

[연구논문]

Effects of Free Trade Agreements and Market Openness on U.S. Export Diversification

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I. Introduction

According to classical international trade theories such as the Ricardian Model or the Heckscher-Ohlin Model, it is beneficial for countries to specialize in and export those goods in which they have a comparative advantage.¹⁾ By doing so, the countries may export more and ultimately grow faster. The 20th century saw how powerful export-driven growth is through the experiences of Japan, Korea, and Taiwan, among others. Yet, in the process of pursuing more exportation, countries should be careful with regard to the degree to which they specialize because specialization inevitably increases export risk. The export risk emerges in two forms: product risk and market risk.²⁾

1) Paul R. Krugman and Maurice Obstfeld. *International Economics: Theory & Policy*, 8th Edition (New York: Prentice Hall, 2009).

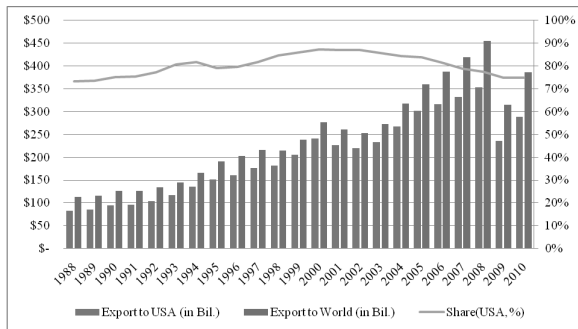
2) Christian Wilhelms, "Export Diversification in Latin America," *Intereconomics* 2

Product risk can be easily illustrated by the example of oil exporters. In countries like Lybia, Nigeria, Saudi Arabia, Iran, Venezuela, Yemen and Gabon, petroleum occupies more than three quarters of their total export value.³⁾ Whenever the price of petroleum suddenly drops, their national economies suffer greatly. Therefore, for all countries, comparative advantage might actually make them worse off—unlike what classical international economists had argued.

Another form of risk, market risk, literally means risks associated with markets (i.e. importing countries). Canada's export reliance on a single economy, the United States clearly shows detrimental effects of the market risk. As shown in Figure 1, from 1988 to 2010, more than 70% of Canada's total exports are continuously directed to the United States alone. As a result, following the 2008 Global Financial Crisis, the Canadian economy suffered more than that of the United States, the origin of the subprime mortgage crisis. From Figure 1, it can be seen that when the United States, deep in the crisis, had to reduce its imports dramatically in 2009, Canada took significant heat. Canada's total value of exports to the world was reduced by about the same magnitude as its decreased value of exports to the United States. This drastic decrease in Canadian exports led Canada's GDP to shrink as well. Whereas the real U.S. GDP shrank by 2.54% in 2009, the Canadian economy registered a shockingly bad -5.45% growth.⁴⁾

(1967): 46-48.

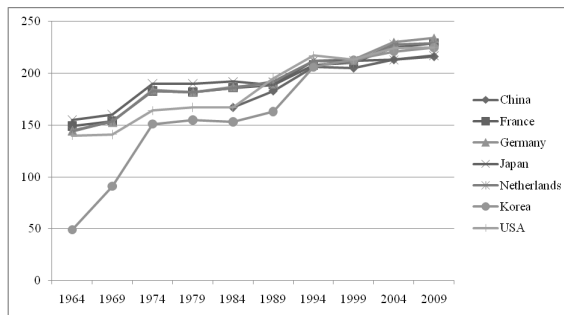
- 3) Luisito Bertinelli, Veronique Salins, and Eric Strobl. "Export Diversification and Price Uncertainty in Sub-Saharan Africa and Other Developing Countries: A Portfolio Theory Approach," *Working Paper*, Ecolé Polytechnique, Paris (2006).
- 4) My own calculations using the Penn World Table 7.0, Center for International Comparisons of Production, Income and Prices (University of Pennsylvania), <http://pwt.econ.upenn.edu/>. In calculating Canada's growth rate, I simply



Source: UN Comtrade Database (SITC Rev,3 Total)

Figure 1: Canada's Export Reliance on the U.S. Market⁵⁾ (1988-2010)

As illustrated by the above example, market risk could be just as daunting as is the product risk. However, the Figure 2 shows that the



Source: U.N, Comtrade (SITC Rev,1 Total)

Figure 2: Number of Export Markets [World's Top 7 Exporters]⁶⁾ (1964-2009)

subtracted Canada's 2008 GDP from its 2009 GDP and divided the result by its 2008 GDP, using *tcgdp* data provided by the Penn World Table 7.0 (Total PPP Converted GDP, G-K method, at current prices). The same method applies to calculating the growth rate of the United States.

5) Export values are in billion U.S. dollars.

United States has diversified its export markets relatively well and since mid-1990, has been exporting to almost all the countries in the world. Hence, this paper focuses only on the product side of the story.

Raul Prebisch and Hans Singer in 1950 warned of the detrimental effects of trade shocks in countries that depend on a few products for their export earnings. Similarly, Murray C. Kemp and Nissan Liviatan, Roy Ruffin, Ravi Batra, and James E. Anderson and John G. Riley have all pointed out that basic implications of international trade theory, such as comparative advantage and H-O theory, may no longer be valid when considered within the context of uncertainty and risk aversion.⁷⁾ This has led scholars to devise export diversification strategies that help countries make their export earnings less volatile to external shocks. Manuel R. Agosin argued that the greater the degree of export diversification, the less volatile will be export earnings.⁸⁾ In turn, less volatile exports are associated with lower variances of GDP growth. Thus, export diversification is highly desirable.

Yet, most economists—even American ones as well—study export

6) WTO Press Release, “Trade growth to ease in 2011 but despite 2010 record surge, crisis hangover persists.” 2011 (2011. 11. 22: http://www.wto.org/english/news_e/pres11_e/pr628_e.htm). According to the press release, the seven largest exporters as of 2010 are China, Germany, United States, Japan, France, Netherlands, and Korea.

7) Murray C. Kemp and Nissan Liviatan. “Production and Trade Patterns under Uncertainty,” *Economic Record* 49 (1973): 215-227; Ruffin, Roy. “International Trade under Uncertainty,” *Journal of International Economics* 4 (1974): 243-259; Batra, Ravi. “Production Uncertainty and the Heckscher-Ohlin Theorem,” *Review of Economic Studies* 69 (1975): 259-268; Anderson, James E., and John G. Riley. “International Trade with Fluctuating Prices,” *International Economic Review* 17 (1976): 76-97.

8) Manuel R. Agosin, “Export Diversification and Growth in Emerging Economies,” *Working Paper* (no. 233), Universidad de Chile (2007).

diversification of developing countries only and not of the wealthy United States. In particular, besides NAFTA, not many literatures exist on effects of the U.S. FTAs on its export diversification. Moreover, even when the scholars do study NAFTA, empirical evidence on the effects of FTAs on export diversification is, at best, mixed. Russell Hillberry and Christine McDaniel claim that NAFTA resulted in a large extensive margin in post-NAFTA trade growth.⁹⁾ On the other hand, Styliani Christodouloupoulou and Pushan Dutt, Ilian Mihov and Timothy Van Zandt argue that the intensive margin grew much more due to FTAs.¹⁰⁾

Currently, the U.S. has FTA in force with 17 countries. In 2009, the US export to FTA partners represented 40% of total US export, and the import to these countries represented 30% of US import—and the shares are on the rise.¹¹⁾ In addition, the growth in US exports to its FTA partners from 2009 to 2010 has been 23%, which is larger than exports to the rest of the world that grew by 20%.¹²⁾ As

9) Russel Hillberry and Christine McDaniel. “A Decomposition of North American Trade Growth Since NAFTA,” *International Economic Review*, USITC Publication 3527 (2002): 1-6.

10) Styliani Christodouloupoulou, “The Effects of Multilateral Trade Liberalization on the Extensive and the Intensive Margins of Trade,” *Munich Personal RePEc Archive Working Paper* No. 29169 (2010); Dutt, Pushan, Ilian Mihov and Timothy Van Zandt. “Does WTO Matter for the Extensive and the Intensive Margins of Trade?” unpublished thesis, INSEAD (2011).

Extensive margins and intensive margins are indices employed by trade economists to indicate the degree of export diversification. The intensive margin measures if a country is exporting larger quantities of each good while the extensive margin considers if the country is exporting a wider set of goods.

11) My own calculation using UN Comtrade Database (SITC Rev.3 Total).

12) Office of the United States Trade Representative. “U.S. Free Trade Agreements.” 2011. (2011. 11. 21: <http://export.gov/FTA/index.asp>).

the WTO Doha Development Agenda negotiations have been stalled, the United States focuses more heavily on bilateral or regional trade arrangements. This trend makes it relevant and timely to discuss the effects of FTAs on the U.S. export diversification.

Another point of interest is trade openness with respect to U.S. partner countries. In WTO DDA negotiations and other bilateral or regional trade arrangement negotiations, the U.S. is well known for urging its trade partners to open up more. Therefore, this paper also tries to see if the U.S. has a valid reason to do so.

The purpose of this paper is thus three-fold. It aims to conduct a comprehensive study on the effects of U.S. FTAs on U.S. export diversification. Another objective is to analyze how trade openness of its partner countries affects U.S. export diversification. Lastly, the paper concludes by suggesting some policy implications.

The rest of this paper will be addressed as follows: Section II discusses ways to measure export diversification such as the widely used Herfindahl-Hirschman Index and methodology to decompose exports into intensive and extensive margins. In addition, equations for gravity model estimations are provided. Section III introduces data used in the paper. Data are mainly retrieved from three sources: UN Comtrade Database, Penn World Tables and International Trade Data. Section IV is devoted to analyzing the calculated margins and empirical results. Lastly, section V concludes the paper.

II. Methodology

1. Herfindahl-Hirschman Index

In order to measure export diversification, the paper employs a number of methods such as measuring the degree to which exports are concentrated, counting categories exported, and weighting categories of goods by their overall importance in exports to a given country.

Firstly, the widely used Herfindahl-Hirschman Index, which measures export concentration, is used to estimate the degree of U.S. export diversification. The equation is as follows:

$$1) HHI_i = \sum_j (S_{ij})^2$$

In the paper, S_{ij} is the share of j th commodity in the U.S. export to its FTA partner i in a given year. In the original HHI which ranges from 0 to 1; 0 means perfect diversification while 1 stands for perfect concentration. In this paper, I subtracted the resulting HHI from 1 so that as the number approaches 1, it would mean a higher degree of diversification.

2. Number of U.S. Export Goods

As another measure of export diversification, the number of U.S. export products to each FTA partner country is also used. An increase in the number of products may be interpreted as an increase in diversification and vice versa. However, simply counting the numbers does not take into account each product's share. Therefore, I do not expect the number of products to be a highly precise

measure. It nevertheless carries some value as it is always readily available and thus easy to apply.

3. Intensive and Extensive Margins

As briefly mentioned above, the Herfindahl-Hirschman Index only allows for a rough estimation of concentration at best; similarly, simply counting the number of products does not take into account volume. To solve these problems, David Hummels and Peter J. Klenow's intensive and extensive margins of trade have also been used.¹³⁾ Hummels and Klenow's intensive and extensive margins are calculated as follows:

$$2) \textit{ ExtensiveMargin} = \frac{\sum_{i \in I_j} V_{wi}}{\sum_{i \in I} V_{wi}}$$

$$3) \textit{ IntensiveMargin} = \frac{\sum_{i \in I_j} V_{ji}}{\sum_{i \in I_j} V_{wi}}$$

i stands for a product and I denotes the total product basket. j is a U.S. FTA partner country at concern and w is the world. Therefore, V_{wi} stands for value of the U.S. exports in commodity i to the world. Similarly, V_{ji} is the value of the U.S. exports in commodity i to its FTA partner country j .

The intensive margin measures if the United States is exporting larger quantities of each good while the extensive margin considers if the United States is exporting a wider set of goods. For this paper's purpose of measuring export diversification, the extensive margin is

13) David Hummels and Peter J. Klenow. "The Variety and Quality of a Nation's Exports," *American Economic Review* 95(3) (2005): 704-723.

more relevant.

4. Gravity Model

The paper employs a slightly modified gravity model to estimate effects of FTAs and partner countries' trade openness on U.S. export diversification. The modified gravity estimation models are as follows:

$$4) HHI_{ij} = a + b \cdot \ln(GDP)_j + c \cdot \ln(population)_j + d \cdot (openness)_j + e \cdot \ln(distance)_{ij} + f \cdot \text{dum}(language)_{ij} + g \cdot \text{dum}(FTA)_{ij}$$

$$5) \ln(PN)_{ij} = a + b \cdot \ln(GDP)_j + c \cdot \ln(population)_j + d \cdot (openness)_j + e \cdot \ln(distance)_{ij} + f \cdot \text{dum}(language)_{ij} + g \cdot \text{dum}(FTA)_{ij}$$

$$6) EM_{ij} = a + b \cdot \ln(GDP)_j + c \cdot \ln(population)_j + d \cdot (openness)_j + e \cdot \ln(distance)_{ij} + f \cdot \text{dum}(language)_{ij} + g \cdot \text{dum}(FTA)_{ij}$$

$$7) IM_{ij} = a + b \cdot \ln(GDP)_j + c \cdot \ln(population)_j + d \cdot (openness)_j + e \cdot \ln(distance)_{ij} + f \cdot \text{dum}(language)_{ij} + g \cdot \text{dum}(FTA)_{ij}$$

III. Data

In constructing the Herfindahl-Herschman Index as well as Hummels and Klenow's intensive and extensive margins, the UN Comtrade Database is used. The classification code is SITC Revision 2. Highly disaggregated 5-digit data is used for more accuracy. Years covered are from 1981 to 2009. The reporter is the United States and its partners are 17 countries with which the U.S. has FTAs in force. For the number of U.S. export products to each partner

country, I simply counted the 5-digit data from 1981 to 2009.

Traditional gravity model variables such as distance and common language data are retrieved from International Trade Data website created by Professor Jon Haveman of Macalester College. GDP, population and trade openness data are taken from the Penn World Table version 7.0.

Lastly, the FTA dummies are created using data from the USTR website. Table 1 describes variables and Table 2 summarizes FTAs of the United States.

Table 1. Variable Descriptions

Dependent Variable	Description	Source
Herfindahl–Hirschman Index	Approaching 1 means more diversified	UN Comtrade
Number of Products	Simple Counting of Export Goods	UN Comtrade
Intensive Margin	IM x EM = share of the country in	UN Comtrade
Extensive Margin	total U.S. exports in a given year	UN Comtrade
Independent Variable		
GDP	PPP GDP at current price (logged)	Penn World Table
Population	Population (logged)	Penn World Table
Distance	Great Circle distance between capitals	Int'l Trade Data
Language	1 if English speaking, 0 otherwise	Int'l Trade Data
Openness	(Export + Import) / GDP	Penn World Table
FTA	1 if FTA in force, 0 otherwise	USTR

Table 2. U.S. Free Trade Agreements at a Glance

FTA Partner	Status of Negotiation
DR-CAFTA(Dominican Republic, Honduras, Costa Rica, El Salvador, Guatemala, and Nicaragua)	Mar 1, 2006 entry into force
NAFTA (Canada, Mexico)	Jan 1, 1994 entry into force
Australia	Jan 1, 2005 entry into force
Bahrain	Aug 1, 2006 entry into force
Chile	Jan 1, 2004 entry into force
Israel	Aug 19, 1985 entry into force
Jordan	Dec 17, 2001 entry into force
Morocco	Jan 1, 2006 entry into force
Singapore	Jan 1, 2004 entry into force
Oman	Jan 1, 2009 entry into force
Peru	Feb 1, 2009 entry into force
South Korea	Jun 30, 2007 signed (Jan 1, 2012 entry into force expected)
Panama	Jun 28, 2007 signed
Columbia	Nov 22, 2006 signed

Source: USTR (Office of the United States Trade Representative) Resource Center on Free Trade Agreements (<http://www.ustr.gov/trade-agreements/free-trade-agreements>)

IV. Empirical Results

Table 3 summarizes panel estimation results featuring four models using the equations 4), 5), 6) and 7). Coefficients and p-values are reported for each independent variables listed on the left-hand side. The four models feature four different dependent variables: HHI of the United States to each of the 17 FTA partners, number of products U.S. exports to each of the 17 FTA partners, U.S. intensive

margins to each of the 17 FTA partners and U.S. extensive margins to each of the 17 FTA partners respectively.

Table 3: Regression Results(OLS)

<i>Dependent Variable</i> →	1. HHI		2. ln(PN)		3. IM		4. EM	
<i>Independent Variables</i> ↓	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
C	0.9590	0.000***	5.5939	0.000***	0.1900	0.000***	0.4646	0.000***
ln(GDP)	0.0027	0.434	0.3621	0.000***	0.0203	0.000***	0.1017	0.000***
ln(POP)	0.00745	0.040**	-0.1504	0.000***	-0.0096	0.000***	-0.0340	0.000***
OPEN	0.0000	0.550	0.0015	0.000***	0.0000	0.811	0.0004	0.000***
ln(DIST)	-0.0102	0.000***	-0.1923	0.000***	-0.036	0.000***	-0.0515	0.000***
dum(LANG)	0.0123	0.125	-0.2486	0.002***	0.0332	0.000***	-0.0547	0.005***
dum(FTA)	-0.0239	0.000***	-0.1046	0.068*	0.0069	0.028**	-0.0389	0.005***
Obs.	493		493		493		493	
R²	0.138		0.421		0.780		0.521	

Note: *, **, *** stand for significance at 10%, 5% and 1% level respectively.

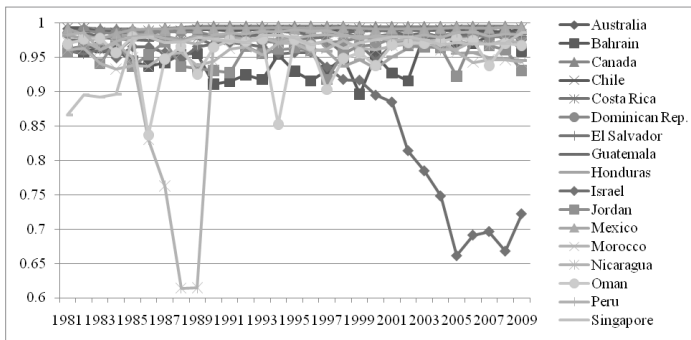
HHI: Herfindahl-Herschman Index

PN: Number of products U.S. exports to each partner country

IM & EM: Hummels and Klenow's Intensive Margins and Extensive Margins respectively

The first model has HHI as the dependent variable. To a market with greater population, thus more potential buyers, U.S. HHI is higher, meaning more diversified exports. The farther away a market is from the United States, the lower the U.S. HHI becomes. Distance is associated with transportation costs. Thus, this result intuitively makes sense. Besides from the two variables, population and distance, what is noticeable from the first model is that some of the traditional gravity model variables such as GDP and language turn out to be insignificant. This result suggests that the Herfindahl-Herschman Index

is not a good measure of U.S. export diversification. Figure 3 demonstrates why HHI is not a good measure. As apparent in Figure 3, U.S. HHIs to the FTA partner countries other than Nicaragua and Israel over the years do not fluctuate much and stay between 0.95 and 1. Since the numbers are so similar with one another for distinctively different countries, measuring export diversification through HHI is of low value. Interestingly, FTA dummy¹⁴⁾ is significant and negatively affects HHI, meaning striking free trade deals actually made U.S. exports to its FTA partner countries less diversified. This is because of the strong outlier Israel, to which U.S. HHI steadily declined after the two countries struck an FTA deal.



Source: My own calculation using UN Comtrade Database (SITC Rev.2 5-digit)¹⁵⁾

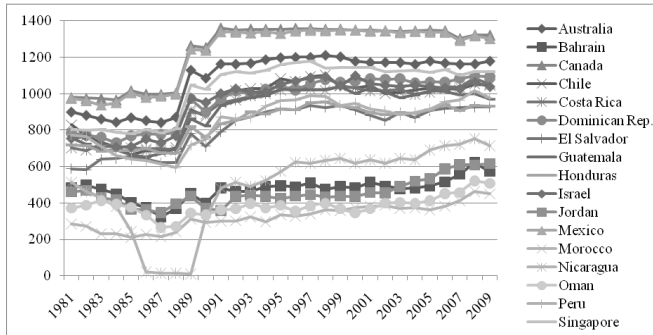
Figure 3. HHI of US Export to 17 FTA Partners (1981-2009)

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- 14) A dummy variable takes the values 0 or 1 to indicate the absence or presence of some categorical effect that may be expected to shift the outcome. In this particular thesis, the FTA dummy variable is inserted to see if entering into a free trade agreement increases the U.S. intensive and extensive margins or not.
 - 15) I set the U.S. as the reporter and 17 countries with which the U.S. has FTAs in force as partners. I calculated Herfindahl-Hirschman Indices of the United States to each partner country from 1981 to 2009.

The second model estimates effects on the number of products. Here, all of the traditional gravity model variables are statistically significant. From Figure 4 below, it can be seen that the number of products exported is actually a much better measure than the Herfindahl-Hirschman Indices. Unlike the HHIs that are all concentrated between 0.95 and 1, product numbers effectively help distinguish groups of countries as the distributions range from around 200 to nearly 1,400 categories of goods. While this approach is still not perfect, it enables one to separate countries into a few groups based on similar characteristics. For example, Mexico and Canada are at the top of the graph. As NAFTA members, Mexico and Canada inevitably share similar characteristics. Next in line are Australia and Singapore. They also share similar development status and similar distances from the United States.

This paper's primary concerned variables, trade openness of importing countries and FTA dummy are also significant. Not surprisingly, the more open a trade partner of the U.S. is, the larger the number of U.S. export categories. As mentioned above, simple product counts do not take into account trade value. Counting categories exported nevertheless still carries some value, as an increase in the number of categories is a positive phenomenon for an exporter under almost any circumstance. The FTA dummy in this case in fact decreases the number of products the U.S. exports. This result is in line with the first model whose result shows that striking free trade deals actually makes U.S. exports less diversified to its FTA partner countries. From coefficients on openness and the FTA dummy, it can be inferred that an FTA's negative impact is much

stronger than the positive effects of openness on U.S. product counts. However, it should be noted that the FTA dummy in the second model is only marginally significant at the 10% level.



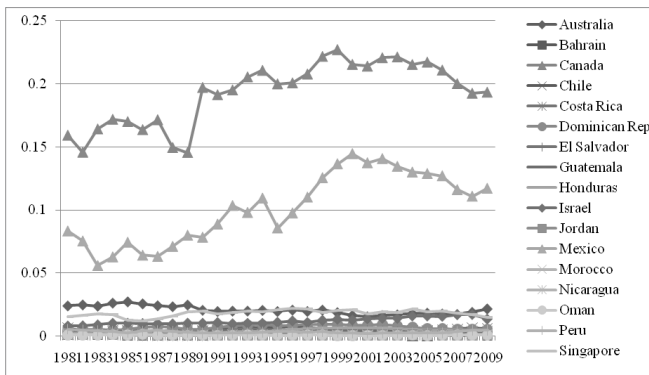
Source: My own calculation using UN Comtrade Database (SITC Rev.2 5-digit)¹⁶

Figure 4. Number of US Export Products to 17 FTA Partners (1981-2009)

The third model estimates effects on U.S. intensive margins, which measure if the U.S. exports larger quantities of each good or not. While all the traditional gravity model variables are significant, openness in this model is no longer statistically meaningful. This means that if the United States aims to expand its exports along the intensive margin, urging its trade partners to open their markets is of no use. Rather, through bilateral or regional trade arrangements, the U.S. may expect to be able to export larger quantities of each good to its FTA partners. Figure 5 plots U.S. intensive margins to 17 FTA partners from 1981 to 2009. Except to NAFTA partners, Canada and Mexico, U.S. intensive margins to the 15 markets are extremely

16) *Ibid.* I counted the number of products the U.S. exported to each FTA partner.

small. Besides proximity and shared border, the fact that NAFTA is a relatively old agreement may have something to do with the higher intensive margins. A large intensive margin growth is also observed in post-NAFTA years. This result reaffirms the findings of Christodouloupoulou and Dutt, Mihov and Zandt.¹⁷⁾ As can be seen in Figure 5, U.S. intensive margins to non-NAFTA countries were very small in 1981 and have not changed much since. This suggests that NAFTA is a very strong outlier causing the FTA dummy to be statistically significant on U.S. intensive margins. Other FTAs of the United States are comparatively new and thus may not have been in effect long enough to influence the intensive margins yet. Another possible explanation is that most recent FTA partners are small, developing countries with which U.S. trade value stays quite minimal.



Source: My own calculation using UN Comtrade Database (SITC Rev.2 5-digit)¹⁸⁾

Figure 5. Intensive Margin of US Exports to 17 FTA Partners (1981-2009)

17) Christodouloupoulou. “Multilateral Trade Liberalization” (2010); and Dutt, Mihov and Zandt. “Does WTO Matter?” (2011).

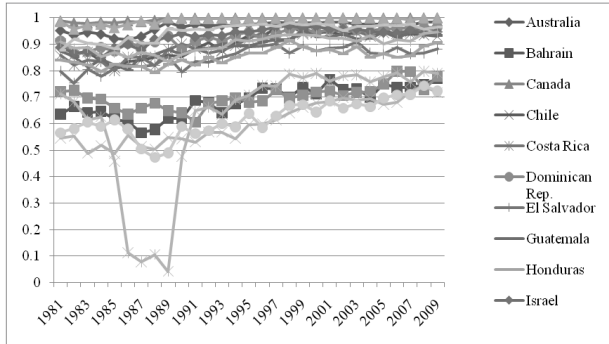
18) I set the U.S. as the reporter and 17 countries with which the U.S. has FTAs in

The last model estimates effects on U.S. extensive margins, which measure if the U.S. exports a wide set of goods or not. In this model, all the variables turn out to be statistically significant at 1% level. Trade openness of partner countries is now positive and significant. This means that if the United States aims to expand its exports along the extensive margin, which in turn is thought to reduce export volatility, the United States should continue to persuade its trade partners to open their markets more. Unfortunately, while still statistically meaningful, the sign on FTA dummy switches to negative in the fourth model. That is, FTAs of the United States in fact make the U.S. export a smaller set of goods than before.

Figure 6 plots U.S. extensive margins to 17 FTA partners from 1981 to 2009. Except for some small and developing economies such as Nicaragua, Jordan, Bahrain, Oman and Morocco, U.S. extensive margins are in general above 0.8. This means that of all the goods that the U.S. exports to the world, U.S. exports destined to many of its FTA partners cover more than 80% of the total varieties. Since the U.S. extensive margins to many of its FTA partners are already close to 1, there is not much room to improve extensive margin to these countries. Instead, the U.S. potentially could expand exports along the extensive margin to the small, developing countries listed above. Coincidentally, some of these developing countries like Jordan and Bahrain have relatively high trade openness at 124.2% and 162% respectively as reported in Table 4. This partially explains why openness is positively correlated with extensive margin whereas FTA

force as partners. Years are from 1981 to 2009. Then, I calculated the intensive margins using the Hummels-Klenow's method.

has rather negative effects on extensive margin.



Source: My own calculation using UN Comtrade Database (SITC Rev.2 5-digit)¹⁹⁾

Figure 6. Extensive Margin of US Exports to 17 FTA Partners (1981-2009)

Table 4. Trade Openness of 17 U.S. FTA Partners (Average of 1981-2009)

Country	Openness	Country	Openness
Australia	37.0%	Israel	72.8%
Bahrain	162.0%	Jordan	124.2%
Canada	64.3%	Mexico	47.6%
Chile	60.1%	Morocco	59.1%
Costa Rica	81.5%	Nicaragua	60.5%
Dominican Rep.	80.9%	Oman	82.1%
El Salvador	58.3%	Peru	36.8%
Guatemala	59.9%	Singapore	366.3%
Honduras	102.3%		

Source: Penn World Table Ver 7.0²⁰⁾

19) *Ibid.* Here, instead of the intensive margins, I calculated for the extensive margins.

20) From Penn World Table Ver 7.0, I downloaded Openness at Current Prices (%) data for the 17 countries from 1981 to 2009 and calculated the simple average

V. Policy Implications and Conclusion

Classical trade theories may no longer be applicable when considered within the context of risk and uncertainty inherent in the international market. This realization has led economists to devise export diversification strategies. Most empirical studies on export diversification, however, have largely ignored wealthy countries such as the United States. With the DDA negotiations in a deadlock, FTAs are flourishing and the U.S. is no exception, as it has FTAs in force with 17 countries. At the same time, the U.S. always emphasizes the importance of opening up markets at trade negotiating tables. Thus, analyzing the effects of openness and FTAs on U.S. export diversification is the main focus of this paper.

In this paper, I decomposed the U.S. exports into intensive and extensive margins to analyze the extent to which the U.S. exports more of each product (the intensive margin) and exports more varieties (the extensive margin). Using trade data between the United States and 17 FTA partners from 1981 to 2009, I found that the openness of a partner country has no influence over U.S. intensive margins, but it does increase U.S. extensive margins. On the other hand, FTAs increase the U.S. intensive margins, but decrease the U.S. extensive margins.

My estimates imply that if the United States is more concerned with export risk management, which is often carried out by increasing the extensive margins, the U.S. should continue to push for more liberalization and openness of its trade partners. This

openness for each country.

argument is in line with Hummels and Klenow and Simon J. Evenett and Anthony J. Venables who claim that countries with more export items not only reduce risks, but also export more.²¹⁾

However, my empirical results also suggest that openness has no impact on U.S. intensive margins while FTAs in fact increase the intensive margins. Scholars such as Tibor Besedes and Thomas J. Prusa, Gabriel J. Felbermayr and Wilhelm Kohler, Jonathan Eaton et al., Elhanan Helpman et al., and Mary Amiti and Caroline Freund argue that majority of export growth is due to exporting more of the same products (i.e. intensive margin is more important for overall export growth).²²⁾ If the U.S. follows their argument, then the openness of a partner country is not as important as whether the U.S. has a free trade agreement with the country or not. John T. Cuddington et al. point out this inherent dilemma of the tradeoff between the greater returns due to specialization and greater exposure to shocks on the world market.²³⁾

21) Hummels and Klenow, "Variety and Quality"; Evenett, Simon J., and Anthony J. Venables. "Export Growth in Developing Countries: Market Entry and Bilateral Trade Flows," *working paper*, University of Bern (2002).

22) Tibor Besedes and Thomas J. Prusa. "The Role of Extensive and Intensive Margins and Export Growth," *Working Paper* 13628, The National Bureau of Economic Research (2007); Felbermayr, Gabriel J., and Wilhelm Kohler. "Exploring the Intensive and Extensive Margins of World Trade," *Review of World Economics* 142.4 (2006): 642-674; Eaton, Jonathan, Marcela Eslava, Maurice Kugler, and James R. Tybout. "The Margins of Entry into Export Markets: Evidence from Colombia," in *The Organization of Firms in a Global Economy*, ed. E. Helpman, D. Marin, and T. Verdier (Cambridge, MA: Harvard University Press, 2008): 231-272; Helpman, Elhanan, Marc Melitz, and Yona Rubinstein. "Estimating Trade Flows: Trading Partners and Trading Volumes," *Quarterly Journal of Economics* 123.2 (2008); Amiti, Mary, and Caroline Freund. "The Anatomy of China's Export Growth," *Working Paper* (Policy Series 4628), World Bank, (2008).

Since the United States has a well-established economy and exports in a large number of categories to almost all the markets in the world, risk management may not be a big concern for the United States. This explains why most economists largely excluded the U.S. in their empirical analyses on export diversification. Simply put, the United States is not as desperate as small and poor economies to diversify its exports. In that case, what matters more is increasing the absolute value of exports, which can be attained through increasing the intensive margin.

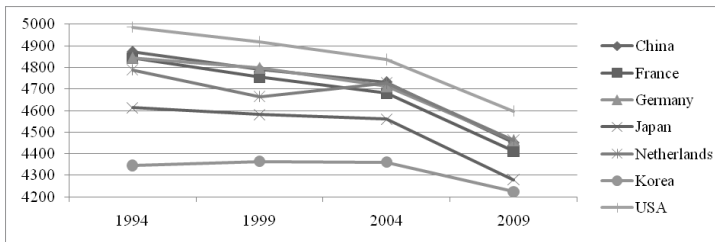
In fact, Jean M. Imbs and Romain Wacziarg came up with a theory that a country diversifies production in the initial stage of development, but once it reaches a certain per capita income, incentives to specialize take over.²⁴⁾ They estimate the income level to be around \$16,000 GDP per capita. Apparently, the United States has crossed that turning point and is at the specialization phase. According to Figure 7 below, all of the major exporting countries are decreasing the number of products and specializing. A point of importance is that while these countries specialize, their export value increased rapidly. Moreover, although these countries seem to be decreasing the number of varieties, they still rank well above most nations in the world in terms of variety. The United States in particular ranks at the top of the world's major exporters in terms of variety with around 4,600 products in 2009. This means the United

23) John T. Cuddington, Hong Liang, and Shihua Lu, "Uncertainty, Trade, and Capital Flows in Sub-Saharan Africa," *Journal of African Economics* 5.3 (1996): 192-224.

24) Jean M. Imbs and Romain Wacziarg. "Stages of Diversification," *American Economic Review*, 93.1 (2003): 63-86.

States would be the least likely among the seven largest exporters to be adversely affected by external shocks from intensively exporting more of a small number of commodities.

All this leads to a conclusion that exporting more of each good (i.e., specialization rather than diversification) is not bad after all for the United States. Rather, it is necessary to expand U.S. exports. Hence, the United States ought to keep up with its pursuit of FTAs, which increase the U.S. exports at the intensive margin. The recent focus on Trans Pacific Partnership is very desirable in this regard. Similarly, the long-awaited FTAs with Korea, Panama and Colombia should enter into force as soon as possible in order for the U.S. exporters to export more in absolute terms.



Source: My own calculation using UN Comtrade Database (HS 1992 6-digit)²⁵⁾

Figure 7. Number of Export Products of the World's Top 7 Exporters (1981-2009)

25) I set the seven top exporters as reporters and the world as the partner. I counted the number of export products from each of the top 7 countries to the world from 1981 to 2009.

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Internet Resources

Bank of Korea (<http://bok.or.kr>)

International Monetary Fund (<http://www.imf.org>)

International Trade Data, Website of Jon Haveman, Professor at Macalester College (<http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/TradeData.html>)

Office of the United States Trade Representative (<http://www.ustr.gov/>)
Penn World Table Version 7.0, Center for International Comparisons of
Production, Income and Prices at the University of Pennsylvania
(<http://pwt.econ.upenn.edu/>)
United Nations Commodity Trade Statistics Database (<http://comtrade.un.org>)
World Trade Organization (<http://www.wto.org>)

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Abstract

Effects of Free Trade Agreements and Market Openness on U.S. Export Diversification

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Classical international trade theories emphasize comparative advantages that arise from specialization without taking into account the fact that specialization exposes the exporting country to product risk and market risk. Therefore, in the second half of the 20th century, economists have studied diversification strategies to manage export risk. However, there has been almost no empirical study on the U.S. export diversification. At the same time, preferential trade arrangements are flourishing with the Doha round in a stalemate. This paper thus tries to examine the relationships between FTAs as well as trade openness on export diversification of the United States.

Employing Hummels and Klenow's intensive and extensive margins, proxies for degrees of export specialization and diversification, my empirical study suggests that trade openness of export partners increase the U.S. extensive margins while entering into FTAs increases the U.S. intensive margins. Extensive margins are often associated with export risk management while intensive margins tend to be regarded as increasing the total export value. This suggests that the U.S., just like any other country in the world, also faces an inherent tradeoff between greater returns due to specialization and greater exposure to shocks from the world market.

The United States nevertheless remains in a strong position that allows it not to worry about export risks because it is currently exporting the largest number of categories among the world's top 7 exporters to almost all the export markets in the world. Hence, the United States would be far better off by keeping up with its pursuit of FTAs rather than trying to urge its

partners to open up more. Doing so would definitely help the U.S. increase its exports in absolute amount.

Key Words

Export Diversification, Trade Openness, FTA, Extensive Margin, Intensive Margin