Divided Industries in the Fight for Two US Free Trade Agreements

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Abstract

Variation in firm export performance suggests that industries may be internally divided over trade liberalization. This paper empirically examines the circumstances under which industries will feature both supporters and opponents of bilateral trade liberalization. Three conditions are emphasized: both countries must reduce tariffs or trade barriers; neither country can be overwhelmingly competitive; and, the product must be differentiated. Under these conditions, both trade partners will feature support for trade liberalization even in the same industry, and commercial rivals' interests may align across borders. This theory is then tested on a new dataset of industry attitudes towards the US-Korea FTA and the Australia-US FTA. Patterns of intra-industry disagreement and bilateral support *in the same industry* are closely linked to the possibility of intra-industry trade, but not consistently explained by the extent of FDI or foreign sourcing of inputs. This paper therefore systematizes the circumstances under which the new, new trade theory's predictions of divided industries should apply, and explores several testable implications of this approach to the politics of trade.

Introduction

This paper develops and tests a theory of intra-industry disagreements over trade liberalization. Following the literature on firm heterogeneity in export performance, it is argued that only exporting firms will benefit from – and therefore support – trade liberalization. In industries featuring significant intra-industry trade, non-exporters will oppose trade liberalization because it means only greater competition from abroad. Two industry features closely connected to the extent of intra-industry trade are particularly crucial as necessary conditions for these divisions: neither country can be overwhelmingly competitive and the product should be differentiated.

A focus on heterogeneous firms producing a differentiated product suggests two testable hypotheses about industry attitudes towards bilateral trade liberalization. First, industries producing differentiated products are more likely to feature divisions over trade liberalization, especially where differences in competitiveness with trade partners are muted. Second, under these same conditions, trade liberalization will feature support (or opposition) in both countries agreeing to reduce trade barriers, even in the same industry.

These hypotheses are tested by examining the response of US industries to the Korea-US Free Trade Agreement and the Australia-US Free Trade Agreement. Data on the publicly expressed attitudes of both trade associations and firms towards these agreements are used to identify industries as supporting, opposing or divided over these agreements. The analysis suggests a very close link between the extent of product differentiation and the existence of intra-industry divisions over trade. These divisions are especially pronounced in US industries that are as competitive or somewhat less competitive than their foreign competition. Support for the FTAs in both countries in the same narrowly-defined industry is also more likely where the product is differentiated and comparative (dis)advantage muted.

Finally, the paper considers several existing explanations for intra-industry divisions, including multinationalization and variation in sourcing inputs from abroad (Schattschneider, 1935; Milner, 1988*b*). While these alternative explanations of intra-industry divisions are operative in some instances, they do not invalidate the basic theory rooted in heterogeneity in firm export performance.

All of the theoretical results on firm-level preferences in the paper were derived in Osgood (2012) which relies on a model of firms and trade developed in Melitz and Ottaviano (2008). This same model is used here to derive a measure of the relative costs of the US and its two trade partners. This model-based measure of comparative advantage recovers underlying differences in costs of production using observables.

The trade politics literature has long debated whether factoral or industrial divisions are most salient in trade politics. This paper empirically examines a third possibility – that industries might be internally divided over trade liberalization – proposed in the literature on firm heterogeneity in export performance (Melitz, 2003). Two empirical patterns documented here are inconsistent

with either the Stolper-Samuelson or Ricardo-Viner approaches to trade, or both. Single industries feature both support and opposition to bilateral trade liberalization. An even broader range of industries feature support for trade liberalization in both trade partners. The evidence presented here therefore makes clear the need for a new theory of trade politics, and suggests that a focus on firm heterogeneity provides a productive route forward.

This line of research also extends the emerging literature on the politics of firms and trade by specifying conditions under which intra-industry reallocations of production are likely to lead to intra-industry divisions over trade liberalization (Melitz, 2003; Milner, 1988*b*). While often ignored, the complex webs of interests *within* industries have been a topic of considerable interest in the trade politics literature from its inception (Schattschneider, 1935). While the focus on firms in the study of international trade has renewed interest in distributional effects of trade within industries, it was not clear how widespread these divisions ought to be. The evidence presented here suggests that such divisions are present in many industries but far from ubiquitous. This is because only some industries produce differentiated products, and only a subset of these strike the right balance of competitiveness with trade partners to generate intra-industry divisions.

The paper also expands theoretically on the role of two existing explanations for intra-industry divisions over trade. The first of these is within-industry variation in the extent of multinational production (Milner, 1988*a*). It is argued here that foreign direct investment of the vertical type is a likelier cause of intra-industry disagreement than horizontal FDI. However, the circumstances most conducive to vertical FDI (sharp factor price differences, proprietary production technologies) are not the same as the characteristics emphasized in the new, new trade theory (similar levels of competitiveness, differentiation in *final* goods). These two explanations are therefore empirically implicated under different circumstances. Reliance on foreign inputs is also discussed.

All of these arguments are tested on an original dataset of association, firm and industry attitudes towards trade agreements between the US and the Republic of Korea and Australia. The data document an extensive set of industries which failed to convey a united front on the agreement, and also demonstrate that many narrowly-defined industries had supporters of the agreements in both countries agreeing to reduce trade barriers. Placing the empirical focus on industries, rather than firm heterogeneity across industries, provides the crucial test of whether the focus on firm heterogeneity is a useful addition to the study of trade politcs.

Very strong effects of product differentiation on intra-industry divisions (and support in both industries) are documented. Moreover, the impact of product differentiation on these outcomes are generally much stronger when differences in competitiveness are muted, as the theory predicts. In general, the paper also finds some evidence for the role of inputs in generating intra-industry division and more inconsistent support for the role of FDI. Moreover, the substantive impact of these factors is far smaller than that of product differentiation and comparative advantage, the factors emphasized in the 'new, new trade' approach to industry attitudes.

The idea that firms within an industry might disagree over trade liberalization is not new, but the evidence here suggests that variation in firm performance in exporting, under the right conditions, is a suitable addition to the list of reasons why. One implication of this focus on intra-industry divisions is that in many industries there will be supporters of the agreed reductions in trade barriers in both countries. When the agreement's terms are negotiated, industries at home share a common interest which is directly opposed to that of their competitors abroad. This is to reduce trade barriers as much as possible in the foreign market and maintain them in the home market. Once the agreement's terms are set, however, industries are fractured between exporting- and non-exporting firms even as new coincidences of interests arise internationally. The most productive firms *in both countries* wish to see the trade agreement pass into law; the least productive firms wish to see it defeated. When products are differentiated, bilateral trade liberalization divides industries.

Theory and Observable Implications

This section explains the logic behind the comparative statics connecting comparative advantage, product differentiation and intra-industry disagreements over trade. Unless otherwise stated, all results build off of a separate Osgood (2012) which uses the Melitz and Ottaviano (2008) model of trade with heterogeneous firms to explore the question of intra-industry divisions over trade. Finally, several alternative explanations for intra-industry disagreement on trade are discussed, including the role of foreign direct investment and reliance on imported inputs.

Differentiated Products and Divided Industries

The possibility of intra-industry redistribution among firms in the wake of trade liberalization relies on four crucial factors. Most obviously, divisions within an industry over trade liberalization require that firms differ in export engagement. These differences in ability to export are now well-established empirically and generally appear to be ubiquitous across industries (Bernard and Jensen, 2004; Bernard et al., 2003; Tybout, 2003; Mayer and Ottaviano, 2008). Variation in engagement in export markets is usually explained by exogenous intra-industry differences in total factor productivity. More productive firms can charge lower prices or produce better quality goods and therefore have the greatest sales and profits. Only the most productive firms can therefore absorb the large fixed costs associated with entering a new export market, or find positive demand for their varieties abroad when barrier to trade are factored into prices.

The second crucial factor is that the product be differentiated. The extent of product differentiation, which varies across industries, is usually treated as a consequence of a taste for variety among consumers. Product differentiation plays an important role in generating intra-industry divisions

over trade liberalization for several reasons. Most importantly, it gives rise to intra-industry trade, where countries both import and export goods in the same product class. Intra-industry trade means that bilateral trade liberalization has two competing effects: it leads to greater competition in the home market while increasing opportunities for export. Combined with firm heterogeneity, these dual effects mean that the least productive firms face only costs from greater trade while the most productive can gain on net due to increased sales in the foreign market.

The coarse distinction between homogeneous and differentiated product industries can be refined. The 'extent' of intra-industry divisions over trade is generally increasing in a continuous love-of-variety parameter in the model of trade with heterogeneous firms which underwrites the results in this paper. Put more precisely, the proportion of firms which support trade liberalization in a comparative disadvantage industry is increasing in consumer love-of-variety. The proportion of firms which *oppose* trade liberalization is also generally increasing in consumer love-of-variety in comparative advantage industries. The logic behind this is very similar to that described above. Greater product differentiation opens up new export opportunities for the less efficient firms in countries at a comparative disadvantage in the differentiated good. At the same time, this leads to more competition in the home market of the country at a comparative advantage, pushing more producers to oppose trade liberalization.

The third crucial condition for intra-industry divisions over trade is that neither country be overwhelmingly competitive in the production of the differentiated product. If that is the case then no firms will support liberalization in the country at a strong comparative disadvantage and all (or nearly all) firms will support liberalization in the country at a comparative advantage in the particular product. In the model used to derive these results, comparative advantage is driven by technology differences and market size (countries with a bigger market will have greater entry, and so more productive firms, on average). Here I assume that the market sizes between the countries are equivalent across all industries and focus only on technology differences, treated here as *ex ante* average costs of production for firms.[1]

The final ingredient for intra-industry divisions over trade liberalization is that both countries reduce barriers to trade in the industry. Unilateral liberalization, at least in the short run, only

[1] It is important to provide some greater precision about the meaning of comparative advantage as used here. Three facts are crucial. In models with heterogeneous firms, comparative advantage must be defined by analogy, considering *average* prices in autarky. The Melitz and Ottaviano (2008) model is a partial equilibrium framework with a numeraire good which is traded, so a country has a 'comparative advantage' in a particular differentiated product if the average price of that product is lower in autarky then in the foreign economy. Finally, cross-country differences in comparative advantage in this model are affected only by market size and the cost distribution of firms entering the market, the latter of which is a form of Ricardian comparative advantage. Industries in larger markets with lower cost distributions have a comparative advantage, but only the cost distribution is assumed to vary across countries. Therefore, for the rest of the discussion I refer to the country with lower costs as having a comparative advantage or as being 'more competitive' in the production of the differentiated good.

increases competition in the home market while providing no new opportunities in the export market. This is straightforward theoretically, but will require careful attention in the empirical analysis because in trade agreements there generally are some industries which avoid substantive liberalization.

There are two subsidiary conditions for intra-industry disagreements which are important to mention because they have been important areas of debate in the trade politics literature. First, it is assumed here that capital assets are firm-specific, at least in the short run. This ensures that owners will evaluate the impact of trade liberalization by considering the fortunes of their own business, not their industry or those of capital owners more generally. Second, it is assumed in developing this theory that trade policy is a public good to firms in the industry. In the model on which the preceding results are based, firms are neither able to lobby for, nor desirious of, variety-specific protection. This is because all goods in an industry are to some extent substitutable and varieties are global monopolies. Of course, this may not be the case in practice and is discussed further in the section on alternative explanations.

Testable predictions

For the rest of the paper, the first and the fourth conditions (firm heterogeneity and mutual reductions in trade barriers) are generally taken as given, so the focus will be on product differentiation and comparative advantage as key explanatory factors. As noted above, firm heterogeneity in export performance has generally been found to be ubiquitous. In the FTAs examined, there are a few industries where little or no tariff reductions were made. A strategy for dealing with this is presented when the data is introduced. The theory described above therefore leads to a first set of testable predictions.

> **Prediction 1** Industries producing differentiated products are more likely to have both supporters and opponents of bilateral liberalization. In particular, intra-industry divisions are predicted in industries where neither trade partner is overwhelmingly competitive.

This hypothesis is testable using data on industry attitudes towards some proposed liberalization in a single country but of course the theory makes predictions about both trade partners. A separate but related empirical issue is that *opposition* to trade liberalization can be hard to observe, especially in industries which have supporters of trade. Smaller firms – the predicted losers from trade liberalization – are probably less likely to have fully formed opinions, have less resources to make their voices heard if they do, and may be cowed by the pro-trade orientation of the most powerful actors in the economy and government. Similarly, trade associations are likely to be most influenced by their largest members who may set the agenda on public policy issues.

In order to get around these limitations in the data, while taking advantage of industry positions in both trade partners, where available, I test the following prediction:

> **Prediction 2** Industries producing differentiated products are more likely to have supporters of trade liberalization in both countries. This should be especially likely in industries where neither trade partner is overwhelmingly competitive.

The question here is whether it is possible for both country's firms to support trade liberalization if the firms are not heterogeneous. If so, then Prediction 2 would perhaps provide evidence for new trade theory, which focuses on intra-industry trade with homogeneous firms, but not new, new trade theory as a model of trade politics. I leave formal treatment of this question to future research, but I consider this possibility implausible and assume throughout that support in both countries is evidence of firm heterogeneity.

Extending the theory to suppliers of intermediate inputs

Some industries may not be directly engaged with export markets, but nonetheless may benefit (or be harmed) by trade liberalization because some downstream industry in their home market is affected by trade. For example, some US producers of stamped steel products came out in favor of the Korea-US Free Trade Agreement only after the agreement was renegotiated to facilitate greater auto exports to South Korea. Similarly, owners of cattle ranches are unlikely to export themselves, but can benefit from trade liberalization if processed meat exports result. Of course, both of these industries can simultaneously face both direct (in their own industry) or indirect (in the downstream industry) competition as a result of trade liberalization.

This suggests that industries might be divided 'by proxy'. If only some downstream firms are capable of profitably exporting, than perhaps only some of their suppliers will support greater trade liberalization. This of course raises the question of whether the same predictors described above – product differentiation, firm heterogeneity and moderate comparative (dis)advantage – are analytically useful. Considering each of these factors in turn, it is clear that the same industry features which predict intra-industry divisions should also predict intra-industry divisions 'by proxy', albeit with weaker explanatory power.

The extent of product differentiation is important in the sourcing industry as a straightforward extension of the logic described above. Homogeneous goods have a single market and a single price domestically, and so whether a homogeneous input ends up being manufactured into an export or not is immaterial. For example, feed corn sells at a single price whether or not the beef is subsequently exported. Differentiated inputs, on the other hand, are more likely to match specific suppliers with specific firms in long-term arrangements. These links lead to a mutual interest in the health of both supplier and supplied.

Firm heterogeneity, which in this setting means that only certain firms are presently (capable of) producing inputs for exporting firms, is somewhat trickier to address. It may be the case that the largest, most productive firms are most likely to source inputs from only the largest and most productive suppliers. This could reflect complementarities of scale between the levels of production as well as the superior ability of productive firms to search out the most effective suppliers. It could also be that there is simply variation in the extent of engagement with export-competing firms which differs among suppliers, which is especially believable in the short-run. In either case, trade liberalization will have distributive consequences within a single upstream industry.

What role would the comparative advantage of the supplying industry play? The competitiveness of the supplying industry contributes to the competitiveness of the downstream industry. Downstream industries which are sharply more (or less) competitive than their foreign competitors are less likely to be internally divided over trade liberalization. Upstream industries which are similarly 'moderate' in their productivity relative to foreign competitors should therefore be more likely to be divided over trade if their neutral comparative advantage contributes to the neutral comparative advantage of their downstream partners. Of course, many other factors contribute to the competitiveness of the downstream industry so observed correlations are expected to be somewhat weak.

Alternative Explanations for Divisions

There are several alternative explanations for intra-industry divisions over trade liberalization. In the seminal study of trade politics in America, Schattschneider (1935) describes many instances of apparent intra-industry disagreement in the fight over the Smoot-Hawley tariff bill and explained them with reference to multinationalization; variation in the reliance on sources of inputs from abroad; firm-specific ('private') protection; and industries being erroneously conflated. Each of these is discussed in turn.

Multinationals and foreign production Industries with both domestic- and foreign-based production are likely to feature divergent interests over trade liberalization. Those firms producing only in the domestic market may support or oppose further liberalization for the reasons described above. Firms producing abroad, on the other hand, are likely to share the interests of their foreign competitors and oppose further liberalization of the foreign market and favor liberalization of their home base, depending on their export participation. Distinguishing between these 'horizontal' and 'vertical' forms of foreign direct investment helps to ground expectations about when multinational engagement should predict intra-industry divisions.

Horizontal foreign direct investment occurs when foreign affiliates are founded or purchased primarily to serve the foreign markets in which production takes place. It is closely linked to firm- (rather than plant-)level economies of scale; modest differences in factor prices and productivity;

and, high costs of trade due to either shipping costs or existing trade barriers (Brainard, 1997; Markusen and Venables, 2000). Caves (2000), in particular, highlights the links between proprietary technology, variation in firm competitiveness and product differentiation as explanations for horizontal FDI, while Helpman, Melitz and Yeaple (2004) argue that heterogeneity in productivity is also associated with horizontal FDI. These conditions for horizontal FDI (heterogeneous firms; product differentiation; no significant differences in factor prices) are very similar to those which predict intra-industry divisions over trade based on export performance.[2]

Are intra-industry divisions therefore likely when only some firms participate in horizontal FDI? Considering competition in the domestic market and the foreign market, in turn, suggest that the answer is no. By definition, firms engaging in horizontal FDI are not exporting back to their home market, so there is no additional competition in the home market caused by this form of FDI. However, it is possible that domestic-based firms which export may have a clash of interests with multinationals because the former wish to gain access to the foreign market, and the latter to restrict it. These clashes require a relatively implausible set of conditions whereby some firms are productive enough to export but insufficiently productive to invest abroad, while other firms are highly productive and motivated to invest abroad as the most efficient way access to the foreign market. For example, horizontal FDI is closely associated with large shipping costs which suggest few opportunities for exporting among the less productive potential exporters in the home market.

Vertical FDI, on the other hand, is a more promising site for intra-industry clashes precisely because the foreign production is aimed directly at export back to the home market. This sets up a complex clash of interests between multinationals, home-based exporters and firms which serve the domestic market only. The economic literature on vertical FDI has focused on locational advantages associated with foreign production, most prominently due to differences in factor endowments between countries, as well as transactions costs associated with outsourcing of differentiated (i.e. firm-specifc) inputs (Helpman, 1984; Grossman and Helpman, 2002; Antras, 2003). Note however that the industries likely to feature these divisions are not the same as those where divisions arise because of heterogeneity in export performance. Vertical FDI is driven by sharp differences in factor prices while the theory outlined above says that these differences should create unity in industries. The links between product differentiation in *final* goods and vertical FDI are also not clear.

In the cases described below, both types of FDI at least partly explain certain instances of intra-industry disagreement over the FTAs examined. For example, it was commonly argued that the

[2] One ambiguity here concerns the extent to which product differentiation is linked to horizontal FDI. On one hand, proprietary methods of production and R&D expenditures are not necessarily available only to differentiated final products. On the other hand, brand names and other "special skills in styling or promoting products" are likely to be closely linked to the extent of product differentiation (Caves, 2000, pp. 147).

American Apparel and Footwear Association supported the Korea-US FTA in part because certain of its members were multinationals with production in South Korea who exported back to the US. At the same time, certain domestic-based producers of apparel opposed the agreement (most prominently producers of hosiery). Similarly, GM was the only one of the big three to initially support KORUS, and this was in part explained as a consequence of its subsidiary GM Korea Company's interests, which mostly consisted of sales in the Korean market. Once the agreement was amended to facilitate greater sales of US autos in Korea, each of the big three supported KORUS.

Still, multinationalization is not likely to explain the intra-industry divisions across the cases explored in this paper. First, many of the industries featuring divisions, like machine tools and seafood products, have little MNC production in South Korea (or Australia) by US firms. Second, total US FDI in South Korea is extremely modest in terms of the number of firms involved and so does not provide a very good explanation for entire associations (which feature anywhere from a dozen to several hundred members) and sets of firms supporting the agreement, despite the opposition of other firms in the industry. Third, the patterns of divisions predicted by this theory (that they occur in industries with relatively even competitiveness and producing differentiated products) do not predict vertical FDI while horizontal FDI does not seem like a promising site for divisions to occur. In the empirical section, I also suggest a regression-based approach for dealing with multinationalization as an alternative explanation.

Imported inputs Another explanation for intra-industry divisions over trade liberalization relies on the presumption that only some firms are capable of importing inputs from abroad. For example, South Korea is a quite competitive producer of basic chemicals and ferrous metals but it may be that only the largest downstream firms in the US are capable of benefiting from this fact because of costs associated with sourcing inputs from abroad. Intra-industry variation in the extent of reliance on foreign inputs is not well-documented empirically, but is both plausible and a central piece of the theoretical literature (Antras and Helpman, 2004).

Product differentiation again plays a crucial role. If the imported input is undifferentiated, then all firms in the industry seemingly will benefit from liberalization of that industry because it lowers the domestic market price of that commodity. Whether the commodity is foreign- or domestic-made is immaterial. If, however, the product is differentiated, greater imports from abroad might benefit the firms getting access to new (and perfectly suited) varieties of inputs to the disfavor of other domestic producers.

In order to test this idea (and consider variation across industries in the extent of input importingness as an explanation for intra-industry divisions over trade liberalization) I again propose a regression adjustment based on some measures of reliance on imported inputs which are described in the next section. I also make the following prediction:

Prediction 3 Industries which source inputs the most from abroad are more likely to be divided over trade liberalization. This is particularly so if the inputs are differentiated.

Regarding the horse race between variation in exporting and variation in input importing as explanations for divisions, it is worth noting that there is no clear relationship *in theory* between reliance on foreign inputs, comparative advantage and the extent of product differentiation in the industry in question.

Conflating different industries and level of aggregation This explanation for divisions within industries can take two forms. First, different stages in the production process might be erroneously grouped together into a single final product industry. For example, producers of some input might oppose trade liberalization while users of the input would favor trade liberalization. Second, industry categories may be too coarse and mix together fundamentally different products which are not substitutes for one another and for which producers vary in competitiveness. In order to address these concerns, the empirical section uses six-digit NAICS industries, which is a relatively fine-grained level of aggregation. Final goods are unlikely to be mixed with intermediate inputs at this level, and this level of aggregation seems acceptable for attributing differences in export performance to firm-specific rather than technological or factoral explanations. A regression adjustment for industry size (conditional on cost structure) is also employed to control for the broadness of the industry category.

'Private' or firm-specific protection One of the core assumptions of the model on which the results here are presented is that trade protection in a given industry is a public good. There is a single domestic tariff or NTB which benefits all firms without exclusion and its benefits are not rivalrous at least above and beyond the usual competition among firms. This concern is clearly connected to the extent of product differentiation because it is harder to craft private protection for undifferentiated commodities. Moreover, there are examples in the agreements examined here which suggest firm- or industry-segment targeted protection, for example, the exclusion of 17 US rubber footwear categories from any tariff reductions which secured the support of that segment of the footwear industry. Two counter-arguments are worth making. First, there are many examples of divided industries where trade barriers were broadly reduced and evidence of 'carveouts' is limited. Second, these exemptions generally seem aimed at creating unity, rather than divisions. For example, leather and some footware producers would have supported KORUS without the special exceptions for some rubber footwear producers because their products were not exempted from tariff reductions in any event. These exceptions are addressed again in the following section.

Other policy issues in agreements A final potential source of disagreements within industries over free trade agreements is that other, non-trade-related policy issues may be included in the agree-

ment terms and differentially affect firms. For example, the Generic Pharmaceutical Association opposed KORUS in part because they felt that the intellectual property protections included in the agreement were too stringent and that government procurement rules in Korea discriminated against makers of generics (USITC, 2007; CRS, 2008*b*). It is hard to systematically theorize about a residual category such as this, other than to say that it is unlikely to be correlated with neutral comparative advantage and that many of the examples of industries that were internally divided do not appear to have a clear set of 'other' issues that divided their firms as in the pharmaceutical sector.

Cases, Data and Methods

The US-Korea and US-Australia FTAs

The US-Korea Free Trade Agreement (KORUS) was negotiated from 2006-2007. It generated little public controversy in the United States, but was criticized or opposed by several important industries and many firms. In the United States, Ford and Chrysler initially opposed the agreement (even as General Motors supported it) and many beef producers also opposed the agreement due to Korean restrictions on beef imports from cattle over 30 months old stemming from BSE infections in the United States detected in 2006. Ultimately, the agreement was renegotiated to facilitate greater entry of US autos in the Korean market and the beef issue was left unresolved. This renegotiation led to passage by the US House and Senate in October 2011 of an FTA implementation act and entry-into-force of the treaty in March 2012.

The agreement was considerably more controversial in the Republic of Korea, mainly because of deep worries about the impact of US agriculture imports on Korea's smaller scale farms and food producers. Extensive street protests against the agreement persisted up until final passage in the Korean National Assembly. The Grand National Party (now Saenuri) pushed through the trade bill despite opposition legislators boycotting the session and a tear gas attack immediately before the final vote. The final tally was 151 legislators in favor, seven against, twelve abstentions and the balance of the 299 members not present.

Because of this sharp asymmetry in competitiveness in agriculture and food products, as well as mining and mineral products, I also include the US-Australia Free Trade Agreement for all agriculture and mineral-related industries. Although considerably less controversial, the agreement nonetheless sparked opposition in both countries, particularly in the agricultural sectors. Because Australia is quite competitive in the production of many agricultural products, the extent of opposition between the countries was generally much more balanced.

KORUS and AUSUS provide reasonable cases for testing the theory described in the previous section. In both agreements, nearly all sectors were liberalized either initially or within 10 years

(with some notable exceptions discussed below). For example, 99% of US tariff lines and 98% of Korean tariff lines will be reduced to zero by 2022 starting from a base of 38% and 13% respectively (CRS, 2008*a*). The agreements also paved the way for reductions or controls on non-tariff barriers to trade such as government procurement rules, SPS measures, and quantitative restrictions. Certain industries were left out of the agreement, such as sugar in the United States and rice in South Korea, but these generally appear to be the exception. AUSUS similarly reduced most tariffs and quantitative restrictions with some significant exceptions for sugar in the US and wheat and other grains for Australia (USITC, 2004).

These agreements are also valuable cases because each involves trade partners who are both reasonably large and competitive in the same types of industries as the United States. This means there is the potential for intra-industry trade, the key factor predicting intra-industry disagreement over trade liberalization. Of course, the United States is still an order of magnitude larger in terms of market size and production than Australia and Korea, which might suggest little opportunity for divisions within industries. As the evidence will show, however, a number of industries were in fact divided and some US industries were united in opposition to these agreements across all tradable sectors of the economy.

Who supported and opposed KORUS and AUSUS? Sources and coding

Which industries supported and which opposed passage of the Korea-US FTA? Which industries took no position or were divided? This section describes an approach to answering these questions by focusing on the *public* statements of trade associations and individual firms. These statements are used as proxies for the actual interests at stake for firms in particular industries.

On-the-record, public statements generally reflect an internal process of deliberation by associations and firms on the merits of an agreement and so are more likely to be well-considered and reflective of an actual interest at stake. They are also accessible across many industries and a recurring feature of debates over trade liberalization. A significant amount of effort is expended by the United States government, lobbyists, unions, businesses, industry groups and other special interests to get firms and trade associations to put their position on record publicly. Public statements are also potentially costly if member associations or industry members do not concur, or if interests are misapprehended, and so are unlikely to be hastily or erroneously formulated.

However, public positions can also create controversy and unwanted attention, especially amidst contentious debates. They may also reflect social pressures rather than being pure expressions of interest. In particular, some of the Korean associations contacted were unwilling to comment even on the question of whether their association took a public position. A particular concern here is that in industries where firms don't agree on trade liberalization, associations will simply not take a position. Nonetheless, in presenting the dependent variable below, I will argue that these public

positions are good proxies for private interests. There are three reasons for this. Public positions correlate well with sensible predictors of economic interests, like import and export volumes, and comparative advantage. Second, associations and industries which took no position on the agreement were frequently in industries with higher costs of trade, little FDI or intermediate inputs, and low volumes of trade with South Korea. Finally, most of the industries that were expected to be heavily affected by the agreement (autos and auto parts, machinery, chemicals, agriculture, textiles and apparel, certain electronics) had high rates of public comment.

The unit of analysis here is the six-digit NAICS industry, using the 2012 revisions of the nomenclature. Six-digit industries are a useful level of aggregation in many ways, and often reflective of meaningful product or organizational differences within industries. For example, eggs (112310), chicken (112320) and turkey (112330) would be conflated into one industry for any higher level of aggregation, although they are represented by different (product-specific) trade associations. Allocation of firms into industries is also much more refined using this approach. Producers of metal stampings for autos are unlikely to also be involved in interior trims or transmissions, for example.

In order to code positions of industry associations (and a few agriculture cooperatives), I have relied on association press releases and website statements; Congressional and ITC testimony, both written and oral; signature on various petitions about the agreement; and mass and trade media comments by association officers if clearly speaking for the association. If these were lacking, associations were contacted directly via email or phone, although the vast majority of replies have indeed taken no public position.[3]

In coding industry attitudes, I also take advantage of expressions of support or opposition to the agreement made by firms. The vast majority of these public expressions took place in petitions or were signaled by membership in the US-Korea FTA Business Council, an organization which pushed for ratification of the FTA. Unlike with industry associations, where it is possible to exhaustively document associations and code those who took “no position", I simply employ the count of firms who supported or opposed the agreement in each industry. Note that most of the firms cover at least two industries, and many of the firms have wide coverage across many industries.

[3] Two of these sources deserve particular attention. First, I have sparingly made use of ITAC reports – where they are unanimous and completely unambiguous – to code particular associations as being in favor of the agreement. Second, a number of associations and firms signed a petition written by the Committee to Support US Trade Laws (CSUSTL), an organization comprised of trade associations, labor unions and firms which promotes robust development and application of trade remedies to protect US business affected by trade. The CSUSTL petition “raise[d] concerns about certain antidumping and countervailing duty provisions within the Trade Remedies Section of the KORUS" and recommended that extra safeguards be added in any implementing legislation. While the text of the letter is measured, I argue that it represents a separate outlet for expressing opposition to the agreement. First, many of the associations signing the letter elsewhere did express public opposition to the agreement. Second, only a small number of associations signing the letter expressed support publicly and only the smallest fraction of associations otherwise expressing public support signed the letter. Finally, note that because the letter expresses opposition, it has no impact on the testing of prediction two.

Table 1: Simulated change in counts from zero-inflated negative binomial regression models of number of firms publicly expressing either support or opposition to KORUS and AUSFTA. Each variable is moved from the first to third quartile. US imports from the trade partners, but not the world as a whole, predict expressions of opposition by firms. US exports to the trade partners, as well as the world, predict expressions of support. These results support the idea that public expressions of sentiment by firms are rooted in distributive consequences of trade and are not simply noise. All variables are on the log scale.

	Change in count of firms:	
Predictor	Opposing	Favoring
US imports from trade partner	1.128^{***}	
	(0.170)	
US imports from world	-0.297^{***}	
	(0.083)	
US exports to trade partner		0.445^{**}
		(0.154)
US exports to world		0.638^{***}
		(0.106)
Number of firms	121	140

$^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$ from a two-tailed test with null hypothesis $\beta_j = 0$.

One concern with these petitions is that apparently meaningful expressions of attitudes may be so much noise and consequently will lead to overestimation of the number of divided industries or industries with an opinion. Table 1 presents the results of several separately estimated event count models for the number of firms supporting and opposing the agreement in each industry. Imports and exports to the trade partners and the world are used as predictors of support and opposition. Both models suggest that counts of supporting and opposing firms are meaningfully connected to underlying economic fundamentals. In particular, while US imports from and exports to Korea predict counts of opposing and supporting firms, total US imports and exports do not.

Industries are coded from among {Oppose, Divided, Favor, No position}. Any association I have not heard a definitive "No position" from, is classified as missing data and generally omitted from the analysis. Industry codings are in turn built on actor codings as described above. If an industry has even one association taking a position from among {Oppose, Divided, Favor}, then the industry is coded in that manner, even if other associations took no position. If multiple associations conflict in their position, then the industry is coded as divided. An industry is also coded as divided if an association was explicitly neutral and cited disagreement among its firms (or varying effects on members from the agreement). Counts, and proportions weighted by sales, of all the industry codings based solely on association positions are reported in the first two rows of Table **??**.

The second half of Table **??** reports the counts and weighted averages of the industry codings

Table 2: This table contains counts of US industries by position on the KORUS and AUSFTA agreements. Counts are supplemented with proportions weighted by industry sales to illustrate that counts of divided industries, for example, are not simply a consequence of small industries. Industries with no recorded position constitute around %17 percent of weighted observations.

Country	Oppose	Divided	Favor	No position	NAs
South Korea	33	52	210	56	53
	0.051	0.162	0.671	0.069	0.048
Australia	12	2	49	0	55
	0.081	0.013	0.488	0	0.418
Both	45	54	259	56	108
	0.056	0.133	0.639	0.103	0.070

when firm attitudes are also included. Firms in an industry are coded as favoring or opposing the agreement if three or more signed on with a given position. These groups of firms are then treated equivalently to an association. For example, an industry with a single association favoring the agreement and 3 or more firms opposing the agreement is coded as “divided". Note that the number of industries coded as divided based only on association preferences are quite significant, and division is in fact far more common than unqualified opposition.

Finally, there were a number of industries which avoided significant liberalization in part or as a whole in these agreements. These cases are relatively few but of course are disruptive to the results because comparative disadvantage industries, for example, might support the agreement only because they avoided any liberalization. In order to handle these cases, which are relatively few, four industry attitudes were imputed as described in Appendix A. Only one of these industries was coded as divided.

Measuring comparative advantage

I develop a model-based approach to measuring costs of production based on the model presented in Melitz and Ottaviano (2008). Assuming that both countries have similar demand structures for each good, average costs of production and country size are the only source of comparative advantage in the model. Specifically, the paramter m^l determines the support of the Pareto distribution from which firms draw a stochastic cost of production. These parameters are best conceptualized as either differences in technology or in the quality of unpriced inputs.

The measure is derived as follows. Total sales in the domestic market (l) and exports from l to h are given by

$$R_D^l = \frac{L^l}{2\gamma(k+2)(m^l)^{-k}} N_e^l (c_D^l)^{k+2}$$

and

$$R_X^l = \frac{L^h}{2\gamma(k+2)(m^l)^{-k}}(\tau^h)^{-k}N_e^l(c_D^h)^{k+2}.$$

N_e^l is the number of entering firms in l (before any exit), k is the skewness of the Pareto distribution, L^l is the number of worker/consumers, and γ is the extent of product differentiation. In a long-run equilibrium, the zero-profit productivity cutoff c_D^l is equal to

$$\left(\frac{\gamma}{L^l}\frac{\phi^l - (\tau^h)^{-k-1}\phi^h}{1-(\tau^h)^{-k-1}(\tau^l)^{-k-1}}\right)^{\frac{1}{k+2}},$$

where $\phi^l = 2(k+2)(k+1)(m^l)^{-k}$ and ϕ^h is defined analagously. Dividing exports by domestic sales, we have:

$$\frac{R_X^l}{R_D^l} = \frac{\phi^l - (\tau^h)^{-k-1}\phi^h}{(\tau^h)^{-k}\left(\phi^h - (\tau^l)^{-k-1}\phi^l\right)}.$$

This then yields an expression for relative costs of production between the two countries :

$$\frac{m^h}{m^l} = \left(\frac{\frac{R_X^l}{R_D^l}\left(\tau^h\right)^k + \left(\tau^l\right)^{-k-1}}{\frac{R_X^l}{R_D^l}(\tau^h)^{-1}+1}\right)^{\frac{1}{k}}.$$

This expression recovers underlying relative costs of production taking full account of barriers to trade[4]. For example, holding the export-to-domestic sales ratio constant, the measure is increasing in foreign trade barriers and decreasing in domestic trade barriers. If trade barriers are measured accurately, the measure will reveal that countries facing very high trade barriers have lower costs of production despite seemingly low export volumes. This is, in principle, an improvement on ad hoc measures of comparative advantage like revealed comparative advantage, import- and export penetration, and import-export ratios. This measure can also be viewed as an adjusted measure of exports as a percentage of total production, $R_X^l/(R_D^l + R_X^l)$, which the measure collapses to when

[4] Note also that comparative advantage, which is defined for this application as relative average prices in autarky is equal to

$$\begin{aligned}\frac{\tilde{p}_A^l}{\tilde{p}_A^h} &= \frac{c_A^l}{c_A^h} \\ &\propto \left(\frac{L^l(m^l)^k}{L^h(m^h)^k}\right)^{\frac{1}{k+2}}\end{aligned}$$

The measure is relatively insensitive as trade barriers in both countries go to zero (i.e. as $\tau \to 1$). This is a consequence of the use of long-term equilbria, which are necessary to have an explicit solution for the cutoffs. If trade barriers and costs are completely eliminated, no firms will enter in the market with worse technology.

Table 3: The relative costs measure of comparative successfully predicts the underlying determinants of industry positions, at both the firm and association level. Each estimate is a first difference when the relative costs measured is moved from its first quartile to its third quartile. The firm models are zero-inflated negative binomial models of counts of support and opposition by firms. The association positions are modeled in a single multinomial logit model.

Outcome	Expected	Estimate
Δ # Opposing firms	-	-0.680^{***}
		(0.217)
Δ # Supporting firms	+	0.309^{**}
		(0.118)
Δ Pr(Association opposes)	-	-0.023^{***}
		(0.010)
Δ Pr(Association supports)	+	0.073^{***}
		(0.016)
Δ Pr(Association takes no position)	0	-0.050^{***}
		(0.016)

$^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$ from a two-tailed test with null hypothesis $\beta_j = 0$.

trade barriers are high at home and low abroad.

One useful feature of this measure is that it relies on observable quantities. The easiest among these to measure are exports and sales by industry. For the US data, these are measured using 2007 Census of Agriculture, Census of Mineral Industries, and Census of Manufacturers data on total sales. Imports and exports to Korea and Australia are taken from US International Trade Statistics, an online tool managed by the Census Bureau. Trade barriers are obviously less well measured. I employ 2007 measured tariffs and *ad valorem* equivalents, where available, of non-tariff barriers, both taken from the WITS database. An ad valorem measure of maritime shipping costs from the United States to East Asia provided at the HS two- (and in some cases six-) digit level is employed to measure trade costs. This measure is published by the IMF. These three components are summed together to measure τ^h and τ^l. The only other required parameter is k, the skewness of the assumed Pareto distribution of firm productivities. Here I assume k is equal to 3, which is a close match to the figure employed in numerical simulations by Bernard, Redding and Schott (2008). This does not vary across industries.

Three patterns stand out in examining the measure. First, the measure is in general too low. South Korea, for example, is estimated to have lower relative costs in virtually every product category, including much of agriculture. This in part reflects unmeasured trade barriers and costs of trade. Korea has an extensive set of non-tariff barriers to agricultural inputs and many minerals and mineral products are likely to have high shipping costs not entirely captured in the maritime trade costs measure, which is at a somewhat high level of aggregation. More importantly, it prob-

ably reflects 'home bias' in consumption (Trefler, 1995; Wolf, 2000; McCallum, 1995). Second, there is surprisingly little correlation between existing proxies for comparative advantage. In part, this reflects mismeasurement or conceptual difficulties associated with all of the approaches, but is also in part caused by very poor estimation of relative costs in agriculture and minerals, two areas of real strength for the United States relative to South Korea. However, correlations are much improved within the problematic industry areas, agriculture and mining.

In order to address some of the problems described above while retaining a parsimonious measure, I recenter the relative costs measure so that exact neutrality (relative costs = 1) between the US and Korea occurs at the 15th, 30th, and 50th percentile for agriculture and food, mining and mineral products, and manufacturing, respectively. For the US and Australia, exact neutrality is assumed to occur at the 50th percentiles for both agriculture and food, and mining and mineral products. The resulting categorization of industries are generally quite sensible. For example, 3 This measure will generally be referred to as the 'relative costs' measure of comparative advantage.

Other key covariates

The Rauch (1999) coding of industries into exchange-traded, reference-priced and differentiated goods is used as the primary proxy for product differentiation. These codes are measured in four digit SITC revision 2 products, and are concorded with appropriate six-digit NAICS industries. Where there are disagreements, the modal SITC coding is used.

Data on foreign direct investment by the United States and other countries is only available at a relatively high level of aggregation, usually the two- or three-digit NAICS code. There is however data on worldwide FDI by American businesses at the four-digit NAICS level. I assume that (potential) US FDI in South Korea and Australia is distributed similarly to US FDI worldwide within three-digit industries, in order to construct a four-digit NAICS measure of potential FDI in each market. I use the percentage of total US FDI for each market in all models. For these two agreements, the largest percentage of FDI by two-digit industry is accounted for by mining in Australia (at more than 39.8% of total US direct investment in Australia). The largest percentage of imputed FDI for a four-digit industry in South Korea is electronic components (13.8%).

In order to capture the extent of US reliance on imported inputs, I make use of the BEA Input-Output tables from the 1997 Economic Census. Input-output tables are available at the 6-digit level, and I set inputs on all diagonals to zero to avoid conflating import competition with input usage. I further assume that each foreign and domestic input is distributed across industries equally. The measure then captures for each industry the proportion of the final value of products that is accounted for by foreign inputs from either Korea or Australia, as appropriate. This measure is also disaggregated by the extent of product differentiation so, for example, none of the value of US computers is accounted for by undifferentiated Korean products while .0028% of the value is ac-

counted for by differentiated Korean products.

Methods

Before turning to the evidence, there are several methodological issues which apply throughout the analysis and are helpful to address at the outset. The presentation of the evidence relies on graphical presentation of the simplest versions of the hypotheses (e.g. that divisions are increasing in the extent of product differentiation). Simulations and regression results are generally presented for the full versions of Predictions 1-4. Clear quantities of interest are generally provided in the text to provide a sense of effect sizes.

Confounding: In the economic model which underlies the hypotheses tested here, it is assumed that product differentiation and comparative advantage are determined by exogenous factors (consumer love-of-variety; and technology and market size). Here, I assume a one-to-one correspondence between the proxies for product differentiation and consumer love-of-variety. It is also assumed for a given industry and country, that domestic market size for that product is a constant proportion of the total market size of the country. In other words, only the total market size influences comparative advantage and the only varying determinant of comparative advantage across industries is technology. These three forces jointly determine the extent of support in the industry and any residual sources shaping industry preferences are assumed to be uncorrelated with these predictors.

To consider violations of this unconfoundedness assumption, it helps to consider love-of-variety and technology separately. The attitude adopted here is that love-of-variety is a product of an underlying consumer preference for variety as well as taste-, cost- and technology-based constraints on the possibility/desirability of variety. These are all intrinsic (and highly static) properties of goods and people and it is difficult to name prior determinants which would confound industry attitudes towards trade liberalization. On the other hand, technology is both more dynamic and subject to choice, and so may be confounded. Nonetheless, it is difficult to identify prior causes of technology differences which feed into industry attitudes, but not via the technology channel.

Alternative explanations as mediators: Because of the assumed exogeneity of the main explanatory factors, the primary empirical challenge here concerns causal mediation (Baron and Kenny, 1986). Does product differentiation affect intra-industry divisions, for example, via its effect on intra-industry trade or on the extent of foreign direct investment? The main approach to this problem is to consider changes in regression coefficients when post-treatment mediators are introduced to the model. The validity of this approach relies on relatively stringent assumptions about effect homogeneity, linearity of the predictors and unconfoundedness of the mediator (Glynn, 2012; Green,

Ha and Bullock, 2010). Moreover, this approach can result in bias in the generalized linear models employed here.

Evidence

I now turn to the evidence. Recall that two surprising outcomes, at least from the perspective of the standard models of trade politics, are predicted in industries producing differentiated products: intra-industry disagreement over whether to support or oppose freer trade; and, support for the FTA in both countries in the same industry. The first two outcomes are expected, in particular, in industries where neither country has an overwhelming comparative advantage. All three of these predictions are validated by the data and the estimated impacts of product differentiation on each of these outcomes are large.

This section also examines two alternative explanations of these outcomes: variation in multinationalization and variation in the reliance on foreign inputs. The contention that industries relying on differentiated products are more likely to feature each of these outcomes is consistently supported. FDI, however, does not appear to drive intra-industry divisions (or support in both countries) in any significant fashion. In addition, the inclusion of measures of FDI and reliance on foreign inputs do not substantially alter the results described in the previous paragraph. The links between product differentiation, comparative advantage and intra-industry divisions are not simply products of these two alternative explanations.

Intra-industry divisions

Under what circumstances do industries have both supporters and opponents of trade liberalization? The first finding here is that US industries producing differentiated products are far more likely to have internal divisions than those producing homogeneous products. This relationship is presented graphically in the right half of Figure 1, which gives rates of support, opposition and division across the sampled industries. There are only a small number of industries producing undifferentiated products who were internally divided over the FTAs, while nearly 20% of industries producing moderately or highly differentiated products were internally divided.

The left half of Figure 1 presents the breakdown of support, opposition and division using the measure of comparative advantage described above. Two interesting patterns are present. First, the number of US industries with divisions is noticeably higher in industries that are roughly competitive with their foreign rivals. Fewer industries at a noticeable comparative disadvantage or advantage were divided over the agreement. This is especially true for most competitive US industries, where divisions were unlikely. Second, a significant number of industries coded as being

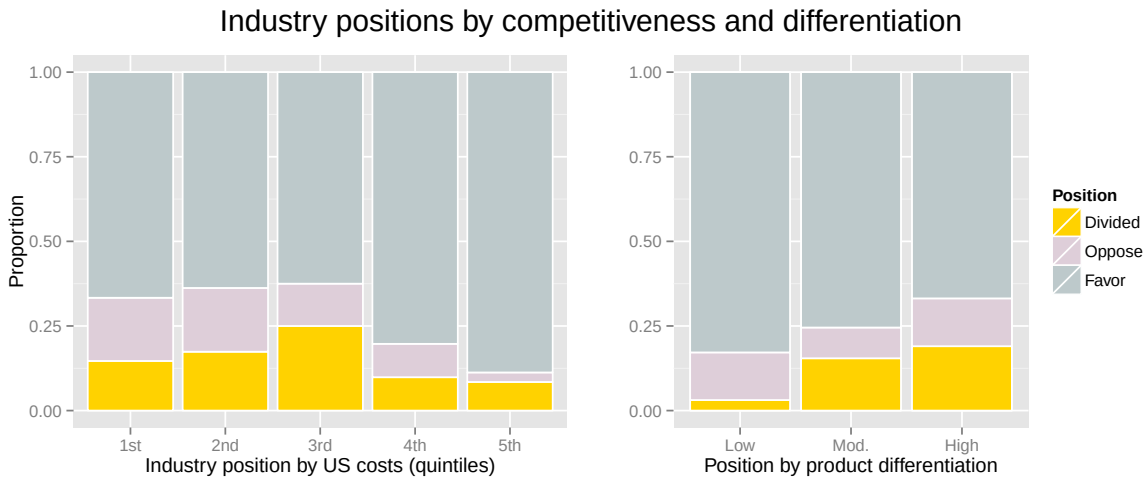

Figure 1: This figure provides the breakdown of US industry attitudes separately by product differentiation (right half) and US comparative advantage relative to its trade partners. Industries producing differentiated prodcuts are much more likely to feature divisions. Industries with no clear comparative advantage or disadvantage relative to their foreign competitors are also more likely to feature intra-industry divisions. A number of comparative disadvantage industries appear support the agreement, however.

at a comparative disadvantage *supported* the agreement, with no divisions whatsoever. This is surprising and of course inconsistent with the fullest version of the theory as presented above, which would predict united *opposition* in comparative disadvantage industries.[5] The existence of support in comparative disadvantage industries will be examined in some detail later on, as a potential manifestation of firm heterogeneity.

Figure 2 presents the core result on the extent of intra-industry divisions from a parametric analysis. I estimated a multinomial logit model using only industries coded as favoring, opposing or divided on the two FTAs. The main exogenous predictors in the model are the trichotomous measure of product differentiation interacted with the continuous measure of comparative advantage and its squared term. This permits the expected non-linear effect of comparative advantage to express itself. In addition, three endogenous predictors are included: the measure of FDI, input re-

[5] There appear to be a couple of forces at work. First, in certain highly uncompetitive industries for the United States, there is relatively little remaining domestic production except among highly successful global brands, reflecting the process described in Hathaway (1998). For example, the apparel industry is largely coded as supporting the agreement although trade flows are sharply in favor of South Korea. Of course, sourcing inputs and foreign production may also be playing a role here. The lack of opposition could reflect Korea's steadily deteriorating competitive position relative to other exporters of apparel to the US. A second group, composed mostly of plastic and rubber products, is somewhat more mysterious. In 2012, US imports of these products from Korea were around $2.5 billion while exports were only $290 million. Trade in specific goods, like tires, is even more asymmetric, yet the major rubber and tire industry associations supported the agreement and there was no visible protest from individual tire producers. Note also that both US and Korean tire tariffs were cut in the agreement.

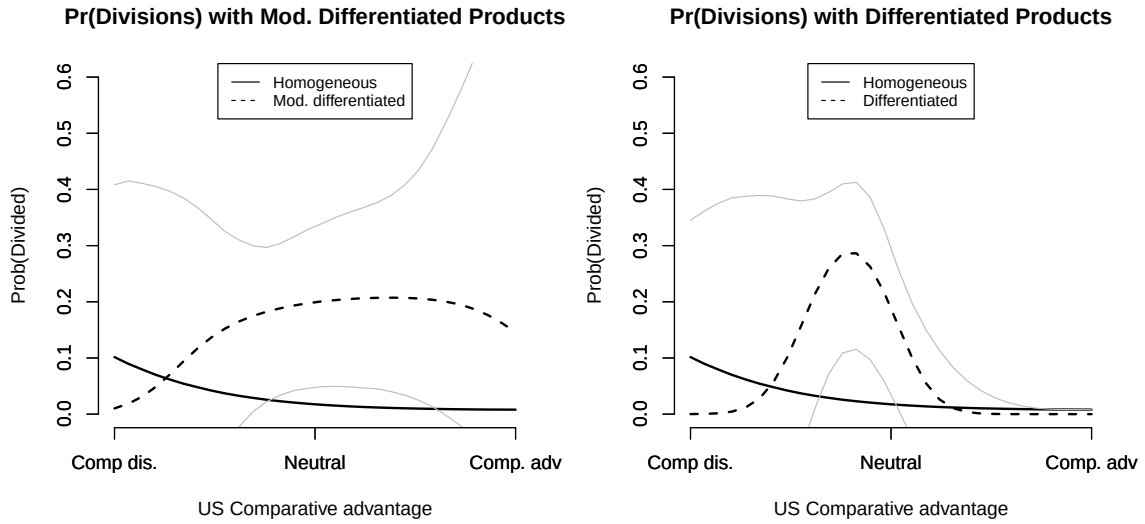

Figure 2: This figure plots predicted proportions of divided industries using results from a multinomial logit model, which includes only industries which took a public position. This model includes measures of FDI, foreign input reliance and total industry sales. Homogeneous goods are generally predicted to have very few divided industries, with no clear relationship to comparative advantage. Highly differentiated product industries have divisions only where comparative advantage is moderate, while somewhat differentiated industries have divisions where comparative advantage is moderate or in favor of the United States. 95% confidence bands are plotted for the estimated differene between differentiated and homogeneous products. Where the lower confidence band is above the homogeneous product line, this difference is significant at the $\alpha = 10\%$ level.

liance and total sales.[6] These covariates are included in order to examine whether the relationship between product differentiation and industry divisions is a result of FDI, reliance on foreign inputs or industry size. Figure 2 shows the estimated proportion of divided industries as a function of both product differentiation and comparative advantage.

Several results confirming predictions 1 and 2 of the theory are worth noting. First, there are very few divided industries predicted when product differentiation is low. Second, the predicted non-linear effect of comparative advantage on the proportion of industries with divisions is observed. This relationship is especially sharp for the highly differentiated products. Third, the substantive effects predicted by the model are large. Consider moving from a homogeneous good industry to a moderately or fully differentiated good industry when the comparative advantage measure is set at its median (roughly 1.01). The predicted increases in the number of divided industries are 0.157 and 0.254, respectively, and the 95% confidence intervals for these estimates exclude zero.[7]

Alternative explanations

Are the alternative explanations of divisions within industries, which are on their own quite plausible, driving these results? Because comparative advantage and consumer love-of-variety are exogenous, at least within the model of trade employed here, this boils down to a question of decomposition of the effects. For example, does product differentiation lead to intra-industry divisions because of its interaction with firm heterogeneity in exporting or because differentiated product industries feature more foreign direct investment? For the time being, I simply note that the baseline results for Predictions 1 and 2 are robust to the inclusion of measures of FDI, input reliance and industry size. The analog to Figure 2 for the models *without* these alternative explanations looks very similar.

Figure 3 presents effects sizes for each of the three classes of predictors. (The inputs measure is also broken down based on the extent of input differentiation in the inputs for these results).

[6] The score function for outcome k in the model is given by

$$\lambda^k = \boldsymbol{\beta}^k(1 + \mathrm{I}_{\text{Mod.diff}} + \mathrm{I}_{\text{Diff.}})(1 + \mathrm{CA} + \mathrm{CA}^2) + \mathrm{fdi} + \ln \mathrm{inputs} + \ln \mathrm{sales}.$$

$I_{\text{Mod.diff}}$, for example, is an indicator variable for the level of product differentiation being 'moderate' according to the Rauch (1999) measure. Homogeneous goods are used as a baseline category here and throughout. CA stand for the relative costs measure of comparative advantage, which is described above. $\boldsymbol{\beta}^k$ is a vector of length 12 and, for example, β_1^k fits an intercept term.

[7] When the US is at a comparative disadvantage ($CA = .91$) these effects are small (0.006 and -0.036) and not significant. When the US is at a comparative advantage ($CA = 1.15$), there is a (statistically significant) increase in divisions of around 0.181 for moderately differentiated products and -0.008 for differentiated products. These two figures are the .05 and .95 percentile for the comparative advantage measure, respectively.

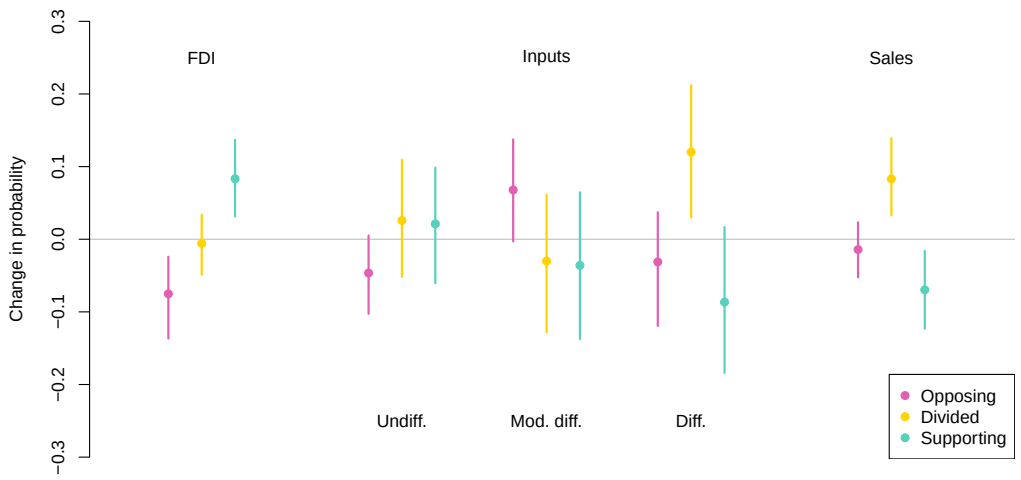

Figure 3: Comparative statics associated with each of the endogenous predictors of industry divisions. Predicted changes in proportions of each outcome are presented, along with 90% confidence intervals, for each predictor when it is moved from its first to its third quartile. Of them, only the extent of reliance on differentiated inputs and the industry size are positively linked to intra-industry divisions.

Intra-industry divisions are more likely where inputs are differentiated (but not moderately differentiated) which is partial confirmation of Prediction 3. Industry size also is associated with intra-industry divisions. The FDI measure is not positively linked to intra-industry divisions, although it is associated with higher rates of support within the industry.

Support in both countries

In this section, I pair the responses of US industries to the Korea and Australia FTAs with their competitor industries abroad in order to examine Prediction 2. The coverage of the data is much more limited, primarily because the overall rate of public pronouncement among South Korean associations was much lower than among US associations. Alternative sources, such as public petitions, were also not manifest. When contacted, a number of even the largest associations preferred not to comment even on the question of whether they did or did not have a public position. Still, enough Korean and Australian associations did make public pronouncements or respond when contacted to permit some investigation of Prediction 2.

Recall that the second prediction coming out of this model was that in industries producing differentiated goods, and where comparative (dis)advantages are not too sharp, we should be like-

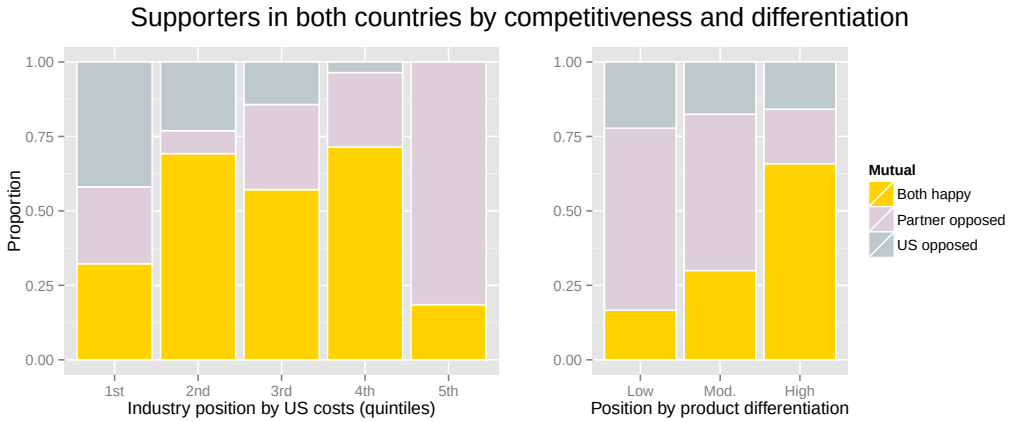

Figure 4: This figure plots the proportion of industries where both countries have supporters as a function of product differentiation. Product differentiation is strongly linked to this occurence.

lier to see support for the agreement in both countries. The equivalent statement about opposition is also true and there are indeed some industries where there was opposition in both countries. However, opposition is generally harder to observe for the reasons described above so these cases are not considered.

Focusing only on product differentiation, there is strong support for the claim that differentiated product industries are more likely to feature support in only one trade partner. This is presented visually in Figure 4.

Simulations from a parametric model are also presented in Figure 5 in order to consider how comparative advantage interacts with product differentiation. The model is a penalized logistic regression where the dependent variable is support in both countries. The predictors are again the interaction of product differentiation and comparative advantage.[8] In industries producing homogeneous goods, support in both countries is generally rare. For moderately differentiated goods, support in both countries is much more common and is closely associated with moderate levels of comparative (dis)advantage, in accord with the second prediction. In industries producing the most differentiated products, support in both countries is common. However, there is not strong evidence of the hypothesized non-linear role of comparative advantage on the range of the relative costs variable available for this outcome.

[8] Penalized regression is used here because of problems arising from perfect separation of the outcome by the predictors. Again, the linear predictor of the model is given by

$$\lambda = \boldsymbol{\beta}(1 + \mathrm{I}_{\mathrm{Mod.diff}} + \mathrm{I}_{\mathrm{Diff.}})(1 + \mathrm{CA} + \mathrm{CA}^2),$$

where $\boldsymbol{\beta}$ is a length nine vector of coefficients. The Rauch measure of product differentiation and the relative costs measure of comparative advantage are employed for the baseline results.

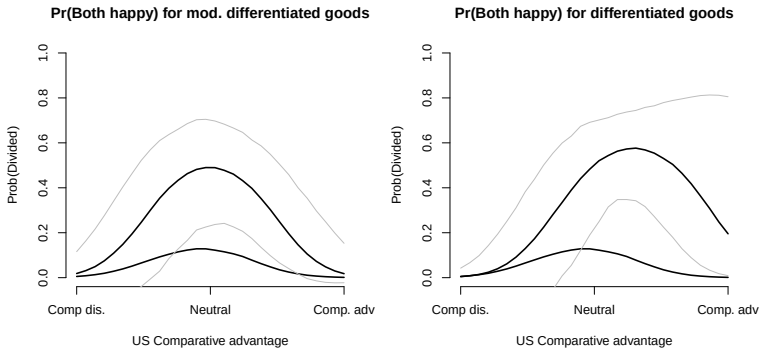

Figure 5: This figure plots predicted probabilities that both the US and trade partner industry will have supporters of trade liberalization, as a function of product differentiation and comparative advantage. The statistical model is a penalized logistic regression, in order to deal with perfect separation, and the confidence bands are bootstrapped. The plot suggests good support for Prediction 2. Note also that the predictions are holding all mediating factors (FDI, input, industry size) constant.

Alternative explanations

Figure 5 presents estimates from a statistical model which conditions on three alternative explanations for bilateral support in the same industry. The analagous figure for the baseline model without those additions looks very similar, suggesting that the mediating variables are not driving the association between product differentiation, comparative advantage, and mutual support. Note again though that this type of empirical strategy relies on strong assumptions for its validity.

The alternative explanations are of intrinsic interest themselves. For the bilateral support outcome, the patterns of significance are quite similar as with the industry divisions outcome. As before, the measure of US FDI intensity has no significant relationship with the probability of support in both industries. The measure of US industry reliance on inputs is only significant for differentiated inputs, suggesting that mutual support in both industries is at least partly driven by sourcing of differentiated inputs. Finally, US industry size is again associated with support in both countries.

The tests conducted here are one-sided, in the sense that comparable measures of South Korean or Australian industries are examined. This possibility is left for future revisions. Another possibility is that these measures might be most predictive of support in both industries where the industry is at a comparative disadvantage. For example, US FDI is only likely to provide an additional explanation for support in the US and South Korea where the US is at a comparative disadvantage. Similarly, South Korean FDI in the US might only provide an explanation for support in both countries where South Korea is at a comparative disadvantage in the production of the product.

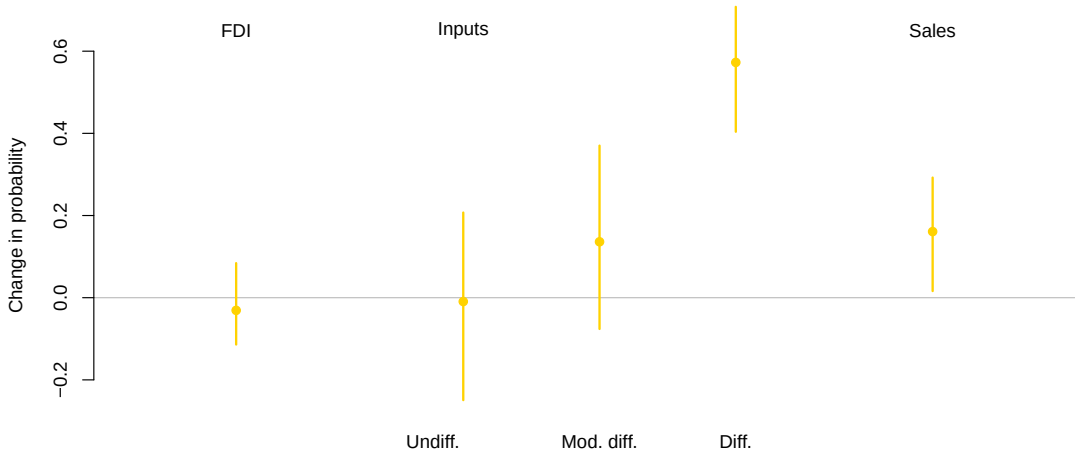

Figure 6

Conclusion

This paper presents and tests several theories of the preferences of industries, and the actors that constitute them, over trade liberalization. On the theoretical side, three arguments are of particular importance. First, the paper builds on the other work in elucidating a clear and testable set of conditions under which industries are likely to be internally divided over trade liberalization because of firm heterogeneity in export performance. These are that the industry should not be too (un)competitive relative to its foreign trade partners and that the product should be differentiated. The paper therefore builds off of the new, new trade theory in developing and testing a theory of where distributive effects within industries are likely to lead to intra-industry divisions over trade. Put another way, it brackets the microfoundations of trade politics with heterogeneous firms, which considers which firms support trade liberalization in a particular industry, and focuses on a macro implication of this theory: only some industries have the right mix of ingredients to generate divisions over trade.

Second, the paper considers in depth the role of foreign direct investment in generating divisions over trade liberalization. Industries with primarily horizontal FDI are identified as unlikely sites for these divisions because divisions rely, in theory, on a clash between non-exporting (but highly productive) producers in the foreign market and exporters in the home market (the latter of which are likely to be few in number, because horizontal FDI is generally driven by high barriers

to trade). FDI of the vertical type is a more plausible explanation for divisions but is present under a different set of conditions then the divisions predicted by the new, new trade theory. In particular, it is predicted where factor prices are sharply different and so comparative disadvantages are present. This helps to distinguish between an FDI-based story of divisions and the distributive consequences emphasized in the literature on heterogeneous firms.

Third, the paper develops an argument about the role of product differentiation in the import of foreign inputs. While variation in the extent of importing inputs among firms has long been argued to be a cause of intra-industry divisions, it is argued here that this should only be so if inputs are differentiated. Homogeneous inputs have a single market price and so all firms benefit equally when their price falls due to greater imports. Differentiated inputs are firm-specific and their benefits are more excludable. While all firms may benefit in principle from an increase in competition in the input sector, those firms which source from abroad may be best able to take advantage of new opportunities and use their now superior inputs to lower prices and increase sales, pushing firms with fewer foreign linkages out of business.

Both of these alternative explanations (that is, both FDI and reliance on foreign inputs) are areas which require both further theoretical and empirical work. On the theoretical side, the distributive consequences of trade liberalization are developed here only informally and require a complete formal treatment to be fully explored. On the empirical side, the measure of FDI used here is at a quite high level of aggregation and does not distinguish between vertical and horizontal FDI.

The paper's empirical contributions can be summarized in three points. First, three empirical implications of the new, new trade theory are derived. Product differentiation is linked to intra-industry divisions, support for bilateral trade liberalization in both countries within a single industry, and support for trade liberalization in comparative disadvantage industries. Each of these is surprising from the perspective of standard approaches to trade politics, and so merits attention to the extent it is present in the data. A new data set is collected to test each of these predictions, based on the public statements of US trade associations and firms, as well as matching data from Korean and Australian trade associations. Although the latter data are generally less rich, they are sufficient to provide some initial tests of the hypotheses. However, owing to the demanding nature of the theory being tested here, which requires considerable variation in comparative advantage across different levels of product differentiation to estimate non-linear regression functions, there is clearly a need for more data to provide the most convincing test of these arguments.

Second, the paper finds strong evidence for the contention that product differentiation is associated with each of the 'surprises' described above. There is also some evidence that these are most likely where comparative disadvantages are muted, although it is generally not as strong. In particular, intra-industry divisions are also likely in US industries at a comparative disadvantage, as long as the product is differentiated. These patterns are generally robust, in parametric statistical models, to the inclusion of the post-treatment alternative explanations described above.

Finally, the paper also examines the impact of FDI and the extent of reliance on imported inputs on intra-industry divisions. Moderately and fully differentiated inputs are fairly consistent predictors of the three surprises, while the extent of reliance on homogeneous inputs adds little as a predictor. FDI is only inconsistently associated with the three surprises.

Which industries are divided over bilateral trade liberalization? Schattschneider (1935) provided several explanations for divisions over unilateral liberalization in his seminal study of trade politics in America. The new, new trade theory suggests an extra explanation for these divisions, rooted in firm heterogeneity, when trade liberalization is bilateral or multilateral. It is argued here that these divisions rely crucially on two industry features: product differentiation and muted comparative (dis)advantages relative to their trade partners. These factors help explain the intra-industry divisions over trade which arose in the debates over AUSUS and KORUS, as well as two additional surprising features in patterns of support and opposition: many industries featured supporters of liberalization in both trade partners; and, many comparative disadvantage industries had supporters of these agreements.

Appendix A: Imputed positions

Several US industries received imputed positions for the KORUS agreement. Other vegetables (111219) was coded as favoring, although its associations were in fact divided once the CSUSTL petition is taken into account. However, the opposing groups were all Florida-based, and they appeared to team up in opposition because South Korea was permitted to maintain some significant seasonal tariffs on oranges. The US apiculture industry (112910) took no position, but is an imputed supporter. Apiculture products were largely exempted from tariff reductions on the part of South Korea. The rice milling industry opposed the agreement but is imputed as favoring the agreement, because South Korea was permitted to maintain very stringent limits on US rice imports. Finally, the footwear industry, which favored the agreement, was imputed as 'divided' because 17 specific footwear types were exempted from tariff reductions. No positions were imputed for Korean industries. No US or Australian industry positions were imputed for positions on the US-Australia Free Trade Agreement.

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