-unionized industries (19.8 percent) compared with less-unionized industries (15.2 percent). This was the case even though tariff cuts were lower in heavily-unionized industries.

Canadian employment began to fall after the implementation of the CUSTA in January, 1989 until 1992. During this period, the tradeables sector nonagricultural workforce fell by 19 percent (309,600 jobs). Employment in the services sector increased by 1.6 (123,000 jobs) over the same period (Gaston and Trefler (1997)). Note that employment contracted in all tradeables-sector industries. This is inconsistent with trade theory which predicts that employment expand in some industries and contract in others and the net effect is negligible.

Gaston and Trefler (1997) draw four conclusions: 1) CUSTA was supposed to lead to specialization and therefore expansion in sectors with a comparative advantage vis à vis the U.S. and contraction in sectors with a comparative disadvantage. Employment contracted in all tradeables-sector industries. This may in part be explained by the recession in both countries. But note that the 1990 Canadian recession was deeper and longer than both the U.S. recession and the 1982 Canadian recession. CUSTA may have

contributed to the 1990 Canadian recession. Canadian business viewed the interest rate spread and exchange rate trends, not the CUSTA, as the key reason for the recession. 2) The impact of the CUSTA-mandated tariff cuts was small - only 9-14 percent of the job loss. 3) Wages changed little during the CUSTA period. Tariff cuts do not explain why wages did not rise. 4) Winners include less unionized industries; losers include those sensitive to high interest rates and a strong Canadian dollar. They do not examine the distributional consequences of the CUSTA for skilled and and unskilled workers.

IV.3. CUSTA and the Adjustment of Skilled and Less-skilled Labor

Were skilled workers affected by the CUSTA differently than unskilled workers?

Figure 1 shows the evolution of employment and earnings for production and nonproduction workers in manufacturing from 1983 to 1993. Production employment grew, while nonproduction employment was relatively stagnant from 1983 to 1989. After 1989, production employment began a pronounced decline and after 1990 nonproduction employment also declined. Note that this matches the pattern, already discussed, that total manufacturing employment declined after 1989. The manufacturing employment declines however, were disproportionately among production workers. This can be seen in

Figure 1c where the ratio of nonproduction to production workers increased from 1989 to 1992. The ratio did decline from 0.36 in 1992 to 0.35 in 1993 but remained well above the 1989 ratio of 0.32. This pattern is in stark contrast to the U.S. experience

where the ratio of nonproduction to production employment in manufacturing industries increased over the period (see Lawrence and Slaughter (1993, pp. 182).

As was seen in the previous section, real average earnings in Canadian manufacturing did not change very much in the late 1980s and early 1990s. There were however some differences in earnings performance between nonproduction and production workers. Real earnings of nonproduction workers increased slightly from $34,200 in 1983 to $36,300 in 1989 while production worker's earnings were more or less stagnant over the same period. This is reflected by a slight increase in the ratio of nonproduction to production real average annual earnings shown in Figure 1d. After 1989, there was a slight decline in the ratio as the real wages of both groups declined, but by proportionately more among nonproduction workers. From 1991 to 1993, real earnings increased for both groups. But the ratio of production to nonproduction earnings declined slightly as there was a larger increase in average earnings among production workers than among nonproduction workers.

IV.3.1 Econometric Approach

The focus of this chapter is the effect of CUSTA mandated tariff changes on industry wage and employment in 19 manufacturing industries. The approach follows that taken in several other studies in estimating reduced-form equations derived from the

supply and demand for labor. The general approach can be summarized by equations 1 and 2[7]:

1. $$d\ln(w_{it}) = \alpha_0 + \alpha_1 dX_t + \alpha_2 dZ_{it} + \alpha_3 dT_{it} + u_{it}$$

2. $$d\ln(E_{it}) = \beta_0 + \beta_1 dX_t + \beta_2 dZ_{it} + \beta_3 dT_{it} + v_{it}$$

where d is the first-difference operator (i.e. $d\ln(w_{it}) = \ln(w_{it})-\ln(w_{it-1})$); E_{it} is employment in industry i at time t; w_{it} is average annual earnings in industry i at time t; X_t is a vector or time-varying explanatory variables common to all industries; Z_{it} is a vector of time and industry varying explanatory variables; T_{it} is a vector of time and industry varying international trade variables such as trade flows and tariff rates. The random disturbances, u_{it} and v_{it} are assumed i.i.d. normal.

The variables of primary interest are the international trade variables. The variables included here are the bilateral Canadian and U.S. tariff levels, the imports, exports and domestic consumption. All trade variables refer to bilateral Canada-U.S. trade rather than total trade. Employment and earnings adjustment to domestic and international trade shocks are treated the same as in Gaston and Trefler (1997), Freeman and Katz (1991) and Abowd and Lemieux (1991). Domestic consumption is defined as DC = S + M -X, where S is total industry shipments, M is imports and, X is exports. This is rewritten as the first difference in the log values as dlnS = (DC/S)dlnDC + (M/S)dlnM +

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[7] See Gaston and Trefler (1997, pp. 28).

(X/S)dlnX. Therefore, the log changes of imports, exports, and domestic consumption weighted by their share of total shipments are used in estimating equations 1 and 2.

Based on the discussion in Section 2.3, the time-varying explanatory variables common to all industries are the Canada-U.S. interest rate differential and the bilateral exchange rate (U.S. dollar price of the Canadian dollar). Since there are only 10 years in the sample (after differencing the data), the time varying specification had to be as parsimonious as possible. The interest rate differential and exchange rate are used because they are commonly cited as important determinants of earnings and employment in Canadian manufacturing.

The interest rate spread is measured as the percentage point spread between returns on Canadian and U.S. three-month treasury bills. It is an indication of central bank policy, with a higher interest rate spread indicating tighter monetary policy in Canada. The Bank of Canada's anti-inflation policy which began in the mid-1980s is a possible contributing factor to the large employment losses. Another result of the Bank of Canada's tough stance on inflation was a strong Canadian dollar in the late 1980s and early 1990s. The strong Canadian dollar over the 1986-91 period was considered by many economists and the business community to be a major reason for the decline of profits and employment in Canadian manufacturing industries. The independent consequences of a higher interest rate spread and stronger Canadian dollar on employment and wages are considered.

The industry and time varying explanatory variable is employment by industry in the United States. This variable is used to account for structural change across industries and over time in manufacturing. Long term structural adjustment within manufacturing industries are reflected in observed changes in industrial employment in the United States. This variable is potentially endogenous but evidence from Gaston and Trefler (1997, p. 28-9) and sources cited there is that the CUSTA tariff cuts did not affect U.S. earnings and employment.

Rather than looking only at the industry average earnings and employment, this study examines the patterns of nonproduction and production earnings and employment. Therefore, equations 1 and 2 are estimated separately for total, nonproduction and production earnings and employment. This allows for a comparison of results with Gaston and Trefler (1997) and for a benchmark on which to compare the nonproduction and production results.

After comparing the regression results for production and nonproduction workers separately, the equations are estimated for the ratios of nonproduction to production earnings and employment. Since the estimating equation is no longer based on first differencing it is important to include industry fixed effects in the estimation. The earnings and employment ratio equations are estimated using fixed effects.

IV.3.2 Results

IV.3.2.1 Changes in earnings and employment

The results from estimating equations 1 and 2 separately for total, production and nonproduction earnings and employment are presented in Table 2. As expected (based on the Gaston and Trefler results), the earnings equation reported in the left panel does not fit the data very well. This is especially the case for total and production earnings which explains only 14 and 10 percent of the variance in earnings changes. The earnings equation for nonproduction workers has more explanatory power ($R^2 = 0.22$) but still does poorly compared to the employment equations.

As Table 2a shows, changes in the Canadian tariff rate did not affect changes in real average annual earnings. This is true for overall earnings and for both production and nonproduction workers. There is no differential effect on earnings from the two groups of workers. Reductions in the American tariff rate, however, tended to increase real earnings overall and for nonproduction workers. It had no effect on production workers. None of the demand shock variables (exports, imports and domestic consumption) had an effect on earnings. The interest rate spread and American employment affected real earnings among nonproduction workers only. A larger spread between Canadian and American interest rates increases the earnings of nonproduction workers. Employment increases in the same industry in the United States increased nonproduction earnings, but not production

earnings. An appreciation of the Canadian dollar put upward pressure on earnings, and this effect is larger for production than it is for nonproduction workers.

Tariff rate changes did affect employment. The estimated coefficient of 0.018 on Canadian tariffs in the employment equation is interpreted as a one percent reduction in Canadian tariffs leading to a 1.8 percent decline in employment. Lower tariffs had a much larger effect on production than on nonproduction employment. A one percent decline in Canadian tariffs led to a reduction in production employment of 2 percent and a reduction in nonproduction workers of 1.1 percent.

U.S. tariffs did not have a statistically significant effect on employment, but the coefficient is negative (lower U.S. tariffs increase employment in Canada) and the coefficient for production employment is twice the nonproduction estimate. Increased imports reduced employment and this effect was also much larger for production workers than it was for nonproduction workers. Higher exports increase employment and the effect is similar for both types of workers. The effects of all explanatory variables have the same sign for production and nonproduction workers with the exception of the interest rate spread. The interest rate spread lowers production employment and increases nonproduction employment. An appreciation of the exchange rate lowers employment for both types of workers and Canadian employment moves in the same direction as American employment by industry.

A Comparison with Gaston and Trefler

Note that the earnings regressions perform much better than in Gaston and Trefler (1997) where they estimate the same equation for average weekly earnings from 1981-93. The results reported for total average annual earnings in Table 2 are not directly comparable to Gaston and Trefler because the explanatory variable is different and they include three mining industries in addition to the 19 manufacturing industries examined here. Nevertheless, it is desirable that the estimation results be robust to small changes in the sample. But the same model using the Gaston and Trefler data over the extended sample period (1981-93) and including the mining industries yield an R^2 of only 0.07. The difference in the explanatory power of the two regressions stems from the different sample period, not from the different measures of earnings, nor from excluding mining industries. Regressions based on the Gaston and Trefler data for the 1983-93 period (with and without mining included) yield very similar results to those reported in Table 2, with an R^2=0.12.[8] It is not clear why dropping two years makes such a big difference in the estimation results. It could be that the 1982 recession profoundly affected the ability of the model to explain earnings and employment adjustment during that period.

The overall fit of the employment equation using the total employment data from 1983-93 (reported in Table 2b) is also much better than the fit in the Gaston and Trefler data. The R^2 is 0.53 for the 1983-93 sample period based on total employment in my

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[8] Gaston and Trefler kindly supplied their data and I ran their regressions for the 1983-93 sample period. I was not able to obtain earnings and employment data by type of occupation earlier than 1983.

sample versus 0.41 for the Gaston and Trefler data for the longer 1981-93 sample period. This difference appears to be an artifact of the different measures of the dependent variable used rather changes in the sample period or changes in the coverage of industries.

Although the overall fit of the models is affected by the sample period most of the coefficient estimates are robust to changes in the sample period. Most importantly, the coefficients on Canadian and American tariffs are robust to changes in the sample. The Canadian tariff rate did not have a statistically significant effect on earnings but had a positive effect on employment. The Canadian tariff coefficient estimates and levels of significance are very similar to the results found by Gaston and Trefler. The coefficient on the American tariff is negative and significant for the earnings equation and negative but not significant for employment. The signs and magnitude of this coefficient are the same in Table 2 as reported by Gaston and Trefler. The only difference is that the coefficient for the earnings equation in Table 2 is significant. Overall the tariff effects are robust to changes in the explanatory variable and the sample chosen.

IV.3.2.2 The relative performance of nonproduction and production workers

Trade theory predicts that tariff changes will likely affect the relative returns to different factors of production. This section analyses the effect of the CUSTA mandated tariff changes on the nonproduction/production wage ratio and the ratio of employment levels for these two groups. Since the explanatory variable is now a ratio and not first

differences, it is important to control for fixed industry effects. Table 3 presents the results from estimating the ratios of earnings and employment.

As shown in Table 3, lower Canadian tariffs increased the earnings ratio of nonproduction to production workers but had no effect on the employment ratio. The other statistically significant effect is from the exchange rate. A Canadian exchange rate appreciation lowered the earnings differential and increased the employment ratio of nonproduction to production workers. The estimation results are from a fixed-effects model and the industry dummy variables are jointly significant. It is puzzling that the earnings ratio increased but the earlier estimation found no effect of Canadian tariffs on either type of worker. Similarly, the earlier results imply that a reduction in the Canadian tariff would lead to a lower nonproduction/production employment ratio.

The estimation results reported in Table 3 should be considered preliminary and subject to change as the estimation is examined for robustness. The dependent variables are the log of the ratios of nonproduction to production real annual earnings and employment. The tariff rates are the actual tariff levels and vary of time (rather than the difference in log tariff rates). The log of the tariff rates was also used and produced similar results. The rest of the variables are measured as first differences of log values as in the previous model.

IV.4. Conclusions

This chapter provides a first look at the impact of tariff reductions mandated in the CUSTA on relative earnings and employment of nonproduction and production workers in Canada from 1983-93. It finds that Canadian tariff reductions did not affect the earnings of nonproduction or production workers independently but may have increased the ratio of earnings between the two groups. On the other hand, when estimated separately, it is found that Canadian tariff reductions lower employment disproportionately among production workers but had no effect on the nonproduction/production employment ratio. An appreciating Canadian dollar increased earnings and decreased employment for both groups but the effects were larger (in absolute terms) for production workers.

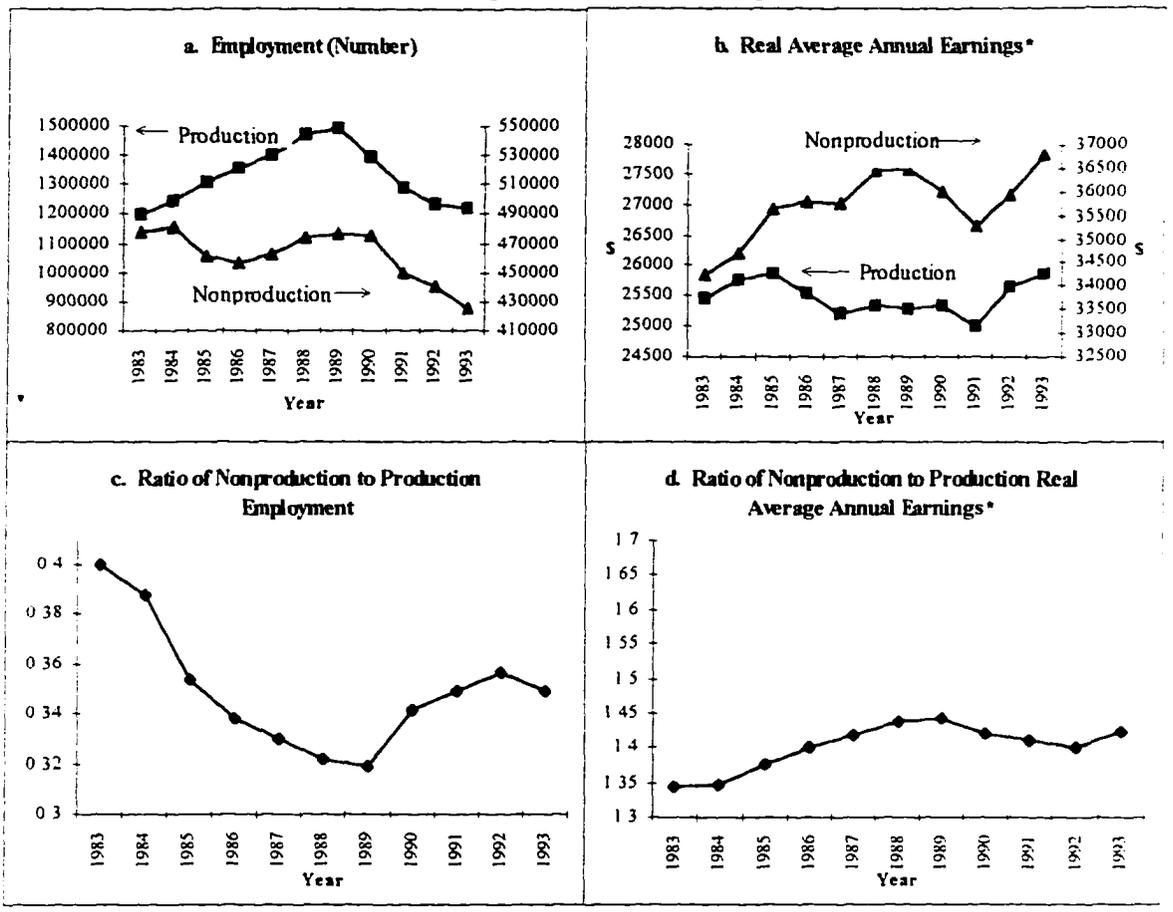
It is important to note that this study considers only the impact of the CUSTA on income inequality and ignores technological change. As Leamer (1994) points out, however, trade and technological change interact multiplicatively to increase income inequality. Therefore, ignoring technological change potentially leaves out an important part of the story.

Data Appendix

Data on real average annual earnings by industry and occupation type (nonproduction and production) were constructed from published Statistic Canada data in Catalog #31-203. The historical data were purchased from the Industry Division of Statistics Canada. The earnings and employment data are from the Census of Manufacturers based on establishment level data which were aggregated up to the industry level. Number of employees and the total nominal wage bill are reported by occupation type for each industry. Real average annual earnings were computed by dividing the total wage bill by the number employed in each category; the CPI was used to derive real from nominal earnings.

Daniel Trefler kindly provided the other series used in this study based on the data used in Gaston and Trefler (1997). Most of the Canadian data are from CANSIM and the U.S. data are from the Bureau of Labor Statistics. Bilateral tariff changes are from Magun et al.

Figure 1: Evolution Nonproduction and Production Employment and Real Average Annual Earnings in Manufacturing: 1983-93



Notes: * The CPI (1987=100) was used to compute real earnings.

Table 1: The Tariff Structure by Industry

		Tariff rate			Difference from 1987 tariff rate	
Industry	**SIC Code**	**1987**	**1990**	**1998**	**1990**	**1998**
Food & beverages	20	4.2	3.3	0	0.9	4.2
Tobacco products	21	16	12.8	0	3.2	16
Textiles	22	9.9	7.9	0	2	9.9
Apparel	23	17.2	13.8	0	3.4	17.2
Lumber	24	2.7	2.1	0	0.6	2.7
Furniture & Fixtures	25	11	8.2	0	2.8	8.2
Paper	26	4	2.4	0	1.6	4
Printing & publishing	27	1.4	0.8	0	0.6	1.4
Chemical	28	5.6	3.6	0	2	5.6
Petroleum products	29	0.5	0.4	0	0.1	0.5
Rubber & plastic	30	8.9	7	0	1.9	8.9
Leather	31	12	3.9	0	8.1	12
Non-metalic mineral	32	3.4	2.1	0	1.3	3.4
Primary metals	33	4	3.1	0	0.9	4
Fabricated metals	34	6.8	5.1	0	1.7	6.8
Machinery	35	4.7	2.5	0	2.2	4.7
Electrical appliances	36	6.1	4.4	0	1.7	6.1
Transportation equip.	37	2.3	1.7	0	0.6	2.3
Other manufacturing	38	6.2	4.8	0	1.4	6.2

Notes: The source is Magun et al.

Table 2: Regression results for earnings and employment equations: 1983-93

	a. Real average annual earnings			b. Annual employment		
	Total	Production	Non-production	Total	Production	Non-production
Canadian tariff	0.003	0.003	0.003	0.018 ***	0.02 ***	0.011 ***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.007)	(0.006)
American tariff	-0.004 **	-0.001	-0.008 ***	-0.005	-0.006	-0.003
	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)	(0.005)
Imports	0.001	-0.002	-0.007	-0.203 ***	-0.23 ***	-0.134 ***
	(0.021)	(0.024)	(0.025)	(0.042)	(0.053)	(0.052)
Exports	0.021	0.026	0.022	0.260 ***	0.263 ***	0.216 ***
	(0.021)	(0.024)	(0.025)	(0.042)	(0.053)	(0.051)
Domestic	0.004	0.005	0.021	0.206 ***	0.243 ***	0.115 ***
	(0.019)	(0.022)	(0.023)	(0.039)	(0.049)	(0.047)
Interest rate spread	0.002	0.002	-0.004 **	-0.010 ***	-0.014 ***	0.008 ***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)
Exchange rate	0.135 ***	0.121 ***	0.083 *	-0.366 ***	-0.36 ***	-0.254 ***
	(0.038)	(0.043)	(0.045)	(0.076)	(0.096)	(0.093)
American employment	0.060	0.046	0.133 **	0.513 ***	0.579 ***	0.366 ***
	(0.048)	(0.054)	(0.057)	(0.097)	(0.122)	(0.118)
Constant	-0.004	-0.004	0.019 ***	0.028 ***	0.047 ***	-0.037 ***
	(0.005)	(0.006)	(0.006)	(0.010)	(0.013)	(0.013)
N	185	185	185	185	185	185
F-Statistic	3.68	2.56	6.21	24.42	19.71	7.5
R-squared	0.14	0.10	0.22	0.53	0.47	0.25

Notes: The dependent variables are the change in log earnings in panel a and the change in log employment in panel b. Tariffs and interest rates are differences in percentage points. All other explanatory variables are changes in logs. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10 % level.

Table 3: Regression results from the ratio of nonproduction to production average annual earnings

	Earnings ratio	Employment ratio
Canadian tariff	-0.002 *	0.000
	(0.001)	(0.004)
American tariff	-0.002	-0.012 **
	(0.002)	(0.006)
Imports	0.000	-0.033
	(0.037)	(0.115)
Exports	0.012	-0.009
	(0.036)	(0.113)
Domestic	0.002	0.051
	(0.033)	(0.104)
Interest rate spread	0.002	-0.013
	(0.003)	(0.009)
Exchange rate	-0.208 ***	0.803 ***
	(0.061)	(0.193)
American employment	-0.261 ***	0.450
	(0.088)	(0.278)
Constant	0.368 ***	-0.986 ***
	(0.012)	(0.036)
N	185	185
F-Statistic	6.24	6.38
R-squared	0.24	0.24

Notes: The dependent variable is the ratio of nonproduction to production earnings in column 1 and employment in column 2. Canadian and U.S. tariffs are percent Interest rate is the difference in percentage points. All other explanatory variables are changes in logs. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10 % level.

Chapter V: Conclusion

This dissertation empirically analysed the relationship between international trade policy and the distribution of income. Three essays focused on the distributional consequences of trade policy per se, not on some measure of openness. The first two essays (Chapters II and III) took an indirect approach to examine the distributional consequences of international trade policy. They examined whether political cleavages around trade policy form along the lines predicted by the Stolper-Samuelson Theorem. Chapter II addressed this question using individual-level data on the Canadian electorates' positions on the CUSTA from a survey conducted during the 1988 Canadian federal election. Chapter III analysed the cross-sectional voting patterns of congressional representatives on CUSTA, NAFTA, and GATT merged with census data on constituent characteristics to examine whether the representatives' voting decisions are consistent with the economic interests predicted by the Stolper-Samuelson Theorem.

The third paper, Chapter IV, took a more direct approach by examining the effect of CUSTA on the earnings and employment of skilled and unskilled workers in Canada from 1983 to 1993.

The main finding in Chapter II is that skill type was an important determinant of voters' positions on the CUSTA; political cleavages in the 1988 election on the CUSTA were drawn along factor lines. Industry of employment had a statistically significant effect on free trade positions in some specifications of the model. The industry effect, however, is a weak one, and is not robust to model specification. The empirical results suggest that labor in Canada is sufficiently mobile to ensure that the distributional consequences of

trade policy are independent of industry employment. Contrary to previous literature, this is indirect evidence in support of the Stolper-Samuelson-type prediction that cleavages in trade policy will form along factor lines.

The results in Chapter III provide evidence that constituents' economic interests help determine a representative's voting behavior on international trade issues. It is not clear from the results, however, whether the underlying model is the sector (Stolper-Samuelson), or factor model. Both the skill and industry composition of districts help determine House voting patterns on CUSTA and NAFTA. The nonnested J-test was not able to reject either model for CUSTA or NAFTA, but it did reject the factor model for the GATT vote. Neither the factor nor sector models do a very good job of explaining House voting patterns on CUSTA, NAFTA and GATT. On the other hand, both the skill composition and the industrial composition of the labor force had an important impact on House voting decisions with respect to CUSTA and NAFTA. The CUSTA and NAFTA result is consistent with a partial factor mobility model of trade.

The key results from Chapter IV are that the Canadian tariff rate reductions mandated by CUSTA did not affect average annual earnings in the manufacturing industries. The tariff rate reductions did reduce employment in manufacturing industries and the employment reductions were disproportionately among production workers. There is some evidence that lower Canadian tariffs did increase the wage differential between skilled and unskilled workers in Canada.

Bibliography

Abowd, J. M. And T. Lemieux (1991) "The Effects of International Trade on Collective Bargaining Outcomes: A Comparison of the United States and Canada," in *Immigration, Trade and Labour Markets*, ed. J.M. Abowd and R.B. Freeman (Chicago: NBER).

Baldwin, Robert E. (1982) "The Political Economy of Protection," in J. N. Bhagwati, ed. (1982), *Import Competition and Response*. (Chicago: University of Chicago Press). pp. 153-84.

Baldwin, Robert E. (1985) *The Political Economy of U.S. Import Policy*. (Cambridge, Massachusetts: The MIT Press).

Bergstrom, Theodore C., Daniel L. Rubinfeld, and Perry Shapiro (1982) "Micro-based Estimates of Demand Functions for Local School Expenditures," *Econometrica*. Vol. 50, pp. 1183-1205.

Berman, Eli, John Bound and Zvi Griliches (1994) "Changes in the Demand for Skilled Labor within U.S. Manufacturing: Evidence from the Annual Survey of Manufacturers," *Quarterly Journal of Economics*. Vol 109, No. 2. Pp. 367-399.

Bhagwati, Jagdish and Srinivasan, T.N. (1984) *Lectures on International Trade*. (Cambridge, Massachusetts: The MIT Press).

Brander, James (1991) "Election Polls, Free Trade, and the Stock Market: Evidence from the Canadian General Election." *Canadian Journal of Economics*. 24, pp. 827-43.

Brock, William A. and Stephen P. Magee (1978) "The Economics of Special Interest Politics: The Case of the Tariff," *American Economic Review Proceedings*. Vol. 68 May, 1978. pp. 246-50.

Burtless, Gary (1995) "International Trade and the Rise in Earnings Inequality," *Journal of Economic Literature*, Vol. XXXIII (June 1995), pp. 800-816.

Clarke, Harold D. and Allan Kornberg (1992) "Support for the Canadian Federal Progressive Conservative Party since 1988: The Impact of Economic Evaluations and Economic Issues," *Canadian Journal of Political Science*. XXV:1, March, pp. 29-53.

Clarke, Harold D., Jane Jenson, Lawrence Le Duc and Jon H. Pammett (1991) *Absent Mandate: Interpreting Change in Canadian Elections. Second Edition*. (Toronto, Canada: Gage Educational Publishing Company).

Coughlin, Cletus C. (1985) "Domestic Content Legislation: House Voting and the Economic Theory of Regulation." *Economic Inquiry*. July, pp. 437-48.

Davidson, R. and J. G. MacKinnon (1981) "Several Tests for Model Specification in the Presence of Alternative Hypotheses," *Econometrica*. Vol. 49, pp. 781-93.

Deacon, Robert and Perry Shapiro (1982) "Private Preference for Collective Goods Revealed Through Voting on Referenda," *American Economic Review*. Vol. 65, pp. 943-55.

Deardorff, Alan V. and Dalia S. Hakura (1994) "Trade and Wages - What are the Questions?" in *Trade and Wages: Leveling Wages Down?* Editors: Jagdish Bhagwati and Marvin H. Kosters. Chapter 3, pp. 76-104.

Destler, I. M. and John Odell (1987) *Anti-protectionism: Changing Forces in U.S. Trade Policies*. (Washington D.C.: Institute for International Economics).

Ethier, Wilfred J. (1982) "The General Role of Factor Intensity in the Theorems of International Trade," *Economics Letters*. 10: pp. 337-42.

Feenstra, Robert C. and Jagdish N. Bhagwati (1982) "Tariff Seeking and the Efficient Tariff," in J. N. Bhagwati, ed. (1982), *Import Competition and Response*. (Chicago: University of Chicago Press). pp. 245-62.

Findlay, Ronald and Stanislaw Wellisz (1982) "Endogenous Tariffs, the Political Economy of Trade Restrictions, and Welfare," in J. N. Bhagwati, ed., *Import Competition and Response*. (Chicago: University of Chicago Press). pp. 223-34.

Fischell, William A. (1979) "Determinants of Voting on Environmental Quality: A Study of a New Hampshire Pulp Mill Referendum," *Journal of Environmental Economics and Management*. Vol. 6, pp. 107-18.

Freeman, R.B. and Karen Needles (1991) "Skill Differentials in Canada in an Era of Rising Labor Market Inequality," *NBER Working Paper*, No. 3827.

Freeman, R.B., and L.F. Katz (1991) "Industrial Wage and Employment Determination in an Open Economy," in *Immigration, Trade and Labour Markets*. ed. J.M. Abowd and R.B. Freeman (Chicago: NBER).

Gaston, Noel and Daniel Trefler (1993) "Tariffs, Nontariff Barriers to Trade, and Workers' Wages," in *Studies in Labour Economics*. Erkin I. Bairam (ed.), (Avebury, Alershot England). pp. 72-110.

Gaston, Noel and Daniel Trefler (1994a) "The Role of International Trade and Trade Policy in the Labour Markets of Canada and the United States," *World Economy*. Vol. 17, No. 1 (January, 1994). pp. 45-63.

Gaston, Noel and Daniel Trefler (1994b) "Protection, Trade, and Wages: Evidence from U.S. Manufacturing," *Industrial and Labor Relations Review*. Vol. 74, No. 4 (July 1994). pp. 574-593.

Gaston, Noel and Daniel Trefler (1997) "The Labour Market Consequences of the Canada-U.S. Free Trade Agreement," *Canadian Journal of Economics*. Vol. 30, No. 1. (February, 1997). pp. 18-42.

Grossman, Gene M. (1983) "Partially Mobile Capital: A General Approach to Two-sector trade theory," *Journal of International Economics*. 15, pp. 1-17.

Grossman, Gene M., and James A. Levinsohn (1989) "Import Competition and the Stock Market Return to Capital," *American Economic Review*. 79, pp. 1065-87.

Hall and Grofman (1990) *American Political Science Review*.

Hanson, Gordon H. and Ann Harrison (1995) "Trade, Technology, and Wage Inequality" *National Bureau of Economic Research Working Paper*, No. 5110.

Harris, Richard G. (1985) "Summary of a Project on the General Equilibrium Evaluation of Canadian Trade Policy," Chapter 8 in Whalley, John (1985), *Canada-United States Free Trade*. Volume 11 in the series of studies commissioned as part of the research program of the Royal Commission on the Economic Union and Development Prospects for Canada (MacDonald Commission). (Toronto: University of Toronto Press).

Helpman, Elhanan and Paul R. Krugman (1985) *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy*. (The MIT Press, Cambridge, Massachusetts).

Hill, John K. and Jose A. Mendez (1983) "Factor Mobility and the General Equilibrium Model of Production," *Journal of International Economics*. 15, pp. 19-25.

Hufbauer, Gary Clyde and Jeffrey J. Schott (1992) *North American Free Trade: Issues and Recommendations*. Institute for International Economics, Washington, DC.

Irwin, Douglas A. (1994) "The Political Economy of Free Trade." *Journal of Law and Economics*. April. pp. 75-108.

Irwin, Douglas A. (1996) "Industry or Class Cleavages over Trade Policy? Evidence from the British General Election of 1923." Feenstra, Robert C., Gene M. Grossman and Douglas A. Irwin (1996) *The Political Economy of Trade Policy: Papers in Honor of Jagdish Bhagwati*. (Cambridge, Massachusetts: The MIT Press).

Jackson, John E. (1974) *Constituencies and Leaders in Congress*. (Cambridge, Mass.: Harvard University Press, 1974).

Johnston, Richard, André Blais, Henry E. Brady and Jean Crête (1992) *Letting the People Decide: Dynamics of a Canadian Election*. (Stanford, California. Stanford University Press).

Johnston, Richard, et al. (1988) Canadian National Election Study, 1988 [Computer File]. Toronto, Canada: Institute for Social Research [producer], 1989. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 1990.

Jones, Ronald W. (1971) "A Three Factor Model in Theory, Trade and History," in J. Bhagwati et al. (eds.) *Trade, Balance of Payments and Growth*. (Amsterdam: North-Holland).

Judge, George G., W. E. Griffiths, R. Carter Hill, Helmut Lutkepohl and Tsoung-Chao Lee (1985) *The Theory and Practice of Econometrics: Second Edition*. (New York, John Wiley and Sons).

Kahn, Matthew and John G. Matsusaka (1995) "Demand for Environmental Goods: Evidence from Voting Patterns on California Initiatives." Columbia University Discussion Paper Series No. 737.

Kalt, Joseph P. and Mark A. Zupan (1984) "Capture and Ideology in the Economic Theory of Politics," *American Economic Review*. Vol. 74 No. 3, pp. 279-300.

Kau, James B. and Paul H. Rubin (1979) "Self-Interest, Ideology, and Logrolling in Congressional Voting," *Journal of Law and Economics*, pp. 365-84.

Kenen, Peter B. (1965) "Nature, Capital and Trade," *The Journal of Political Economy*. October, 1965, vol. LXXIII, No. 5. pp. 437-60.

Krueger, Alan B. (1996) "Observations on International Labor Standards and Trade," mimeo, Princeton University, May 1996.

Krugman, Paul R. (1981) "Intraindustry Specialization and the Gains from Trade," *Journal of Political Economy*. Vol. 89, pp. 959-973.

Lawrence, Robert Z. and Matthew J. Slaughter (1993) "International Trade and American Wages in the 1980s: Giant Sucking Sound or Small Hiccup?" in *Brookings Papers: Microeconomics 2*, 1993. pp. 161-226.

Leamer, Edward E. (1994) "Trade, Wages, and Revolving Door Ideas," *National Bureau of Economic Research Working Paper*, No. 4716.

Leamer, Edward E. and James Levinsohn (1995) "International Trade Theory: The Evidence," in *Handbook of International Economics: Volume 3*, editors: Gene M. Grossman and Kenneth Rogoff. Chapter 26, pp. 1339-1390. (Elsevier Science B.V., Amsterdam).

LeDuc, Lawrence (1991) "Voting for Free Trade?: The Canadian Voter and the 1988 Federal Election," in Paul W. Fox and Graham White, eds. (1991), *Politics Canada: Seventh Edition*. (Toronto, Canada: McGraw-Hill Ryerson). pp. 350-66.

Litvak, Isaiah A. (1986) "Freer Trade With Canada: The Conflicting Views of Canadian Business." *Business Quarterly*. Spring, pp. 22-32.

Maddala, G. S. (1992) *Introduction to Econometrics: Second Edition*. (New York, MacMillan Publishing Company).

Magee, Stephen P. (1980) "Three Simple Tests of the Stolper-Samuelson Theorem," in Peter Oppenheimer (ed.), *Issues in International Economics*. (Stockfield, England: Oriel Press). Re-printed in Alan V. Deardorff and Robert M. Stern, eds. (1994), *The Stolper-Samuelson Theorem: A Golden Jubilee*. (Ann Arbor, Michigan: The University of Michigan Press). Chapter 11, pp. 185-204.

Magee, Stephen P. (1994) "Endogenous Protection and Real Wages," in Alan V. Deardorff and Robert M. Stern (1994), eds. *The Stolper-Samuelson Theorem: A Golden Jubilee*. (Ann Arbor, Michigan: The University of Michigan Press). Chapter 19, pp. 279-88.

Magee, Stephen P., William A. Brock and Leslie Young (1989) *Black hole tariffs and endogenous policy theory: Political economy in general equilibrium*. (Cambridge: Cambridge University Press).

Magun, Sunder, Someshwar Rao, Bimal Lodh, Laval Lavallee and Jonathan Pierce (1988) "Open Borders: An Assessment of the Canada-U.S. Free Trade Agreement," Economic Council of Canada, Discussion Paper No. 344.

Mayer, Wolfgang (1974) "Short-Run and Long-Run Equilibrium for a Small Open Economy," *Journal of Political Economy*. Vol. 82, no. 5, pp. 955-68.

Mayer, Wolfgang (1984) "Endogenous Tariff Formation," *American Economic Review*. 74. December. pp. 970-85.

Mayhew, David (1974) *Congress: The Electoral Connection*. New Haven: Yale University Press.

McArthur, John and Stephen V. Marks (1988) "Constituent Interest vs. Legislator Ideology:The Role of Political Opportunity Cost," *Economic Inquiry*. pp. 461-470.

Miller (1977) *Public Choice*. Summer.

Milner, Helen and David Yoffie (1989) "Between Free Trade and Protectionism: Strategic Trade Policy and a Theory of Corporate Trade Demands," *International Organization*. 43 (Spring 1989), pp. 239-72.

Moomau, Pamela H. and Rebecca B. Morton (1992) "Revealed Preferences for Property Taxes: An Empirical Study of Perceived Tax Incidence," *The Review of Economics and Statistics*. pp. 176-79.

Mussa, Michael (1974) "Tariffs and the Distribution of Income: The Importance of Factor Specificity, Substitutability, and Intensity in the Short Run and Long Run," *Journal of Political Economy*. 82, pp. 1191-203.

Mussa, Michael (1982) "Imperfect Factor Mobility and the Distribution of Income," *Journal of International Economics*. February.

Nollen, Stanley D. and Harvey J. Iglarsh (1990) "Explanations of Protectionism in International Trade Votes," *Public Choice*. Vol. 66, pp. 137-153.

Nollen, Stanley D. and Dennis P. Quinn (1994) "Free Trade, Fair Trade, Strategic Trade, and Protectionism in the U.S. Congress, 1987-88," *International Organization*. 48 (Summer 1994), pp. 491-525.

Pammett, Jon H. (1989) "The 1988 Vote," in Alan Frizzell, Jon H. Pammett, and Anthony Westell, eds. (1989), *The Canadian General Election of 1988*. (Ottawa, Canada: Carleton University Press). Chapter 7, pp. 115-30.

Peltzman, Sam (1990) "How Efficient is the Voting Market?" *Journal of Law and Economics*. Vol. 33, No. 1, pp. 27-63.

Peltzman, Sam (1990) "How Efficient is the Voting Market?" *Journal of Law & Economics*. Vol. 33 (April), pp. 27-63.

Rogowski, Ronald (1987) "Political Cleavages and Changing Exposure to Trade," *American Political Science Review*. Vol. 81, pp. 1122-37.

Smith, Alastair and Fiona McGillivray (1996) "Senate Voting on NAFTA: The Power and Limitations of the MCMC Methods for Studying Voting Across Bills and States," manuscript presented at the Annual Meeting of the Political Methodology Society July, 1996. The manuscript is available online from the Political Methodology home page, http://wizard.ucr.edu/polmeth/polmeth.html.

Srinivasan, Krishna (1997) "An Empirical Analysis of the Political Economy of Tariffs," *Economics & Politics*. March. Pp. 55-70.

Stolper, Wolfgang F. and Paul A. Samuelson (1941) "Protection and Real Wages," *Review of Economic Studies*. Vol. 9. November, 1941. pp. 58-73.

Stratmann (1992) *American Economic Review*.

Thompson, Aileen J. (1993) "The Anticipated Sectoral Adjustment to the Canada-United States Free Trade Agreement: An Event Study Analysis." *Canadian Journal of Economics*, May. XXVI, no. 2. 253-72.

Thompson, Aileen J. (1994) "Trade Liberalization, Comparative Advantage, and Scale Economies: Stock Market Evidence from Canada," *Journal of International Economics*. Vol 37. pp. 1-27.

Tosini, Suzanne C. And Edward Tower (1987) "The Textile Bill of 1985: The Determinants of Congressional Voting Patterns," *Public Choice*, 54, pp. 19-25.

Wilson, James Q. and John J. DiIulio, Jr. (1995) *American Government: Sixth Edition.* (Lexington, Massachusetts: D. C. Heath and Company).

Zupan, Mark A. (1990) "The Last Period Problem in Politics: Do Congressional Representatives Not Subject to a Reelection Constraint Alter Their Voting Behavior?" *Public Choice*, 65, pp. 167-80.