ABSTRACT

ZHANG, SIQI. Essays on Organic Trade and Auto Finance. (Under the direction of Dr. Kathryn A. Boys).

This dissertation is composed of three essays that explore the demand for low-documentation auto loans in China, and the impacts of Organic Equivalency Agreements (OEAs) on the international trade flows of agri-food products. Chapter 1 investigates consumers' willingness to pay (in terms of down-payment) for low-documentation auto loans in China. In China, the "low-documentation" auto loans may be offered if consumers choose a smaller loan size, which require limited documentation of a consumer's income, liquidity, or other evidence they are able to repay the loan. In this analysis, a mixed logit model is estimated using transaction-level data from a Chinese automobile loan company from November 2014 through April 2017. This analysis makes use of a unique dataset from a major non-bank financial institution authorized by the State Commerce Department to run a country-wide business of financial leasing. Results indicate that, on average, consumers are willing to pay 43.7% of the car price (including tax and insurance) as a down payment to get a low-documentation loan. Additionally, the preference for low-documentation loans is found to be significantly higher for elderly, higher income, and single or divorced borrowers. These results suggest that informal financial institutions as a fast-growing and integral part of financial system in China should improve lending schemes and facilitate the loan originations for demographic groups (elderly and single or divorced consumers) who are particularly vulnerable to credit constraints.

Chapter 2 investigates the effects of Organic Equivalency Agreements (OEAs) on the imports of organic agricultural products into the United States (U.S.) and Denmark using trade flow data from 2011-2016. OEAs are policies under which countries with organic standards confirm that another country's organic standard and oversight of their organic food production

system are sufficiently similar as to be “equivalent” to their own. The BLP method (Berry, Levinsohn, and Pakes, 1995) is used to estimate market share elasticities with respect to the establishment of OEAs. These elasticities are then used to predict the value of exports between a new OEA signatory with Demark or the U.S.. The results indicate that both the current and potential OEAs have a positive effect on the value of exports and market share for most countries exporting to these two markets. The sensitivity of the remaining exporting countries to the reduction of trade costs from a newly established OEA depends on the extent to which the organic agricultural products sold by these competitive exporting countries are close substitutes. These findings offer new and offer unique insights into the broader and indirect impacts an importer’s decision to enter a unilateral or bilateral trade agreement can have on countries not-party to the agreement.

Chapter 3 examines the impact of Organic Equivalency Agreements (OEAs) on agri-food imports and exports of the U.S. and Canada at highly disaggregated product categories over the period 2007-2019. The empirical analysis is implemented through gravity models using different econometric methods. We find positive and significant effects of OEAs on the U.S. and Canada imports and exports of agri-food products from both the Ordinary Least Square (OLS) estimator and the Poisson pseudo-maximum-likelihood (PPML) estimator. The results show that the OEAs have positive effects on the U.S. and Canada non-organic (or organic but not tracked) agri-food imports, and the organic exports would be considerably higher than non-organic (or organic but not tracked) exports under the establishment of OEAs. These findings offer novel and important insights into the U.S. and Canada current trade patterns of organic agri-food products, potential development of OEAs, and future organic policy opportunities.

Essays on Organic Trade and Auto Finance

by
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DEDICATION

To my parents, Yunxia Zou and Heming Zhang, who love me and accompany me on this long trip;

To my best friend, Yiming Lin, who would love to see me as frequently as she could;

To Ye Hong, who is my friend of ten years and cares about my personal life;

To Weiwei Fan, who is my friend of twenty years and my spirit leader in my life-time;

To my advisor Prof. Boys, for wholeheartedly leading me to the job market and preparing me for my academic career;

And to my beloved Yunlei Zhang, who walks into my life in a blaze of light, pulls me out of darkness, and lights up my life.

BIOGRAPHY

Siqi Zhang was born in Anhui Province, China. She received the Bachelor of Economics from the University of International Business and Economics, and she earned a Master of Science in Economics at University of Illinois at Urbana-Champaign. Siqi entered the Ph.D. program in economics at North Carolina State University in 2015. Her primary area of research is international trade and agricultural economics. In the Spring of 2021, Siqi will join the faculty in the Department of Economics at Huazhong University of Science and Technology.

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1.1 Introduction

Traditional financial institutions play a decisive role in Chinese credit markets. However, the inability of these firms to meet the diverse demands of households and firms causes credit constraints (Li et al., 2011). In China, the government-supported and state-owned financial institutions are reluctant to serve the poor due to the lack of collateral (Li et al., 2011; Turvey et al., 2010) and due to the lack of guarantors (Yuan and Xu, 2015). In addition, traditional Chinese financial institutions have fewer incentives to make loans to private firms (Poncet et al., 2010; Cong et al., 2019), smaller firms (Chan et al., 2012), and firms whose CEOs are not appointed by the government (Cull et al., 2015). Rui and Xi (2010) find that 71% of rural households in China have credit constraints, and that these credit constraints result in a loss in both rural household's income (12-13%) and their consumption expenditures (15-16%).[1]

Households and firms who cannot obtain credit from the formal credit market are more likely to demand loans from the informal credit market. In China, informal credit refers to loans secured from friends and relatives, and loans from private lending and borrowing organizations (PLBs) such as moneylenders, pawnbrokers, and usurers (Li et al., 2011). Han (2004) finds that 50-60% of rural households in China finance their consumption and production from the informal credit market. Turvey et al. (2010) find that farmers with less farmland and who are more reliant

[1]Rui and Xi (2010) define the household with credit constraints as the one who is not able to obtain the desired amount of credit due to financial regulations, adverse selection, and market monopoly in Chinese rural credit markets.

on farm income have a higher probability of borrowing from friends and relatives.

Few studies have investigated the loans from PLBs and whether these loans impact consumers with credit constraints. This study aims to improve understanding of credit constrained Chinese consumers' behavior in the market for automobile loans. In this analysis transaction-level data from a Chinese private loan company is used to explore how consumers' preference for characteristics of loan products such as interest rate, term, and down payment varies with consumers' demographic characteristics such as family income, age, and marital status. Findings of this study improves understanding of the demographic groups who are particularly vulnerable to credit constraints and sheds light on the development of the informal credit market and reform of the formal credit market. Findings from this study offer useful and specific insights regarding the nature of these credit constraints and will be useful to interested policymakers or banking industry officials who wish to address the limitations in informal credit market.

In 2017, Chinese automobile loans reached 1,160 billion RMB (approximately 165 billion USD), where traditional financing institutions accounted for 53.96%, and PLBs accounted for 33.03% (Zhongshang Industry Research Institute Report, 2018).[2] Nearly one-third of consumers sourced credit from private financing companies, and on average, consumers borrowed 58,000 RMB (approximately 8,247 USD) from PLBs to finance automobiles in 2017. In total, 8.94 million automobile loans were made to the Chinese consumers by private lending and borrowing organizations.

The data come from Anhui Wanxin Financial Leasing Co., Ltd (Wanxin Leasing hereafter)[3], an automobile loan company in China founded in February 2014. With a registered capital of 500 million RMB (approximately 71 million USD), this auto loan company is a major non-bank financial institution authorized by the State Commerce Department to run a country-wide business of financial leasing. Financial leasing refers to a way of financing whereby a licensed leasing company (the "lessor") purchases an asset on behalf of its customer (the "lessee") and maintains the

[2]The remaining 13.01 percent of the Chinese automobile financial market consists of Internet Financing and Insurance companies.

[3]The company's website can be found in wanxinleasing.com, the headquarter locates in Hefei city, Anhui Province.

ownership of the asset; as a result, the lessee enjoys the use of the asset during the lease agreement and repays the loan size with interest every month, usually accompanied by an option to buy the asset at the end of the lease agreement.[4] Up till now, the number of domestic financing and leasing firms authorized by the Chinese government amounted to 397 by the end of June 2019.[5] Starting with a business of financial leasing mainly on the auto loan market, this company also expanded its business to other markets such as culture industry (Mar 2016)[6], educational equipment (Jan 2017), and city infrastructure (Sep 2017).

This company offers automobile loan services to individual consumers all over the country and competes with traditional financial institutions as well as other non-bank financing and leasing enterprises. To attract more consumers from traditional financial institutions to the auto loan company and alleviate transaction costs related to loan origination, Wanxin Leasing offers low-documentation loan products. The low-documentation loan refers to an auto loan product that has no requirement of screening for consumer's bank statements and is available in cases where a small amount is borrowed. In the case of Wanxin Leasing up to 80,000 RMB (approximately 11,376 USD) by be borrowed through a low documentation loan.[7] If the consumer's loan size is above this limit, a full-documentation loan is issued which requires that the consumer provides banking statements for the six months before the loan origination. The low-documentation loan meets the needs of diversified demographic groups, especially for credit constrained consumers. Within the pool of consumers whose full auto loan size would have been above the threshold of a low-documentation loan, we find that elderly and single/divorced consumers were more willing to pay a down payment in order to reduce the loan size to be lower than the threshold and choose the low-documentation loan. Therefore, this study suggests that elderly and single/divorced con-

[4]The definition of "financial leasing" comes from https://www2.deloitte.com/cy/en/pages/financial-services/articles/finance-leasing.html, consistent with the definition in Chinese market.

[5]The number of domestic financing and leasing firms authorized by the Chinese government is available at https://www.sohu.com/a/331060013_99901684.

[6]Wanxin Leasing also provides companies with financing through the leaseback of copyright of movies, TV shows, books, anime, online games, as well as the patent right and the operation right of media and cultural enterprises. The lessee (client) sells related rights to Wanxin Leasing, and then rents the rights back from Wanxin. After the lessee has paid off the total rent and the residual value, the lessee could take over the above rights.

[7]To the best of our knowledge, other non-bank financing firms also offer low-documentation loans; however, the detailed information is not available. The threshold of low-documentation loans varies with loan companies.

sumers were most vulnerable to the credit constraints in China due to their stronger incentive to avoid the “paper requirement” policy.

Low-documentation loans first were used in the home equity loan market. These loans were criticized due to their high default rate derived from adverse selection and lender’s careless screening. In this study, adverse selection refers to the tendency of those in higher default risk categories to demand low-documentation loans. In the U.S. home equity loan market, Agarwal et al. (2011) pointed out that consumers had the right to select either low-documentation loans with a higher annual interest rate, or full-documentation loan with a lower annual interest rate. Jiang et al. (2014) utilize loan-level data from a major national mortgage bank in the U.S. from 2004 to 2008 and find that low-documentation loans do not necessarily compromise lending standards along verifiable metrics such as loan-to-debt (LTV) ratio and credit score, but they encompass more adverse selection along unobserved dimensions. Keys et al. (2010) find that careless screening by lenders due to the increased ease of securitization is the main reason for the higher default rate in the U.S. subprime mortgage loan market.

The Chinese automobile loan market differs in important ways from the market in the United States. In China, low-documentation loans are excluded from the home equity loan market due to relatively high housing prices as well as a high default rate. Low-documentation loans are pervasive, though, in small loan size markets such as the automobile loan market, small online loans market, and student loans market. In the automobile loan market, the U.S. auto loan company usually tailors the interest rate and down payment to consumers with higher default risk, while their Chinese counterpart offers fixed interest rate and serves as an alternative due to the lack of credit score system. For example, Einav (2013) described how a U.S. auto loan company priced auto loans based on the credit score derived from credit bureau reports. With a low-score (high default risk) borrower, the lender offered a lower loan size with the alternatives of higher down payment and lower quality of the car. Facing a high-score (low default risk) borrower, the loan size would be relatively high and attractive due to lower down payment and higher quality of the car. Therefore, the loan demand is related to the car price and family income. Wanxin Leasing, the Chinese auto loan company in this study, offered a list of auto loan alternatives comprised of a combination of fixed interest rate and loan terms to the potential borrower who already purchased a car from a car dealer and went to the counter of Wanxin Leasing for an auto loan. With a predetermined car price, the loan demand mainly depends on the alternatives offered and the trade-off between lower down payment and higher probability of obtaining a low-documentation loan. As low-documentation loan is available for each auto loan alternative, facilitating the application of a discrete choice model in this work.

As a preview, our results indicate that consumers are willing to pay an average of 43.7% of the car price (including tax and insurance) as a down payment to get a low-documentation loan. The preference for low-documentation loans is significantly higher among elderly, higher income, and single or divorced borrowers. In addition, consumer surplus would have increased by an average of 149,200 RMB (approximately 21,215 USD) when the loan company offered low-documentation loans relative to the situation under which low-documentation loans were not available. Based on the findings, borrowers with incomes precisely equal to the threshold for obtaining low-documentation loans, those older than 50 years, and those who are married would benefit most from the alternative of low-documentation loan.

The remainder of the paper is structured as follows. Section 2 provides an overview of the literature related to credit constraints and low-documentation loans. Section 3 discusses the empirical model and estimation approach, and the data used in this analysis is introduced in Section 4. Empirical results are presented and discussed in Section 5, and concluding remarks presented in Section 6.

1.2 Literature Review

Relative to state-owned enterprises or foreign invested firms, private firms have an increasingly difficult time accessing capital. With a detailed exploration of 20,000 Chinese firms in the period of 1998 to 2005, Poncet et al. (2010) find that private firms suffer most from financial constraints while state-owned and foreign enterprises face no such restrictions. This finding is evidenced by the private firms' higher reliance on internally generated cash flow to finance investments. Cong et al. (2019) use confidential loan-level data from the nineteen largest Chinese banks and match the data with firm-level data from the Annual Survey of Industrial Firms. They find that credit was reallocated from private firms to state-owned or state-controlled firms from 2009 to 2010. Employing a dynamic panel GMM estimation approach, Chan et al. (2012) examined Chinese firms' data from 1996-2007 and found that smaller firms face significant credit constraints relative to larger firms. In analyzing the 2005 World Bank's Enterprise Survey of manufacturing firms in 120 Chinese cities, Cull et al. (2015) conclude that the investment of firms with secure government connections are less sensitive to internal cash flows than firms with government-appointed CEOs.

In addition, credit constraints become a growing concern for Chinese households and firms. Employing logistic regression, Li et al. (2011) utilize household survey data collected in Hubei Province during the periods of November 2008 –January 2009 to explore critical factors that affect the rural household's probability of obtaining microcredit in China. They find that rural households with higher income, higher education, less assets, and smaller family size are more likely to demand (require) microcredit. Turvey et al. (2010) employ farm household survey data collected in three Chinese provinces (Shanxi, Henan, and Gansu Province) between October 2007 and October 2008 and find that farmers whose income comes primarily from farming, and farmers with a smaller land base, would prefer to borrow from friends and relatives. Yuan and Xu (2015) utilize the China Household Finance Survey in 2011 and find that the probability of accessing the informal credit market would increase by 4 percent if income increases by 1 percent.

Jiang et al. (2014) explore the differences in delinquency rates between low-documentation and full-documentation loans using loan-level data from a significant U.S. mortgage bank from 2004 to 2008. The authors find that borrowers with high incomes, high credit score, low loan-to-value ratio (LTV), and prior mortgage experience are more likely to choose low documentation loans, conditional upon the loan origination channel. Applying a probit model and nonlinear decomposition method, the authors find that the 5-10 percentage point higher delinquency rate for low-documentation loans relative to full-documentation loans mainly stems from adverse selection at the time of origination, such as potential falsification of income and less careful verification of lenders.

Focusing specifically on low documentation loans, Keys et al. (2010) use data on securitized subprime mortgage loan contracts to evaluate the effect of securitization on lender screening decisions. They find that loans for borrowers with credit scores above 620 have a higher probability of being securitized than borrowers with credit scores below 620. The authors also find that low documentation loans that originated at credit scores above the 620 threshold tend to default at a rate of 10%-25% higher than low-documentation loans with scores lower than 620. Conditional on observable loan and borrower characteristics, the regression discontinuity model indicates that the only difference surrounding the credit threshold is the increased ease of securitization, potentially inducing careless screening by the lenders.

In the U.S. auto loan market, low-income households are more sensitive to term of loan maturity, while high-income families are more sensitive to the interest rate (Attanasio et al., 2008). Using data from an auto sales company from 2001 to 2004, Adam et al. (2009) find that consumer's demand for an auto loan is more sensitive to the down payments relative to the future payments, illustrating a positive relationship between the demand elasticity of down payments and liquidity constraints of the consumer. To explore the effect of the credit score system on auto loan firm's profit, Einav et al. (2013) utilize data from an auto loan company which experienced the establishment of credit score system. They find that the credit score contributes to a firm's profit by screening out higher-risk borrowers by increasing the down payment requirement, and by introducing high-value cars to consumers so that the loan company can issue larger loans.

A very limited literature has examined the Chinese automobile loan market and investigated consumer's decision on auto loan products at the time of loan origination. Using data from a large Chinese financial institution, Duan et al. (2018) find that consumers who come from a province with a higher corruption rate are more likely to default using car loans.

1.3 Model

1.3.1 Demand Model

To quantify the willingness to pay for low-documentation loan, I estimate a discrete choice model using the method proposed by Train (2009). In a discrete choice model, a borrower b chooses alternative j from choice set J. The utility obtained from borrower b choosing alternative j is specified as the following:

$$U_{bj} = \alpha_b(I_b - dp_j) + X_j\beta_b + \varepsilon_{bj} \tag{1.1}$$

where I_b represents income of each borrower b, and dp_j refers to down payments of each alternative j in terms of Chinese currency (RMB), which is component of attributes of car loan product; where X_j is a 1 ×K vector of observed variables that relate to the alternative j, including attributes of car loan product, such as term, interest rate, and especially our variable of interest, indicator of low-documentation loan. The parameter α_b and K ×1 parameter vector β_b are borrower b's taste for car loan attributes and unobserved for each b. ε_{bj} is an unobserved random error term that follows i.i.d. extreme value distribution.

We further revise the demand model due to the following reasons. First, since the income of each borrower does not vary with alternative j, it drops out from the estimation. Second, considering that the down payments in terms of Chinese currency is a continuous number, we need to define a new variable dpr_{bj}, the ratio of down payments of each alternative j to the total car price payable including tax and insurance for borrower b, and define the choice set of dpr_{bj} as a discrete choice set in order to fit the discrete choice model and capture all the possible down-payment ratio alternatives, for example, $J^{dpr} = \{0.00, 0.01, ...0.49\}$. Therefore, each borrower b faces the same choice set of down-payment ratio dpr_j. We revise the demand model as the following:

$$\begin{aligned} U_{bj} &= -\alpha_b dp_j + X_j\beta_b + \varepsilon_{bj} \\ &= -\frac{\beta_b^{dp}}{p_b} dp_j + X_j\beta_b + \varepsilon_{bj} \\ &= -\beta_b^{dp} \cdot \frac{dp_j}{p_b} + X_j\beta_b + \varepsilon_{bj} \\ &= -\beta_b^{dp} dpr_j + X_j\beta_b + \varepsilon_{bj} \end{aligned} \tag{1.2}$$

where p_b is the car price payable for borrower b and dpr_j is the down-payment ratio, defined as the ratio of down payment to the car price payable, belongs to the choice set $J^{dpr} = \{0.00, 0.01, ...0.49\}$. Parameter β_b^{dp} represents borrower b's taste for the down-payment ratio. The down payment ratio captures the borrower's cost of obtaining a low-documentation loan more than the down payment serving as a continuous variable. Even if paying the same amount of down payment by two borrowers, the down payment ratio would be higher with a lower pre-determined car price.

I assume that the K ×1 parameter vector β_b follows normal distribution $f(\beta_b|\gamma)$ where γ are mean and variance of β_b. The kth element β_b^k follows a normal distribution with mean $\bar{\beta}^k + Z_b\theta^k$ and variance $(\sigma^k)^2$. This specification allows borrowers' tastes for car loan attributes to depend on both observed variables and unobserved borrower attributes, which contributes to our analysis whether borrower's income, age and married indicator could further explain the borrower's decision of low-documentation loan. We define $\beta_b^{dp} = exp(\bar{\beta}^{dp} + Z_b\theta^{dp} + \sigma^{dp}\mu_b^{dp})$, where μ_b^{dp} are i.i.d. standard normal random variables. Assume that β_b^{dp} follows a log normal distribution with log mean $(\bar{\beta}^{dp} + Z_b\theta^{dp})$ and log variance $(\sigma^{dp})^2$. Then, β_b^{dp} follows normal distribution with mean $exp(\bar{\beta}^{dp} + Z_b\theta^{dp} + (\sigma^{dp})^2/2)$, and variance $[exp(\bar{\beta}^{dp} + Z_b\theta^{dp} + (\sigma^{dp})^2/2)]^2 \cdot (exp((\sigma^{dp})^2) - 1)$.

As a result, utility (2) can be rewritten as

$$U_{bj} = -exp(\bar{\beta}^{dp} + \sigma^{dp}\mu_b^{dp} + Z_b\theta^{dp})dpr_j + \sum_{k=1}^{3} x_j^k(\bar{\beta}^k + \sigma^k\mu_b^k + Z_b\theta^k) + \varepsilon_{bj} \tag{1.3}$$

where $\mu_b^k, k = 1, 2, 3$ and μ_b^{dp} are i.i.d. standard normal random variables, and x_j^k is the kth car loan attribute except for down payments; where x_j includes low-documentation indicator, term and interest rate for each alternative j; where dpr_j represents the down-payment ratio for each alternative

j; where Z_b refers to family income, age, sex and married dummy for each borrower b.

We include nine interaction variables $x_j^k Z_b$ and two interaction variables $dpr_j Z_b$ in (3). For example, in $x_j^k Z_b$, we interact low-documentation loan indicator, term and interest rate with household attributes such as family income, age and married dummy respectively. As for $dpr_j Z_b$, we only include the interaction term between down-payment ratio and age, down-payment ratio and married dummy. We exclude the interaction term betwen down-payment ratio and family income since we use down-payment ratio to measure the consumer welfare in the counterfactual analysis section, and the implementation of log-sum term requires that the marginal utility of income does not depend on the income. We also exclude the interaction term between all variables of attributes(x_j^k, dpr_j) and borrower's sex because there's no clear effect of borrower's sex on loan products.

1.3.2 Demand Estimation

Conditional on β_b, the probability that borrower b chooses alternative j from contract alternatives $\{1...J\}$ is given by:

$$L_{bj}(\beta_b) = \frac{e^{V_{bj}}}{\sum_{j=1}^{J} e^{V_{bj}}} \tag{1.4}$$

The unconditional probability that borrower b will choose alternative j is the integral of the conditional probability over all possible values of β_b , which depends on the parameters of the distribution of β_b:

$$P_{bj} = \int L_{bj}(\beta_b) f(\beta_b|\gamma) d\beta_b \tag{1.5}$$

In particular, P_{bj} is approximated by a summation over randomly chosen values of β_b. Draw a value of β_b from $f(\beta_b|\gamma)$ and calculate the logit formula $L_{bj}(\beta_b)$ with this draw. Repeat this process for 100 draws and take the average of the result, the average is the simulated probability:

$$\tilde{P_{bj}} = \frac{1}{R}\sum_{r=1}^{R} L_{bj}(\beta_b^r) \tag{1.6}$$

where R is the number of repeated draws, β_b^r is the r^{th} draw from $f(\beta_b|\gamma)$.

We estimate the paramter γ by maximizing the simulated log-likelihood function, which is constructed by:

$$SLL = \sum_{b=1}^{B}\sum_{j=1}^{J} d_{bj} ln\tilde{P_{bj}} \tag{1.7}$$

where $d_{bj} = 1$ if borrower b chooses alternative j, and zero otherwise.

The simulated score for each borrower with respect to $\bar{\beta}^k$ and $\bar{\beta}^{dp}$ are as the following:

$$\begin{aligned} SS_b(\bar{\beta}^k) &= \frac{\partial \sum_{j=1}^{J} d_{bj} ln\tilde{P_{bj}}}{\partial \bar{\beta}^k} \\ &= \frac{\partial \sum_{j=1}^{J} d_{bj} ln(\frac{1}{R}\sum_{r=1}^{R}\frac{e^{V_{bj}^r}}{\sum_{j=1}^{J} e^{V_{bj}^r}})}{\partial \bar{\beta}^k} \\ &= \frac{\partial \sum_{j=1}^{J} d_{bj}[ln(\frac{1}{R}) + ln(\sum_{r=1}^{R}\frac{e^{V_{bj}^r}}{\sum_{j=1}^{J} e^{V_{bj}^r}})]}{\partial \bar{\beta}^k} \\ &= \sum_{j=1}^{J} d_{bj}(\frac{1}{\sum_{r=1}^{R}\frac{e^{V_{bj}^r}}{\sum_{j=1}^{J} e^{V_{bj}^r}}}) \cdot \sum_{r=1}^{R}[\frac{e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \bar{\beta}^k}\sum_{j=1}^{J} e^{V_{bj}^r} - e^{V_{bj}^r}\sum_{j=1}^{J} e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \bar{\beta}^k}}{(\sum_{j=1}^{J} e^{V_{bj}^r})^2}] \end{aligned} \tag{1.8}$$

where $V_{bj} = -exp(\bar{\beta}^{dp} + \sigma^{dp}\mu_b^{dp} + Z_b\theta^{dp})dpr_j + \sum_{k=1}^{3} x_j^k(\bar{\beta}^k + \sigma^k\mu_b^k + Z_b\theta^k)$; where $\frac{\partial V_{bj}^r}{\partial \bar{\beta}^k} = x_j^k$

Similarly,

$$SS_b(\bar{\beta}^{dp}) = \sum_{j=1}^{J} d_{bj}(\frac{1}{\sum\limits_{r=1}^{R} \frac{e^{V_{bj}^r}}{\sum\limits_{j=1}^{J} e^{V_{bj}^r}}}) \cdot \sum_{r=1}^{R}[\frac{e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \bar{\beta}^{dp}} \sum\limits_{j=1}^{J} e^{V_{bj}^r} - e^{V_{bj}^r} \sum\limits_{j=1}^{J} e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \bar{\beta}^{dp}}}{(\sum\limits_{j=1}^{J} e^{V_{bj}^r})^2}] \tag{1.9}$$

where $\frac{\partial V_{bj}^r}{\partial \bar{\beta}^{dp}} = -dpr_j \cdot exp(\bar{\beta}^{dp} + \sigma^{dp}\mu_b^{dp(r)} + Z_b\theta^{dp})$

Then, we get the simulated score for each borrower with respect to σ^k and σ^{dp} as the following:

$$\begin{aligned} SS_b(\sigma^k) &= \frac{\partial \sum\limits_{j=1}^{J} d_{bj} ln\tilde{P}_{bj}}{\partial \sigma^k} \\ &= \frac{\partial \sum\limits_{j=1}^{J} d_{bj} ln(\frac{1}{R}\sum\limits_{r=1}^{R} \frac{e^{V_{bj}^r}}{\sum\limits_{j=1}^{J} e^{V_{bj}^r}})}{\partial \sigma^k} \\ &= \frac{\partial \sum\limits_{j=1}^{J} d_{bj}[ln(\frac{1}{R}) + ln(\sum\limits_{r=1}^{R} \frac{e^{V_{bj}^r}}{\sum\limits_{j=1}^{J} e^{V_{bj}^r}})]}{\partial \sigma^k} \\ &= \sum_{j=1}^{J} d_{bj}(\frac{1}{\sum\limits_{r=1}^{R} \frac{e^{V_{bj}^r}}{\sum\limits_{j=1}^{J} e^{V_{bj}^r}}}) \cdot \sum_{r=1}^{R}[\frac{e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \sigma^k} \sum\limits_{j=1}^{J} e^{V_{bj}^r} - e^{V_{bj}^r} \sum\limits_{j=1}^{J} e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \sigma^k}}{(\sum\limits_{j=1}^{J} e^{V_{bj}^r})^2}] \end{aligned} \tag{1.10}$$

where $\frac{\partial V_{bj}^r}{\partial \sigma^k} = x_j^k \mu_b^{k(r)}$

Similarly,

$$SS_b(\sigma^{dp}) = \sum_{j=1}^{J} d_{bj}(\frac{1}{\sum\limits_{r=1}^{R} \frac{e^{V_{bj}^r}}{\sum\limits_{j=1}^{J} e^{V_{bj}^r}}}) \cdot \sum_{r=1}^{R}[\frac{e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \sigma^{dp}} \sum\limits_{j=1}^{J} e^{V_{bj}^r} - e^{V_{bj}^r} \sum\limits_{j=1}^{J} e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \sigma^{dp}}}{(\sum\limits_{j=1}^{J} e^{V_{bj}^r})^2}] \tag{1.11}$$

where $\dfrac{\partial V_{bj}^r}{\partial \sigma^{dp}} = -dpr_j \cdot exp(\bar{\beta}^{dp} + \sigma^{dp}\mu_b^{dp(r)} + Z_b\theta^{dp}) \cdot \mu_b^{dp(r)}$

Then, we get the simulated score for each borrower with respect to θ^k and θ^{dp} as the following:

$$\begin{aligned}
SS_b(\theta^k) &= \frac{\partial \sum_{j=1}^{J} d_{bj} ln\tilde{P_{bj}}}{\partial \theta^k} \\
&= \frac{\partial \sum_{j=1}^{J} d_{bj} ln(\frac{1}{R}\sum_{r=1}^{R}\frac{e^{V_{bj}^r}}{\sum_{j=1}^{J} e^{V_{bj}^r}})}{\partial \theta^k} \\
&= \frac{\partial \sum_{j=1}^{J} d_{bj}[ln(\frac{1}{R}) + ln(\sum_{r=1}^{R}\frac{e^{V_{bj}^r}}{\sum_{j=1}^{J} e^{V_{bj}^r}})]}{\partial \theta^k} \\
&= \sum_{j=1}^{J} d_{bj}(\frac{1}{\sum_{r=1}^{R}\frac{e^{V_{bj}^r}}{\sum_{j=1}^{J} e^{V_{bj}^r}}}) \cdot \sum_{r=1}^{R}[\frac{e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \theta^k}\sum_{j=1}^{J} e^{V_{bj}^r} - e^{V_{bj}^r}\sum_{j=1}^{J} e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \theta^k}}{(\sum_{j=1}^{J} e^{V_{bj}^r})^2}]
\end{aligned} \tag{1.12}$$

where $\dfrac{\partial V_{bj}^r}{\partial \theta^k} = x_j^k Z_b$

Similarly,

$$SS_b(\theta^{dp}) = \sum_{j=1}^{J} d_{bj}(\frac{1}{\sum_{r=1}^{R}\frac{e^{V_{bj}^r}}{\sum_{j=1}^{J} e^{V_{bj}^r}}}) \cdot \sum_{r=1}^{R}[\frac{e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \theta^{dp}}\sum_{j=1}^{J} e^{V_{bj}^r} - e^{V_{bj}^r}\sum_{j=1}^{J} e^{V_{bj}^r}\frac{\partial V_{bj}^r}{\partial \theta^{dp}}}{(\sum_{j=1}^{J} e^{V_{bj}^r})^2}] \tag{1.13}$$

where $\dfrac{\partial V_{bj}^r}{\partial \theta^{dp}} = -dpr_j \cdot exp(\bar{\beta}^{dp} + \sigma^{dp}\mu_b^{dp(r)} + Z_b\theta^{dp}) \cdot Z_b$

At the end, we add up the simulated score of each person across all borrowers to get the simulated score of objective function.

1.4 Data

Using loan transaction data from a Chinese automobile loan company (Wanxin Leasing), 9,834 loan contracts originating between November 2014 and April 2017 were analyzed. The loan company works with car dealers in most provinces in China. During the observation period, three different loan products were offered to individuals who desired to purchase a new car from one of the cooperating car dealers, and each of the three loan products offered a low-documentation loan option. One of these products was a general loan product where borrowers make decisions at their discretion on the amount of down payment, the loan term, and whether the requested loan size will also include car tax and insurance. A second type of loan product was an interest-prepaid loan that allows borrowers to make interest payments at the loan origination at the cost of a higher interest rate than the general loan. As a result, the borrower is required to just repay the loan principal in the ensuing loan terms. The third loan product offered by the Wanxin Leasing was a deposit loan. In this type of loan, borrowers are required to pay a deposit equal to 20 percent of the loan size to the loan company. In exchange, the borrower would enjoy a lower interest rate during the repayment period and receive a full refund of the deposit at the end of the loan term if no prepayment existed.

An essential characteristic of these loan products is that the interest rate was invariant with loan size. Instead, the interest rate was a function of the term and loan products. Since there were only three loan products, and each product had discrete choices of terms, the interest rate becomes a discrete choice, like all the other components of loan products. However, these three loan products were present in different periods so that the choice set J varies with time. From November 4, 2014 to October 26, 2015, the Wanxin Leasing only offered general and interest-prepaid loan products. The deposit loan product was introduced on October 27, 2015. Beginning in 2016, the loan company eliminated interest-prepaid loan and only provided general and deposit loans. Table 1.1 reports how the loan option set varied across time.

In the absence of credit scores or available credit history, the loan company made use of bank statements to facilitate the screening of loan applications. In the approval process, the loan company signs purchasing contracts with car dealers and then lends the car to the borrowers; as such, the car that the borrower chooses to purchase serves as collateral for the loan company. Ono and Uesugi (2009) argued that the collateral might complement the incentives of lenders in monitoring and screening borrowers corresponding to the value of the collateral. This was observed in our data as the loan company imposed tighter documentation requirements on cars with higher values. For example, if the requested loan size was more than 80,000 RMB (approximately 11,376 USD), the borrower was required to provide the loan company with bank statements for the six months before the loan origination, in addition to providing an identification card, driver's license, and debit card. If the loan size was smaller than or equal to 80,000 RMB (approximately 11,376 USD), the borrower would obtain the loan without offering banking statements. In this case, the borrowers also needed to provide an identification card, driver's license, and debit card. These smaller loans are the previously mentioned low-documentation loan.

The primary outcome of interest in this study is the consumer's willingness to pay for low-documentation loans. In order to investigate this outcome of interest, we selected 2,716 sample borrowers from the pool of borrowers during the period of November 2014 - April 2017, and the selection criteria is whether the loan size should have been above 80,000 RMB (approximately 11,376 USD) if the borrowers financed the car price, tax and insurance. Since the borrower would have a positive probability of paying down payment and receive low-documentation loan with higher likelihood only if the borrower's car price payable exceeded 80,000 RMB (the threshold of low-documentation loan), we narrow our focus to the sample borrowers rather than all the borrowers in the dataset. If the borrower's car price payable was already below the 80,000 RMB (the threshold of low-documentation loan), then there would be no incentive to getting the low-documentation loan by paying down payment. Considering that borrowers have a flexible choice of including tax and insurance into the loan size, the down payment-to-loan ratio can be expressed as the following:

$$\text{down payment ratio} = \frac{\text{down payment} + \text{tax and insurance from the borrower's pocket}}{\text{car price} + \text{tax and insurance payable}} \tag{1.14}$$

Table 1.2 reports the summary statistics. Panel A displays the mean value and standard deviations for all consumers available in the data. Among the 9,834 loan observations, 7,475 (76%) of borrowers chose the low-documentation loan. On average, borrowers decided to pay 13% of car price plus tax and insurance, as the down payment, and chose 32 months as loan term, and 11% as the interest rate. Panel B shows the summary statistics for sample consumers whose car prices with tax and insurance payable are above 80,000 RMB (approximately 11,376 USD), having a positive probability of choosing low-documentation loans. With 2,716 loan observations, 1,353 consumers chose the low-documentation loan, accounting for 50% of sample consumers. The average down payment ratio, term, and interest rate was 17%, 33 months, and 11%, respectively.

In this data, we only use sample borrowers in Phase 3. Since 71% of sample borrowers in Phase 3 (Jan/1/2016-Apr/28/2017) chose the low-documentation loan, while only 28% and 54% of sample borrowers chose the low-documentation loan in Phase 1 (Nov/4/2014-Oct/26/2015) and Phase 2 (Oct/27/2015-Dec/31/2015). The willingness to pay is positive in Phase 3, while not the case in Phase 1 and Phase 2.[8] Therefore, we drop sample borrowers in Phase 1 and 2, merely focusing on sample borrowers in Phase 3. In Phase 3 of Panel B, the total number of loan was 1,111. As is reported here, 794 consumers chose the low-documentation loan. On average, consumers decided to pay 24% of the car price (including tax and insurance) as the down payments, consumers chose 33 months as loan term, and 9% as the interest rate.

The dependent variable is a dummy variable which equal to one if the consumer chose this alternative among 350 alternatives, and zero otherwise.

The explanatory variables used in the mixed logit model are:

(a) Low-documentation loan: This dummy variable is equal to one when the borrower choses the low-documentation loan, with a loan size below or equal to 80,000 RMB. It is equal to zero if consumers chose the full-documentation loan, with a loan size above 80,000 RMB.

[8] We employed mixed logit model on sample borrowers in the whole period (Phase 1, 2, and 3), and also on sample borrowers in the Phase 1, 2, and 3, separately. We find that only the willingness to pay in the Phase 3 is positive, while in the Phase 1 and 2 are negative. The reason might be that the auto loan company was in its infancy during the period of 2014-2015, therefore, the auto loan company advertised less on the low-documentation loan in the Phase 1 and 2 in order to have default risk under control. Beginning with 2016, the auto loan company began to advertise more on the low-documentation loan in order to attract more borrowers and expand its business.

(b) Down payment ratio: This variable is defined in Equation (1.14) which indicates the ratio of the value of down payments to the total amount of car price payable. The down payments refer to the amount from the borrower's pocket, including down payments and self-paid tax and insurance, the total car price payable includes the car price and tax and insurance payable. In the data, values of this variable range from 0.00 to 0.49, where 0.01 reflects a 1% down payments and self-paid tax and insurance of the total car price payable.

(c) Loan Term: Loan term options of 12, 24, 36, and 48 months are available.

(d) Interest rate: Interest rates are reported as a proportion where, for example, an interest rate of 11.88% is reported as 0.1188. Possible interest rates in all periods of Phase III are 0.085, 0.1159, 0.1171, and 0.1177.

From Table 1.1, the total number of combinations of loan term and interest rates was 7 in Phase 3. As for the combination of down payment ratio (0.00-0.49) and low-documentation dummy (1/0), only when $(1 - downpayment\_ratio) * (carprice + tax + insurance\_payable) <= 80,000RMB$, the borrower had probability to get low-documentation loans. Since $(carprice + tax + insurance\_payable)$ for each observation was known and fixed, each possible value of down payment ratio corresponded to a fixed value of low-documentation dummy. Therefore, each borrower faced $7*50 = 350$ alternatives in Phase 3.

1.5 Empirical Results

1.5.1 Baseline Results

Table 1.3 reports the mixed logit model results. The mean value of the marginal utility of the low-documentation loan is 0.378[9], and the mean value of the marginal utility of down payment ratio is -0.866[10]. Therefore, consumers are willing to pay 43.7% (0.378/0.866) of the total car price

[9] $\bar{\beta}^{Lowdoc} + \sigma^{Lowdoc} * \bar{\mu}^{Lowdoc} + \theta^{Lowdoc\_Income} * \bar{I}_b + \theta^{Lowdoc\_age} * \bar{age}_b + \theta^{Lowdoc\_married} * \bar{married}_b = -0.3605 + 0.0066 * 1.02608 + 0.0221 * 34.3 - 0.0371 * 0.7 = 0.3783$

[10] The coefficient of down-payment ratio is $-\beta_b^{dp} = -exp(\bar{\beta}^{dp} + Z_b\theta^{dp} + \sigma^{dp}\mu_b^{dp})$, where $-(\bar{\beta}^{dp} + Z_b\theta^{dp})$ and σ^{dp} represent the mean and standard deviation of $log(-\beta_b^{dp})$. The mean value of marginal utility of down-payment ratio $-\beta^{dp}$ is $-exp(\bar{\beta}^{dp} + \bar{Z}_b\theta^{dp} + (\sigma^{dp})^2/2) = -exp(0.1141 - 0.0061 * 34.3 - 0.0765 * 0.7 + 0.0997^2/2) =$

payable, including tax and insurance, to get the low-documentation loan. As shown in Table 1.2, the mean value of total car price payable, including tax and insurance, is 96,576 RMB (approximately 13,733 USD). Combined, these results which indicate that the consumers are willing to pay 42,184 RMB (approximately 5,998 USD) on average to get the low-documentation loan.

As for terms and interest rates, the average marginal effect of the loan term is 0.012[11], and the mean value of the marginal utility of interest rate is -19.116[12]. Therefore, on average, borrowers were inclined to choose loan products with longer loan terms and lower interest rates.

Results in Table 1.3 offer insight regarding how borrower's preferences for loan product characteristics such as low-documentation loan, down payments, loan term, and interest rate vary with their demographic characteristics such as age, family income, and marital status. Firstly, the elderly, higher-income, and single or divorced borrowers prefer low-documentation loans. The coefficients of interaction terms between low-documentation dummy (Lowdoc) and income, age, marriage status (Married) are all statistically significant at the 1 percent level. Consumers with higher income tend to demand low-documentation loans, the reasons are three-fold. First, consumers with higher income are likely to have more investment opportunities and more incentives to finance their investment, therefore, higher-income consumers have higher demand for loans. This finding is consistent with Li et al. (2011) and Tang and Guo's (2017) findings. Second, higher-income consumers are auto loan company's favorite clients due to the higher probability of larger loan size (corresponding to high-price and high-quality car) and lower risk of default. Thus, the auto loan company utilized low-documentation loans as an advertisement to attract this type of consumers. Third, the higher-income consumers might report their future income rather than income in the past. As far as we know, a portion of consumers purchased the car/truck for running a business and making profits, that's why the consumers had more confidence in the future income but less incentive to offer the past banking statements.

$-exp(-0.1437) = -0.8661.$

[11] $\bar{\beta}^{Term} + \sigma^{Term} * \bar{\mu}^{Term} + \theta^{Term\_Income} * \bar{I}_b + \theta^{Term\_age} * \bar{age}_b + \theta^{Term\_married} * \bar{married}_b = -0.0246 - 0.0003 * 1.02608 + 0.0011 * 34.3 - 0.0017 * 0.7 = 0.0116$

[12] $\bar{\beta}^{Interest} + \sigma^{Interest} * \bar{\mu}^{Interest} + \theta^{Interest\_Income} * \bar{I}_b + \theta^{Interest\_age} * \bar{age}_b + \theta^{Interest\_married} * \bar{married}_b = -0.0644 + 0.1911 * 1.02608 - 0.5644 * 34.3 + 0.1589 * 0.7 = -19.1160$

On the other hand, elderly and single or divorced consumer's preference for low-documentation loan reflects that these two demographic groups suffer most from credit constraints in China. Since elderly and single/divorced consumers were more willing to pay a down payment in order to reduce the loan size from above 80,000 RMB to be lower than or equal to 80,000 RMB, obtaining the low-documentation loan and avoiding the screening of "paper requirement."

Next, we focus on how borrower's preferences for specific loan characteristics such as the down payment amount, loan term, and interest rate vary with borrower's characteristics. We find that elderly consumers are more inclined to choose lower down payments, longer loan term, and lower interest rate. The finding that elderly consumers prefer lower down payments (larger loan size) is consistent with Tang and Guo's (2017) finding, who conclude that older households are more likely to demand loans in China. In addition, elderly borrower's preference for longer loan terms and lower interest rates reflect the fact that they have lower monthly income as well as more economic pressure due to higher health-related and medical expenditures.

We also find that married borrowers prefer lower down payments, shorter loan terms, and higher interest rates. The finding that married borrowers prefer choose lower down payments (and thus a larger loan size) is consistent with Tang and Guo's (2017). These authors find that one more family member would increase the probability of borrowing from informal market by 4 percent. Such findings might reflect the fact that they have higher monthly income, lower cash stock, and fewer willingness to keep positive debt.

Higher-income consumers prefer shorter loan terms and higher interest rates. Higher-income consumers might have more confidence in their capability of repaying higher monthly payments due to higher monthly income; meanwhile, they have less willingness to keep positive debt.

1.5.2 Consumer Surplus of Alternative Types of Loans

1.5.2.1 Consumer Surplus Generated by Low Documentation Loans

Based on the previous finding that borrowers were sensitive to the low-documentation loan, the measure of the consumer surplus when the loan company offers the low-documentation loan is of interest. We simulated the 350 alternatives when the loan company did not offer the alternative of low-documentation loans and then used the log-sum term (Small and Rosen,1981) to compute the consumer surplus due to the introduction of low-documentation loans. The expected consumer surplus for each borrower b was defined as the following:

$$\Delta E(CS_b) = \frac{1}{-\alpha_b}\{ln[\frac{1}{R}\sum_{r=1}^{R}(\sum_{j=1}^{J^1} e^{V_{bj}^{1(r)}})] - ln[\frac{1}{R}\sum_{r=1}^{R}(\sum_{j=1}^{J^0} e^{V_{bj}^{0(r)}})]\} \qquad (1.15)$$

where $-\alpha_b$ represents the marginal utility of income, in our demand model, $-\alpha_b = -\frac{\beta_b^{dp}}{p_b}$, where β_b^{dp} is the parameter of down-payment ratio, and p_b is the total amount of car price payable, including tax and insurance. The subscripts 0 and 1 refer to the log-sum term before and after change, J^0 and J^1 refers to the choice set when the loan company eliminates low-documentation loan and offers a low-documentation loan, respectively. Table 1.4 reports the results of these simulations.

As reported in Table 1.4, we found that borrower surplus increased by an average of 149,200 RMB (approximately 21,215 USD) when the loan company offered a low-documentation loan. Based on our findings, we are 95% confident that the average consumer surplus when the loan company offered the alternative of the low-documentation loan was between 143,680 RMB (approximately 20,431 USD) and 154,720 RMB (approximately 22,000 USD). Compared to the annual income of sample borrowers in Phase 3 (102,608 RMB, approximately 14,596 USD), the consumer surplus was equivalent to 40%-50% higher than the annual income.

Consumer surplus varied based on borrower demographic characteristics. The borrowers who obtained the most significant benefit from the of availability of low-documentation loans were those whose incomes were equal to 80,000 RMB (approximately 11,376 USD), those over 50 years old, and those who were married. The consumer surplus of offering low-documentation loans increased by the smallest amount for borrowers whose incomes were higher than 100,000 RMB (approximately 14,220 USD), those who were under 30 years old, and those who were single or divorced.

1.5.2.2 Consumer Surplus Generated by Deposit Loans

Deposit loans require borrowers to make a deposit of 20 percent of the loan size at the loan origination in exchange for receiving the deposit back at the time of repayment. This form of loan assists with risk management from the loan company's perspective (lower risk of default) and provides consumers with more alternatives such as lower monthly payments from consumer's perspective. In the Phase 3, the auto loan company only offered the general loan and the deposit loan, and the deposit loan played a more essential role in lowering default risk and attracting high-quality consumers. This analysis estimates the change of consumer surplus when the loan company offered the deposit loan relative to the situation when the option of a deposit loan is not available. Equation (1.15) was used to compute the expected change of consumer surplus; these results are presented in Table 1.5.

The findings indicated that the consumer surplus increased by an average of 127,200 RMB (approximately 18,087 USD) on when the loan company offers a deposit loan, as shown in Table 1.5. Further, we are 95% confident that the average consumer surplus when the loan company offered the alternative of deposit loan fell between 121,150 RMB (approximately 17,227 USD) and 133,250 RMB (approximately 18,947 USD). Compared to the annual income of sample borrowers in Phase 3 (102,608 RMB, approximately 14,596 USD), the consumer surplus was equivalent to 18%-30% higher than the annual income.

Borrowers whose incomes were equal to 80,000 RMB (approximately 11,376 USD), who were over 50 years old, and who were married obtained the most considerable benefits from the alternative offering of the deposit loan. In contrast, the consumer surplus increased by the smallest amount for borrowers whose incomes were below 80,000 RMB (approximately 11,376 USD), who were under 30 years old, and who were single or divorced.

1.5.3 Costs of Alternative Types of Loans

The costs of alternative types of loan products faced by the auto loan company are grouped into two categories, cost of default risk and administrative cost. Default risk refers to the risk of borrowers not being able to repay the full or part of the loan size during the repayment period. Administrative costs are the costs to the loan company associated with creating and administering a loan. For instance, meeting with and collecting all the paperwork from the borrower, assessing paperwork, generating the loan, collecting and applying payments. These costs may differ among three types of loan products offered by the loan company, it might also differ between low-documentation loan and full-documentation loan.

For both types of costs, the expense of generating and administering a deposit loan is the lowest, followed by the general loan, and the interest-prepaid loan. The deposit loan is a loan product that requires borrowers to pay a deposit equivalent to 20 percent of the loan size to the auto loan company. In exchange, the borrower would enjoy a lower interest rate (8.5%) during the repayment period and receive a full refund of the deposit at the end of the loan term if no prepayment exists. Therefore, the deposit loan takes the lowest cost of default risk and becomes the prominent loan product offered by the auto loan company in recent years. On the other hand, the deposit loan collects deposits in terms of cash flows and facilitates the loan company to make loan origination to more potential borrowers. The interest-prepaid loan is a loan product that allows borrowers to make interest payments at the loan origination at the cost of a higher interest rate than the general loan. As a result, the borrower is required to repay the loan principal in the ensuing loan terms. The interest-prepaid loan product is abandoned since 2016 due to the higher cost of default risk as well as lower attractiveness to borrowers. After discussion by the management group and examination by the market, the interest-prepaid loan product was decided to be terminated.

If the cost of default risk and administrative costs (i.e., less time and administrative cost to review relevant documents and verify credit worthiness) is considered in our model, then we might find a lower consumer surplus generated by the low-documentation loan while a higher consumer surplus induced by the deposit loan. It is assumed that the borrowers with higher default risk would have more willingness to pay for the low-documentation loan. By identifying the borrowers with higher default risk and lower default risk, the average willingness to pay for the low-documentation loan measured by the down-payment ratio would be lower than the results shown in this analysis. Therefore, we would expect a lower consumer surplus generated by the alternative of low-documentation loan. In terms of consumer surplus induced by the alternative of deposit loan, it is underestimated in this analysis due to the lack of concern related to the default risk. However, the data pertinent to the default risk and administrative costs is difficult to obtain from the loan company. They are not only private data source but also unrecorded or recorded with errors.

1.6 Conclusion

This study utilizes transaction-level data from a Chinese auto loan company to explore the effect of consumer characteristics such as family income, age, and marital status on financial preferences for low-documentation loan down payments, loan terms, and interest rates. The findings suggest that consumers prefer auto loan products with low documentation requirements, longer terms, and lower interest rates on average. Financial decisions and preferences for auto loan products varied with consumer characteristics. The elderly and single or divorced consumer's preference for low-documentation loans reflects that elderly and single or divorced groups suffer most from the credit constraints in China. Therefore, traditional financial institutions should improve the lending scheme and offer more available loan products in order to alleviate the credit constraints faced by the elderly and single or divorced households.

We find that consumers benefit from the introduction of low-documentation loans and deposit loans. The consumer surplus increased by an average of 149,200 RMB (approximately 21,215 USD), and 127,200 RMB (approximately 18,087 USD) when the loan company offered a low-documentation loan and the deposit loan, respectively. It indicates that, on average, consumers benefit more from the relief of credit-constrained than a lower monthly payment.

Besides, this study fills a gap in the literature related to the effects of private lending and borrowing organizations (PLBs) on the Chinese informal credit market, leading to an effective reform in the informal credit market and satisfying needs of various demographic groups. This study also contributes to the literature regarding consumer responses and financial decisions to auto loan products offered in a developing country without a credit score system. Further, it provides product managers with consumer welfare measured in consumer surplus when low-documentation loans are available.

Although the data covered ranges from 2014 to 2017, the majority of the loan products offered by the loan company does not change a lot in recent years (2018-2020). As far as we know, the auto loan company still offers the general loan and deposit loan. The low-documentation loan is also available when the loan size does not exceed 80,000 RMB (approximately 11,376 USD). The interest rate of each loan alternative might fluctuate over time due to the loan company's predicted profits and budgets. The implementation of low-documentation loan is originated from auto loan market in Shanghai, and then it is borrowed by Wanxin Leasing and operated up till now.

These findings have two limitations. One limitation is the data source coming from a single Chinese automobile loan company. As we cannot observe consumer financial decisions outside of this auto loan company, we need to interpret the results carefully, and the applications to other types of loan finance are limited. The other limitation is that we are unable to explore how the borrower's default risk affects his or her behavior under the alternative of low-documentation loan. The lack of complete follow-up record and credit-score system undermines further examination of borrower's incentives.

Future research on this topic is suggested to use data which covers an expanded set of alternatives of loan products faced by the consumers in the auto loan market, including loan products offered by both traditional financial institutions and informal credit market. Future research is recommended to collect loan application data rather than loan origination data, which would allow for a deeper investigation about the loan preferences and borrowing practices of credit-constrained borrowers. In addition, the follow-up data related to the incentives of default or not might contribute to the investigation of borrower's incentives for the low-documentation loans.

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Table 1.1: Discrete Choice Set of Interest Rate and Term

	term=12	term=24	term=36	term=48	term=60
Phase1:2014/11/04-2015/10/26	11.88	11.88	11.88		
interest rate	(interest-prepaid loan)	(interest-prepaid loan)	(interest-prepaid loan)		
		11.77	11.71	11.59	11.45
		(general loan)	(general loan)	(general loan)	(general loan)
Phase2:2015/10/27-2015/12/31	11.88	11.88	11.88		
interest rate	(interest-prepaid loan)	(interest-prepaid loan)	(interest-prepaid loan)		
	8.5	8.5	8.5	8.5	
	(deposit loan)	(deposit loan)	(deposit loan)	(deposit loan)	
		11.77	11.71	11.59	11.45
		(general loan)	(general loan)	(general loan)	(general loan)
Phase3:2016/01/01-2017/04/28	8.5	8.5	8.5	8.5	
interest rate	(deposit loan)	(deposit loan)	(deposit loan)	(deposit loan)	
		11.77	11.71	11.59	
		(general loan)	(general loan)	(general loan)	

Notes: General loan is a loan product where borrowers make decisions at their discretion on the amount of down payment, the loan term, and whether the requested loan size will also include car tax and insurance. Interest-prepaid loan is a loan product that allows borrowers to make interest payments at the loan origination at the cost of a higher interest rate than the general loan. As a result, the borrower is required to just repay the loan principal in the ensuing loan terms. Deposit loan is a loan product that requires borrowers to pay a deposit equal to 20 percent of the loan size to the loan company. In exchange, the borrower would enjoy a lower interest rate during the repayment period and receive a full refund of the deposit at the end of the loan term.

Table 1.2: Summary Statistics

	Phase 1	Phase 2	Phase3	whole period
A. All borrowers				
obs	4228	1491	4115	9834
car price	79408	65245	64067	70841
	(49605)	(26958)	(24851)	(38494)
loan size	81917	62450	59333	69515
	(46753)	(22901)	(20028)	(36111)
borrowers with low documentation loan	2611	1241	3623	7475
percentage of borrowers with low documentation loan	0.62	0.83	0.88	0.76
down payment ratio	0.08	0.14	0.17	0.13
	(0.10)	(0.16)	(0.16)	(0.14)
term	32.51	31.90	32.11	32.25
	(6.13)	(6.21)	(6.00)	(6.09)
interest rate	0.1173	0.1109	0.099	0.1088
	(0.0004)	(0.01)	(0.02)	(0.01)
default in censored data	175	17	12	204
prepay in censored data	1209	140	208	1557
age	35.2	34.2	33.9	34.5
	(8.0)	(7.9)	(8.00)	(8.0)
gender (male=1)	0.85	0.86	0.87	0.86
	(0.36)	(0.35)	(0.33)	(0.35)
marriage (married=1)	0.70	0.67	0.7	0.69
	(0.46)	(0.47)	(0.46)	(0.46)
annual income	106819	84266	89640	96213
	(107784)	(50350)	(97576)	(97217)

Notes:Summary statistics for all the borrowers and sample borrowers,the table shows means and standard errors in parentheses. The sample borrowers are borrowers whose total price payable including car price, tax and insurance is above 80,000 RMB (approximately 11,376 USD).

Table 1.2: (Continued) Summary Statistics

	Phase 1	Phase 2	Phase3	whole period
B. Sample borrowers				
obs	1187	418	1111	2716
car price	83258	83833	84265	83758
	(10121)	(10357)	(10347)	(10257)
loan size	86603	77655	72744	79557
	(13655)	(16670)	(14968)	(16031)
borrowers with low documentation loan	333	226	794	1353
percentage of borrowers with low documentation loan	0.28	0.54	0.71	0.50
down payment ratio	0.09	0.19	0.24	0.17
	(0.10)	(0.16)	(0.14)	(0.15)
term	34.03	34.19	33.5	33.84
	(5.41)	(5.74)	(5.51)	(5.51)
interest rate	0.1172	0.1079	0.0937	0.1061
	(0.0004)	(0.02)	(0.01)	(0.02)
default in censored data	66	9	2	77
prepay in censored data	316	36	50	402
age	35.0	34.3	34.3	34.6
	(7.9)	(8.3)	(8.10)	(8.0)
gender (male=1)	0.84	0.86	0.87	0.85
	(0.37)	(0.35)	(0.34)	(0.35)
marriage (married=1)	0.69	0.64	0.7	0.69
	(0.46)	(0.48)	(0.46)	(0.46)
annual income	105546	91374	102608	102163
	(71328)	(53739)	(133446)	(99848)

Notes:Summary statistics for all the borrowers and sample borrowers,the table shows means and standard errors in parentheses. The sample borrowers are borrowers whose total price payable including car price, tax and insurance is above 80,000 RMB (approximately 11,376 USD).

Table 1.3: Mixed Logit Estimation Results

Variable name	Parameter	Estimate
Lowdoc	$\bar{\beta}_{Lowdoc}$	-0.3605^{***}
		(0.1095)
	σ_{Lowdoc}	0.1015^{***}
		(0.0001)
Downpay	$\bar{\beta}^{dp}$	0.1141^{***}
		(0.0110)
	σ^{dp}	0.0997^{***}
		(0.0001)
Term	$\bar{\beta}_{Term}$	-0.0246^{***}
		(0.0094)
	σ_{Term}	0.0006^{***}
		(0.0026)
Interest	$\bar{\beta}_{Interest}$	-0.0644
		(4.7557)
	$\sigma_{Interest}$	0.1013
		(2.3382)
Lowdoc*Income	θ_{Lowdoc_Income}	0.0066^{***}
		(0.0024)
Lowdoc*Age	θ_{Lowdoc_Age}	0.0221^{**}
		(0.0109)
Lowdoc*Married	$\theta_{Lowdoc\_Married}$	-0.0371^{***}
		(0.0140)
Downpay*Age	$\theta_{Downpay\_Age}$	-0.0061^{***}
		(0.0023)
Downpay*Married	$\theta_{Downpay\_Married}$	-0.0765^{***}
		(0.0288)
Term*Income	θ_{Term_Income}	-0.0003^{***}
		(0.0001)
Term*Age	θ_{Term_Age}	0.0011^{***}
		(0.0003)
Term*Married	$\theta_{Term\_Married}$	-0.0017^{***}
		(0.0004)
Interest*Income	$\theta_{Interest\_Income}$	0.1911^{***}
		(0.0619)
Interest*Age	$\theta_{Interest\_Age}$	-0.5644^{***}
		(0.1320)
Interest*Married	$\theta_{Interest\_Married}$	0.1589^{**}
		(0.0531)

Number of borrowers: 1,111
Log-Likelihood at convergence: 13126.6824

Notes: Standard errors are in parentheses. $*p < 0.1, **p < 0.05 ***p < 0.01$

Table 1.4: Estimate of Consumer Welfare When the Alternative of Low-Documentation Loan is Offered

Demographic groups	Number of borrowers in sample data	$\Delta E(CS_n)$ mean	standard deviation	95% confidence interval
all borrowers	N=1,111	$149,200^{***}$	93,866	[143,680 , 154,720]
income$> 100,000$	N=112	$138,670^{***}$	101,310	[119,910 , 157,430]
$80,000 <$income$\leqslant 100,000$	N=320	$145,790^{***}$	95,193	[135,360 , 156,220]
income$= 80,000$	N=317	$148,270^{***}$	89,832	[138,380 , 158,160]
income$< 80,000$	N=362	$144,030^{***}$	90,837	[134,670 , 153,390]
age$\geqslant 50$	N=62	$151,390^{***}$	101,160	[126,210 , 176,570]
$40 \leqslant$age< 50	N=215	$150,870^{***}$	101,080	[137,350 , 164,380]
$30 \leqslant$ age< 40	N=454	$145,080^{***}$	94,130	[136,430 , 153,740]
age< 30	N=380	$139,000^{***}$	86,414	[130,310 , 147,690]
married	N=783	$149,870^{***}$	98,314	[142,980 , 156,760]
single/divorce	N=328	$136,580^{***}$	84,577	[127,430 , 145,730]

Notes: All the values are measured in Chinese currency(RMB). $*$, $**$ and $***$ indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 1.5: Estimate of Consumer Welfare When the Alternative of Deposit Loan is Offered

Demographic groups	Number of borrowers in sample data	$\Delta E(CS_n)$ mean	standard deviation	95% confidence interval
all borrowers	N=1,111	$127,200^{***}$	102,890	[121,150 , 133,250]
income$>100,000$	N=112	$124,690^{***}$	107,310	[104,810 , 144,560]
$80,000<$income$\leqslant 100,000$	N=320	$125,680^{***}$	103,750	[114,320 , 137,050]
income$=80,000$	N=317	$126,140^{***}$	99,169	[115,220 , 137,060]
income$<80,000$	N=362	$122,550^{***}$	99,730	[112,280 , 132,830]
age$\geqslant 50$	N=62	$135,230^{***}$	108,260	[108,290 , 162,180]
$40\leqslant$ age<50	N=215	$132,780^{***}$	108,920	[118,220 , 147,340]
$30\leqslant$ age<40	N=454	$125,230^{***}$	102,580	[115,790 , 134,660]
age<30	N=380	$118,410^{***}$	95,025	[108,850 , 127,960]
married	N=783	$129,360^{***}$	106,950	[121,860 , 136,850]
single/divorce	N=328	$116,220^{***}$	93,162	[106,140 , 126,310]

Notes: All the values are measured in Chinese currency(RMB). $*, **$ and $***$ indicate statistical significance at the $10\%, 5\%$ and 1% levels, respectively.

Chapter 2 Assessing the Impacts of Equivalency Agreements in International Organic Trade

2.1 Introduction

Growing consumer demand for organic food products has led to a quickly evolving global organic industry (OTA, 2017). In 2011, the global organic market totaled $62.9 billion, with 1.8 million producers and 162 countries engaging in organic activities (Willer et al., 2013). Between 2011 and 2016, the global organic market increased by 42.6%, amounting to $89.7 billion in 2016, with 2.7 million producers and 178 countries involved in organic activities (Willer et al., 2018). While the worldwide demand for organic food products has increased, organic production has lagged behind (Barrett et al., 2002; Martinez and Banados, 2004; Seufert et al., 2017). Although organic agricultural land increased by 55.4% between 2011-2016 and reached 57.8 million hectares in 2016, the average organic share of total agricultural land among 178 countries was only 1.2% (Willer et al., 2013; Willer et al., 2018). The growing demand for organic food products has augmented international organic trade (Demko and Jaenicke, 2017; Pekdemir, 2018), especially favored by consumers in the developed countries such as the United States and the European Union whose organic sales accounted for 90% of global organic sales in 2016 (Oberholtzer et al., 2013).

Organic production is an overall system of farm management and food production that integrates cultural, biological and mechanical practices as well as high-level production and animal welfare standards to foster cycling of resources, promote ecological balance and conserve biodiversity (the European Union (EU) Regulation 2018/848; e-CFR, Title 7, PART 205, Subpart A).

Although the definitions of organic and organic production have been clarified in both EU and U.S. organic regulations, the lack of a standard definition in early 20th century drew attention by organic farmers due to fraudulent claims and unfair competition (Grolink, 2012). The Soil Association in the United Kingdom published the first private organic standards in 1967 and established a certification system in 1973 (Soil Association, 2012). A similar pattern was found in the U.S., where California Certified Organic Farmers (CCOF) started to produce organic standards and operate certification systems in the early 1970s (Arcuri, 2015). As a result, a great many certification bodies published their own organic standards in the 1970s and 1980s in order to provide organic farmers with technical assessment and assure the integrity of organic production systems (Grolink, 2012). The EU Council Regulation EEC 2092/91, published in 1991 and came into force in January 1993, was the first legal regulation in the world and was motivated by protecting consumers rather than organic farmers (Mikkelsen and Schlüter, 2009). The organic regulations established by the EU and other countries in the world do not necessarily drive out the private standards set by the third certification bodies and private organizations, because private standards are conducive to the enforcement of organic standards (Arcuri, 2015) and are more adaptive to local ecosystems and culture (Grolink, 2012). The coexistence of public standards published by governments and private standards set by private organizations prevents organic producers from accessing international markets and leads to two central concepts in organic agriculture, certification and regulation (Seufert et al., 2017).

Organic Equivalency Agreements (henceforth, OEAs) contribute to reducing costs in organic certification and indirectly influencing organic regulation in most countries. Bilateral OEAs exist to confirm that another country's control system and standards are in line with domestic requirements in order to allow the products certified in that country to be sold in the domestic market. The establishment of OEAs facilitates trade by allowing organic food products certified to an internal standard to gain access to the market in the partner country without further documentation, therefore lowering administrative costs otherwise required (Barrett et al., 2002). On the other hand, considering that organic producers pay certification costs, lower cost of certification bodies resulted from obtaining fewer accreditations to various target markets further reduces transaction costs related to organic trade and thus alleviates the burden of organic producers (Bowen and Hoffman, 2013). The effects of the establishment of OEAs on organic trade by lowering certification costs are even more salient for manufacturers whose products are composed of organic ingredients. Bowen and Hoffman (2015) mentioned the so-called "chocolate problem" under the circumstances when U.S. signed an OEA with the EU while not with Switzerland, Swiss organic chocolate producers could not source certified milk powder and cocoa competitively from the U.S. recognized ingredient suppliers and were eventually excluded from the U.S. market.[1]

Considering the many differences between the organic standards of different countries, particularly in the degree to which fertilizers and animal feed were defined as organic (Padel et al., 2009), the Codex Alimentarius Commission (Codex)[2] founded in 1961 and the International Federation of Organic Agriculture Movement (IFOAM) founded in 1972 have made an effort to harmonize organic standards (Mutersbaugh, 2005). The IFOAM published the IFOAM Basic Standards (IBS) in 1980, and the Codex developed and approved the Guidelines for the Production, Processing, Labeling and Marketing of Organically Produced Foods (Codex Guidelines) in 1999. Whilst the guidelines published by Codex and IFOAM aimed to reach a consensus on the definitions of organic practices across countries and facilitate trade by harmonizing organic requirements (Codex Alimentarius, 2007; Bowen and Hoffman, 2013), few countries in the world officially claimed that their organic regulations were affected by the IBS and Codex Guidelines (Katto and Bowen, 2012).[3] Notably, the EU and the U.S. organic regulations were not affected by the IBS (Bowen and Hoffman, 2013) or the Codex Guidelines (Katto and Bowen, 2012). The reasons why international organizations can hardly influence the development of organic regulations in most countries are two-fold. First, harmonization is often restricted by differences between countries such

[1]EU signed bilateral OEA with the U.S. in June 2012, and Switzerland signed bilateral OEA with the U.S. in July 2015.

[2]The Codex Alimentarius Commission is an intergovernmental body established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

[3]India and Uganda claimed that they adopt IBS (Seufert et al., 2017), and Japan adopted the Codex Guidelines (Katto and Bowen, 2012). However, Japan introduced "grading" of organic products throughout the production and distribution chain to the Japanese Agricultural Standard (JAS).

as culture, technical development, and governance constructs (Bowen and Hoffman, 2015). For example, countries whose organically produced livestock are in their infancy would prefer more basic standards related to animal welfare than other countries. Second, consumers' concern and understanding of organically produced food play an essential role in the development of organic regulation. For example, Indian consumers care more about biodiversity, while Australian regulation focuses on water issues (Seufert et al., 2017).

When compared to the process of developing a multilateral harmonized standard, OEAs are more comfortable to implement because this form of agreement allows each country to retain their own production and certifying systems, and agree to acknowledge another country's organic standard and technical regulations as equal in its effectiveness on environmental and health protection (Vogl et al., 2005; Pekdemir, 2018). Some argue that equivalency negotiations could be lengthy and costly (International Task Force, 2003). Despite this, the number of bilateral OEAs has increased from seven to thirty from 2011 to 2019 (IFOAM-Organic Equivalency Tracker, 2019).

In addition, trade agreements have the capacity to reshape public and private quality control systems in the international framework (Henson and Caswell, 1999). Gandal and Shy (2001) pointed out that each country would mutually recognize organic standards when network effects overwhelmed conversion costs.[4] Up to this point, 87 countries have organic legislation, 18 countries are in the process of drafting legislation, and 33 countries have national organic standards without national legislations (Willer et al., 2018).[5] International trade agreements such as OEAs could contribute to creating a policy environment in which network effects outstrip conversion costs and guide the drafting of organic legislation. "Ultimately, organic is about a way of life," said Franz Fischler, the former Agriculture Commissioner of the European Union (GOMA, 2012, p.12). As a representative of a new style of life, Consumers' awareness of health and environmental protection in developed countries induced more stringent definitions of organic farming and

[4]Gandal and Shy (2001) note that conversion costs are required when governments do not recognize foreign standards, foreign firms must incur a standard conversion cost in order to adhere to the local specification and be permitted to sell in the domestic country.

[5]Such organic standards do not necessarily lead to national inspection and certification system which would be supervised by the government, they only provide a national definition of organic products and are a reference point for certification activities (Willer et al., 2018). For example, Laos, Nepal, Vietnam, and South Africa.

conformity assessment in organic regulations, which created more significant gaps between developed and developing countries in terms of organic standards. The establishment of OEAs gives developing countries more incentive to update organic regulations, especially when the developed countries are ideal markets they would like to access, and eventually facilitates harmonization.

This study focused on OEAs between exporting countries and two major organic markets: the U.S. and Denmark. The U.S. organic market is the largest in the world, accounting for 47% of the global sales of organic food products and amounting to $43 billion in organic food sales in 2016. The European Union (EU) is the second-largest organic market in the world, holding 37% of the global organic market and amounting $35 billion in organic retail sales in 2016 (Willer et al., 2018). Denmark is the second-largest member country in the E.U. in terms of per-capita consumption of organic food products. In Denmark, the consumption of organic food products is approximately 244 Euros per person in 2016, and organic products comprise nearly 10% of Denmark's total food sales (Willer et al., 2018, p.147). In the context of international trade, the U.S. imported $1.7 billion of organic food products, and Denmark's import value of organic food products amounted to $0.5 billion in 2016. Combined, the U.S. and Denmark accounted for nearly half of global import value of organic food products. In addition, U.S. and Denmark make their bilateral trade value data related to organic food products publicly available, reporting in detail with each partner country.[6]

Two recent studies have highlighted concern about the effect of OEAs on the international trade of organic products. Demko and Jaenicke (2017) used the synthetic control method to explore the impacts of the OEA between the U.S. and the EU. This study found that the policy generated a 9.1% increase in quarterly exports of U.S. organic food products to the EU. Demko and Jaenicke (2015) used 2011-2014 trade flow data to predict that the impact of OEAs between U.S.-Canada and U.S.-Japan on U.S. organic exports at 454.6% and 219.7%, respectively. They also predicted that U.S. imports of organic food products from Canada and Japan would increase by 371% and

[6] This study only considers two markets due to data availability; only the U.S. and Denmark collect trade value data for organic food products with each partner country. Data availability also limits variables used in this study, in specific, product-level data related to organic land in exporting countries.

267%, respectively, using 2013-2014 trade flow data.

Whether or not OEAs create trade depends on: (i) agroecological characteristics and technological productivity in the exporting country; (ii) whether the organic food products originating from the remaining exporters in the importing country are close substitutes for those originating from the exporting country; and (iii) trade costs between the exporting and importing country. The results of Demko and Jaenicke (2015; 2017) should be carefully interpreted. Not all bilateral OEAs necessarily cause "trade creation,"[7] indicating that within-bloc trade increases and imports from non-member countries remain unchanged (Carrere, 2006; Sun and Reed, 2010). If organic food exporters produce and sell different products to a given importing country, then the trade benefits of entering an OEA are less clear. Further, focusing on OEAs between developed countries and organic market leaders might give policymakers a misleading impression that the establishment of OEAs ensures "trade creation."

Based on a structural model, this study sought to solve the previously discussed issues to some degree and to answer the following empirical question: How large are the effects of current and potential OEAs on the value of exports for countries exporting to the U.S. and Denmark? This study focuses on the period of 2011-2016, during which the U.S. signed four out of five bilateral OEAs, and Denmark expanded bilateral OEA partners from two to five. Following Eaton and Kortum (2002), it is assumed that the exporting country that offers the lowest price for a given product in the importing country dominates the market. Further, price is a function of agroecological characteristics, technological productivity of the exporting country, and bilateral trade costs between exporting and importing countries. Therefore, the effects of OEAs on trade flows are constrained by productive factors. In addition, this study assumed that increases in market shares of exporting countries were at the expense of other exporting competitors. It was especially true for competitors with similar land and climate endowments that compete head-to-head for specific organic food products in the destination market. This structural model followed the work of Heer-

[7] Carrere (2006) defines pure trade creation that trade flow increases among member countries within regional trade agreements, and trade flow between importer and non-member countries remains unchanged. Sun and Reed (2010) support trade creation if within-bloc trade increases and imports from non-member countries decrease, but the decrease in imports from non-member countries is lower than within-bloc trade increase.

man et al. (2015), which first applied the BLP method (Berry, Levinsohn and Pakes, 1995) in agricultural trade literature and identified the elasticity of bilateral trade flow with respect to trade costs by relaxing the assumption of IIE (independence of irrelevant exporters)[8], thus offering the likelihood of disproportionate elasticities to trade costs. As a result, the simulation on the predictive trade patterns between the importing country and each active exporter gives policymakers a broader view of OEAs.

This study has three primary contributions. First, the findings are reliable to the extent that the effects of OEAs are based on technological productivity and agroecological endowments in exporting countries. The findings suggest that OEAs lead to growing trade volumes for most exporters in the market of the U.S. and Denmark, which gives policymakers a global view of OEAs. Second, since the focus was on the effects of exports to the Danish market rather than imports from Denmark, unilateral OEAs in which the Danish market were grantors were treated as similarly "effective" as bilateral OEAs. The inclusion of unilateral OEAs is novel, as it has not been addressed previously. Therefore, the findings shed light on how unilateral OEAs benefit exporters, especially for export-oriented exporters such as Argentina, Chile and Peru.[9] Third, although the establishment of an OEA depends on the extent to which two countries trust each other's organic production and quality control systems (Bowen and Hoffman, 2015; Pekdemir, 2018), this study offers a more realistic prediction of trade pattern based on comparative advantage of agroecological characteristics in exporting countries rather than political willing. The findings with respect to how each exporting country would have repositioned under possible organic equivalency agreements not only allow competitive developing exporting countries enter the vision field of developed importers, but also reinforce the influence of importing countries on development of organic regulations in exporting countries who have a comparative advantage in producing organic food products of interest.

The findings indicate that exporters that have an OEA with the importer enjoy higher mar-

[8] IIE property is equivalent to IIA(independence of irrelevant alternatives) property in discrete choice literature. Heerman et al. (2015) define IIE as the following: "changes to a third country's trade costs are 'irrelevant' to the ratio of any other two competitors' market share in a given import market."

[9] Examples of export-oriented countries come from a blog written by Joelle Katto Andrighetto, head of policy and guarantee, IFOAM-Organics International, https://www.organicwithoutboundaries.bio/2018/08/15/data-collection-promote-organic/

ket shares relative to those that do not have an OEA with the importer. If the U.S. had signed an OEA with one of its non-OEA exporting partners in 2016, the value of export of organic food products to the U.S. would have averaged $205 million, 650% higher than the actual value in 2016. If Denmark had established an OEA with one of its exporting partners in 2016, the export value would have increased by 350% and reached $9 million on average. However, some OEAs (e.g., between U.S.-Tunisia, U.S.-Turkey) would have negatively impacted the export value of organic food products to the corresponding markets in 2016.

The remainder of this paper is structured as follows. In Section 2, background information on the organic policy and OEAs is provided. Section 3 provides an overview of literature related to organic standards/agreements and internationa trade. In Section 4, the structural model is proposed, and the data set is introduced. Section 5 presents estimation results and discusses counterfactual analyses, and Section 6 offers conclusions.

2.2 Background: Organic Food and Relevant Global Market

2.2.1 Organic and Organic Regulations in the U.S. and EU

The term "organic" originates from the Greek word "bios," meaning life or way of living. The Codex Alimentarius Commission defines organic as a "labeling term that denotes products that have been produced in accordance with organic production standards and certified by a duly constituted certification body or authority" (Codex Alimentarius, 2007). Green Earth Organics provides an alternative definition of organic food products: "organic foods are minimally processed to maintain the integrity of the food without artificial ingredients, preservatives or irradiation" (Essoussi and Zahaf, 2008). The International Federation of Organic Agricultural Movement (IFOAM) defines organic agriculture as a production system that relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects, such as synthetic chemical fertilizers, pesticides and pharmaceuticals (Raynolds, 2004; IFOAM Norms, 2014).

Initially promulgated by third-party certification bodies and private organizations, organic standards, inspections, and certifications are increasingly regulated by government authorities. European governments established laws regulating organic certification and labeling in the 1980s (Michelsen, 2001). In 1991, the European Union published EU Council Regulation (EEC 2092/91) on organic production of agricultural products, and EEC 2092/91 came into force on January 1st, 1993. The EU Council adopted a new Council Regulation EC 834/2007 on organic production and labeling of organic products in July 2007, which came into force on January 1st, 2009. At the same time, two sets of implementing rules came into force under EC 834/2007: EC 889/2008 on detailed production rules for plants, livestock and processed products including yeast, and their labeling and control; EC 1235/2008 on detailed rules for imports from third countries. The latest version of the EU Council Regulation on organic production and labeling of organic products is EC 2018/848, which was published in May 2018 and would not be effective until January 1st, 2021.

In the United States, California was one of the first states to regulate organic products. In 1979, California passed the Organic Food Act into law, which defined the term "organic" (CCOF, 2015). In 1990, the Organic Foods Production Act (OFPA), enacted under the 1990 Farm Bill, authorized the U.S. Department of Agriculture (USDA) to establish the National Organic Program (NOP). NOP set regulations and guidance on certification, production, and labeling of organic products and finalized the national organic standards in 2001. By 2002, operations with gross agricultural income from organic sales of more than $5,000 must be certified organic by an accredited certification agent (ACA) and complied with the national organic standards.

2.2.2 Organic Equivalency Agreements

United States

In 2009, the U.S. established the first bilateral OEA with Canada. As a result, producers and processors who are certified by a USDA accredited certifying agent following U.S. National Organic Program (NOP) standards do not have to be certified by the Canada Organic Product

Regulation (COPR) standards in order for their products to be represented as organic in Canada. Likewise, Canadian products certified under COPR standards may be sold or labeled in the United States as organically produced. In June 2012, the U.S. and the EU recognized one another's organic standards and control systems as equivalent. To improve clarity, organic food products treated with specific synthetic fertilizers or produced by certain production methods might be excluded from the bilateral OEAs. For example, under the U.S.-Canada bilateral OEA, agricultural products produced with the use of sodium nitrate shall not be sold or marketed as organic in Canada. Besides, agricultural products produced by hydroponic or aeroponic production methods shall not be sold or marketed as organic in Canada. Under U.S.-EU bilateral OEA, in order to be marketed as organic in EU, antibiotics tetracycline and streptomycin should not be used to control fire blight in apples and pears produced in the United States; on the other hand, in order to be marketed as organic in the U.S., antibiotics should not be administered to animals raised in EU member countries. After signing OEAs with Canada and EU, an OEA between the U.S. and Japan went into effect in January 2014. Later, in July 2014, an OEA was established between the U.S. and South Korea. Finally, in July 2015, a bilateral OEA between the U.S. and Switzerland was established, marking its fifth organic equivalency arrangement.

European Union

The EU currently recognizes thirteen countries as being equivalent to the EU's organic standards and control systems; therefore, products assessed in conformity with organic standards in these thirteen countries are authorized to export to the EU labeled as organically produced products. These thirteen countries are listed in Annex III to EC 1235/2008, an implementation rule under EC834/2007 (known as the Third Country List). Chile is the newest member of the third country list with the organic agreement established between the EU and Chile in 2017. The other twelve countries and the year the EU OEA was established are as follows: Australia (1996), Argentina (1997), Israel (1997), Switzerland (1997), New Zealand (2002), Costa Rica (2003), India (2006), Tunisia (2009), Japan (2010), Canada (2011), United States (2012), and South Korea (2015). According to the IFOAM-Organic Equivalency Tracker (2019) and the best of my knowledge, only six countries in this third country list also accepted EU's organic standards and conformity assessment and thus constituted bilateral OEAs. They are Switzerland (1997), Japan (2010), Canada (2011), U.S. (2012), South Korea (2015), and Chile (2017). The OEAs between the EU and the other seven countries in the third country list can be treated as unilateral OEAs where the EU is the grantor.

Table 2.1 details the OEAs between exporters and two import markets from 2011 to 2016. In the U.S. market, notice that Croatia joined the EU in 2013; thus, Croatia was excluded from the US OEA partners in 2012 but included in 2013. Table 2.1 displayed thirteen countries which were recognized by the EU, including the EU-Chile OEA. However, notice that the EU-Chile OEA was established in 2017 and was out of range of sample period 2011-2016.

2.3 Literature Review

Previous literature has a long-time debate on useful methods to reduce organic certification costs and how to codify organic regulations in order to facilitate international trade. Vogl et al. (2005) confirm that farmers and consumers pay for multiple certifications and accreditations, and Barrett et al. (2002) suggest that more efficient and affordable certification process should be made to facilitate organic trade to Europe, such as local inspection bodies. Arcuri (2015) studies the effects of the process of publicization and finds that public regulation allows private actors to maintain private standards and expand in new directions, on the other hand, the process of publicization might have reduced the regulatory capabilities of private regulators committed to core organic values. Padel et al. (2009) and Seufert et al. (2017) advocate the establishment of public regulations on organic products, but they both suggest that public regulations should focus more on the organic values and environmental practices rather than specific rules. Padel et al. (2009) compare the discrepancies of core organic values between private principles (IFOAM) and public regulations (EEC 2092/91), they suggest that concern of organic regulation should focus on harmonization of ethical values and principles rather than rules in order to protect the integrity of organic farming. Seufert et al. (2017) employ a scoring approach to assess how organic principles vary with organic regulations in countries. They find that substances that are allowed (or not) as inputs are codified in regulations while environmental best practices such as diversified crop rotations are less emphasized.

To be consistent with the organic principles and values in developed countries, scholars investigate the possibilities of developing multilateral agreements on organic products. Gandal and Shy (2001) develop a three-country and three-variety world economy model, they assume that each government decides whether or not to recognize foreign standards against with conversion costs in the first stage, and each firm sets prices to maximize profits and consumers make purchases in the second stage. They find that the likelihood of standardization unions would be higher if conversion costs overwhelm network effects, countries will choose to mutually recognize all standards with positive network effects and no conversion costs. Pekdemir (2018) introduces the development of regional organic standards established in the EU, Africa, Central America, the Pacific, Asia and concludes that inter-regional equivalence and multilateral agreements contribute to the reduction of regulatory complexity in organic regulation systems.

Several works of literature shed light on the international trade of organic products. Demko and Jaenicke (2017) obtain data from USDA GATS system, they use quarterly level data on 23 categories of the U.S. organic food products during 2011-2014 period and find that the Organic Equivalency Agreement between the U.S. and the EU established in 2012 brings about 9.1% increase in organic food export from the U.S. to the EU market. They minimize the distance between pre-treatment characteristics of a treated country and those of a country from comparison group to construct the optimal weight of the comparison group and then use the difference-in-difference method to assess the impacts of the U.S.-EU OEA. Oberholtzer et al. (2013) employ the Heckman model to explore organic handler's decision to import and how much of the organic product to import using a survey of organic handlers in 2007 administered by Washington State University. They find that larger organic firms are more likely to import organic products, while smaller firms are less likely to import, smaller firms would import a more considerable share once deciding to import.

Empirical models have been employed in emerging literatures to investigate the impacts of trade agreements on trade flow and trade pattern. Baier and Bergstrand (2007) use panel data for 96 potential trading partners in eight five-year intervals during 1960-2000 period to estimate the effects of Free Trade Agreements (FTAs) on member's trade, they find that FTAs will on average increase two member countries' trade about 100% after ten years. Baier and Bergstrand (2009) use nonparametric matching econometrics to estimate the long-run effects of Free Trade Agreements (FTAs) on members' trade, they find that the long-run effects of membership in the European Economic Community (EEC) and Central American Common Market (CACM) between 1960 and 2000 are 100%, not far away from gravity results. Egger and Larch (2008) employ spatial econometrics to revisit the effects of Preferential Trade Agreements (PTAs) using data for 145 countries during 1955-2005. They find that pre-existing PTAs have a positive impact on the probability of non-members to participate in existing PTAs, and this impact is more substantial for the pairs of countries which are geographically close to member countries of the pre-existing PTAs. Hertel et al. (2007) use Computable General Equilibrium (CGE) model to estimate elasticities of imports from different countries, and they find that nine of thirteen Free Trade Area of the Americas (FTAA) region experience a welfare gain.

This paper employs Berry, Levinsohn, and Pakes (1995) method, not only because of the development of BLP method in estimating demand parameters but also considering the similarities between BLP model and trade theory derived from Eaton and Kortum (2002). Berry, Levinsohn, and Pakes (1995) firstly provide a structural model to estimate demand and cost parameters in the U.S. automobile industry using only aggregate consumer-level and product-level data. Nevo (2001) extends the BLP method and employs a random coefficients logit model to estimate price-cost margins in the ready-to-eat cereal industry. He finds that product differentiation and multi-product firm pricing explain most of the observed price-cost margins. In Nevo's guide for practitioners (Nevo, 2000), he clearly points out three advantages of using BLP method: first, the model can be estimated using only market-level data such as price and quantity; second, it deals with the endogeneity of prices using instrument variables; third, it produces a more realistic demand elasticities pattern, in that, cross-price elasticities are larger for products that are closer substitutes. As noted by Eaton and Kortum (2002), "our model of trade bears resemblance to discrete-choice models of market shares, popular in industrial organization" (footnote 19). Heerman et al. (2015) use 2006 production and trade data on the 134 agricultural items to investigate bilateral trade patterns due to Asia-Pacific integration. They find that exporters would have occupied higher market shares if the United States was excluded from Asia-Pacific integration. If China was excluded, then the increase in the market shares of exporters would have been lower relative to U.S. exclusion. Compared with the U.S., fewer exporters produced close substitutes for agricultural products originated from China and were, therefore, less sensitive to the change of trade costs.

2.4 Methods and Data

Suppose there are I exporters and an *outside exporter* engaging in international trade. In this model, it is assumed that importers may decide not to purchase a specific product from any of the I exporters; in this case, the exporter from which they choose to purchase products is defined as the *outside exporter*. Exporters are indexed by $i \in \{0, 1, 2, \ldots\ldots I\}$, where $i = 0$ represents the *outside exporter*. Importers are indexed by j, and products are indexed by k. This analysis uses as a basis for the Eaton and Kortum model (2002). To this, specific land productivity and other aspects of the production function used by Heerman et al. (2015) are added, and add production is assumed to follow:

$$q_{ik} = z_{ik}(N_i^{\beta_i}(a_{ik}L_i)^{1-\beta_i})^{\alpha_i} Q_i^{1-\alpha_i} \tag{2.1}$$

where q_{ik} is the output of product k in exporter i, z_{ik} represents product k-specific technological productivity in exporter i, N_i, L_i, and Q_i refers to input of labor, land, and intermediate inputs, respectively. The newly added measure of product-specific land productivity, a_{ik}, reflects the overall suitability of exporter i's environment for producing product k.

Following Eaton and Kortum (2002), it is assumed that exporter i's technological productivity follows a Frechet distribution (also called the Type II extreme value distribution):

$$F_i(z) = e^{-T_i z^{-\theta}} \tag{2.2}$$

where $T_i > 0$ and $\theta > 1$. The country-specific scale parameter T_i governs the location of the distribution; a higher value of T_i implies that it is more likely to draw a high productivity for any product k in country i. The shape parameter θ reflects the amount of variation within the distribution, and a larger θ implies less variability in productivity across products.

With perfect competition, the price offered by exporter i in market j for product k is equivalent to the unit production cost multiplied by the cost of trading product k between countries i and j:

$$p_{ijk} = \frac{a_{ik}^{-\alpha_i(1-\beta_i)} c_i \tau_{ijk}}{z_{ik}} \tag{2.3}$$

where p_{ijk} represents the price offered by exporter i in market j for product k; where c_i is the cost of an agriculture input bundle in exporter i. The product-specific cost of land input in exporter is reflected by $a_{ik}^{-\alpha_i(1-\beta_i)}$, and the power $\alpha_i(1-\beta_i)$ is derived from measures of the responsiveness of output to a change in the productivity of land used in production. The trade cost of delivering product k from exporter i to market j is denoted as τ_{ijk}. The Samuelson iceberg assumption is adopted, which implies that delivering one unit of product k to country j requires shipping $\tau_{ijk} > 1$ units for $j \neq i$ from country i since a portion of goods are disappeared during the delivery. If there is no cross-border delivery, trade costs within each country are assumed negligible, then $\tau_{iik} = 1$. Cross-border arbitrage forces effective geographic barriers to obey the triangle inequality[10]: for any three countries, i, s, j, $\tau_{ijk} \leqslant \tau_{isk}\tau_{sjk}$.

[10]Triangle inequality implies that trade cost of delivering product k from country i to country j always costs less than or equal to trade cost of delivering from country i to country n thorugh country s rather than straightforward delivery from country i to country n.

The method developed by Eaton and Kortum (2002) is used to obtain the probability that exporter i offers the lowest price for product k in market j (See Appendix A).

Denoting the exporter's product-specific cost of land input $a_{ik}^{-\alpha_i(1-\beta_i)}$ as $\tilde{a_{ik}}$, then the probability that exporter i offers the lowest price for product k in market j is:

$$\pi_{ijk} = \frac{T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}{\sum_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \tag{2.4}$$

where π_{ijk} represents the probability that price of product k offered by exporter i is equal to or lower than the price offered by any other exporter in market j; where T_i is scale parameter for exporter i's technological productivity distribution.

Rearranging equation (2.4) to express market share in the form of a logit formula:

$$
\begin{aligned}
\pi_{ijk} &= e^{ln(\pi_{ijk})} = e^{ln(\frac{T_i(\widetilde{a_{ik}}c_i\tau_{ijk})^{-\theta}}{\sum_{i=0}^{I} T_i(\widetilde{a_{ik}}c_i\tau_{ijk})^{-\theta}})} \\
&= e^{ln(T_i(\widetilde{a_{ik}}c_i\tau_{ijk})^{-\theta}) - ln(\sum_{i=0}^{I} T_i(\widetilde{a_{ik}}c_i\tau_{ijk})^{-\theta})} \\
&= \frac{e^{ln[T_i(\widetilde{a_{ik}}c_i\tau_{ijk})^{-\theta}]}}{e^{ln[\sum_{i=0}^{I} T_i(\widetilde{a_{ik}}c_i\tau_{ijk})^{-\theta}]}} \\
&= \frac{e^{lnT_i - \theta lnc_i + \theta\alpha_i(1-\beta_i)lna_{ik} - \theta ln\tau_{ijk}}}{\sum_{l=0}^{I} e^{lnT_l - \theta lnc_l + \theta\alpha_l(1-\beta_l)lna_{lj} - \theta ln\tau_{ljk}}}
\end{aligned}
\tag{2.5}
$$

We denote V_{ik}^{E}, V_{ijk}^{t}, and ν_{ijk} as random variables drawn from distribution of unobserved product k-specific agro-ecological characteristics in exporter i, unobserved product k-specific trade cost between exporter i and market j, and unobserved product k-specific standard deviation from the mean effect of OEA respectively. Integration with respect to the product-related random variables is used to identify the market share specific to exporter i and market j. We also normalize the mean effect of *outside exporters'* characteristics on trade flow to zero. The random coefficients logit model can thus be written as:

$$
\pi_{ij} = \int \frac{exp(lnT_i - \theta lnc_i + \theta\alpha_i(1-\beta_i)lna_{ik}(V_{ik}^{E}) - \theta ln\tau_{ijk}(V_{ijk}^{t}, \nu_{ijk}))}{1 + \sum_{l=1}^{I} exp(lnT_l - \theta lnc_l + \theta\alpha_l(1-\beta_l)lna_{lk}(V_{lk}^{E}) - \theta ln\tau_{ljk}(V_{ljk}^{t}, \nu_{ljk}))} dV_{ik}^{E} dV_{ijk}^{t} d\nu_{ijk} \tag{2.6}
$$

The definition of a market determines the set of available exporters, and we define a market as an importer-year combination. That is, each importer (U.S. or Denmark) combined with each year (from 2011 to 2016) is defined as a new "market". Overall, this definition results in 12 markets, encompassing two import markets and six years. The random coefficients logit model which describes the organic food market share of exporter i in market j at time t can thus be rewritten as the following:

$$\pi_{ijt} = \int \frac{exp(lnT_{it} - \theta lnc_{it} + \theta\alpha_i(1-\beta_i)lna_{ikt}(V^E_{ikt}) - \theta ln\tau_{ijkt}(V^t_{ijkt}, \nu_{ijkt}))}{1 + \sum_{l=1}^{I} exp(lnT_{lt} - \theta lnc_{lt} + \theta\alpha_l(1-\beta_l)lna_{lkt}(V^E_{lkt}) - \theta ln\tau_{ljkt}(V^t_{ljkt}, \nu_{ljkt}))} dV^E_{ikt} dV^t_{ijkt} d\nu_{ijkt} \tag{2.7}$$

Following Eaton and Kortum (2002) and Heerman et al. (2015), $S_{it} = lnT_{it} - \theta lnc_{it}$, S_{it} represents exporter i's "competitiveness" at time t, its state of technology adjusted for its intermediate input costs. Then we simplify the random coefficients logit model as:

$$\pi_{ijt} = \int \frac{exp(S_{it} + \theta\alpha_i(1-\beta_i)lna_{ikt}(V^E_{ikt}) - \theta ln\tau_{ijkt}(V^t_{ijkt}, \nu_{ijkt}))}{1 + \sum_{l=1}^{I} exp(S_{lt} + \theta\alpha_l(1-\beta_l)lna_{lkt}(V^E_{lkt}) - \theta ln\tau_{ljkt}(V^t_{ljkt}, \nu_{ljkt}))} dV^E_{ikt} dV^t_{ijkt} d\nu_{ijkt} \tag{2.8}$$

where V^E_{ikt} and V^t_{ijkt} follows the standard multivariate normal distribution, and ν_{ijkt} is random variable drawn from the standard normal distribution.

Next, we specify $S_{it} + \theta\alpha_i(1-\beta_i)lna_{ikt}$ as a function of exporter agro-ecological characteristics, product agro-ecological characteristics, exporter, and time fixed effects.

$$S_{it} + \theta\alpha_i(1-\beta_i)lna_{ikt} = X_{it}\varphi + X_{it}\Sigma_E V^E_{ikt} + \lambda_i + \lambda_t \tag{2.9}$$

where S_{it} represents exporter i's "competitiveness" at time t, defined as $X_{it}\varphi + \lambda_i + \lambda_t$; where X_{it} is a $1 * g$ vector of variables describing exporter i's agro-ecological characteristics at time t; φ is a $g * 1$ vector of coefficients; λ_i is exporter fixed effects, and λ_t is time fixed effects;

We define X_{it} as:

$$X_{it} = f(orgland_{it}, \quad orgshare_{it}, \quad temp_i) \tag{2.10}$$

where $orgland_{it}$ is the log of organic arable land in exporter i at time t, $orgshare_{it}$ is the organic arable land share of total farmland in exporter i at time t, and $temp_i$ represents the share of total arable land area in temperate climate zones in exporter i.

$$\theta\alpha_i(1 - \beta_i)lna_{ikt} = X_{it}\Sigma_E V_{ikt}^E \tag{2.11}$$

where a_{ikt} represents organic product k-specific land productivity in exporter i at time t, which reflects the overall suitability of exporter i's environment for product k at time t; where V_{ikt}^E is a $g * 1$ vector that captures the effect of unobservable product k-specific agro-ecological characteristics in exporter i at time t with diagonal scaling matrix Σ_E ($g * g$).

We specify product-specific trade cost $-\theta ln\tau_{ijkt}$ as the following:

$$-\theta ln\tau_{ijkt} = t_{ijt}\eta + t_{ijt}\Sigma_t V_{ijkt}^t + \gamma OEA_{ijt} + \sigma\nu_{ijkt}OEA_{ijt} + \lambda_n + \xi_{ijt} \tag{2.12}$$

where t_{ijt} is a $1 * h$ vector describing the relationship between exporter i and market j at time t; η is a $h * 1$ vector of parameters;

We define t_{ijt} as:

$$t_{ijt} = f(border_{ij}, \quad language_{ij}, \quad rta_{ijt}, \quad d_{ij}, \quad exgdp_{it}, \quad imgdp_{jt}) \tag{2.13}$$

where equal to one if the two countries share a common border ($border_{ij}$), language ($language_{ij}$), or are members of a common regional free trade agreement at time t (rta_{ijt}). The log values of the gross domestic product measured in 2010 constant dollars in exporter i at time t and importer j at time t are denoted by $exgdp_{it}$ and $imgdp_{jt}$ respectively. The population-weighted average distances between the largest cities in each trading country pair are separated into five categories and denoted as d_{ij}.

where V_{ijkt}^{t} is a $h * 1$ vector that captures the effect of unobservable product k-specific trade costs between exporter i and market j at time t with diagonal scaling matrix Σ_t $(h * h)$;

where OEA_{ijt} would equal to one if exporter i and market j signed bilateral organic equivalency agreement or unilateral organic equivalency agreement where the market j is the grantor at time t. The coefficient of OEA_{ijt} follows a normal distribution with mean γ and standard deviation σ; where ν_{ijkt} is a random variable drawn from standard normal distribution.

A market-specific trade cost captured by a fixed effect λ_j, and ξ_{ijt} captures unobservable or unquantifiable bilateral trade costs that are common across products and orthogonal to the regressors at time t (For detailed estimation procedures, see Appendix B).

It is worth to note that the establishment of OEAs would not influence the supply of organic agricultural land in the current year due to the provision of conversion period. The conversion period refers to the period during which the farm parcel has been managed in accordance with the national organic standards and no prohibited substances have been applied to the farm parcel. To be certified as "organic" farm parcel, the U.S. National Organic Program (NOP) requires a period of three years to be conversion period, and the EU organic regulation stipulates that at least two years before sowing is needed to be certified as "organic" (e-CFR, Title 7, PART 205, Subpart C; the European Union (EU) Regulation 2018/848). Therefore, the establishment of OEAs might have impacts on the expansion of organic farmland two or three years later (conversion period) rather than in the current year. Taking this into consideration, we only include the organic agricultural land in the current year in the model without taking lags.

It takes a longer time on the negotiation of OEAs between signatories than the time on the implementation. For example, although Canada implemented national organic standards in 1999, Canada were not able to sign OEA with its first partner (the U.S.) until 2009 when Canada published the Organic Product Regulations (OPR). It takes a long time and probably several years for each signatory to recognize the organic regulations governing organic farming, processing, labeling, and control systems as being equivalent to its own national regulations. Based on the admission of the other signatory's national legislation, an OEA between signatories might be established. Once signing to OEAs, the signatory's organic food products produced and certified in accordance with its own organic standards are allowed to be labeled as "organic" and marketed to the other signatory without further documentation. Therefore, the implementation lag of OEAs would be excluded from our empirical model.

2.4.1 Instrumental Variable Construction

OEA_{ijt} is considered an endogenous variable because the importing countries may observe and consider exporting countries' characteristics which are unobserved or unquantified by researcher, when deciding whether signing OEA with exporters. For example, China signed OEA with New Zealand in 2016 because Chinese consumers lost confidence in dairy products resulted from Melamine milk powder incident in 2008.[11]

Due to the endogeneity of OEAs, an instrumental variable (IV) is devoted to a consistent estimation. The IV should be correlated with the endogenous explanatory variable (indicator for the establishment of OEAs), conditional on the other covariates. If, for example, characteristics of exporters who already signed organic equivalency agreement with market j at time t were similar to a potential OEA signatory, then there may be a higher probability of this country pair signing a new OEA. Here the IV is defined as the absolute value of the difference between the average number of organic farmers in exporting countries who already signed OEA with market j at time t and the number of organic farmers in exporter i at time t.[12]

[11] Yin et al. (2018) found that consumers were willing to pay 6.679 US dollars higher for infant milk powder with country of origin label from New Zealand compared with label from China by conducting a choice experiment survey.

[12] The intuition of IV comes from Baier and Bergstrand (2002), who used the absolute value of the difference between free trade agreements (FTAs) member countries' capital-labor ratio with respect to the rest of the world's (ROW's) average capital-labor ratio as IV to solve the endogeneity of indicator for FTAs. They found that the smaller the relative factor-endowment differences (capital-labor ratio) with the ROW, the more likelihood of signing an FTA.

Use of the number of organic farmers as the IV informs how similar (or remote) exporter i is to other OEA exporters to market j rather than similarity to market j itself. Therefore, this IV is not correlated with unobservable and unquantified variables which affect the trade flow between exporter i and market j at time t. Thus this IV is unrelated to the econometric error term in the model (ξ_{ijt}).

2.4.2 Data

The dependent variable is defined as the market share of exporter i in market j at time t. The market share (π_{ijt}) is computed as the ratio of the imported value of organic food products from exporter i to value of organic food products imported from all sources at time t.

The value of organic agri-food trade between exporters and the two import markets of focus, the U.S. and Denmark are obtained from the USDA Foreign Agricultural Service's Global Agricultural Trade System (GATS) and Statistics Denmark, respectively. Due to the identification strategy, an observation was dropped if the market share equaled zero[13]; as such, the set of available exporters to each market varied over time. Table 2.2 shows that the combined market share of all exporter to the U.S. market (n=82) included in this analysis. These countries reflected 98.8% of organic food exports to the U.S., and 96.5% of exports Denmark during the period of study of 2011-2016.

Data concerning the organic arable land and the share of organic arable land to total farmland in exporter i at time t are obtained from the Research Institute of Organic Agriculture (FiBL)

Apart from the IV we selected, we also made an effort on several alternative IVs. For example, the RTA indicator, the aggregate bilateral trade value on agricultural products, the same IV in this study but removing the absolute value. However, they are not valid since they are negatively related to the indicator for OEAs and result in a negative mean effect of OEAs on the value of export.

[13]The selection of organic exporters included in this analysis is limited by the availability of data for the number of organic producers (needed for the IV construction). An observation was dropped if the market share was equal to zero; 267 observations were eliminated for this reason. Observations with zero market share are excluded due to the identification strategy, in specific, the contraction mapping (fixed-point iteration) clarified in Appendix B-step 3. To estimate the mean effect, we simulated the market share and then minimized the difference between observed and predicted market share. An estimate of the mean effect could not be generated if the observed market share were equal to zero.

statistics (Willer, 2018).[14]

The average log value of organic arable land was 11.58 during the sample period, amounting to approximately 106,940 hectares. Organic arable land accounted for an average of 3 percent of total farmland over the period of study.

Data for total arable land in tropical, temperate, and boreal climate zones in exporter i were collected from the Development of the GTAP land use database (Avetisyan, Baldos, and Hertel, 2011). It was assumed that the total arable land in the above three climate zones in exporter i did not vary over time.[15] In this dataset, arable agriculture land is sorted into 18 agroecological zones (AEZ). AEZ 1-6 represents a tropical land area, AEZ 7-12 represents a temperate land area, and AEZ 13-18 represents a boreal land area. The sum of the arable land in each climate zones was calculated, and the ratio of arable land in each climate zones to all the three climate zones was computed. Table 2.2 shows that the average share of arable land in temperate zones was 63 percent, which is higher than average shares of arable land in tropical climate zones (around 34 percent) and boreal climate zones (around 3 percent).

Standard gravity variables, such as a dummy variable indicating whether countries share a common border, a common language, and whether they are both members of a given Regional Trade Agreement, were obtained from the Centre d'Études Prospectives et d'Informations Internationales (CEPII, Head et al., 2010). The real Gross Domestic Product (GDP) of exporters and importers during the sample period were obtained from the World Bank Development Indicators.[16] Population-weighted average distances between the largest cities in each trading country pair were obtained from CEPII and separated into five distance categories following Eaton and Kortum (2002). Eaton and Kortum (2002) explained that the advantage of using distance intervals

[14]"FiBL is an independent and non-profit organization and is considered to be one of the world's leading organic farming information and research centers. In conjunction with the International Federation of Organic Agricultural Movments (IFOAM), FiBL annually conducts a global survey and report 'The World Organic Agriculture' (Willer et al., 2018)."

[15]The GTAP land use database reports production data every 3-4 years; data later than 2011 are not available. The data availability limits our research to time-invariant effects of climate characteristics in exporting countries. The GTAP Research Memorandum No. 30 reports the latest version of GTAP land use and land cover database; it can be accessed at https://www.gtap.agecon.purdue.edu/resources/download/8800.pdf.

[16]World Bank Development Indicators Data can be accessed at https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.MKTP.KD&country=#

rather than continuous distance measures was imposing little structure on how geographic barriers vary with distance. As presented in Table 2.2, 69 percent of country pairs were located greater than 6,000 miles apart, 16 percent of country pairs had relatively far trading distance (1,500 - 6,000 miles), 9 percent had a median trading distance (750 - 1,500 miles), and 5 percent relatively short trading distance (0 - 750 miles).

The OEA dummy variable indicated that, on average, 40 percent of country pairs were OEA partners in the study period. The instrument variable for OEA endogenous variable, defined as the absolute value of the difference between the number of organic producers in exporter i and the average number of organic farmers in all countries who are OEA partners of market j at time t, was an average of 33,170 during the sample period.

2.5 Results

In this section, we report the results of estimating the random coefficients logit model (Table 2.3) and the exporter fixed effects model (Table 2.4). Then we conduct counterfactual analysis to predict the imported value of organic food products if the U.S. and Denmark signed an OEA with another organic food exporter in 2016 (Table 2.5). The response of non-OEA exporters to the creation of a new OEA with either the U.S. and Denmark in 2016 is then explored (Table 2.6 and 2.7, respectively). Another a second type of counterfactual analysis, which predicts the impact on organic food imports by the U.S. and Denmark if one of these countries withdrew from an OEA, is also presented (Table 2.8).

Columns 4-7 in Table 2.3 show estimates of mean effects and unobserved product-specific deviations in the random coefficients logit model. A positive mean effect of covariate implies that exporting country occupies a higher market share on average, and the unobserved deviations of covariate capture the heterogeneity in effects across products. Columns 4 and 5 show the parameters and coefficients of mean values of explanatory variables, and columns 6 and 7 report the parameters and coefficients of product-specific deviations of covariates.

The mean effect of the OEA indicator (OEA_{ijt}) is 2.65 and statistically significant, indicating that exporters that are OEA partners of the importer occupy a higher share in this market relative to non-OEA partners.[17] The product-specific deviation of OEA indicator (OEA_{ijt}) is positive and statistically significant, which implies that the effect of OEA on trade flow varies with products, while the magnitude of deviation is relatively small compared to standard deviations of other explanatory variables.

The mean effect of organic arable land ($orgland_{it}$) is shown in column 5 and denoted by parameter $\varphi^{orgland}$. It results in a coefficient (0.05) that is positive and statistically significant, implying that market share is increasing for organic land-intensive exporters. The product-specific deviation of organic arable land ($orgland_{it}$) is shown in column 7 and denoted by parameter $\Sigma_E^{orgland}$. The positive and significant coefficient (0.03) indicates that market share is increasing for organic land-intensive products. The mean effect of the organic land share of total farmland ($orgshare_{it}$) is 0.04 but not significant, denoted by parameter $\varphi^{orgshare}$. The product-specific deviation of the organic land share of total farmland ($orgshare_{it}$) is shown in column 7 and denoted by parameter $\Sigma_E^{orgshare}$. It results in a coefficient (-0.02) that is negative and statistically significant. This finding is reasonable considering the norm of exporters with large amounts of organic land but a small share of total farmland. The mean effect of arable land in temperate climate zones ($temp_i$) is 14.96 and significant, denoted by parameter φ^{temp}. It suggests that the market share is relatively high for exporters with more temperate-climate-intensive farmland, compared to those exporters with more tropical or boreal-climate-intensive farmland.

The mean effects of trade cost-related variables, such as the dummy variables for common border ($border_{ij}$) and common language ($language_{ij}$) between country pairs are shown in column 5 (denoted by parameters η^{border} and $\eta^{language}$). The negative and statistically significant coefficients (-0.97 and -0.30) indicate that market shares are lower for exporters that share a common border and common language with the importer relative to exporters without sharing a common border or common language. It seems inconsistent with results of other gravity models, however,

[17] The OLS regression only depends on the exporter's characteristics without further considering the heterogeneity in the organic food products, leading to a bias in estimates (negative coefficient of the OEA indicator).

considering that only 3 percent of country pairs in the sample shared a common border, and 14 percent shared a common language, the result is consistent with structure of data used in this study. Besides, neighboring countries are likely to share similar agro-ecological characteristics and therefore produce similar products with domestic farmers, resulting in a lower market share (Heerman et al., 2015).

The product-specific deviations of dummy variables for a common border ($border_{ij}$) and common language ($language_{ij}$) are shown in column 5 (denoted by parameters Σ_t^{border} and $\Sigma_t^{language}$). The coefficients are both 0.01 and smaller than the corresponding mean effects, indicating a small heterogeneity in effects of contiguous border and common language across products. The mean value of the RTA indicator (rta_{ijt}) is denoted by parameter η^{rta}, resulting in a positive and significant coefficient (0.10). It implies that there is an increasing market share for exporters who are party to the same regional trade agreements as the importer.

As for the mean effects of distance indicators shown in column 5, a smaller value indicates that the market shares contract more for exporters that are farther away from importers relative to the smallest distance range (0 - 750 miles). For example, the mean effect of $distance2_{ij}$ is -2.25, indicating that the market shares of country pairs in the median trading distance range (750 - 1,500 miles) are smaller than the market shares of country pairs in the smallest trading distance range (0 - 750 miles). The mean effects of $distance3_{ij}$, $distance4_{ij}$, and $distance5_{ij}$ are -4.94, -4.85, and -6.33, showing that the effect of distance on market share is increasing. The product-specific deviation of $distance5_{ij}$ results in a negative and statistically significant coefficient (-0.03), implying that products are even more sensitive to the larger distance.

The mean effect of real GDP of exporters ($exgdp_{it}$) is negative but not significant (-2.24), while the mean effect of real GDP of importers ($imgdp_{jt}$) is positive and statistically significant (1.89), indicating that exporters incline to export more organic products to larger economies. The year fixed effect estimates imply that organic trade was more active in 2015 and 2016, but less active in the first four years.

The estimates of random coefficients model generally have the same signs with the estimates of OLS model, while with a moderate sensitivity of each variable to the market share of exporting country. The main difference between these two results focuses on the sign of OEA variable. In OLS result, the coefficient of OLS result is negative and significant, indicating that establishing an OEA with the importing country would not increase the market share of the exporting country. However, the positive and significant coefficient of the OEA variable in the random coefficients model suggests that signing OEAs would generate higher market shares for the exporting countries. We posit that the random coefficients model is preferred, considering that the OEA variable is endogenous due to the omitted variables such as political will and heterogeneity in the organic food products.

Exporter fixed effect captures the unobserved heterogeneity that are constant for a given exporter across importers and time. Table 2.4 shows the results for the exporter fixed effects. Indonesia had the largest exporter fixed effect (15.89), followed by Thailand (15.39), and Brazil (15.02). The smallest exporter fixed effect was Albania (-15.52), followed by Latvia (-14.85), and Slovenia (-13.49). Further, the exporter fixed effect values of the top three exporters by volume of exports in 2016, the US, Italy, and China, were all positive.

Two counterfactual analyses were conducted based on estimates and equation (2.6). One analysis investigated what would happen if the market signed an OEA with a non-OEA partner in 2016. The other analysis explored what would happen if the importer removed an OEA with an exporter it had an OEA with in 2016. Each of these counterfactual analyses was conducted for the U.S. and Denmark. Table 2.5 shows the simulated results pertinent to the response of the exporter that newly established OEA with the market in 2016. Table 2.6 and Table 2.7 show the results with respect to the response of the remaining exporters with the status of the OEA unchanged. Notice that the total import value on organic food in each market was kept constant when conducting the counterfactual analysis. For example, in 2016, the total import value on organic food from all exporters, including outside exporters, was $1.69 billion in the U.S., and $0.48 billion in Denmark. The market share for active exporters in the sample was simulated and then multiplied by the total import value of organic food for both the U.S. and Denmark in 2016. Therefore, Table 2.5, Table

2.6, and Table 2.7 should be jointly examined to explain the results of this simulation.

From Table 2.5, the average actual export values from non-OEA exporters to the U.S. and Denmark in 2016 were \$27 million and \$2 million, respectively. If the U.S. had signed an OEA with one of the non-OEA exporting partners in 2016, then the simulated average value of export to the U.S. in 2016 would have averaged \$205 million, 650% higher than the actual value. If Denmark had established an OEA with one of its non-OEA exporting partners in 2016, the export value would have increased by 350% and reached an average of \$9 million.

Case A in Table 2.5 shows that the Philippines would have experienced the highest growth rate in the U.S. market under the establishment of an OEA with the U.S. in 2016. At the same time, market shares of other exporters in the U.S. market would have decreased. Combining results from Table 2.5 and information from Table 2.6, 32.9% of remaining active exporters ($n - 1 = 70$), including six OEA exporting partners and seventeen non-OEA exporting partners, would have experienced drop in market shares in response to the establishment of an OEA between the Philippines and the U.S. in 2016. Romania, an OEA exporter, and Tunisia, a non-OEA exporter, suffered most in the Philippines experiment. In this model, Romania contracted to only 23% of its actual value of export to the U.S. in 2016, and Tunisia shrunk to only 6% of its actual value of export to the U.S. in 2016. According to data from the FiBL Survey regarding land use for organic food products, the predictive trade pattern seems consistent with the proposed theory. The Philippines produces and sells organic banana, organic coconut, organic rice, organic sugarcane, organic tropical and subtropical fruits to consumers worldwide. U.S. consumers treat organic rice originating from Romania and organic tropical and subtropical fruits sold by Tunisia as close substitutes for such products from the Philippines. Therefore, Romania and Tunisia were sensitive to the reduction of trade costs between the Philippines and the U.S., leading to a dramatic drop in their market shares in 2016.

The findings also indicate that several exporters would not have benefitted from signing an OEA with the U.S. in 2016. For example, the rates of change in Tunisia, Turkey, and Ukraine were negative. Combined with Table 2.6, this negative change could be explained by exploring the responses of the remaining exporters. In the case of Tunisia, the model resulted in increased U.S. market shares relative to actual U.S. market shares in 2016 for 75% of the remaining OEA exporters and 65.2% of the remaining non-OEA exporters. It indicates that more than half of U.S. exporting partners produce and sell organic food products that are regarded as fewer substitutes for those originating from Tunisia, making them less sensitive to the reduction of trade costs between Tunisia and the U.S. and squeezing out Tunisia. The same trade patterns are found in the cases of Turkey and Ukraine.

From Case B in Table 2.5, Indonesia would have benefitted most by establishing an OEA with Denmark in 2016, followed by Chile and Ethiopia. Taking into consideration the progress made by Chile and the E.U. by initiating a bilateral agreement on trade in organic products in December 2017, the discussion of findings related to predictive trade pattern is focused on the Chile case. If Denmark and Chile had signed an OEA in 2016, the export of organic food products from Chile to Denmark would have increased from $39,000$ to $15 million, more than 300 times the actual value of export in 2016. Combined with information found in Table 2.7, at the same time, 61.8% of remaining active exporters ($n-1=55$) in the Danish market would have experienced a drop in market share, including eighteen OEA exporting partners and sixteen non-OEA exporting partners. Bulgaria, an OEA exporter, and the Philippines, a non-OEA exporter, would have experienced the most significant decreases in market shares from the Chile experiment. To be specific, Bulgaria contracted to only 4% of its actual value of export to the Denmark in 2016, and the Philippines shrunk to only 2% of its actual value of export to Denmark in 2016. This trade patterns indicated that Bulgaria and the Philippines produced and sold organic food products that were close substitutes to those originating from Chile in 2016 and thus were most sensitive to the reduction of trade costs between Chile and Denmark. According to data from the FiBL Survey related to land use for organic food products, such trade pattern can be explained as the following scenario: consumers in Denmark treated organic apples and strawberries sold by Bulgaria as close substitutes for those originating from Chile and organic tropical and subtropical fruits originating from Chile and the Philippines as close substitutes.

Similar to the U.S. case, several countries, including the Philippines, Cambodia, and Pakistan, seemed to benefit from a change in OEA status with Denmark hardly. An interesting finding is that the Philippines would not have received benefits from the establishment of OEA with Denmark in 2016, while it was predicted to experience the highest export growth from the establishment of OEA with the U.S. in 2016. If the Philippines had signed an OEA with Denmark in 2016, the simulated value of export to Denmark would have dropped from $194,000 to $66,000, accounting for 34% of its actual export value. Based on the simulated results, the Philippines was positioned at opposite extremes in the U.S. and Denmark organic markets in 2016.

Comparing the trade pattern experienced by the same country in two markets was similar to naturally controlling for the agroecological characteristics and technological productivity in the exporting country. Thus, the opposite extremes reflected by the model might reflect the actual extreme situations that the Philippines faced in two markets. Namely, factors that influence bilateral trade costs, such as distance and whether the remaining exporters in the market produce and sell close substitutes to those originating from the Philippines or not. Therefore, the scenarios can be explained by the following: organic food products sold by the Philippines were treated as close substitutes to those originating from other exporters in the U.S., and exporters in the U.S. market were sensitive to the change of trade costs between the Philippines and the U.S.; while Danish consumers treated organic food products sold by the Philippines as fewer substitutes to those originating from other exporters in Denmark, and exporters in the Danish market were less sensitive to the change of trade costs between the Philippines and Denmark. Considering that Denmark is a member country of the E.U., the other exporting countries, especially the remaining member countries of the E.U., might have a comparative advantage in terms of distance and consumer trust in food safety.

Another factor we also need to take into consideration is the similarities of organic standards between potential OEA signatories. For example, the organic standards in Denmark are different with those in the U.S. in terms of conversion period of certified organic farmland, biodiversity, water issue, and animal welfare. Therefore, the closer provisions in the organic standards between the Philippines and potential OEA signatory, the higher likelihood of establishing OEA between them in the near future. The Philippines published the Organic Agriculture Law (Republic Act 10068) in 2010, aiming at supporting the growing organic agriculture movement in the country. The organic regulation in the Philippines backed up the potential OEA with organic leading markets, while more details pertinent to the equivalency of organic standards need to be carefully assessed.

Combining results from Table 2.5 with information collected from Table 2.7, 43.8% of the OEA exporters and 34.8% of the non-OEA exporters in the Danish market would have experienced higher market shares relative to their actual market shares, in response to the simulation under which the Philippines signed an OEA with Denmark in 2016. The supplementary reports of the response of the remaining exporters to one more OEA partner with the U.S. and Denmark in 2016 under each possible establishment of OEA is given in Appendix C. It is important to note that the results should be carefully interpreted, as the similarities of organic standards between exporters and importers need to be assessed by the nature of OEA.

Table 2.8 shows the results for the second counterfactual analysis. If the U.S. had withdrawn from the organic equivalency agreement with an existing OEA partner in 2016, the simulated export volume would have averaged \$1.5 million, 9% of the actual export volume. If Denmark had withdrawn from the organic equivalency agreement with an existing OEA partner in 2016, the simulated value of export from OEA exporting partners to Denmark would have dropped to an average of \$1.25 million, 9% of the actual export value. Table 2.8 shows that withdrawing from the organic equivalency agreement with existing OEA partners would have induced decreased market shares of the OEA partner in the market of the U.S. and Denmark in 2016. Exceptions to this were Sweden in the U.S. market and Argentina and Costa Rica in the Danish market. Consumers in the U.S. market seem to treat organic coffee originated from Sweden as unique food products and organic coffee originating from other exporting countries as less close substitutes; consumers in Danish market prefer organic soybeans, organic wheat and organic oilseeds sold by Argentina and treat organic bananas, organic pineapples produced in exporting countries other than Costa Rica as less close substitutes for those originated from Costa Rica. Therefore, withdrawing from the organic equivalency agreement with the U.S. and Denmark does not affect the comparative advantage of organic food products originated from these exporting countries.

2.6 Conclusion

This study estimated the effects of Organic Equivalency Agreements (OEAs) on the value of exports of organic food products from exporting countries to the markets of the U.S. and Denmark. Unobserved product-specific agroecological characteristics in exporting countries and product-specific bilateral trade costs between exporting and importing countries were simulated to estimate the parameters, and then predict the value of exports for each active exporter in the two markets in 2016. The adoption of the BLP method is superior to OLS in the gravity model analysis for two reasons. First, it provides a broader view of OEAs by observing the effects on all active exporters, allowing policymakers from both exporting and importing countries to get acquainted with how each exporter responds to the establishment of each possible OEA. Second, the dynamic model contributes to a more comprehensive and objective understanding of OEAs. That is, not all OEAs necessarily cause positive effects on the value of exports to the market. This point of view is crucial for the organic industry which relies on resource endowments and consumer trust in food safety.

In this model, OEAs had positive effects on the export values of most exporting countries to the markets of the U.S. and Denmark. Additionally, withdrawing from OEAs would cause adverse effects on trade volumes from most exporting countries. On average, exporting countries that share an OEA with the importing country would occupy higher market shares relative to those who are non-OEA partners. Given that OEAs facilitate the harmonization of organic standards worldwide and act as stepping stones towards the construction of an organic standards union and upgrades to organic standards regulations, it is vital to understand the effects of OEAs on international trade. The first-time inclusion of unilateral OEAs makes this study more meaningful for export-oriented countries, such as Argentina, Chile, and Peru; and several high-value importing countries who desire stringent standards for organic food products, such as Australia, the E.U., Japan, New Zealand, and Switzerland.

Based on the comparative advantage of exporting countries rather than political will, this study allows competitive developing countries to enter the vision field of developed importers. For example, the results indicate that Philippines would have experienced the highest growth rate of export if the Philippines signed OEA with the U.S. in 2016; and Indonesia would have obtained the largest benefit from the establishment of OEA with Denmark in 2016. Meanwhile, the policymakers in the importing countries (the U.S. and Denmark) are able to identify how the remaining exporting partners would have repositioned under the possible establishment of new OEAs. Therefore, this study offers a comprehensive prediction of the OEA "map."

On the other hand, this study enables the policymakers in the importing countries (the U.S. and Denmark) to make decisions on accelerating the development of organic regulations in selected exporting countries by signing new OEAs. As mentioned in the previous section, eighteen countries are in the process of drafting organic legislation. In this case, the establishment of OEAs contributes to building trust on signatories? organic production and quality control systems and facilitating organic trade between importer and exporting countries with comparative advantage of producing products of interest.

This study focused on only two organic markets, the U.S. and Denmark; thus, the results are limited to these two markets and should be carefully interpreted. Internationally, organic markets vary with many respects, including GDP, per-capita consumption of organic food products, and remoteness from the rest of the world. Future work should be extended to more markets across the world to understand the impact fully. Although this work predicted a more realistic trade pattern for organic food products compared to previously published studies, the counterfactual analysis was implemented on active exporting countries with positive trade volume in the markets due to identification strategy. As a result, future work should be extended to exporting countries with zero trade flow in the markets. For example, if the importing country signed OEAs with neighboring countries of the zero-trade-value exporting country, or with exporting countries who produced and sold close substitutes for those originated from the zero-trade-value exporting country, then whether the zero-trade-value exporting country would have decided to enter the market or not. This study only investigated the effects of signing bilateral/unilateral OEAs to be consistent with the reality; future research can be extended to the effects of multilateral organic agreements or predicted trade pattern under regional organic standards union.

The approach used in this study is suggested to be applied to two kinds of work in international trade literature. First, this study fully considers the endogeneity of trade agreements and fills the blank suggested by Baier and Bergstrand (2007) who claimed that effects of Free Trade Agreements (FTAs) were likely to differ and left this research question to future research (Baier and Bergstrand, 2007, p.92). If researchers believe that the trade agreements such as FTAs and RTAs (Regional Trade Agreements) have different impacts on trading country pairs, either depending on the economic size, per capita incomes and distance suggested by Baier and Bergstrand (2007), or relying on product-specific agro-ecological characteristics in exporting countries, product-specific trade costs between exporting and importing countries suggested by this work, this study offers an intuitive example. Second, this study also provides researchers with an innovative approach if the researchers are interested in the impacts of trade policy or food standards on the trade value, assuming that comparative advantage plays an essential role rather than political will.

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Table 2.1: OEA Trading Partners of Import Markets

Import Market	OEA Partner	Effective Year
U.S.	Canada	2009
	EU	2012
	Japan	2014
	Republic of Korea	2014
	Switzerland	2015
Denmark	Australia	1996
	Argentina	1997
	Israel	1997
	Switzerland	1997
	New Zealand	2002
	Costa Rica	2003
	India	2006
	Tunisia	2009
	Japan	2010
	Canada	2011
	U.S.	2012
	Republic of Korea	2015
	Chile	2017

Notes: More OEA fact sheet can be retrieved from IFOAM organics international website.
https://www.ifoam.bio/en/organic-equivalence-tracker

Table 2.2: Summary Statistics

Variable	Description	Mean	Standard Deviation	Minimum Value	Maximum Value
π_{ijt}	Dependent variable, market share of exporter i in market j at time t	0.02	0.04	0.00000065	0.25
$orgland_{it}$	Log of organic arable land in exporter i at time t, hectare	11.58	2.05	5.52	17.12
$orgshare_{it}$	Organic arable land share of total farmland in exporter i at time t	0.03	0.04	0.01	0.22
$temp_i$	Share of total arable land area in temperate climate zones in exporter i	0.63	0.43	0	1
trp_i	Share of total arable land area in tropical climate zones in exporter i	0.34	0.44	0	1
bor_i	Share of total arable land area in boreal climate zones in exporter i	0.03	0.09	0	0.65
$border_{ij}$	Dummy variable, whether exporter i and market j share common border	0.03	0.16	0	1
$language_{ij}$	Dummy variable, whether exporter i and market j share common language	0.14	0.34	0	1
rta_{ijt}	Dummy variable, whether exporter i and market j are RTA partners at time t	0.37	0.48	0	1
$distance1_{ij}$	Distance between exporter i and market j is between [0,750) miles	0.05	0.22	0	1
$distance2_{ij}$	Distance between exporter i and market j is between [750,1500) miles	0.09	0.29	0	1
$distance3_{ij}$	Distance between exporter i and market j is between [1500,3000) miles	0.08	0.27	0	1
$distance4_{ij}$	Distance between exporter i and market j is between [3000,6000) miles	0.08	0.28	0	1
$distance5_{ij}$	Distance between exporter i and market j is between [6000,maximum) miles	0.69	0.46	0	1
OEA_{ijt}	Dummy variable, whether exporter i and market j are OEA partners at time t	0.40	0.49	0	1
IV_{ijt}	IV: Absolute value of the difference between number of organic producers in exporter i and average number of organic producers in all countries who are OEA partners of market j at time t, in 1,000s	33.17	86.75	0	824.98
$exgdp_{it}$	Log of GDP in exporter i at time t, in constant 2010 US dollars	26.13	1.78	21.47	30.46
$imgdp_{jt}$	Log of GDP in market j at time t, in constant 2010 US dollars	28.73	1.92	26.51	30.46
I_t^{US}	Number of active exporters in U.S. market at time t	67.50	4.85	60	72
I_t^{DNK}	Number of active exporters in Danish market at time t	52	3.90	47	57
π_t^{US}	Market share of all active exporters in U.S. market at time t	0.9877	0.0035	0.9818	0.9911
$outshr_t^{US}$	Outside market share in U.S. market at time t	0.0123	0.0035	0.0089	0.0182
π_t^{DNK}	Market share of all active exporters in Danish market at time t	0.9647	0.0248	0.9369	0.9896
$outshr_t^{DNK}$	Outside market share in Danish market at time t	0.0353	0.0248	0.0104	0.0631
n_obs	Number of observations	717			
n_exp	Number of exporting countries in each market	82			

Notes: Values are computed within sample data across sample period (2011-2016).

Table 2.3: Random Coefficients Logit Model Results

	Linear Model OLS	Homogeneous Logit Model 2SLS	Random Coefficients Logit Model Mean Effect		Unobserved Deviation	
OEA_{ijt}	-0.9111^{***}	2.6908	γ	2.6545^{***}	σ	0.0019^{***}
	(0.2703)	(8.0844)		(1.0214)		(0.0003)
			X_{it}			
$orgland_{it}$	0.0831	0.0708	$\varphi^{orgland}$	0.0528^{***}	$\Sigma_E^{orgland}$	0.0287^{***}
	(0.1945)	(0.2190)		(0.0157)		(0.0110)
$orgshare_{it}$	0.0876	0.0408	$\varphi^{orgshare}$	0.0436	$\Sigma_E^{orgshare}$	-0.0154^{***}
	(0.1183)	(0.1688)		(10.8051)		(0.0026)
$temp_i$	30.6867^{***}	14.1681	φ^{temp}	14.9590^{***}	Σ_E^{temp}	0.0173^{***}
	(5.9322)	(37.6376)		(5.7419)		(0.0065)
			t_{nit}			
$border_{ij}$	-0.6384	-1.0129	η^{border}	-0.9684^{***}	Σ_t^{border}	0.0040
	(0.5914)	(1.0687)		(0.0322)		(1,843.8)
$language_{ij}$	-1.0358^{***}	-0.3189	$\eta^{language}$	-0.3030^{***}	$\Sigma_t^{language}$	0.0106^{***}
	(0.3362)	(1.6512)		(0.1109)		(0.0004)
rta_{ijt}	-0.4429	0.0490	η^{rta}	0.1017^{***}	Σ_t^{rta}	0.0230^{***}
	(0.3207)	(1.1600)		(0.0223)		(0.0087)
$diatance2_{ij}$	-2.2674^{***}	-2.2496^{***}	$\eta^{distance2}$	-2.2526	$\Sigma_t^{distance2}$	-0.0064^{***}
	(0.4850)	(0.5432)		(64.2495)		(0.0002)
$distance3_{ij}$	-4.4657^{***}	-4.8890^{***}	$\eta^{distance3}$	-4.9360^{*}	$\Sigma_t^{distance3}$	0.0373
	(0.4825)	(0.6057)		(2.5495)		(241.5947)
$distance4_{ij}$	-5.1538^{***}	-4.8768^{***}	$\eta^{distance4}$	-4.8505	$\Sigma_t^{distance4}$	-0.0095
	(0.6597)	(0.9640)		(25.3772)		(690.5997)
$distance5_{ij}$	-6.8668^{***}	-6.3666^{***}	$\eta^{distance5}$	-6.3255	$\Sigma_t^{distance5}$	-0.0296^{***}
	(0.5728)	(1.2915)		(6.9282)		(0.0018)
$exgdp_{it}$	-6.4024^{***}	-2.0534	η^{exgdp}	-2.2400	Σ_t^{exgdp}	0.0188
	(1.4818)	(9.8937)		(1.5207)		(5.3852)
$imgdp_{jt}$	5.5150^{***}	1.6568	η^{imgdp}	1.8906^{***}	Σ_t^{imgdp}	0.0729
	(1.2902)	(8.7728)		(0.6493)		(2.4717)

Notes: Dependent variable is the market share of each exporter in markets of United States and Denmark from 2011 to 2016. Standard errors are in parentheses. $*p < 0.1, **p < 0.05 ***p < 0.01$

Table 2.3: (Continued) Random Coefficients Logit Model Results

	Linear Model	Homogeneous Logit Model	Random Coefficients Logit Model	
	OLS	2SLS	Mean Effect	Unobserved Deviation
Year Fixed Effect				
λ_t^{2012}	-0.4462^{**}	-1.0203	-1.0909^{***}	
	(0.2065)	(1.3083)	(0.3362)	
λ_t^{2013}	-0.0398	-0.7054	-0.5286	
	(0.2118)	(1.5115)	(182.4281)	
λ_t^{2014}	0.0612	-0.7365	-0.7774^{***}	
	(0.2211)	(1.8063)	(0.2219)	
λ_t^{2015}	0.7450^{***}	-0.1019	0.1495^{***}	
	(0.2337)	(1.9173)	(0.0496)	
λ_t^{2016}	0.9156^{***}	0.0116	0.1283	
	(0.2569)	(2.0478)	(233.7862)	
Importer Fixed Effect				
$\lambda_j^{UnitedStates}$	-18.8886^{***}	-3.3875	-3.4609	
	(5.0117)	(35.2151)	(119.4655)	

Notes: Dependent variable is the market share of each exporter in markets of United States and Denmark from 2011 to 2016. Standard errors are in parentheses. $*p < 0.1, **p < 0.05 ***p < 0.01$

Table 2.4: Exporter Fixed Effects Estimates

Exporter	λ_i	Exporter	λ_i
Albania	-15.5233^{***}	Israel	-0.8209^{***}
United Arab Emirates	9.2740^{***}	Italy	1.5160
Argentina	-0.6309	Jordan	-10.8174
Armenia	-9.2340^{***}	Japan	2.9176
Australia	-1.3126	Kenya	6.5722^{***}
Austria	-6.1061	Cambodia	4.5211^{***}
Burundi	-1.5574^{***}	Republic of Korea	-4.3449
Belgium	-5.1411	Lao People's Democratic Republic	-3.2938
Bangladesh	6.6088	Lebanon	-8.4180
Bulgaria	-11.3911	Sri Lanka	10.0965^{***}
Bosnia and Herzegovina	-10.7515^{***}	Lithuania	-12.7508
Bolivia (Plurinational State of)	1.1619^{***}	Latvia	-14.8474^{***}
Brazil	15.0219^{***}	Madagascar	2.1247^{***}
Canada	6.6506^{***}	Mexico	10.6101
Switzerland	-3.5797^{***}	Namibia	-13.4716
Chile	0.0103	Nigeria	11.1520^{***}
China	9.1455	Nicaragua	5.2602^{***}
Cameroon	3.2924	Netherlands	-2.2384^{***}
Colombia	12.0526^{***}	New Zealand	-3.3252
Costa Rica	6.8822^{***}	Pakistan	-3.0399
Czech Republic	-12.4426	Panama	3.6449
Germany	0.9556	Peru	6.4592^{***}
Denmark	-10.4665^{***}	Philippines	8.9347
Dominican Republic	7.8174	Poland	-7.4689
Ecuador	7.1506	Portugal	-7.7909^{***}
Spain	0.3611	Paraguay	-6.9710^{***}
Ethiopia	4.5954	Romania	-6.7972^{***}
Finland	1.3390	Russian Federation	2.9878^{***}
France	0.5388	Rwanda	3.6231^{***}
United Kingdom	0.4838^{***}	Saudi Arabia	-0.4423^{***}
Georgia	-8.5682	Slovenia	-13.4922^{***}
Ghana	3.4537	Sweden	-5.8518
Greece	-5.5193^{***}	Thailand	15.3856^{***}
Guatemala	7.8401	Tunisia	-8.1174^{***}
Honduras	7.5409	Turkey	1.4077^{***}
Croatia	-11.3310	United Republic of Tanzania	5.7063
Hungary	-10.7497^{***}	Uganda	7.7633^{***}
Indonesia	15.8946^{***}	Ukraine	-6.1942^{***}
India	13.3840^{***}	Uruguay	-9.1686
Ireland	-9.0196	United States	7.2163^{***}
		Viet Nam	10.2271^{***}

Notes:We have 83 exporters in total, but drop λ_i dummy variables for two exporters due to multicollinearity. They are South Africa and Zambia. $*p < 0.1, **p < 0.05 ***p < 0.01$

Table 2.5: Counterfactual Analysis: Adding New OEA Partners

Case A. If U.S. signed OEA with one of the following exporters in 2016				Case B. If Denmark signed OEA with one of the following exporters in 2016			
Exporter	Actual value imported by United States (in thousands of dollars)	Simulated value imported by United States (in thousands of dollars)	Rate of change	Exporter	Actual value imported by Denmark (in thousands of dollars)	Simulated value imported by Denmark (in thousands of dollars)	Rate of change
Albania	7	167	22.93	Bosnia and Herzegovina	286	11,580	39.49
United Arab Emirates	309	1,985	5.43	Bolivia	349	3,306	8.48
Argentina	100,076	271,585	1.71	Brazil	1,093	30,541	26.94
Australia	408	11,700	27.68	Chile	39	14,925	382.21
Bangladesh	54	861	14.94	China	26,787	42,598	0.59
Bosnia and Herzegovina	678	9,351	12.79	Colombia	88	2,109	22.92
Bolivia	2,322	157,603	66.87	Ethiopia	127	11,518	90.04
Brazil	95,065	877,049	8.23	Guatemala	80	2,925	35.44
Chile	47,226	553,090	10.71	Honduras	609	6,363	9.45
China	28,627	1,039,281	35.30	Indonesia	6	3,495	586.81
Colombia	65,027	378,983	4.83	Cambodia	945	358	-0.62
Costa Rica	6,034	93,530	14.50	Sri Lanka	1,458	3,779	1.59
Dominican Republic	2,760	141,848	50.39	Madagascar	63	173	1.72
Ecuador	102,405	460,135	3.49	Mexico	1,535	25,872	15.86
Ethiopia	25,730	97,840	2.80	Nicaragua	368	1,972	4.36
Georgia	65	4,651	70.56	Pakistan	4,324	1,871	-0.57
Guatemala	27,030	455,298	15.84	Peru	1,061	13,633	11.85
Honduras	35,340	806,005	21.81	Philippines	194	66	-0.66
Indonesia	37,019	166,363	3.49	Paraguay	805	1,325	0.65
India	73,667	76,454	0.04	Thailand	3,552	16,624	3.68
Israel	4,311	7,227	0.68	Turkey	2,263	18,681	7.25
Kenya	253	8,762	33.63	Uganda	644	3,910	5.07
Cambodia	422	18,281	42.32	Viet Nam	102	1,176	10.56
Lao People's Democratic Republic	578	10,098	16.47	South Africa	1,282	1,627	0.27

Notes: In 2016, we only have 71 exporters which had positive market share with the United States and 56 exporters who traded organic food with Denmark. Rate of change equals to the the ratio of the difference between simulated value of export and the actual value of export to the actual value of export.

Table 2.5: (Continued) Counterfactual Analysis: Adding New OEA Partners

Case A. If U.S. signed OEA with one of the following exporters in 2016				Case B. If Denmark signed OEA with one of the following exporters in 2016			
Exporter	Actual value imported by United States (in thousands of dollars)	Simulated value imported by United States (in thousands of dollars)	Rate of change	Exporter	Actual value imported by Denmark (in thousands of dollars)	Simulated value imported by Denmark (in thousands of dollars)	Rate of change
Lebanon	735	15,784	20.47				
Sri Lanka	3,560	178,237	49.07				
Madagascar	201	8,897	43.27				
Mexico	172,218	987,137	4.73				
Namibia	28	922	31.92				
Nigeria	269	7,003	25.03				
Nicaragua	14,437	358,104	23.80				
New Zealand	31,261	79,374	1.54				
Panama	33	4,397	132.25				
Peru	104,109	1,156,420	10.11				
Philippines	3	2,533	841.60				
Paraguay	6,904	66,365	8.61				
Russian Federation	4,057	15,137	2.73				
Rwanda	531	21,544	39.57				
Thailand	8,891	597,958	66.25				
Tunisia	26,247	21,945	-0.16				
Turkey	223,220	203,299	-0.09				
Uganda	5,825	139,491	22.95				
Ukraine	20,391	18,402	-0.10				
Uruguay	3,384	13,594	3.02				
Viet Nam	1,254	59,150	46.17				
South Africa	1,023	54,781	52.55				
Zambia	25	571	21.84				

Notes: In 2016, we only have 71 exporters which had positive market share with the United States and 56 exporters who traded organic food with Denmark. Rate of change equals to the the ratio of the difference between simulated value of export and the actual value of export to the actual value of export.

Table 2.6: Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States		Non-OEA partners of United States	
Exporter under experiment	countries that shrink value of export	countries that expand value of export	countries that shrink value of export	countries that expand value of export
Philippines (841.60)	Greece (-0.01), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.55), Belgium (0.66), Japan (0.96), Denmark (1.06), Canada (1.43), Republic of Korea (1.63), Austria (3.28), Hungary (3.44), Lithuania (3.64), Germany (4.47), Croatia (4.79), Slovenia (5.42), Ireland (7.37), Bulgaria (9.95), Switzerland (10.66), Sweden (66.37)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.23), Brazil (0.26), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.68), Uganda (0.82), Nigeria (0.84), Australia (1.03), Peru (1.15), Nicaragua (1.17), Namibia (1.31), Kenya (1.44), Rwanda (1.88), Honduras (1.89), Cambodia (2.07), Madagascar (2.12), Viet Nam (2.42), South Africa (2.88), Sri Lanka (2.90), Dominican Republic (2.92), Georgia (4.04), Bolivia (4.22), China (4.99), Thailand (6.05), Panama (8.38)

Notes: Values in parentheses are rate of change, the ratio of the difference between simulated value of export to U.S. and the actual value of export to U.S. to the actual value of export to U.S. in 2016.

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States		Non-OEA partners of United States	
Exporter under experiment	countries that shrink value of export	countries that expand value of export	countries that shrink value of export	countries that expand value of export
Tunisia (-0.16)	Greece (-0.02), Italy (-0.06), Spain (-0.21), France (-0.29), Netherlands (-0.51), Romania (-0.77)	Portugal (0.09), United Kingdom (0.28), Poland (0.53), Belgium (0.64), Japan (0.94), Denmark (1.03), Canada (1.41), Republic of Korea (1.61), Austria (3.24), Hungary (3.40), Lithuania (3.59), Germany (4.41), Croatia (4.73), Slovenia (5.35), Ireland (7.28), Bulgaria (9.83), Switzerland (10.54), Sweden (65.65)	Bosnia and Herzegovina (-0.04), Mexico (-0.13), Paraguay (-0.31), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.66), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.82), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.17), Lao People's Democratic Republic (0.22), Brazil (0.24), Lebanon (0.51), Guatemala (0.57), Zambia (0.59), Albania (0.66), Uganda (0.80), Nigeria (0.82), Australia (1.01), Peru (1.13), Nicaragua (1.15), Namibia (1.29), Kenya (1.42), Rwanda (1.85), Honduras (1.86), Cambodia (2.04), Madagascar (2.09), Viet Nam (2.39), South Africa (2.84), Sri Lanka (2.86), Dominican Republic (2.88), Georgia (3.98), Bolivia (4.17), China (4.92), Thailand (5.98), Panama (8.28), Philippines (57.63)

Notes: Values in parentheses are rate of change, the ratio of the difference between simulated value of export to U.S. and the actual value of export to U.S. to the actual value of export to U.S. in 2016.

Table 2.7: Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark		Non-OEA partners of Denmark	
Exporter under experiment	countries that shrink value of export	countries that expand value of export	countries that shrink value of export	countries that expand value of export
Chile (382.21)	Portugal (-0.04), New Zealand (-0.09), Germany (-0.35), Canada (-0.46), Poland (-0.48), Hungary (-0.59), Australia (-0.66), Greece (-0.70), Finland (-0.72), Lithuania (-0.73), Romania (-0.74), Sweden (-0.77), Slovenia (-0.79), Austria (-0.81), Spain (-0.81), Ireland (-0.82), Latvia (-0.83), Bulgaria (-0.96)	France (0.40), Netherlands (0.46), United Kingdom (0.51), Italy (0.71), United States of America (0.90), Belgium (1.05), Switzerland (1.23), Czech Republic (1.33), Croatia (2.13), Tunisia (5.20), India (5.24), Japan (9.46), Costa Rica (12.86), Argentina (28.51)	Peru (-0.10), Viet Nam (-0.21), Honduras (-0.28), Bolivia (-0.35), Turkey (-0.41), Uganda (-0.58), Nicaragua (-0.63), Thailand (-0.67), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.21), Colombia (0.64), Brazil (1.03), Guatemala (1.50), Bosnia and Herzegovina (1.83), Ethiopia (5.36), Indonesia (39.40)

Notes: Values in parentheses are rate of change, the ratio of the difference between simulated value of export to Denmark and the actual value of export to Denmark to the actual value of export to Denmark in 2016.

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark		Non-OEA partners of Denmark	
Exporter under experiment	countries that shrink value of export	countries that expand value of export	countries that shrink value of export	countries that expand value of export
Philippines (-0.66)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.44), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.51), United Kingdom (0.56), Italy (0.76), United States of America (0.96), Belgium (1.11), Switzerland (1.30), Czech Republic (1.40), Croatia (2.23), Tunisia (5.39), India (5.42), Japan (9.78), Costa Rica (13.29), Argentina (29.40)	Peru (-0.07), Viet Nam (-0.18), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97)	Mexico (0.25), Colombia (0.69), Brazil (1.09), Guatemala (1.58), Bosnia and Herzegovina (1.92), Ethiopia (5.55), Chile (26.78), Indonesia (40.63)

Notes: Values in parentheses are rate of change, the ratio of the difference between simulated value of export to Denmark and the actual value of export to Denmark to the actual value of export to Denmark in 2016.

Table 2.8: Counterfactual Analysis: Withdrawing from the Organic Equivalency Agreement with Existing OEA Partners

Case A. If U.S. withdrew from the organic equivalency agreement with one of the following exporters in 2016				Case B. If Denmark withdrew from the organic equivalency agreement with one of the following exporters in 2016			
Exporter	Actual value imported by United States (in thousands of dollars)	Simulated value imported by United States (in thousands of dollars)	Rate of change	Exporter	Actual value imported by Denmark (in thousands of dollars)	Simulated value imported by Denmark (in thousands of dollars)	Rate of change
Austria	298	90	-0.70	Argentina	201	434	1.16
Belgium	1,515	177	-0.88	Australia	781	19	-0.98
Bulgaria	58	45	-0.23	Austria	7,993	112	-0.99
Canada	82,315	15,872	-0.81	Belgium	14,159	2,232	-0.84
Switzerland	162	133	-0.18	Bulgaria	1,289	4	-1.00
Germany	2,883	1,121	-0.61	Canada	5,564	219	-0.96
Denmark	16	2	-0.86	Switzerland	1,025	166	-0.84
Spain	99,078	5,821	-0.94	Costa Rica	31	31	0.01
France	25,258	1,294	-0.95	Czech Republic	72	12	-0.83
United Kingdom	5,390	493	-0.91	Germany	105,541	5,770	-0.95
Greece	9,354	653	-0.93	Spain	34,267	476	-0.99
Croatia	106	43	-0.59	Finland	2,819	57	-0.98
Hungary	33	10	-0.69	France	15,657	1,661	-0.89
Ireland	10	6	-0.41	United Kingdom	7,530	846	-0.89
Italy	115,776	8,302	-0.93	Greece	2,508	55	-0.98
Japan	9,302	1,300	-0.86	Croatia	238	54	-0.77
Republic of Korea	221	41	-0.81	Hungary	438	13	-0.97
Lithuania	70	23	-0.67	India	322	146	-0.55
Netherlands	22,885	802	-0.96	Ireland	747	10	-0.99
Poland	126	14	-0.89	Italy	77,535	13,228	-0.83
Portugal	1,058	82	-0.92	Japan	33	25	-0.24
Romania	14,005	232	-0.98	Lithuania	1,455	29	-0.98
Slovenia	4	2	-0.55	Latvia	1,122	13	-0.99
Sweden	13	62	3.75	Netherlands	89,271	12,899	-0.86

Notes: In 2016, we only have 71 exporters which had positive market share with the United States and 56 exporters who traded organic food with Denmark. Rate of change equals to the the ratio of the difference between simulated value of export and the actual value of export to the actual value of export.

Table 2.8: (Continued) Counterfactual Analysis: Withdrawing from the Organic Equivalency Agreement with Existing OEA Partners

Case A. If U.S. withdrew from the organic equivalency agreement with one of the following exporters in 2016				Case B. If Denmark withdrew from the organic equivalency agreement with one of the following exporters in 2016			
Exporter	Actual value imported by United States (in thousands of dollars)	Simulated value imported by United States (in thousands of dollars)	Rate of change	Exporter	Actual value imported by Denmark (in thousands of dollars)	Simulated value imported by Denmark (in thousands of dollars)	Rate of change
				New Zealand	2,320	153	-0.93
				Poland	4,333	163	-0.96
				Portugal	100	7	-0.93
				Romania	1,044	20	-0.98
				Slovenia	151	2	-0.99
				Sweden	43,137	744	-0.98
				Tunisia	296	133	-0.55
				United States	1,896	263	-0.86

Notes: In 2016, we only have 71 exporters which had positive market share with the United States and 56 exporters who traded organic food with Denmark. Rate of change equals to the the ratio of the difference between simulated value of export and the actual value of export to the actual value of export.

Chapter 3 The Impact of Organic Equivalency Agreements on U.S. and Canadian Trade of Organic Agri-Food Products

3.1 Introduction

A proliferation of research has examined the effects on agricultural trade of trade agreements and product standards. Agri-food system standards are generally classified as public or private standards, or are jointly-developed through private-public partnerships. These standards can serve as a signal of food safety, quality control, environmental and ethical aspects of food production, processing, distribution and retailing (World Bank, 2005; Henson, 2008; Swinnen, 2017). Public standards are codified in government requirements or regulations and may be enforced by law. In contrast, private standards are established by private actors such as non-governmental organizations and private standard setting bodies. Although private standards are voluntary, they are often more stringent than public ones and are therefore increasingly demanded by agri-food supply chain participants due to the perception that they may lower the risk of liability and enhanced consumer's trust or willingness to pay for products (Fulponi, 2006; Belton et al., 2011; Vandemoortele and Deconinck, 2014; Swinnen, 2016).

Trade agreements, such as regional trade agreements (RTAs) and bi-lateral preferential trade agreements (PTAs) have been found considerable trade-creation effects on agri-food trade using disaggregated data (Sarker and Jayasinghe, 2007; Cardamone, 2011; Timsina and Culas, 2020). The literature regarding the affect of food standards on agri-food trade, however, is inconclusive. Some private food standards have been found to facilitate agri-food trade, such as GlobalGAP (Global Partnership for Good Agricultural Practices; Andersson, 2019; Fiankor et al., 2020), IFS (International Food Standard) and BRC (British Retail Consortium) (Latouche and Chevassus-Lozza, 2015), and the SQF (Safe Quality Food) standard (Seok et al., 2016). The more the number of certified producers in exporting countries, the greater increase in agri-food exports to high-value markets (Seok et al., 2016; Andersson, 2019; Fiankor et al., 2020). On the other hand, more stringent importing country regulations or buyer requirements may increase exporter's compliance cost and discourage agri-food exports. Evidence of this has been reported in the cases of Sanitary and Phytosanitary (SPS) measures (Jayasinghe et al., 2010; Crivelli and Gröeschl, 2016), Hazard Analysis of Critical Control Points (HACCP; Anders and Caswell, 2009), and a chloramphenicol standard (CAP; Tran et al., 2012). In addition, several studies have failed to find conclusive impacts of restrictive food standards on the propensity to trade (Xiong and Beghin, 2012), or on trade values conditional on the decision to export (Xiong and Beghin, 2012; Ferro et al., 2015). Beghin et al. (2015) suggested that discrepancies in empirical findings and failure of reaching a consensus on the relationship between food standards and agri-food trade might stem from the focus of country- and product-specific case studies and the analytical approaches used.

Organic agricultural and food products are grown and manufactured according to a mix of public regulations and private standards. In general, organic agriculture is "an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony" (USDA-NOP, 1995). The organic food market totaled $105.5 billion USD, with 2.8 million producers and 186 countries engaging in organic activities in 2018 (Willer et al., 2020). Consumers believe organic food is healthier, safer, and tastier than conventional food and incline to pay a higher price for organic food products (Yin et al., 2018; Kim et al., 2019). This trust in organic food products derives from the fact that organic principles and farming practices are codified by law in most countries (Rigby and Cáeres, 2001), and produced without synthetic fertilizers, chemical pesticides, genetically modified organisms (GMOs), and sewage sludge (Seufert et al., 2017; Meemken and Qaim, 2018). Consumers concern about health and environmental protection provides an impetus to the international trade of organic food products, stimulating both export-oriented organic food products such as coffee, tea, cocoa, tropical fruits (Raynolds, 2004), as well as export-oriented countries in organic food sector (i.e., Argentina, Chile, and Peru)[1].

While economically important, the mix of private standards and government regulations governing organic production, manufacturing, and labelling makes organic food markets both particularly interesting and challenging. What is defined as being "organic" varies by country. Thus, those who wish to engage in international organic markets must navigate complex and differing regulations which drives up the transaction costs (Lohr, 1998; Bowen and Hoffman, 2013).

[1] Examples of export-oriented countries come from a blog written by Joelle Katto Andrighetto, head of policy and guarantee, IFOAM-Organics International, https://www.organicwithoutboundaries.bio/2018/08/15/data-collection-promote-organic/

Efforts to harmonization of organic standards has been made by IFOAM[2] and Codex Alimentarius Commission (Codex).[3] Thus far, while many countries now incorporate a set of basic organic principals in their regulations and standards, specific details concerning their implementation do differ. In particular, the use of particular chemicals used in crop production (e.g. fertilizers, pesticides, fungicides), livestock antibiotics, and additives used in manufactured food products vary across countries. In lieu of harmonization, many countries are now seeking alternatives policy instruments to reduce the barriers to trading and marketing organic products, including recognition agreements, export agreements, and equivalency agreements.

Among these, equivalency agreements hold the most promise. Unlike harmonization aimed at establishing identical standards and conformity assessments across countries, equivalence agreements allow produced and certified according to one country's organic standard to be labelled and sold as organic in another country. Organic Equivalency Agreements (henceforth, OEAs) have been established between nations who acknowledged each other's organic production and certifying systems as equal in the effectiveness of environmental and health protection (Vogl et al., 2005; Pekdemir, 2018). These agreements alleviate the need for duplicating testing and certification (reducing costs), enable organic food manufactures the ability to more easily source certified organic ingredients suppliers from signatory countries, and allow firms to access and compete in signatory markets. Meanwhile, OEAs provide the context in which organic regulations

[2] IFOAM (International Federation of Organic Agriculture Movements) was founded in 1972 and has been promoting harmonization and equivalence in organic agriculture since 2002, in partnership with the UN Food and Agricultural Organization (FAO) and UN Conference on Trade and Development (UNCTAD). This partnership was structured in two phases, the International Task Force on Harmonization and Equivalence in Organic Agriculture (ITF, 2003-2008) and the Global Organic Market Access project (GOMA, 2009-2012). The IFOAM published the IFOAM Basic Standards (IBS) in 1980.

[3] The Codex Alimentarius Commission is an intergovernmental body established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) in 1961. The Codex developed and approved the Guidelines for the Production, Processing, Labeling and Marketing of Organically Produced Foods (Codex Guidelines) in 1999.

are made, motivating low- and middle-income countries to revise their organic regulations to become more aligned to those of higher-income countries they wish to have as export destinations.

To date, the impacts of OEAs on the international trade of agri-food products has received very little research attention. The few studies which have examined this issue have offered case examinations of a number of agreements, trading partners, or countries. In this analysis, we contribute to this literature by examining the question of: (1) whether OEAs signed by the United States and Canada affect the trade of agricultural and food products and, (2) if these OEAs do affect trade, in what ways are these trade flows affected? This analysis employs a gravity model and estimates the impact of OEAs on agri-food imports and exports of the U.S. and Canada using highly disaggregated trade flow data during the period 2007-2019. We focus on these countries due both to the size of their shared organic markets (more than half of global organic demand), but also the availability of the highly disaggregated trade flow data required to assess organic product trade for these countries.

This study offers at least two primary contributions. First, we utilize highly disaggregated trade flows and thus capture heterogeneity of OEA trade effects on agri-food products. This analysis requires the novel partnering of highly disaggregated (HS-10) international trade data from both the U.S. international trade commission (USITC) and Statistics Canada. Second, organic equivalency agreements greatly reduce administrative barriers and transactions costs related to the trade and market access of organic food products. As of 2019, eighty-six countries have published national organic regulations or standards (Willer et al., 2020). As global demand and trade of organic agri-food products continues to increase, and as efforts to internationally harmonize organic standards are not advancing, there is likely to be increasing interest in bilateral OEAs in the near future. Therefore, quantifying the impacts of OEAs on agri-food is important to assess the potential of this policy instrument. Understanding the value of these agreements is particularly important for organic markets in the United States and Canada which occupy half of global organic revenues and is also a signatory to more than half of current global OEAs.

This paper is organized as follows. Section 2 outlines the background of organic food, organic standards, and OEAs. An overview of the literature related to the food (organic) standards and agri-food trade nexus is presented in Section 3. Section 4 provides model specifications and describes the data and zero-flows treatment used in this analysis. Section 5 reports the empirical results and summarizes the trade effects of OEAs, and Section 6 concludes the paper.

3.2 An Introduction to Organic Food, Organic Standards, and OEAs

The term "organic" originates from the Greek word "bios," meaning life or way of living. The Codex Alimentarius Commission defines organic as a "labeling term that denotes products that have been produced in accordance with organic production standards and certified by a duly constituted certification body or authority" (Codex Alimentarius, 2007). The International Federation of Organic Agriculture Movement (IFOAM) defines organic agriculture as a production system that relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects, such as synthetic chemical fertilizers, pesticides and pharmaceuticals (IFOAM Norms, 2014). In livestock production, the animals must be fed with organic fodder and allowed to access to outdoor areas. No growth hormones, prophylactic administration of antibiotics, and GMOs are used (Meemken and Qaim, 2018).

3.2.1 U.S. and Canadian Demand and Supply of Organic Agri-food Products

In 2018, the global organic food market amounted to $105.5 billion USD and the U.S. and Canada accounted for half of global revenues (Willer et al., 2020). The U.S. organic market reached $52.5 billion USD in 2018 and 5.7% of total food sales were organic. Canada's organic sales hit the record of $4.9 billion USD and captured 2.6% of total food sales. The United States reported a per capita consumption of $147.5 USD in 2018, while people spent $99.1 USD per capita on organic products in Canada (Willer et al., 2020). In terms of organic agri-food production, 3.3 million hectares of organic agricultural land in 2018 was certified in the United States and Canada in 2018. This represents only 4.6% of the certified organic land area in the world (FiBL Statistics[4]).

As U.S. and Canadian demand exceeds domestic supply for many products, and as consumers prefer specific organic products that are not produced in these countries (e.g. tropical fruit, coffee), both nations have become engaged in the trade of organic foods. The U.S. imported $2.21 billion USD of these foods and exported $0.69 billion USD in 2018. In the same year, the Canada's organic imports and exports amounted to $0.73 billion USD and $0.31 billion USD, respectively.

3.2.2 Organic Standards

A large number of private organic standards were published by certification bodies in the 1970s and 1980s. These standards aimed to provide organic farmers with technical assistance and to

[4] "FiBL is an independent and non-profit organization and is considered to be one of the world's leading organic farming information and research centers. In conjunction with the International Federation of Organic Agricultural Movements (IFOAM), FiBL annually conducts a global survey and report 'The World Organic Agriculture' (Willer et al., 2020)."

protect the integrity of organic production systems (Grolink, 2012). Following this, in many countries, organic standards were taken over by national governments and codified into organic regulations. For example, the European Union (EU) Council Regulation EEC 2092/91 was the first organic regulation in the world and came into force in 1993. Similarly, the U.S. National Organic Program (NOP) was finalized in 2001, and Canadian Organic Product Regulations (OPR) was implemented in 2009.

National and supranational organic regulations can serve as benchmark standards. Here the organic standards owners (private or private organizations) have the legal authority to function as accredition agencies (or assign these duties) to ensure that minimum requirements are incorporated in the private standards and publicly enacted standards are respected (Lohr, 1998; Arcuri, 2015; Pekdemir, 2018). However, organic regulations vary with countries and differ in culture, technical development, and governance constructs (Bowen and Hoffman, 2015). For example, the Indian regulation emphasizes biodiversity, the Australian legislation focuses on water issues, and Mexico regulates strict requirements related to crop rotations. The U.S. NOP offers a negative list of natural substances that are not permitted to be used, while other national standards mainly include a positive list of substances that are allowed[5] (Seufert et al., 2017).

In other instances, private standards such as ISO/IEC 17065 are selected as government-accredited standards that meet the minimum requirements in national regulations and are referred to as legally-mandated private standards (Grolink, 2012; Pekdemir, 2018). Other private standards become a preferred option of retailers due to stricter requirements and consumer's trust in the brand. For example, BRC, IFS, SQF 2000, SQF 1000, and EurepGap are the most widely used

[5] A negative list refers to the list of natural substances that are not allowed, while it allows the use of all other natural substances not listed. A positive list for inputs means, that the use of inputs is prohibited with the exception of those explicitly listed in positive list.

standards by interviews and surveys from 16 leading food retailers in Europe (Fulponi, 2006). The plethora of public and private standards complicate organic farmers' access to the international markets, requiring higher certification costs[6] due to the need to be certified to differing standards in multiple destination markets. Another layer of transaction costs stem from multiple accreditations[7], in this case, certification bodies need to obtain multiple accreditations from each government and eventually transfer the burden of related costs to organic farmers (Bowen and Hoffman, 2013).

3.2.2.1 National Organic Standards

In the United States, California Certified Organic Farmers (CCOF) published private organic standards and established certification systems in the early 1970s (Arcuri, 2015). In 1990, the Organic Foods Production Act (OFPA), enacted under the 1990 Farm Bill, authorized the U.S. Department of Agriculture (USDA) to establish the National Organic Program (NOP). NOP set regulations and guidance for certification, production, and labeling of organic products. The initial version of the national organic standards was finalized in 2001. By 2002, operations with gross agricultural income from organic sales of more than $5,000 USD were required to comply with the U.S. national organic standard and become certified by an accredited certification agent (ACA).

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[6] Certification is a certifying process verified by the certification bodies that the producers and processors meet their standards (Lohr, 1998).

[7] Accreditation means an attestation by a national accreditation body that accredited bodies offering testing, examination, calibration, certification, inspection and verification services have the technical competence and impartiality to check the conformity of products and services with the relevant standards and regulations (EC Regulation No. 765/2008, European Accreditation webpage (https://european-accreditation.org/accreditation/for-regulators/)).

A similar pattern organic standard evolution occurred in Canada. The Certified Organic Associations of British Columbia (COABC) produced its own organic standards and announced the B.C. Certified Organic logo in 1991 (COABC, 2009). In time, provincial organic regulations and guidance on production, certification, and labeling of organic products were transferred into public hands. Canada's national organic standard was implemented in 1999 (Sawyer et al., 2008). The Canadian government, however, did not publish the Organic Product Regulations (OPR) until 2009 (COTA, 2017).[8]

In addition to the United States and Canada, the European Union is another that publishes the first organic regulation in the world. In 1991, the European Union published the EU Council Regulation (EEC 2092/91) on organic production of agricultural products; this regulation came into force on January 1st, 1993. The EU Council adopted a new Council Regulation EC 834/2007 on organic production and labeling of organic products in July 2007, which came into force on January 1st, 2009. At the same time, two sets of implementing rules came into force under EC 834/2007: EC 889/2008 which detailed production rules for plants, livestock and processed products including yeast, and their labeling and control, and EC 1235/2008 on detailed rules for imports from third countries. The latest version of the EU Council Regulation on organic production and labeling of organic products is EC 2018/848, which was published in May 2018 and would not be effective until January 1st, 2021.

Organic regulations in the U.S., Canada, and EU are differ in their production requirements. For example, the U.S. NOP lists synthetic substances allowed for use and non-synthetic substances prohibited for use in organic production, while Canada OPR provided a list of permitted substances

[8] Organic standards provide a national definition of organic products and serve as a reference point for certification activities, while they do not necessarily implement or supervised by the government (Willer et al., 2020).

in organic production systems under CAN/CGSB-32.311-2015 (e-CFR, Title 7, PART 205, Subpart G; Canadian General Standards Board). While they do largely overlap, there are some important differences in the specific substances included on these lists.

3.2.2.2 Regional Organic Standards

Several regional organic standards have been developed by member countries in accordance with organic production guidelines established by the IFOAM.[9] The East African Organic Agriculture Standard (EAOPS) was adopted by the East African Community in April 2007 and thereby became an official but voluntary standard for Burundi, Kenya, Rwanda, Tanzania and Uganda. The Pacific Organic Standard (POS) has been endorsed by the Conference of Pacific Ministers of Agriculture and Fisheries comprised of 15 member countries (Willer et al., 2020). Several additional regional organic standards have been developed but are not yet implemented. Central American countries of Guatemala, Honduras, EI Salvador, Nicaragua, Costa Rica, Panama and the Dominican Republic aimed to harmonize standards and thereby facilitate trade within member countries. Their Harmonized Regional Organic Regulation approved in 2012 by the Central American Agricultural Council has not yet replaced the individual country regulations. The GOMA-Asia Working Group was founded to develop the Asia Regional Organic Standards (AROS) and approved the final draft in 2012; this standard has not yet been adopted by any of participating countries as national legislation (Pekdemir, 2018).

[9] The IFOAM Family of Standards can be accessed from: https://www.ifoam.bio/sites/default/files/2020-05/familyframe_web_0.pdf

3.2.3 Organic Equivalency Agreements

Organic Equivalency Agreements (OEAs) are the most important in their ability to facilitate international trade. OEAs exist to confirm that another country's organic standards and control system are in line with domestic requirements in order to allow the organic products certified in that country to be sold in the domestic market. Globally there are twenty OEAs, in eleven of which the United States or Canada is one of the partner countries. The U.S. established six bilateral OEAs with Canada (2009), EU (2012), Japan (2014), South Korea (2014), Switzerland (2015), and Taiwan (2020). Canada is party to another five bilateral OEAs including agreements with the EU (2011), Switzerland (2012), Costa Rica (2013), Japan (2015), and Taiwan (2020). Other regions and countries engaging in OEAs include the European Union (four agreements) and Taiwan (three agreements). Other OEAs include agreements between Japan-Switzerland OEA (2013) and China-New Zealand OEA (2016).

Figures 1 shows the number of OEAs in the world during the period 2005-2020. The first OEA was established between the EU and Switzerland in 1997. The second OEA has not been signed until 2009 when the U.S.-Canada OEA came into force, followed by the EU-Japan OEA enforced in 2010. Up till 2019, the number of bilateral OEAs increase to fifteen. In 2020, Taiwan established bilateral OEAs with Australia, Japan, New Zealand, Canada, and the U.S. by the end of May. The signatory countries of OEAs and time when the OEAs came into force are given in the Appendix D.

3.3 Literature Review

We review the literature related to the food standards and agri-food trade nexus, followed by impacts of organic standards on international trade. We focus on the literature exploring trade impacts of agri-food products of trade agreements, such as regional trade agreements (RTAs), free trade agreements (FTAs), and food standards union (EU). An overview of whether food standards facilitates or impedes international trade of agri-food products is provided. In terms of the organic trade literature, we firstly introduce how organic standards are codified in the organic regulations. Then we reviewed literature works examining regional trade agreements of organic products, organic agriculture, and organic producer's performance in international market. Finally, a careful overview of recent literature assessing the impacts of OEAs on organic trade is presented.

3.3.1 Food Standards and Agri-food Trade

A large and growing literature as examined aspects of the effects of trade agreements on the trade of agricultural and food products. Using a gravity model analysis, Sarker and Jayasinghe (2007) assess the impacts of the free movement of goods within the EU on trade in six major agri-food commodities - red meat, grains, vegetables, fruits, sugar, and oilseeds - during the period 1985-2000. They find that the EU generated consistent intra-EU trade creation effects for red meat, grains, vegetables, and fruits during the entire study period valued at $49 million USD, $67 million USD, $83 million USD, and $671 million USD, for vegetables, fruits, grains, and red meat, respectively. Trade diversion was found in all other commodities except grains, suggesting that net imports of EU-15 from nonmembers have declined since formation of this Union.

Other regional and preferential trading agreements have also been demonstrated to facilitate agri-food product trade. Cardamone (2011) found that the Generalised System of Preferences (GSP) increased EU imports of grapes (only), the Cotonou Agreement benefits EU imports of oranges only, while regional trade agreements (RTAs) have positive effects on all fruits except oranges. Timsina and Culas (2020) use a gravity model approach to examine the effects of free trade agreements between Australia and ten FTA partners between 1996 to 2017. These authors find that several bilateral trade agreements (China-Australia, Korea-Australia, Australia-USA and Japan-Australia) generated consistent positive trade creation effects for agricultural products (10-30% increase), and that the trade creation effects of these agreements are larger than export diversion effects.

A separate vein of literature has examined the impact of agriculture and food standards on the international trade of these products. This literature has also expanded considerably in recent years and has been particularly explored the impacts of food safety standards and regulations on agri-food trade. Andersson (2019) and Fiankor et al., (2020) have recently examined the impact of certification to GlobalGAP (Global Partnership for Good Agricultural Practices) on EU15 trade, and exports of apples, bananas, and grapes, respectively. Seok et al. (2016) use gravity model to estimate the effects of SQF (Safe Quality Food) certification on U.S. agri-food exports.

In each of these examples, adoption of these standards was found to increase trade. Yet, an emerging literature find a negative effect of stringent food standards on agri-food trade. Anders and Caswell (2009) investigate the impacts of the requirement that HACCP (Hazard Analysis Critical Control Points) be implemented in the seafood industry in the U.S. in 1997. These authors find that the requirement to comply with this standard reduced annual U.S. seafood imports between 0.03% to 0.59% ($2.6 and $51.7 million USD annually). Studies of CAP

(Chloramphenicol) standards (Tran et al. 2012), Sanitary and phytosanitary provisions of the WTO (Jayasinghe et al. 2010; Crivelli and Gröeschl, 2016) reduce the probability and the value of trade. Still other studies find no food standards on trade (Xiong and Beghin, 2012; Ferro et al., 2015).

Overall then, there is not a consistent overall impact of agri-food standards on international trade. Beghin et al. (2015) suggested that discrepancies in empirical findings might stem from the focus of country- and product-specific case studies and the analytical approaches used.

3.3.2 Organic Standards and International Trade

Previous literature has long-time debated on useful methods to reduce organic certification costs and how to codify organic regulations in order to facilitate international trade. Vogl et al. (2005) confirm that farmers and consumers pay for multiple certifications and accreditations, and Barrett et al. (2002) suggest that a more efficient and affordable certification process should be made to facilitate organic trade to Europe, such as local inspection bodies. Arcuri (2015) examines the process of publicization – a term coined to characterize the transformation of private into public standards. This author finds that in the case of organic standards, public regulation allows private actors to maintain private standards and expand in new directions, but that it also might have reduced the regulatory capabilities of private regulators committed to core organic values. Padel et al. (2009) and Seufert et al. (2017) advocate the establishment of public regulations on organic products, but they both suggest that public regulations should focus more on the organic values and environmental practices rather than specific rules. Padel et al. (2009) compare the discrepancies of core organic values between private principles (IFOAM) and public regulations (EEC 2092/91), they suggest that concern of organic regulation should focus on harmonization of ethical values and principles rather than rules in order to protect the integrity of organic farming. Seufert et al. (2017) employ a scoring approach to assess how organic principles vary with organic regulations in countries. They find that substances that are allowed (or not) as inputs are codified in regulations while environmental best practices such as diversified crop rotations are less emphasized.

To be consistent with the organic principles and values in developed countries, scholars investigate the possibilities of developing multilateral agreements for the trade of organic products. Gandal and Shy (2001) develop a three-country and three-variety world economy model, they assume that each government decides whether or not to recognize foreign standards against with conversion costs[10] in the first stage, and each firm sets prices to maximize profits and consumers make purchases in the second stage. By solving the game by backwards induction beginning with the second stage, the authors conclude that countries will mutually recognize all standards with an overwhelming network effects. Network effects refer to the increased utility from consumption of one of the three brands which operate on the same standard in one country. Pekdemir (2018) introduces the development of regional organic standards established in the EU, Africa, Central America, the Pacific, Asia and concludes that inter-regional equivalence and multilateral agreements contribute to the reduction of regulatory complexity in organic regulation systems.

Several works of literature shed light on the organic trade utilizing either other methods or another type of dataset instead of the gravity equation or customs data. Oberholtzer et al. (2013) employ the Heckman model to explore organic handler’s decision to import and how much of the organic product to import using a survey of organic handlers in 2007 administered by Washington

[10] Conversion costs will be incurred so that foreign producers are able to adhere to the local standard and are allowed to sell products in that country.

State University. They find that larger organic firms are more likely to import organic products, while smaller firms are less likely to import, smaller firms would import a more considerable share once deciding to import. Meemken and Qaim (2018) review literatures on the topic of organic agriculture and conclude that organic farming is not the global blueprint for sustainable agriculture due to lower average yield rate than conventional agriculture. They find that the average yield gaps between organic farming and conventional farming amount to 19-25%, suggesting 23-33% of additional land required for producing the same amount of agricultural products.

To date, the impacts of OEAs on organic agri-food trade has received very little research attention. The few studies which have examined this issue were limited in their scope to focus only a very limited set of agreements. In a 2015 industry report, Jaenicke and Demko used a gravity model approach to examine the effect of OEAs on U.S. organic exports and imports. They found that OEAs between U.S.-Canada and U.S.-Japan increased U.S. organic exports by 454.6 and 219.7 percent respectively, and boosted U.S. organic imports by 371% and 267% respectively. Later, Demko and Jaenicke (2018) utilized quarterly level data on 23 selected categories of the U.S. organic food products during the period 2011-2014 and found a 9.1% increase in organic food exports from the U.S. to the EU market associated with the U.S-EU OEA established in 2012.

Their analysis has two limitations. The first one is the lack of concern on the trade pertinent to non-organic food. Since organic trade data with HS codes were tracked only in recent years (2007 in Canada, 2011 in U.S.) and in the form of 10-digit HS code, the product without containing an organic-related HS code did not necessarily indicate that there was no organic trade at that product level (Jaenicke and Demko, 2015, p.8). In addition, their analysis is a case study only focusing on the Unite States, undermining the interpretations and implications of results in the context of global organic trade. Taking these limitations into consideration, our objective is to provide a more general result by virtue of a multi-country analysis at disaggregated level and to quantify the impacts of OEAs on agri-food trade in the U.S. and Canada.

3.4 Empirical Approach

Introduced by Tinbergen (1962) and Pullianen (1964), the gravity model of international trade states that the trade flows between country pairs is proportional to their mass (gauged by GDPs) and hindered by geographic distance (a proxy of transport costs). A basic gravity equation specified by Anderson and van Wincoop (2003) is as follows:

$$\ln(Y_{ij}) = \alpha + \beta_1 \ln(GDP_i) + \beta_2 \ln(GDP_j) + \beta_3 \ln(Dist_{ij}) + \beta_4 \ln(\Pi_i) + \beta_5 \ln(P_j) + \varepsilon_{ij} \quad (3.1)$$

Where the bilateral trade between country i to country j is a function of income of country i (GDP_i), income of country j (GDP_j), and distance between countries i and j. In this context of gravity model, GDP of country i is used as a proxy of exporter's supply capacity and GDP of country j measures the potential demand of importer j. $Dist_{ij}$ is the bilateral distance between the largest cities of the two countries i and j. Furthermore, geographical distance between country pairs is assumed to be one of major factors impeding bilateral trade and expected to be negatively correlated to trade. As the larger distance between country pairs, the more transportation costs and culture dissimilarities would be. The variables Π_i and P_j are so-called outward and inward multilateral resistance which captures the unobservable effects varied by country i and country j, respectively. The outward multilateral resistance gives the sellers' incidence of trade costs on average while the inward multilateral resistance gives the buyers' incidence of trade costs. They are low if a country is remote from world markets, and the remoteness refers to how high the tariff barriers or other trade costs are.

Despite a high explanatory power, the gravity model approach was initially criticized by its lack of a sound theoretical foundation. As a result, Anderson (1979) firstly provided a micro-foundation for the gravity equation based on the development of a Heckscher-Ohlin model, which characterized trade by identical consumers with preference for homogeneous goods. After Anderson's work, Bergstrand (1985, 1989), Helpman and Krugman (1985), Deardorff (1998), and Anderson and van Wincoop (2003) contributed to the further development of this model. It is worth noticing that different theoretical frameworks used to support the gravity model would yield a similar functional form (Deardorff, 1998), motivating the widespread use of the gravity model in assessing international trade flows.

A novel feature of the gravity model is that researchers can derive from the baseline specifications and include new variables which are believed to affect bilateral trade flows. For example, Frankel et al. (1997) added indicators for sharing common language and border between country pairs. Anderson and van Wincoop (2003) explored how "remoteness" should be defined in the gravity model. In the agri-food trade literature, Cardamone (2011) added a dummy variable for preferential trade agreements (PTAs), Grant and Boys (2012) examined the effect of the WTO, and Timsina and Culas (2020) variable to indicate free trade agreements (FTAs). In this analysis we extend the gravity model by introducing a new variable representing the organic equivalency agreements (OEAs) and by separately accounting for organic and non-organic trade flows.

3.4.1 Model specification

To evaluate the impact of OEAs on agri-food trade, we estimate a gravity equation to examine the effects of bilateral OEAs on the U.S. and Canadian imports and exports in the agri-food product sector (HS chapters 02-24). The gravity equation adopted to assess the trade impacts of OEAs is presented in Equation (3.2):

$$\ln(Y_{ijkt}) = \alpha + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(Dist_{ij}) + \beta_4 Border_{ij} + \beta_5 Lang_{ij} + \beta_6 Colony_{ij} + \beta_7 \ln[AgArea_{it} * AgArea_{jt}] + \beta_8 Landlocked_{ij} + \beta_9 RTA_{ijt} + \beta_{10} CU_{ijt} + \beta_{11} WTOBothin_{ijt} + \beta_{12} OEA_{ijt} + \beta_{13} Organic_k + \beta_{14} OEA_{ijt} * Organic_k + \delta_i + \gamma_j + \eta_k + \tau_t + \varepsilon_{ijkt} \quad (3.2)$$

Where Y_{ijkt} denotes the U.S. and Canadian annual exports and imports with trading partners of product k at time t. The index i represents exporting country, and importing country is denoted by index j. The product k is defined at the most highly disaggregated level (i.e., HS-10 level for the U.S. exports, imports, and Canadian imports, HS-8 level for Canadian exports) and confined to HS chapters 02-24 (agri-food product sector). The time t indicates the year a given trade flow took place.

The dummy variables $Border_{ij}$, and $Lang_{ij}$ are equal to one if country pairs share a border, speak the same language, respectively. Similarly, the dummy variables $Colony_{ij}$ is a binary variable equal to one if the country pairs have a colony link. The variable $\ln[AgArea_{it} * AgArea_{jt}]$ is defined as the logarithm of the product of country i and j's total arable land area at time t. $Landlocked_{ij}$ is an indicator denoting the number of landlocked countries in the country pair. Two dummy variables indicating whether country pairs are part of the same regional trade agreement (RTA_{ijt}) or currency union (CU_{ijt}) at time t. A dummy variable $WTOBothin_{ijt}$ equal to one if the country pairs are both the World Trade Organization (WTO) member countries. The variable OEA_{ijt} is a dummy variable for country pairs i and j that signed a bilateral organic equivalency agreement (OEA) at time t. $Organic_k$ is a dummy variable indicating if product k is an organic product. The interaction term $OEA_{ijt} * Organic_k$ indicates the gap of trade flows between the U.S. and Canada organic agri-food products and non-organic (or organic but not tracked) agri-food products under the establishment of OEAs. Finally, δ_i is a exporter fixed effect, γ_j is an importer fixed effect, η_k is a two-digit HS product-level fixed effect, τ_t is a time fixed effect, and ε_{ijkt} is a log-normal error term. Various combinations of these fixed effects are used in alternative specifications of the model.

The PPML estimation are yielded from the following specifications:

$$\ln\left(Y_{ijkt}\right) = \alpha + \beta_1 \ln(GDP_{it}) + \beta_2 \ln\left(GDP_{jt}\right) + \beta_3 \ln\left[AgArea_{it} * AgArea_{jt}\right] + \beta_4 RTA_{ijt} + \beta_5 OEA_{ijt} + \beta_6 Organic_k + \beta_7 OEA_{ijt} * Organic_k + \rho_{ij} + \eta_k + \tau_t + \varepsilon_{ijkt} \quad (3.3)$$

Where Y_{ijkt} denotes the U.S. and Canadian annual exports and imports with trading partners of product k at time t. The index i represents exporting country, and importing country is denoted by index j. The product k is defined at the most highly disaggregated level (i.e., HS-10 level for the U.S. exports, imports, and Canadian imports, HS-8 level for Canadian exports) and confined to HS chapters 02-24 (agri-food product sector). The time t indicates the year a given trade flow took place.

Apart from the variables defined in the previous specification, we also include a new fixed effect variable into the PPML specification. The ρ_{ij} denotes a country pair fixed effect, and ε_{ijkt} is a log-normal error term. Various combinations of these fixed effects are used in alternative specifications of the model.

We use another set of empirical specifications to assess the impact on U.S. trade of OEAs in aggregate and evaluate trade impacts of each individual OEA established by the U.S. and its trading partners. The equations we use in the U.S. case are defined as the following:

$$X_{kjt} = OEA_{jt} + Organic_k + \tau_t + \delta_j + \varphi_k + \varepsilon_{kt} \quad (3.4)$$

$$X_{kt} = OEA_t + Organic_k + \tau_t + \varphi_k + \varepsilon_{kt} \quad (3.5)$$

Where X_{kjt} denotes the logarithm of the U.S. annual exports (or imports) of product *k* from country *j* in year *t*. OEA_t is a dummy variable indicating OEA a is in effect in year *t*, and $Organic_k$ is a dummy variable indicating if product *k* is an organic product. τ_t indicates the year a given trade flow took place and is included to capture time varying trends in the trade of these products. Country and product fixed effect are denoted by δ_j and φ_k, respectively, and ε_{kt} is the error term. Data used in these analyses cover the period 2011-2019, with the exception of the evaluation of the impact of the U.S.-Canada OEA on U.S. exports which includes data from 2007-2019.

Regression analyses are used to assess the impacts of organic equivalency agreements on facilitating U.S. imports and exports of these products. With few exceptions, each U.S. OEA is separately examined to assess their impact on U.S. imports and exports. In the case of the U.S.-Canada OEA, as this agreement was signed in 2009 but as organic exports data was not available until 2011, this was the first year that the agreement could be evaluated. As described above, U.S. import (Canada export) data was not available until 2017; given the short time this data is available, only U.S. imports are not examined.

In order to explicitly capture the impact of OEAs on organic trade, in this analysis products (*k*) are defined at the highly disaggregated HS10 level. Again, the products considered as organic are only those which are being formally tracked through having been assigned a unique HS code.

This careful approach does, however, introduce several analytical challenges. The number of organic products being tracked is dwarfed by the total number of traded products at this level of disaggregation. Thus, if the full-set of traded non-organic products were included in the dataset, even if OEAs did facilitate trade among the small number of identified organic products, the impact of this would likely not appear as being significant. Further, in assessing the impact of an OEA on trade, it would not be fair to judge its performance on the basis of not impacting trade for categories of products which are not tracked. For example, as the U.S. does not uniquely identify the import or export of any organic fish or crustaceans, it would not be accurate to claim that an OEA was not effective because it did not impact trade of these products.

For these reasons, a novel and careful approach was needed to fairly assess the trade impacts of OEAs. Rather than including all traded agri-food products (chapters 02-24), this analysis instead includes only HS-10 products within HS-6 product categories which include at least one (tracked) organic product. These products then reflect those for which there is at least some potential for a trading partner to trade organic or similar non-organic products. Importantly as well, the dynamics of changes in the list of organic products identified and tracked by the USITC is accounted for in the dataset construction. As such, the HS-6 product categories (and thus the specific HS-10 products within them) included in this analysis vary over time to reflect changes in the periodically updated USITC list of track organic products.

3.4.2. Data Sources

Product aggregation at the HS-6 level and higher are determined by the World Customs Organization. Countries have the option to develop their own product descriptions and numerical codes, at higher levels of product disaggregation. Product category disaggregation at the most highly disaggregated level is needed to distinguish between a conventional and organic product of the same type. In the U.S. data (export and import) this is reflected at the HS-10 level, for Canadian exports at the HS-8 level. Data only up to the HS-6 level of disaggregation is required to be compiled and submitted to United National Conference on Trade and Development (UNCTAD). As such, organic trade data is not available through the commonly used datasets of global trade flows and must instead be obtained directly from each country's customs or statistical offices.

In 2011, the U.S. International Trade Commission (USITC)[11] began tracking U.S. organic trade for 23 exported and 20 imported organic products. Additional organic products have been subsequently added and, as of 2019, the trade of 44 exported and 56 imported organic products have been tracked. A list of imported and exported organic products tracked by the U.S. government is presented in Appendix tables E1 and E2, respectively. In Canada, since 2007 Statistics Canada[12] has been tracking organic imports; data concerning Canada's organic exports started being collected in until 2017. According to datasets obtained from Statistics Canada, 17 exported and 88 imported organic products are being tracked as of 2019. A list of imported and exported organic products tracked by Canadian government is presented in Appendix tables E3 and E4, respectively. It is important to note that the U.S. and Canada are trading many more organic products than those indicated by these HS codes; organic agri-food products not on these lists are being aggregated with conventionally produced products. Thus, given the current

[11] USITC is an independent agency that provides analysis and expertise on tariffs and trade, aiming at making decision in proceedings with regard to adjudication of intellectual property and trade disputes. USITC trade data is public and can be accessed at the website: https://dataweb.usitc.gov/
[12] Statistics Canada, founded in 1971, is the Canadian government agency with the commission of providing statistics on Canada's economy, society, and environment and improving the understanding of Canada.

approach used to collect data, it is not possible to precisely know the full value or types of organic products being traded.

In our dataset, the U.S. annual import and export data is obtained at the HS-10 level from USITC for 184 countries with whom the U.S. is trading these products. This data covers HS chapters 02-24 (all fresh and processed agri-food products and beverage sectors) from 2011 to 2019. Canada's annual import data was obtained from Statistics Canada, covering the period over 2007-2019 at the HS-10 level and encompassing 184 trading partners. It is important to note that Canadian annual export data was also obtained from Statistics Canada at its most disaggregated level (HS-8) from 2017 to 2019. This is the most highly disaggregated data collected by Statistics Canada, and includes sufficient information to permit information to separately identify the organic and conventional products. Given data availability it was not possible to include Canadian organic export data prior to 2017.

Information on the Organic Equivalency Agreements (OEA) was obtained from the International Federation of Organic Agriculture Movement (IFOAM)-Organic Equivalency Tracker (2019)[13]. Gross domestic product (GDP) data (in U.S. dollars) are obtained from the World Bank Development Indicators.[14] Measures of distance, contiguity, common language, colony link, colonial relationship after 1945, landlocked status, currency union (CU) membership, and the

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[13] IFOAM-Organic Equivalency Tracker offers information on the development of equivalence arrangements between government trade partners, with a website at: https://www.ifoam.bio/our-work/how/regulation-policy/organic-equivalence. It is conducted by IFOAM, Food and Agriculture Organization (FAO) of the United Nations, and the United National Conference on Trade and Development (UNCTAD). These organizations established long-term partnerships under the International Task Force (ITF) Project and the Global Organic Market Access (GOMA) project, aiming to support the growth and development of organic agriculture worldwide (IFOAM), maintain chances for sustainable agriculture and rural development through organic agriculture (FAO), and explore trade opportunities for developing countries and their producers (UNCTAD) (Bowen and Hoffmann, 2013).
[14] World Bank Development Indicators Data can be accessed at the website: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD&country=#. For recent GDP data in 2018 and 2019, we obtained from World Economic Outlook Database supported by International Monetary Fund, which can be accessed at the website: https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/index.aspx

World Trade Organization (WTO) membership are taken from the Centre d'Etudes Prospective et d'Informations Internationales (CEPII) dataset (Head, Mayer and Ries, 2010). Information regarding the arable agricultural land area (measured in hectares) at country level comes from Food and Agriculture Organization of the United Nations-Statistics (FAOSTAT)[15]. Regional Trade Agreements (RTAs) are obtained from the WTO-RTA Database[16]. A detailed statistics of RTAs and the year when RTAs came into force are provided in Appendix F.

3.4.3 Treatment of Zero Trade Flows

In the literature related to application of gravity model, how to deal with the zero trade flows is a major concern. Generally, three alternative approaches have been utilized and recommended to handle zero trade flows: (a) truncated OLS which eliminates zero flows and only keeps positive trade values (Westerlund and Wilhelmsson, 2011; Xiong and Beghin, 2012); (b) replace zeros with arbitrary positive numbers, usually adding one to all observations (De Frahan and Vancauteren, 2006); (c) tobit model estimations with a censored sample (Rose, 2000; Baldwin and Di Nino, 2006). Westerlund and Wilhelmsson (2011) point out that truncation and censoring methods when zeros are not randomly distributed may induce a sample selection bias. Baldwin and Di Nino (2006, footnote 5) indicate that they dropped product-pair combinations if one of the country pairs never traded with any of its partners in any of the year. For example, no zeros for product lines that Germany never exported to any of the 19 partners in any of the year.

[15] FAOSTAT offers statistics on food and agriculture sector covering over 245 countries worldwide, which is free to the public. The land area data comes from the Land Use chapter, which is available at the website: http://www.fao.org/faostat/en/#data/RL

[16] WTO-RTA Database is available at: https://rtais.wto.org/UI/PublicMaintainRTAHome.aspx

Concern about zero trade values also extends to the agricultural trade literature. As the prevalence of zeroes rises with disaggregation (Anderson, 2011; Gashi et al., 2017), observations with zero trade reported can dominate export and import flows (Jayasunghe et al., 2010; Xiong and Beghin, 2012; Haq et al., 2013; Philippidis et al., 2013). It is important to recognize that zero trade flows include both "true" and "false" zero values. "True" zero values indicate a positive probability of trading between pairs of countries exists, but that it might not have occurred in a given period due to transportation costs or relative price competitiveness. On the other hand, "false" zero values imply that pairs of countries have no potential for trade a given product due to exogenous factors which prevent trade (e.g. political action which prevents trade), or factors which limit supply or demand of a given product for a given importer or exporter (e.g. U.S. will not be able to import bananas from Switzerland).

We carefully address this issue in our data. Firstly, we fill in zeros where trade is missing for country pairs at HS-10 level in each year during the sample period. We used a "rule of thumb" approach to identify the "true" potential trade flows. In this case, if a country-pair did not trade more than $5,000 USD of a product at least three times during the sample period they were considered not usual trading partners of that good; in these instances the zero observations for that country pair-product-year are dropped from the dataset. After dealing with "false" trade flows which implies no potential for trade between country pairs, we find that zeros occupy 67.60% of the number of total observations (2,071,582 zero observations in total).

Santos Silva and Tenreyro (2006) point out that log-linearization of the gravity equation leads to inconsistent estimation since the large portion of very small values in the disturbance term violates the normal distribution assumption. By modeling the disturbance term as generated from a Poisson distribution, the Poisson pseudo-maximum likelihood (PPML) model can provide unbiased estimates in the presence of heteroskedasticity. Santos Silva and Tenreyro (2011) demonstrate that the PPML method applies well to trade data dominated by zero values. The PPML approach is used in this analysis in alternative model specifications.

3.5 Results

We provide a series of descriptive results in section 5.1. First, we characterize organic imports and exports by outlining trade flows and organic share of total agri-food trade in the U.S. and Canada, respectively. Figures showing the U.S. and Canada top 10 importers and exporters in organic agri-food sector during the period 2017-2019 are presented. Finally, we summarize the top five organic food products imported and exported by the U.S. and Canada using the average trade flows in recent years (2017-2019). In section 5.2, we offer summary statistics of variables included in the gravity analysis and present gravity model results. The gravity model results include both the Ordinary Least Square (OLS) estimator and the Poisson pseudo-maximum-likelihood (PPML) estimator. A general trade effects of OEAs in the U.S. and Canadian agri-food sector is analyzed, followed by a separate report for the impact of OEAs on imports and exports, respectively. We focus on the PPML results in our discussion since the PPML model provides unbiased estimates in the presence of heteroskedasticity and applies well to trade data dominated by zero values. Section 5.3 examines the import and export impacts of each U.S. OEA. To assess the impacts of individual OEAs based on tracked organic agri-food products and conventional products of the same type, we limit the dataset to HS-10 products within HS-6 product categories which include at least one (tracked) organic product.

3.5.1 Descriptive Results

Trends of organic exports and imports in the U.S. during the period 2011-2019 are presented in Figure 2. Vertical lines in this Figure indicate years when a U.S. OEAs were implemented. In 2019, the U.S. organic agri-food exports products reached $0.76 billion USD, reflecting a 72.7% increase in 2011. The U.S. organic exports in agri-food products comprised 0.32% of U.S. total agri-food exports in 2011, while the share increased and amounted to 0.54% in 2019. On the other hand, the U.S. organic agri-food imports hit a record of $2.27 billion USD in 2019, three times the value in 2011. Within the U.S. agri-food imports, only 0.59% was organic imports in 2011, and the organic share of imports rose to 1.46% in 2019.

From Figure 2, we find that several U.S. OEAs appear to facilitate the U.S. trade of organic organic agri-food products. For example, the U.S.-EU OEA was established in 2012, and in the next year U.S. organic exports and imports increased by 6.8% and 176%, respectively. The implementation of the U.S.-Japan, U.S.-South Korea, and U.S-Switzerland OEAs appears to have increased imports, but not had an effect on U.S. exports. Overall, from this descriptive evidence it appears that OEAs may have facilitated U.S. organic imports more than organic exports. The U.S.-Canada OEA is not displayed in Figure 2 due to the time periods limited time range here. The U.S.-Canada OEA was established in 2009, but data tracking U.S. organic imports and exports are only available from 2011 to 2019.

It is important to note that the trends in this descriptive analysis reflect only the data available to track these trade flows. In considering these descriptive results, we need to emphasize that some of the observed increase in organic trade flows might result from the changed, and often expanded, lists of tracked organic products over time.

Figure 3 presents Canada's exports and imports in organic agri-food products from 2007 to 2019. In 2007, Canadian organic imports in the agri-food sector totaled $0.17 billion USD, accounting for 0.71% of total agri-food imports. After thirteen years, organic agri-food imports amounted to $0.60 billion USD, approximately 3.5 times their 2007 value. The organic share of total agri-food imports in Canada was 1.57% in 2019. Canadian organic exports were first tracked and reported in 2017; the trade flows ranged from $0.31 billion USD to $0.36 billion USD and the organic share of total agri-food exports was between 0.62% and 0.75%.

The Canada-U.S. and the Canada-EU OEAs were signed in 2009 and 2011, respectively. From Figure 3, we speculate that Canada-U.S. and Canada-EU OEA considerably facilitated Canadian organic agri-food imports. Following the establishment of the Canada-U.S. OEA Canadian organic imports increased from $0.24 billion USD in 2008 to $0.43 billion USD in 2009, reflecting 79.2% growth. Following the implementation of the Canada-EU OEA, organic agri-food imports increased 16.3%. It is not clear, however, if Canada's other OEAs have offered any trade facilitation benefits. Canada established OEAs with Switzerland, Costa Rica, and Japan in 2012, 2013, and 2015, respectively; changes in trade following implementation of these agreements was relatively flat.

Using mean value of trade flows over the past three years (2017-2019), the sources and destinations tracked organic food exports and imports are presented in Panels A and B of Figure 4, respectively. Among the products that are tracked, a significant majority are shipped to buyers in Canada (55.3%) and Mexico (24%). Due to the relative perishability of many of the tracked organic products, the relative proximity of these markets, and policies which facilitate trade between these partners (NAFTA and, in the case of Canada, an OEA), this outcome is not surprising. Other significant destinations for U.S. exports include Japan (annual average of $39.6

million USD), South Korea ($28.4 million USD), Taiwan ($24.11 million USD), and the UK ($9.91 million USD); importantly, each of these markets had either on OEA or an export agreement in place during the period under consideration. The remaining top destination markets U.S. organic exports, the UAE, Hong Kong, Philippines, and Guatemala, do not have any form of an organic trade agreement in place.

The primary suppliers of U.S. organic imports are presented in Panel B of Figure 2. It can be seen here that Mexico is the largest source of the tracked products ($335.7 million USD; 22.2% of imports). The remaining imports are sourced primarily from South America (Peru, Brazil, Argentina, Columbia, Ecuador), Europe (Spain, Italy), and Canada. Each of these partners account for similar amounts (7-12%) of U.S. organic imports. Among these, only the U.S.-EU and U.S.-Canada OEAs govern organic trade with these partners. It is important to note though, that these results may be partially an artifact of the specific products which the U.S. is tracking at its boarders. A recent survey of U.S. organic food manufacturers, reported that Canada, Mexico and China were the most likely sources of organic ingredients (OTA, 2019).

Figure 5 presents the top export destinations and sources of imports for Canada during 2017-2019. The primary sources of Canadian exports are the United States ($75.65 million USD), India ($31.77 million USD), Germany ($23.34 million USD), China and Japan. Among these, United States and Japan were OEA partners with Canada during the period 2017-2019. A significant majority of Canadian organic imports are sourced from the United States and Mexico, followed by much less significant imports from Peru, Columbia, and Ecuador. Among these top sources of imports several have OEA agreements with Canada – the U.S. (largest source of imports), Honduras (7th largest import source), and Italy (9th largest source).

The primary fresh and processed products traded by Canada and the United States are presented in Figure 6. Panel A and C shows organic exports for the U.S. and Canada, respectively; panel B and D present this information for organic imported products. As presented in Panel A, we find the highest valued U.S. exports are organic apples ($94.25 million USD), grapes ($64.99 million USD), and strawberries ($51.43 million USD). In Panel B, which shows imported organic food products, it is reported that organic unroasted coffee value of U.S. imports ($280.57 million USD), bananas ($270.56 million USD), and soybeans ($212.19 million USD) are the most organic agri-food products imported into the U.S.

Panel C and Panel D reflects Canada's highest valued exports and imports over 2017-2019. In Panel C it is reported that lentils, maple syrup, red spring wheat, unroasted coffee, and soybeans are the most exported organic agri-food products. As for Canadian imported products (Panel D), organic unroasted coffee is the most imported product ($100.08 million USD), followed by bananas ($47.93 million USD), strawberries ($35.67 million USD), virgin olive oil ($27.03 million USD) and organic blueberries ($26.26 million USD).

It is not surprising to find that there is little overlap between top organic products imported and exported by the U.S. and Canada during the period 2017-2019. It was expected that the U.S. and Canada have similar types of organic agri-food products exported and imported during the same period due to the similar agricultural and environmental comparative advantages in these two countries as well as the leading position in organic regulations and demands. However, the U.S. tracked 39 organic product categories for imports over 2017-2019 and Canada tracked 46 organic product categories for imports during the same period. Only 12 organic imported categories were tracked by both of the U.S. and Canada customs from 2017 to 2019, amounting to one-third of total number of organic imported products tracked at HS-6 level by both countries.

Similarly, out of 33 organic exported categories tracked by the U.S. customs and 12 organic exported categories tracked by the Canada customs, two organic product categories were tracked by both countries for exports. It accounts for only 10% of the total number of organic exported categories tracked by both countries during the period 2017-2019. Therefore, we are not surprising to observe a little overlap between imported and exported organic products tracked by the U.S. and Canada customs over 2017-2019.

3.5.2 Gravity Model Results

Table 3.2 describes the summary statistics of our data set. The organic and non-organic datasets contain a total of 49,719 and 3,014,817 observations, respectively. The organic food products account for 1.62% of the total number of observations. The average value for variable Y_{ijkt} indicates that the mean value of trade flows at the HS-10 level between two country partners at time t is approximately $970,000 USD. The probability of speaking the same language is 30%, while the trading partners in only 4% of observations share a common border. The mean value of variable RTA_{ijt} indicates that the probability of country belonging to the same regional trade agreement with the U.S. or Canada is 0.24, and average value of variable $WTOBothin_{ijt}$ implies that, for 94% of the observations, the trading country pairs are both member countries of the WTO. The mean value of variable OEA_{ijt} is 0.23, suggesting that 23% of observations are between country pairs who are also parties in a bilateral Organic Equivalency Agreement.

The results of the econometric analysis are presented below. Tables 3.3 and 3.4 reports OLS results examining the OEA effects on U.S. and Canada trade during the period 2007-2019.

Table 3.3 aggregates import and export flows, while Table 3.4 disaggregates this analysis to unidirectional flows. In Table 3.5, this analysis is revisited using the PPML approach.

Table 3.3 reports the impact of OEAs on U.S. and Canada imports and exports of agri-food products. Columns 1 and 2 report OLS results with time fixed effect and product fixed effects at HS-2 level, respectively. In columns 3-5, we include combinations of various fixed effects. The coefficients of gravity variables behave in a consistent manner and generally as expected across columns. For example, the positive and significant coefficients of GDP_{it} and GDP_{jt} imply that economic size in exporter i and importer j at time t are positively related to trade flows of agri-food products. The negative and significant coefficients of $Dist_{ij}$ across columns suggest that larger distance between country pairs would increase transportation costs and reduce agri-food trade flows by 18%-56.3%. The positive and significant coefficients of variables $Border_{ij}$, $Lang_{ij}$, and $Colony_{ij}$ indicate that common border and cultural similarities (i.e., common language and having colony relationship) provide an impetus for trade flows of agri-food products. The positive estimates of the variable related to arable land area in exporter i and importer j at time t support the belief that country pairs with larger arable land area incline to trade more agri-food products with each other. We find negative and significant coefficients of variable $Landlocked_{ij}$ across columns, indicating that one more landlocked country in country pairs would considerably reduce the agri-food trade flows. The significantly positive coefficients of variables RTA_{ijt}, CU_{ijt}, and $WTOBothin_{ijt}$ suggest that participating in the same regional trade agreements and currency unions with the U.S. and Canada, and being a WTO member country would greatly facilitate agri-food trade. The unexpected signs of coefficients in Table 3.3 are the exporter GDP and arable land area in exporter and importer in column 5. In column 5, the exporter fixed effect added would absorb the trade effect of exporter GDP and exporter's arable land area which do not vary with time.

In column 1 of Table 3.3, we add time fixed effect and find a positive and significant OEA effect on the U.S. and Canada imports and exports. The coefficient of variable OEA_{ijt} indicates that the U.S. and Canada imports and exports of non-organic (or organic but not tracked) agri-food products would have increased by 8.5% ((exp(0.082)-1)*100) if the U.S. or Canada signed OEA with its trading partners. The coefficient of variable $Organic_k$ is negative and significant at 1% level, showing that the imports and exports of tracked organic products are 8.9% lower than the reference group of products when OEAs are not signed between country pairs. The positive and significant coefficient of interaction term $OEA_{ijt} * Organic_k$ suggests that the OEAs facilitate more organic agri-food trade flows relative to non-organic agri-food trade values, with a gap of 13.1%.

We add product fixed effect at HS-2 level in column 2, not supporting a significant trade effects of OEAs in the U.S. and Canada non-organic (or organic but not tracked) agri-food sector due to a not statistically significant coefficient of variable OEA_{ijt}. The significantly negative coefficient of variable $Organic_k$ also implies that tracked organic trade flows are 53.4% ((exp(-0.763)-1)*100) lower than non-organic trade values of agri-food products. The coefficient of interaction term $OEA_{ijt} * Organic_k$ is positive and significant at 10% level, showing that the organic imports and exports of agri-food products would be 9.6% higher than non-organic (or organic but not tracked) imports and exports under the establishment of OEAs.

In columns 3-5, we add a combination of fixed effects. The impacts of OEAs on U.S. and Canada imports and exports of non-organic (or organic but not tracked) agri-food products are positive and significant in column 3 and column 5, while not significant in column 4. The coefficients of variable OEA_{ijt} in column 3 and column 5 show that the OEAs generate an increase of 2.3% ((exp(0.023)-1)*100) and 5.7% ((exp(0.055)-1)*100) in non-organic (or organic but not tracked) agri-food trade flows, respectively. The negative and significant coefficients of variable $Organic_k$ in column 3-5 suggest that trade values of tracked organic agri-food products are 54.3%, 61.4%, and 54% lower than non-organic products, respectively. In column 3 and column 4, the coefficients of interaction term $OEA_{ijt} * Organic_k$ are positive and significant, suggesting a 9.4% and 11.6 % higher impacts of OEAs on organic agri-food products than non-organic (or organic but not tracked) agri-food products. Results in column 5 do not support a significant gap between organic and non-organic trade flows under the enforcement of OEAs.

Combining the results of columns 1-5 in Table 3.3, we find that the U.S. and Canada imports and exports of non-organic (or organic but not tracked) agri-food products would have increased by 2.3%-8.5% if the U.S. or Canada signed OEA with its trading partners. The results show that the OEAs facilitate more organic agri-food trade flows relative to non-organic agri-food trade values, with a gap ranging from 9.4% to 13.1%. In addition, the tracked organic imports and exports are lower than non-organic trade values when OEAs are not established between country pairs, with a gap amounting to 8.9%-61.4%.

We notice the difference of results between column 4 and column 5, motivating us to split the data and investigate the OEA effects on imports and exports separately. Apart from this reason, the difference in the number and size of trade flows of the tracked products may suggest that there would be a difference between results of imports and exports.

Table 3.4 reports the impact of OEAs on imports and exports separately using the U.S. and Canadian annual trade flows. The dependent variables reflect imports (only, columns 1 and 2), and exports (only, Columns 3 and 4) of product k at time t. In columns 1 and 3, we add time, product, and importer fixed effects to the analysis. The time fixed effect with product and exporter fixed effects are added to analysis in columns 2 and 4.

Estimate of variable OEA_{ijt} in column 1 indicates that OEA generates a 1.8% ((exp(0.018)-1)*100) increase in non-organic (or organic but not tracked) imports of agri-food products. The significantly negative coefficient of variable $Organic_k$ implies that tracked organic imports are 56.8% lower than the reference group when OEAs are not signed between country pairs. The coefficient of interaction term $OEA_{ijt} * Organic_k$ is negative and significant at 1% level, suggesting that OEAs facilitate more non-organic imports of agri-food products than imports of tracked organic products, with a gap of 15.2%.

Results in column 2 imply a consistent story with column 1, while the economic magnitudes of estimates are larger than column 1. The coefficient of variable OEA_{ijt} in column 2 of Table 3.4 shows that the U.S. and Canada imports of non-organic (or organic but not tracked) agri-food products would have increased by 6.4% ((exp(0.062)-1)*100) if the U.S. and Canada signed OEA with its trading partners. The coefficient of variable $Organic_k$ is negative and significant at 1% level, indicating that tracked organic imports are 57% lower than non-organic imports. The negative and significant coefficient of interaction term $OEA_{ijt} * Organic_k$ suggests that organic imports of agri-food products would be 25.6% lower than non-organic (or organic but not tracked) imports under the establishment of OEAs.

In column 3, we focus on the impacts of OEAs on the U.S. and Canada exports of agri-food products and find a different story compared to imports (columns 1-2). Although the coefficient of variable OEA_{ijt} is not significant, the positive and significant estimate of interaction term $OEA_{ijt} * Organic_k$ supports the belief that OEAs facilitate more organic exports of agri-food products than non-organic (or organic but not tracked) exports, with a gap of 57.6% ((exp(0.455)-1)*100). The coefficient of variable $Organic_k$ indicates that tracked organic exports are 73.6% lower than non-organic exports of agri-food products when OEAs are not established between country pairs.

We replace importer fixed effect with exporter fixed effect in column 4 and find a negative and significant effect of OEAs on the U.S. and Canada exports of non-organic agri-food products. If the U.S. and Canada signed OEAs with its trading partners, the non-organic (or organic but not tracked) agri-food exports would have decreased by 62.2% ((exp(-0.972)-1)*100). The coefficient of variable $Organic_k$ indicates that tracked organic exports are 73.2% lower than non-organic exports of agri-food products when OEAs are not signed between two countries. A consistent story is witnessed from results in column 4, the positive and significant estimate of interaction term $OEA_{ijt} * Organic_k$ suggest that OEAs lead to a 72.8% more exports for organic agri-food products than non-organic (or organic but not tracked) exports of agri-food products.

In general, estimates in columns 1 and 2 indicate that OEA generates a 1.8%-6.4% increase in non-organic (or organic but not tracked) imports of agri-food products. The OEAs facilitate more non-organic imports of agri-food products than tracked organic imports, with a gap amounting to 15.2%-25.6%. The organic imports of agri-food products are 56.8%-57% lower than non-organic agri-food imports when OEAs are not signed between country pairs. In contrast, results in columns 3 and 4 imply that OEAs do not support non-organic (or organic but not tracked) exports of agri-food products and results in a 62.2% decrease. The organic exports of agri-food products are 57.6%-72.8% higher than non-organic exports under the enforcement of OEAs. In addition, the organic exports of agri-food products are lower than non-organic exports when OEAs are not established between two countries, with a gap of 73.2%-73.6%.

The different results between imports (columns 1-2) and exports (columns 3-4) stem from the different categories of tracked organic products for imports and exports. For example, U.S. and Canada tracked organic bananas, green tea, and mangos for imports not for exports, while organic maple syrup, oat, and vinegar were tracked for exports not for imports. Although a portion of the product categories were both tracked for imports and exports, the trade flows within the same product categories vary for imports and exports. In addition, Canada began to track organic exports since 2017, leading to a shorter time range of reported organic products for exports.

Table 3.5 presents results of PPML analysis evaluating the impact of OEAs on the U.S. and Canada imports and exports of agri-food products. Columns 1-3 represent the PPML results for OEA trade impacts on the U.S and Canada imports and exports during the period 2007-2019. In column 4, the dependent variable is the U.S. and Canada imports of agri-food products over 2007-2019, and in column 5 the U.S. and Canada exports from 2011 to 2019 are considered.

In column 1, we include country pair fixed effect in the analysis. The coefficients of exporter GDP and importer GDP are positive and significant which comply with gravity results estimated by OLS. The estimates of arable land area in exporter and importer and indicator for member countries in the same regional trade agreements are not significant. Since the country pairs fixed effects absorb trade factors which are invariant with country pairs, the variables which do not show much variation in the data might not be statistically significant. The positive and significant coefficient of variable OEA_{ijt} indicates that OEAs facilitate non-organic (or organic but not tracked) agri-food imports and exports in the U.S. and Canada and generate a 21% ((exp(0.191)-1)*100) of increase. The estimate of variable $Organic_k$ shows that tracked organic trade flows are 42.8% lower than non-organic trade values when OEAs are not signed between country pairs. Unlike OLS results, the PPML estimates of interaction term $OEA_{ijt} * Organic_k$ in column 1 suggests that organic imports and exports of agri-food products are 24.3% lower than non-organic imports and exports under the establishment of OEAs.

We include country pair fixed effect and time fixed effect in analysis of column 2, adding another product fixed effect in analysis of column 3. The results of columns 2 and 3 both imply negative impacts of exporter GDP on imports and exports of agri-food products, which are not consistent with result in column 1. The reason might be the inclusion of both country pair and time fixed effects, leading to several dominant exporters with smaller economic size captured by the variable of exporter GDP in the analysis. In columns 2 and 3, the coefficients of variable OEA_{ijt} are not significant. The results in columns 2 and 3 suggest that the tracked organic imports and exports are 42.8% ((exp(-0.559)-1)*100) and 54.4% ((exp(-0.785)-1)*100) lower than non-organic trade values in agri-food sector when OEAs are not established between country pairs. The positive and significant coefficients of interaction term $OEA_{ijt} * Organic_k$ in columns 2 and 3 indicate that OEAs facilitate non-organic (or organic but not tracked) imports and exports of agri-food products more than organic imports and exports, with a gap of 24.7% and 20.6%, respectively.

The estimates in column 4 show significantly positive trade effects on the U.S. and Canada agri-food imports of exporter GDP, importer GDP, and indicator for the same RTA member country. The positive and significant coefficient of variable OEA_{ijt} indicates that non-organic (or organic but not tracked) imports of agri-food products would have increased by 22.5% ((exp(0.203)-1)*100) if the U.S. and Canada signed OEAs with its trading partners. The coefficient of variable $Organic_k$ is not significant. The coefficient of interaction term $OEA_{ijt} * Organic_k$ is negative and significant at 1% level, suggesting that organic imports of agri-food products would be 50% lower than non-organic imports under the enforcement of OEAs.

In column 5, most of the estimates in this analysis are not significant except for the coefficients of variables $Organic_k$ and $OEA_{ijt} * Organic_k$. The estimates indicate that tracked organic exports of agri-food products would be 83.1% ((exp(-1.775)-1)*100) lower than non-organic exports when OEAs are not established between two countries. The significantly positive coefficient of interaction term $OEA_{ijt} * Organic_k$ implies that the OEAs facilitate more organic exports of agri-food products than non-organic exports, with a gap of 102%.

From columns 1-3, we find that the establishment of OEAs would lead to a 21% increase in the U.S. and Canada non-organic (or organic but not tracked) imports and exports of agri-food products. However, the negative and significant coefficients of interaction term in columns 1-3 suggest that organic agri-food trade flows in the U.S. and Canada would be 20.6%-24.7% lower than non-organic (or organic but not tracked) trade values of agri-food products. The signs of interaction term in PPML results are opposite from those in OLS results. The tracked organic trade flows are lower than non-organic trade values when OEAs are not established between country pairs, with a gap ranging from 42.8% to 54.4%. If we consider the column 4-5, we find a consistent story from OLS results to PPML results. The estimates in column 4 of Table 3.5 indicate that the OEAs facilitate non-organic (or organic but not tracked) agri-food imports and generate a 22.5% increase, larger than 1.8%-6.4% in OLS results. In column 4, the PPML results suggest that organic imports of agri-food products induced by OEAs are 50% lower than non-organic imports, while OLS results imply a gap of 15.2%-25.6%. Although the coefficient of OEA variable in column 5 is negative while not significant, the significantly positive interaction term indicates that organic exports of agri-food products would be 102% higher than non-organic (or organic but not tracked) agri-food products. In OLS results, the gap is 57.6%-72.8%, smaller than PPML results. Overall, the PPML estimates are larger than OLS estimates in economic magnitude.

This finding from this article is consistent with conclusions reached by Demko and Jaenicke (2018) who posited that the U.S.-EU OEA increased the U.S. organic exports by 9.1% using 23 selected categories over 2011-2014. Our results are derived from broader types of OEAs and longer list of organic as well as non-organic product categories. We find a consistent story of the organic exports induced by OEAs estimated by OLS and PPML, suggesting that the OEAs facilitate more organic exports of agri-food products than non-organic exports and lead to a gap of 57.6%-102%.

3.5.3 Trade Impacts of Individual OEAs

Table 3.6 reports the impact of OEAs on U.S. exports and imports of agri-food products. This analysis focuses only on OEA effects on U.S. imports and exports of agri-food products over 2007-2019, utilizing trade data of only HS-10 products within HS-6 product categories which include at least one (tracked) organic product. These products reflect those for which there is at least some potential for a trading partner to trade organic or similar non-organic products.

Results in column 1 evaluate the aggregate effect of all OEAs on agri-food trade, while the subsequent columns individually examine U.S. OEAs (columns 2-6). Estimates in Table 3.6 are yielded by the Equation (3.4) and Equation (3.5). The model used to assess the impact on trade of OEAs in aggregate is presented in Equation (3.4), while that presented in Equation (3.5) is used to evaluate trade impacts of each individual OEAs. This analysis is mainly motivated by the limited list of organic products have been tracked by the U.S. customs. In the previous analysis, we include the full-set of traded non-organic products, however, a negative or not statistically significant estimate does not necessarily indicate that OEAs did not facilitate organic trade on the basis of many categories of products which are not tracked. Therefore, we include only HS-10 products within HS-6 product categories which include at least one (tracked) organic product. These products reflect those for which there is at least some potential for a trading partner to trade organic or similar non-organic products.

In Table 3.6, starting first with the aggregated impact of OEAs (column 1), there is no evidence that, as a group, U.S. OEAs have impacted the trade of the agri-food products included in this analysis. It also does not appear that, in aggregate, there is a statistically significant change in the trade of the bundle of agri-food products included in this analysis. Importantly, however, there is a large and statistically significant difference in the trade of organic products. It is reported here that export of tracked organic products is 95.0% ((exp(0.668)-1)*100) higher than the reference group of products. In the case of imports, this difference is even more significant – these results indicate that there is a 247.6% higher trade of these products.

Results in Table 3.6 imply that the U.S. OEA agreements with the EU, Japan, South Korea, and Switzerland do not appear to have impacted trade, however, the U.S.-Canada OEA deserves specific consideration. The exports of the tracked organic products from the U.S. to Canada is lower than for non-organic goods. This outcome is not surprising given the strong trading relationship, across both the intensive (value of trade) and extensive margins of trade (variety of traded products), between these two countries. In addition, in the case of U.S. exports flows, this OEA was unique in that it was found to have contributed to a 63.2% ((exp(0.490)-1)*100) increase in the trade of the considered agri-food products. This outcome is important and is consistent with findings of a recent survey conducted by the Organic Trade Association which found that close to 30% of surveyed U.S. organic agri-food businesses indicated that their exports to Canada increased since the implementation of this agreement (OTA, 2019).[17]

The U.S.-Canada OEA is the earliest agreement the U.S. signed, and Canada is a major destination of the set of products which can be identified as organic. The longer time since implementation of this agreement, complemented by strong existing business and trading relationships supported through NAFTA and relative proximity of these two countries (leading to reduced trading costs), likely contribute to this outcome. This result thus offers some promise that OEAs can, in fact, facilitate agri-food product trade and that with time and perhaps a more extensive array of organic products being tracked, other agreements could also offer more value in this dimension.

In column 2, the coefficient of interaction term between the OEA variable and organic dummy variable is negative and significant, indicating that U.S. organic exports of agri-food products would be 48.4% ((exp(-0.661)-1)*100) lower than non-organic (or organic but not tracked) exports under the establishment of U.S.-Canada OEA. However, the positive and significant estimate of interaction term in column 6 implies that the U.S.-Switzerland OEA facilitates U.S. organic exports of agri-food products more than non-organic (or organic but not tracked) agri-food exports, leading to a gap of 687.7%. The coefficients of interaction term in other columns do not suggest a statistically significant gap of U.S. exports and imports between tracked organic and non-organic agri-food products under the enforcement of U.S. individual OEA.

[17] Results of this survey also indicate that respondents reported increased exports to the EU (~25% of respondents), Japan (~11%), and South Korea (~22%) since implementation of these OEA agreements.

3.6 Conclusions

This article contributes to the empirical literature which uses gravity models to assess the impacts of OEAs on agri-food imports and exports in the U.S. and Canada during the period 2007-2019.

The U.S. and Canada are primary organic-involved participants in the world, establishing eleven bilateral OEAs with its trading partners (out of twenty bilateral OEAs in the world) as well as holding half of organic revenues in the world. Exploring the impacts of OEAs on the U.S. and Canada is thereby a vital empirical work contributing to the organic trade literature and offering realistic understanding with current and potential OEAs. The objective of this study is to examine whether OEAs signed by the United States and Canada affect trade of agricultural and food products and further explore the ways in which agri-food trade flows are influenced.

We find that organic imports and exports in the U.S. and Canada experienced a considerable growth over 2007-2019. The U.S. organic imports of agri-food products tripled from $0.67 billion USD in 2011 to $2.27 billion USD in 2019. The U.S. organic exports amounted to $0.76 billion USD in 2019, reflecting a 72.7% increase in 2011. In Canadian agri-food sector, the organic imports totaled $0.17 billion USD in 2007, hitting a record of $0.60 billion USD in 2019 and accounting for 1.57% of total agri-food imports. The Canadian organic exports of agri-food products was firstly tracked in 2017, reporting a value ranged from $0.31 billion USD to $0.36 billion USD for recent years (2017-2019). Using mean value of trade flows over the past three years (2017-2019), we find that the primary suppliers of U.S. organic imports in agri-food sector is Mexico. Mexico is also the second largest buyers of U.S. organic agri-food products, following buyers in Canada. Among Canada's trading partners of organic agri-food products, the United States is the leading source of imports and export destination over 2017-2019. In terms of primary fresh and processed products traded by the U.S. and Canada from 2017 to 2019, we find the highest value of organic imports in both countries are unroasted coffee and bananas. During the same period, organic apples and organic lentils are the most exported agri-food products in the U.S. and Canada, respectively.

We assess the impacts of OEAs on agri-food imports and exports of agri-food products in the U.S and Canada using both OLS and PPML estimations. The PPML estimator indicates that the establishment of OEAs would lead to a 21% increase in the U.S. and Canada imports and exports of non-organic (or organic but not tracked) agri-food products, with a larger magnitude of effects than OLS results (2.3%-8.5%). The OLS estimator suggests that OEA facilitates the U.S. and Canada organic imports and exports more than non-organic (or organic but not tracked) imports and exports in the agri-food sector, leading to a 9.4%-13.1% gap. In contrast, the PPML estimator indicates that organic agri-food trade flows in the U.S. and Canada would be 20.6%-24.7% lower than non-organic (or organic but not tracked) trade values of agri-food products under the establishment of OEAs. If we focus on agri-food imports and exports separately, we find a novel and important trade pattern. The PPML results indicate that the U.S. and Canada OEAs encourage non-organic (or organic but not tracked) agri-food imports by generating a 22.5% increase while suggesting a 50% lower organic imports of agri-food products induced by OEAs than non-organic imports. However, the PPML estimator implies that organic exports of agri-food products would be 102.0% higher than non-organic (or organic but not tracked) exports of agri-food products. The OLS results suggest a similar story with PPML results due to the same signs of coefficients related to the OEA dummy variable and the interaction term, while smaller effects in terms of the economic magnitude of relevant coefficients.

Finally, we assess the impact of all OEAs and each individual OEA on U.S. exports and imports of agri-food products, using trade data of only HS-10 products within HS-6 product categories which include at least one (tracked) organic product. In terms of the aggregate impact of OEAs, we find that export of tracked organic products is 79.7% higher than export of non-organic products, and the gap is as high as 502.5% between tracked organic imports and non-organic imports. However, there is no evidence that U.S. OEAs impacted the trade of agri-food products. Examining the impact of each individual OEA on U.S. agri-food trade, we find that the U.S.-Canada OEA contributed to a 37.3% increase in the U.S. exports of agri-food products.

In general, our results suggest that the overall impact of OEAs on non-organic (or organic but not tracked) imports and exports of agri-food products is equivalent to a growth rate between 2.3%-21%. Using both the OLS and PPML estimation, we find that the OEAs facilitate more organic exports of agri-food products than non-organic exports and lead to a gap between 57.6%-102%. The findings of this study is consistent with conclusion reached by Demko and Jaenicke (2018) who found a 9.1% increase in organic exports from the U.S. to the EU resulted from the U.S.-EU OEA signed in 2012. The OEA trade impact is larger than that from Demko and Jaenicke (2018), part of the reason is a single case study (exports from the U.S. to the EU), single OEA (the U.S.-EU OEA), limited product categories (23 selected organic categories), and shorter period of trade data (2011-2014) used in Demko and Jaenicke (2018).

In several ways this analysis offers novel insights into this issue. First, we tackle with the limited and short-time data issue in organic trade literature by utilizing highly disaggregated (HS-10) international trade data from the USITC and Statistics Canada for the periods over 2007-2019. Combing this data in the manner used in this analysis is a particularly unique feature of this analysis. Secondly, using unique and highly disaggregated data, permits this analysis to offer the first true assessment of the trade impacts of OEAs.[18] Finally, this analysis carefully considers the impact of individual OEAs on the imports and exports on organic products.

Data Considerations

It is important to note that tracking and recording organic imports and exports separately from their conventionally produced counterparts is time- and effort-consuming. The U.S. government began to track organic imports and exports in 2011, with 23 exported and 20 imported organic products initially assigned separate HS codes from similar but conventionally produced products. After nine years of development, the organic products tracked in the U.S. trade doubled and reached 44 exported and 56 imported products. Similarly, the Canadian government decided to track organic imports in 2007, with 41 organic products being reported. Thirteen years have been taken for the Canadian government to expand HS codes specifically assigned to organic products from 41 to 88 in organic imports. In addition, the Canadian government has not tracked organic exports until 2017. Although trade related to organic products emerged at an earlier time, the track of organic imports and exports has been realized and implemented by several major organic markets such as the U.S., Canada, and Denmark only in recent decades and slowly grew. Data limitation is a prominent issue in empirical literature pertinent to organic trade, and mostly highly-disaggregated data must be obtained from the country's customs or statistical offices and utilized in this kind of analysis.

The limited and short-time organic trade data collected by governments of several organic leading markets complicates the development and improvement of research in organic trade. For

[18] Among the few previous analyses of OEAs, the presence of OEAs were simply captured on the basis of country-pairs and times. No consideration was given to the actual organic products which are tracked and traded.

example, we find that the establishment of OEAs would encourage the U.S. and Canada non-organic imports and exports of agri-food products using both OLS and PPML estimations. The OLS estimator suggests that the implementation of OEAs would generate a 2.3%-8.5% increase, while PPML estimator implies a more considerable trade impacts on the U.S. and Canada non-organic agri-food products of OEAs (21%). It is imperative to emphasize that an unobserved portion of non-organic agri-food products are organic but not tracked agri-food products. Therefore, the positive and significant impacts of OEAs on non-organic imports and exports of agri-food products in the U.S. and Canada might attribute to the increase in organic but not tracked trade flows in agri-food sector resulted from OEAs. Further, if more organic products were tracked, we would have witnessed a larger gap between organic trade flows and non-organic trade flows of agri-food products in the U.S. and Canada induced by OEAs.

3.6.1 Policy Implications

The establishment of OEAs is a promising process in terms of reducing transaction costs (i.e., certification costs, accreditation costs, administrative barriers) and facilitating organic trade. The development of OEAs is based on two fast-growing changes. One change is that 86 countries have published national organic regulations up till 2019, offering a public guidelines from which two countries are able to evaluate production standards and conformity assessment. The other change is that consumers' awareness of health and environmental protection in leading organic markets encourages imported varieties in organic agri-food sector and boosts organic trade. A salient character of signing OEAs is that no identical production standards or control systems are needed for two signatory countries, and the equivalency refers to the achievement of common objectives to the extent of health, environment, and animal welfare.

The benefits of OEAs are not limited to the international trade, more potential implications would be generated. First, policy makers in developing countries (or export-oriented organic exporters) would make efforts on revisions of organic standards and regulations in order to be consistent with those in leading organic markets. For example, the European Commission published the latest organic regulation EC2018/848 in May 2018, and then Australian Certified Organic Standards was revised in 2019 in order to keep in pace with the rules related to organic wine and livestock products, which were excluded from the EU-Australia OEA. Second, the OEAs would lead to a potential organic trade union within which member countries are allowed to source organic ingredients from each other's suppliers and sell organic final products to each other's markets. The effects from an organic trade union might be worth for future research.

This study provides policy makers with several policy implications, especially outlining potential and promising OEA signatories with the U.S. and Canada. For example, Mexico and Philippines are potential candidates to be U.S. OEA trading partners in the near future. Mexico is the largest exporter of organic agri-food products trading with the U.S., amounting to $335.67 million USD on average in recent three years (2017-2019). Mexico's imports of organic agri-food products from the U.S. totaled $148.12 million USD on average over 2017-2019, ranking second of the U.S. largest importers. Considering the common border between Mexico and the U.S. as well as the ongoing efforts towards establishing OEA, Mexico would become the most promising OEA signatory country with the U.S. in the next few years. If an OEA was signed between the U.S. and Mexico, the U.S. would have benefited from importing organic coffee Arabica, bananas, avocados and blueberries from Mexico. On the other hand, Mexico would have enjoyed the convenience in terms of importing organic agri-food products from the U.S., for instance, organic apples, strawberries, vinegar and coffee. Philippines has agricultural and environmental advantages in producing organic bananas, sugarcane, tropical and subtropical fruits. The U.S. currently import organic bananas and sugarcanes from South America due to the nearer distance, and the U.S. might import more organic agri-food products from Philippines if they had signed OEA and benefited from the lower market-entry costs. Further, Philippines are expected to import more organic vinegar, coffee, grapes, and strawberries from the U.S. market.

In evaluating new potential OEA partners, it is important to consider the differences in organic standards between Mexico, Philippines and the United States. Although Philippines published the Organic Agriculture Law (Republic Act 10068) in 2010 and aimed to support the growing organic agriculture movement in the country, they might have less likelihood of signing an OEA with the U.S. if no further revision or improvement of the organic regulation is implemented.

In terms of Canada's promising OEA signatories, Mexico would also be one of the best choice. On average, Canada imported $85.87 million USD from Mexico in recent three years (2017-2019), ranking the second largest source country following the United States. If Mexico sign OEA with the U.S. in the near future, then it is highly likely that Mexico would strive for an OEA signed with Canada. Canada is expected to import more organic coffee, bananas, and olive oil from Mexico.

3.6.2 Study Limitations and Suggestions for Future Research

Limitation of this study are two-fold. First, this study focuses on organic trade flows in the U.S. and Canada, and the results related to OEA effects on agri-food trade should be carefully interpreted. Second, the shorter time periods of tracked organic trade flows and the limited range of tracked organic product categories constitute the major limitation of organic dataset related to international trade.

Consequently, we offer two suggestions for future research. The first one is that more countries-involved with a longer period of trade data should be utilized in future research so that a more general OEA effect can be concluded. Such analysis might benefit from the collection and analysis using other forms of datasets. For instance, like the USITC and Statistics Canada data, more datasets from other countries consisting of highly disaggregated trade flow data, which allows for organic trade flows to be separately identified. Secondly, we suggest that other forms of organic agreements could be evaluated, such as recognition agreement and unilateral organic equivalency agreements. Relative to OEAs these other forms of agreements are not expected to have as significant of a trade flow impact as OEAs due to the limited capability of reducing transaction costs such as certification costs and accreditation costs.

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Table 3.1: Summary of U.S. and Canadian International Organic Food Policies

Type of Agreement	**Description**	**U.S. Agreements (Year Entered-Ended)**	**Canada Agreements (Year Entered-Ended)**
Recognition Agreement	Allows a foreign government to accredit certifying agents that can certify products in that country to the USDA organic standard.	New Zealand (2003-) India (2006-) Israel (2007-)	
Export Agreement	Allows U.S. organic products to be sold as organic in the receiving country, provided specific requirements are met (e.g. export certificate with shipment).	Taiwan (2009-2020)	Taiwan (2009-2020)
Equivalency Agreement	Allows products produced and certified according to one country's organic standard to be sold and represented as organic in the other country.	Canada (2009-) European Union (2012-) Japan (2014-) South Korea (2014-) Switzerland (2015-) Taiwan (2020-)	United States (2009-) European Union (2011-) Switzerland (2012-) Costa Rica (2013-) Japan (2015-) Taiwan (2020-)

Notes:
Adopted and updated from Boys and Hooker (2015).
Taiwan transitioned from an export agreement to an equivalency agreement in May 2020 with the U.S. and Canada. Other agreements are ongoing.

Table 3.2: Summary Statistics of Variables Included in the Analysis of U.S. and Canada OEAs, 2007-2019

Variable	Mean	Standard deviation	Min	Max
Y_{ijkt}	969,882	2.60e+07	0	1.49e+10
GDP_{it}	6.38e+12	8.19e+12	1.23e+08	2.14e+13
GDP_{jt}	7.70e+12	8.44e+12	1.60e+08	2.14e+13
$Dist_{ij}$	8,484	3,576	2,079	16,466
$Border_{ij}$	0.04	0.20	0	1
$Lang_{ij}$	0.30	0.46	0	1
$Colony_{ij}$	0.06	0.24	0	1
$AgArea_{ijt}$	8.05e+06	2.32e+07	140	1.62e+08
$Landlocked_{ij}$	0.07	0.25	0	1
RTA_{ijt}	0.24	0.43	0	1
CU_{ijt}	0.01	0.11	0	1
$WTOBothin_{ijt}$	0.94	0.23	0	1
OEA_{ijt}	0.23	0.42	0	1
$Organic_{k}$	0.02	0.13	0	1

Notes:
* The index i represents exporting country, and importing country is denoted by index j. The product k is defined at the most highly disaggregated level (i.e., HS-10 level for the U.S. exports, imports, and Canadian imports, HS-8 level for Canadian exports) and confined to HS chapters 02-24 (agri-food product sector). The time t indicates the year a given trade flow took place.
* The total number of observation is 3,064,536.

Table 3.3: Impact of Organic Equivalency Agreements on U.S. and Canada Imports and Exports of Agri-Food Products, 2007-2019

	(1) Time Fixed Effect	(2) Product Fixed Effect	(3) Time & Product Fixed Effects	(4) Time & Product & Importer Fixed Effects	(5) Time & Product & Exporter Fixed Effects
$\ln(GDP_{it})$	0.359***	0.373***	0.381***	0.285***	-0.456***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.026)
$\ln(GDP_{jt})$	-0.000	0.027***	0.033***	0.121***	0.161***
	(0.002)	(0.002)	(0.002)	(0.035)	(0.003)
$\ln(Dist_{ij})$	-0.204***	-0.228***	-0.234***	-0.180***	-0.563***
	(0.008)	(0.008)	(0.008)	(0.010)	(0.012)
$Border_{ij}$	3.076***	3.166***	3.145***	3.409***	2.531***
	(0.020)	(0.020)	(0.020)	(0.024)	(0.025)
$Lang_{ij}$	0.283***	0.253***	0.254***	0.172***	0.369***
	(0.007)	(0.007)	(0.007)	(0.008)	(0.011)
$Colony_{ij}$	0.206***	0.300***	0.282***	0.290***	0.351***
	(0.013)	(0.013)	(0.013)	(0.016)	(0.019)
$\ln(AgArea_{it} * AgArea_{jt})$	0.027***	0.016***	0.015***	0.090***	-0.080***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$Landlocked_{ij}$	-0.773***	-0.834***	-0.831***	-0.542***	-1.578***
	(0.012)	(0.012)	(0.012)	(0.014)	(0.021)

Table 3.3: (Continued) Impact of Organic Equivalency Agreements on U.S. and Canada Imports and Exports of Agri-Food Products, 2007-2019

	(1) Time Fixed Effect	(2) Product Fixed Effect	(3) Time & Product Fixed Effects	(4) Time & Product & Importer Fixed Effects	(5) Time & Product & Exporter Fixed Effects
RTA_{ijt}	0.648***	0.617***	0.608***	0.332***	0.907***
	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)
CU_{ijt}	0.335***	0.492***	0.516***	-0.052	0.512***
	(0.027)	(0.027)	(0.027)	(0.046)	(0.031)
$WTOBothin_{ijt}$	0.198***	0.282***	0.262***	0.242***	0.434***
	(0.013)	(0.013)	(0.013)	(0.016)	(0.019)
OEA_{ijt}	0.082***	0.002	0.023***	0.008	0.055***
	(0.008)	(0.008)	(0.008)	(0.009)	(0.011)
$Organic_k$	-0.093***	-0.763***	-0.784***	-0.953***	-0.777***
	(0.026)	(0.027)	(0.027)	(0.026)	(0.026)
$OEA_{ijt} * Organic_k$	0.123**	0.092*	0.090*	0.110**	0.038
	(0.054)	(0.053)	(0.053)	(0.052)	(0.053)
Constant	-5.700***	-5.590***	-5.529***	-9.582	20.656***
	(0.092)	(0.096)	(0.098)	(2107.146)	(1.077)

Table 3.3: (Continued) Impact of Organic Equivalency Agreements on U.S. and Canada Imports and Exports of Agri-Food Products, 2007-2019

	(1) Time Fixed Effect	(2) Product Fixed Effect	(3) Time & Product Fixed Effects	(4) Time & Product & Importer Fixed Effects	(5) Time & Product & Exporter Fixed Effects
Time fixed effect	Yes	No	Yes	Yes	Yes
Product fixed effect at HS-2 level	No	Yes	Yes	Yes	Yes
Importer fixed effect	No	No	No	Yes	No
Exporter fixed effect	No	No	No	No	Yes
Observations	3,064,536	3,064,536	3,064,536	3,064,536	3,064,536
R2	0.069	0.091	0.092	0.118	0.106

Notes: The dependent variable is the U.S. and Canadian annual exports and imports with trading partners of product k at time t. The index i represents exporting country, and importing country is denoted by index j. The product k is defined at the most highly disaggregated level (i.e., HS-10 level for the U.S. exports, imports, and Canadian imports, HS-8 level for Canadian exports) and confined to HS chapters 02-24 (agri-food product sector). The time t indicates the year a given trade flow took place. The data covers the U.S. annual exports and imports over the period 2011-2019. Canadian imports in the data spans from 2007 to 2019, while data related to Canadian exports is covered in recent three years (2017-2019). Standard errors are in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table 3.4: Impact of Organic Equivalency Agreements on U.S. and Canada Imports (2007-2019) and Exports (2011-2019) of Agri-Food Products Separately

	(1) Imports OLS	(2) Imports OLS	(3) Exports OLS	(4) Exports OLS
$\ln(GDP_{it})$	0.338*** (0.003)		-0.243*** (0.042)	
$\ln(GDP_{jt})$		-0.532*** (0.022)		0.699*** (0.004)
$\ln(Dist_{ij})$	-0.262*** (0.010)	-0.079 (0.071)	-3.349*** (0.267)	-1.254*** (0.014)
$Border_{ij}$	3.223*** (0.023)	0.740*** (0.050)	1.935*** (0.210)	2.082*** (0.038)
$Lang_{ij}$	0.148*** (0.008)	-0.089*** (0.024)	0.752*** (0.074)	0.499*** (0.013)
$Colony_{ij}$	0.205*** (0.015)	0.341*** (0.036)	-0.238* (0.136)	0.585*** (0.025)
$\ln(AgArea_{it} * AgArea_{jt})$	0.068*** (0.002)	-0.048 (0.036)	0.231*** (0.070)	-0.221*** (0.003)
$Landlocked_{ij}$	-0.382*** (0.013)	1.066 (0.803)	1.510 (10916.785)	-0.988*** (0.023)
RTA_{ijt}	0.205*** (0.009)	0.162*** (0.015)	0.238*** (0.045)	0.598*** (0.015)
CU_{ijt}	-0.265*** (0.045)	0.109 (0.094)	1.120*** (0.191)	0.565*** (0.036)
$WTOBothin_{ijt}$	0.184*** (0.016)	-0.084 (0.055)	-0.599*** (0.081)	0.046** (0.023)

Table 3.4: (Continued) Impact of Organic Equivalency Agreements on U.S. and Canada Imports (2007-2019) and Exports (2011-2019) of Agri-Food Products Separately

	(1) Imports OLS	(2) Imports OLS	(3) Exports OLS	(4) Exports OLS
OEA_{ijt}	0.018** (0.009)	0.062*** (0.017)	-0.039 (0.054)	-0.972*** (0.016)
$Organic_k$	-0.839*** (0.031)	-0.845*** (0.030)	-1.331*** (0.049)	-1.318*** (0.049)
$OEA_{ijt} * Organic_k$	-0.165*** (0.060)	-0.296*** (0.059)	0.455*** (0.101)	0.547*** (0.102)
Constant	-7.629*** (0.107)	20.500*** (1.033)	37.833 (10916.785)	6.396*** (0.132)
Time fixed effect	Yes	Yes	Yes	Yes
Product fixed effect at HS-2 level	Yes	Yes	Yes	Yes
Importer fixed effect	Yes	No	Yes	No
Exporter fixed effect	No	Yes	No	Yes
Observations	2,074,725	2,074,725	989,811	989,811
R^2	0.111	0.131	0.145	0.124

Notes: The dependent variables in column (1) and (2) are the U.S. and Canadian annual imports with trading partners of product k at time t. The dependent variables in column (3) and (4) are the U.S. and Canadian annual exports with trading partners of product k at time t. The index i represents exporting country, and importing country is denoted by index j. The product k is defined at the most highly disaggregated level (i.e., HS-10 level for the U.S. exports, imports, and Canadian imports, HS-8 level for Canadian exports) and confined to HS chapters 02-24 (agri-food product sector). The time t indicates the year a given trade flow took place. The data covers the U.S. annual exports and imports over the period 2011-2019. Canadian imports in the data spans from 2007 to 2019, while data related to Canadian exports is covered in recent three years (2017-2019). Standard errors are in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table 3.5: Impact of Organic Equivalency Agreements on U.S. and Canada Imports and Exports of Agri-Food Products, 2007-2019 (PPML Estimation)

	(1) PPML	(2) PPML	(3) PPML	(4) PPML Imports	(5) PPML Exports
ln (GDP_{it})	0.168*	-0.517***	-0.506***	0.293***	0.049
	(0.086)	(0.172)	(0.172)	(0.094)	(0.195)
ln (GDP_{jt})	0.686***	0.125	0.120	0.812***	0.051
	(0.208)	(0.299)	(0.298)	(0.145)	(0.364)
$\ln(AgArea_{it} * AgArea_{jt})$	-0.096	-0.248	-0.244	0.181	-0.390
	(0.272)	(0.268)	(0.267)	(0.207)	(0.697)
RTA_{ijt}	0.123	0.023	0.015	0.217***	0.134
	(0.092)	(0.087)	(0.086)	(0.082)	(0.182)
OEA_{ijt}	0.191***	-0.087	-0.084	0.203***	-0.038
	(0.059)	(0.080)	(0.080)	(0.050)	(0.120)
$Organic_k$	-0.559***	-0.559***	-0.785***	0.038	-1.775***
	(0.052)	(0.052)	(0.050)	(0.052)	(0.102)
$OEA_{ijt} * Organic_k$	-0.278***	-0.284***	-0.231***	-0.692***	0.703***
	(0.071)	(0.070)	(0.070)	(0.081)	(0.124)
Constant	-24.109*	14.481	13.548	-39.349***	7.157
	(13.304)	(19.097)	(19.069)	(7.520)	(27.513)

Table 3.5: (Continued) Impact of Organic Equivalency Agreements on U.S. and Canada Imports and Exports of Agri-Food Products, 2007-2019 (PPML Estimation)

	(1) PPML	(2) PPML	(3) PPML	(4) PPML Imports	(5) PPML Exports
Country-pair fixed effect	Yes	Yes	Yes	Yes	Yes
Time fixed effect	No	Yes	Yes	No	No
Product fixed effect	No	No	Yes	No	No
Observations	3,064,536	3,064,536	3,064,536	2,074,725	989,811
R^2	0.006	0.006	0.009	0.011	0.006

Notes: The dependent variables in column (1)-(3) are the U.S. and Canadian annual imports with trading partners of product k at time t. The dependent variable in column (4) is the U.S. and Canadian annual imports with trading partners of product k at time t, and dependent variable in column (5) is the U.S. and Canadian annual exports with trading partners of product k at time t. The index i represents exporting country, and importing country is denoted by index j. The product k is defined at the most highly disaggregated level (i.e., HS-10 level for the U.S. exports, imports, and Canadian imports, HS-8 level for Canadian exports) and confined to HS chapters 02-24 (agri-food product sector). The time t indicates the year a given trade flow took place. The data covers the U.S. annual exports and imports over the period 2011-2019. Canadian imports in the data spans from 2007 to 2019, while data related to Canadian exports is covered in recent three years (2017-2019). Standard errors are in parentheses. * $p < .1$, ** $p < .05$, *** $p < .0$

Table 3.6: Impact of Organic Equivalency Agreements on U.S. Imports and Exports of Agri-Food Products Using HS-6 Selected Data, 2007-2019

	(1)		(2)	(3)		(4)		(5)		(6)	
OEA	All		U.S.-Canada[a]	U.S.-EU		U.S.-Japan		U.S.-South Korea		U.S.-Switzerland	
Year Signed	Varies	Varies	2009	2012		2014		2014		2015	
Trade Flow	EX	IM	EX	EX	IM	EX	IM	EX	IM	EX	IM
OEA	0.261	0.099	0.490**	1.347	0.227	-0.500	-0.016	0.006	0.148	0.007	-0.588
	(0.238)	(0.429)	(0.201)	(0.891)	(1.085)	(0.857)	(0.769)	(0.841)	(0.749)	(0.830)	(0.923)
Organic	0.668**	1.246*	-0.583*	3.405**	3.849*	2.277**	0.353	0.150	-3.333**	0.435	0.035
	(0.339)	(0.748)	(0.305)	(1.449)	(1.969)	(0.922)	(1.214)	(0.887)	(1.462)	(0.945)	(1.081)
OEA*Organic	-0.100	0.664	-0.661**	-1.373	-0.404	0.929	-0.429	1.043	0.602	2.064*	-0.777
	(0.028)	(0.065)	(0.326)	(1.513)	(2.021)	(1.076)	(1.414)	(1.037)	(1.636)	(1.111)	(1.323)

Table 3.6: (Continued) Impact of Organic Equivalency Agreements on U.S. Imports and Exports of Agri-Food Products Using HS-6 Selected Data, 2007-2019

	(1)		(2)	(3)		(4)		(5)		(6)	
OEA	All		U.S.-Canada[a]	U.S.-EU		U.S.-Japan		U.S.-South Korea		U.S.-Switzerland	
Year Signed	Varies	Varies	2009	2012		2014		2014		2015	
Trade Flow	EX	IM	EX	EX	IM	EX	IM	EX	IM	EX	IM
Year	0.007	0.048	0.031*	-0.146	-0.052	0.156	0.124	0.052	0.221*	-0.323**	0.194
	(0.028)	(0.065)	(0.018)	(0.092)	(0.093)	(0.147)	(0.136)	(0.143)	(0.133)	(0.155)	(0.181)
Country FE	Yes	Yes									
Product FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
n	5,892	2,960	2,761	930	1,242	899	606	850	588	452	524
R2	0.468	0.215	0.216	0.223	0.192	0.244	0.289	0.245	0.268	0.238	0.188

Notes:
EX and IM refer to analysis of U.S. Exports and Imports with the OEA partner, respectively.
Standard errors are in parentheses. *(**,***) denotes significance at the 10(5,1)% level.
Product FE reflect fixed effects for HS-6 categories. Country FE reflects fixed effects for each trading pair (i.e. U.S.-Canada).
The period covered by analysis of the U.S-Canada OEA is 2007-2019; for all other agreements 2011-2019.
[a] Due to the nature of data used in this analysis, U.S.-Canada Import flows can not be estimated.

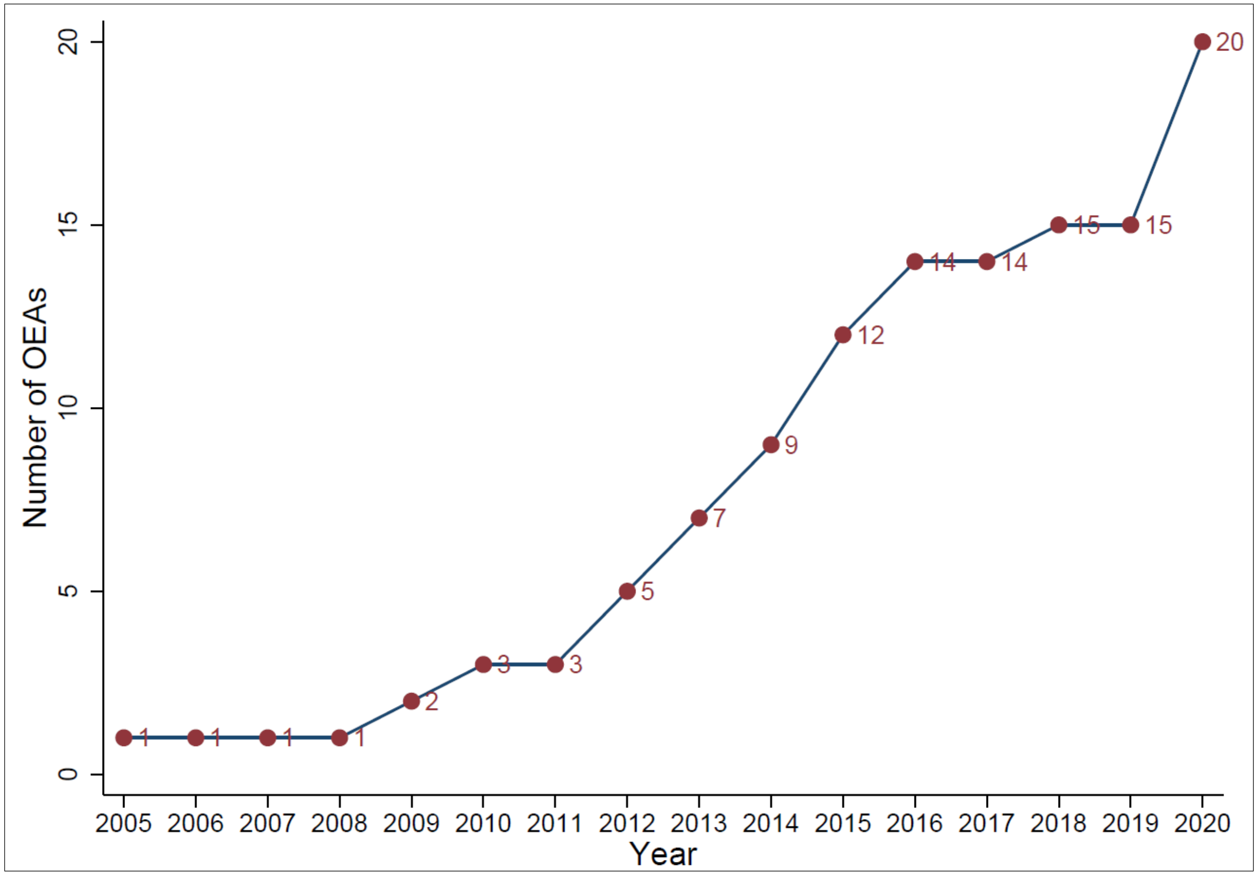
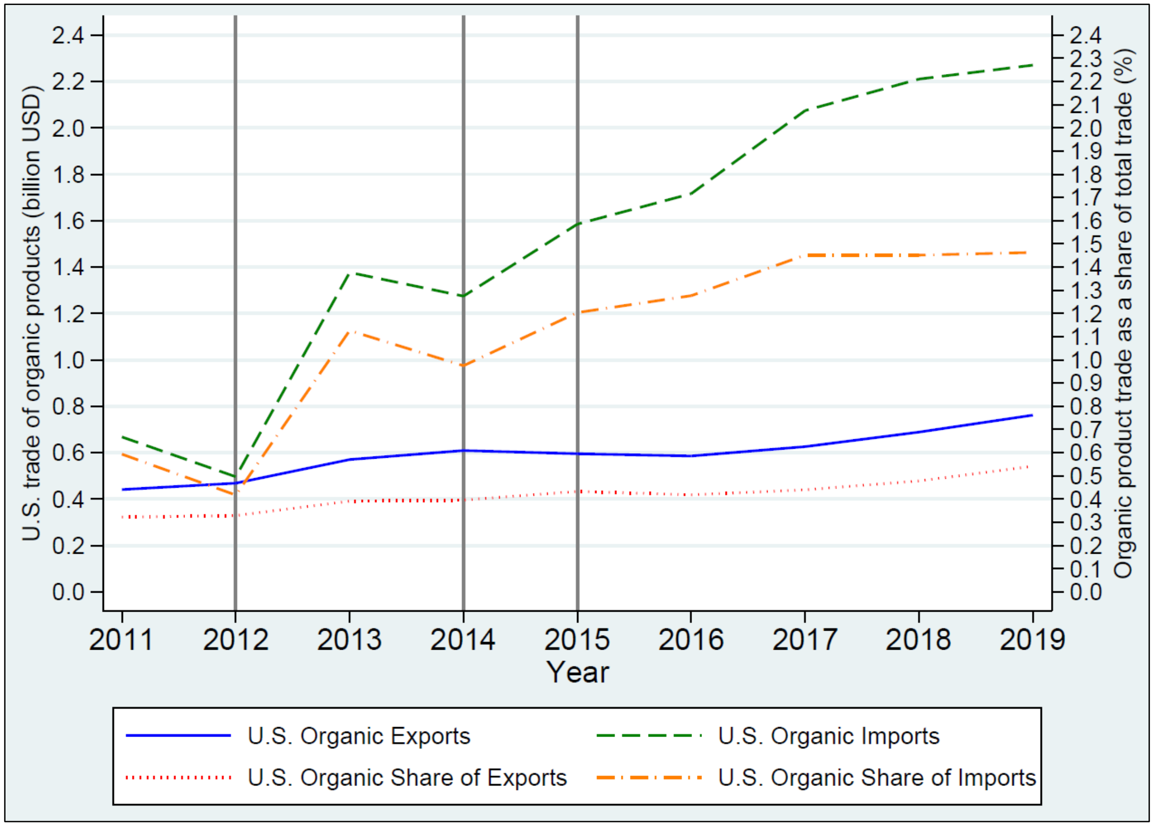
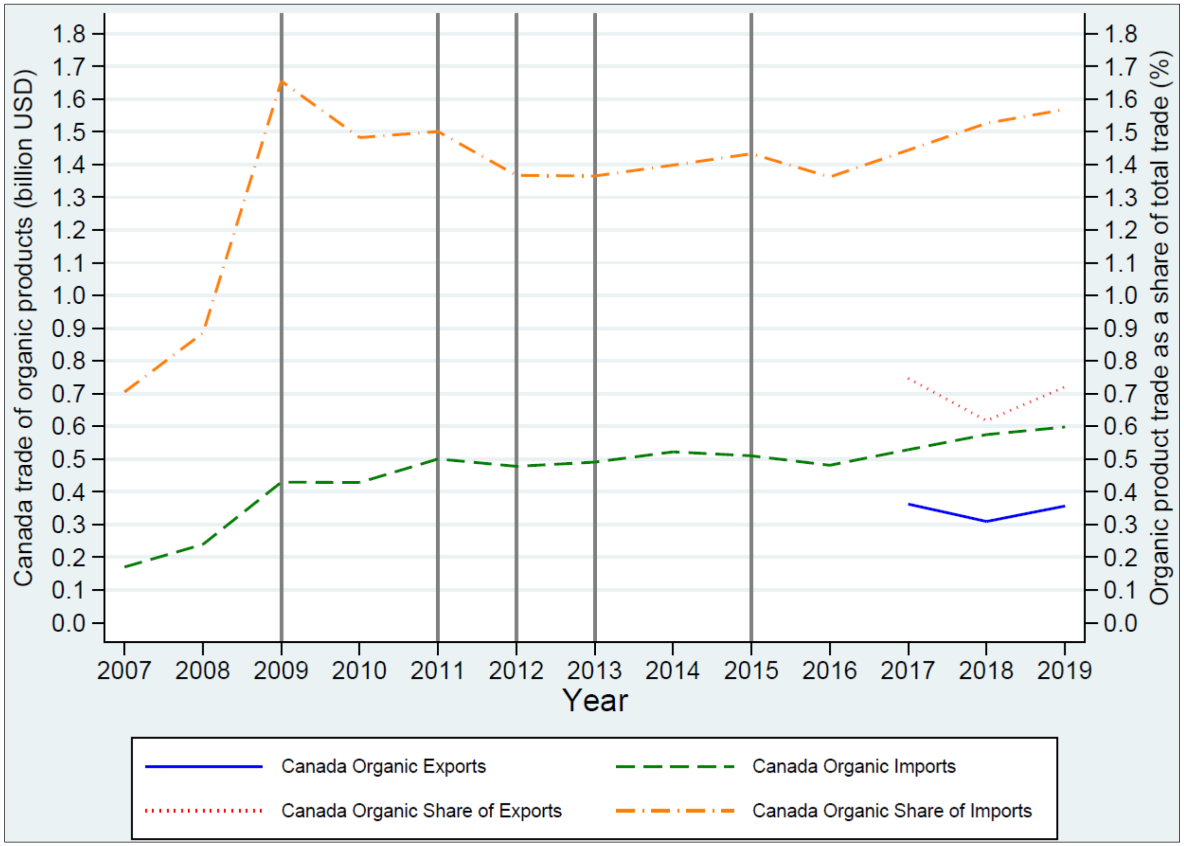


Figure 3.1: The Number of OEAs Worldwide during the Period 2005-2020



Note: U.S. agri-food refers to products under HS chapters 02-24 in Harmonized Tariff Schedule of the United States Annotated (HTSA). The solid line represents the U.S. exports of organic agri-food, and the dashed line shows the U.S. imports of organic agri-food, both measured in billion U.S. dollars. The dot line indicates the U.S. organic exports as a share of total agri-food exports, and the dash-dot line implies the U.S. organic imports as a share of total agri-food imports, both measured in percentage values. The vertical lines suggest the years when each OEA was established (except for U.S.-Canada OEA in 2009). For example, the U.S.-EU OEA was signed in 2012, the U.S.-Japan and U.S.-South Korea OEAs were established in 2014, and the U.S.-Switzerland OEA was signed in 2015.

Figure 3.2: U.S. Exports/Imports in Organic Agri-Food and Organic Share of Total Agri-Food Trade



Note: Canadian agri-food refers to products under HS chapters 02-24 in Harmonized Tariff Schedule of the United States Annotated (HTSA). The solid line represents the Canada exports of organic agri-food, and the dashed line shows the Canada imports of organic agri-food, both measured in billion U.S. dollars. The dot line indicates the Canadian organic exports as a share of total agri-food exports, and the dash-dot line implies the Canadian organic imports as a share of total agri-food imports, both measured in percentage values. The vertical lines suggest the years when each OEA was established. For example, Canada-U.S. OEA was signed in 2009, Canada-EU OEA was established in 2011, and Canada-Switzerland, Canada-Costa Rica, and Canada-Japan came into force in 2012, 2013, and 2015, respectively.

Figure 3.3: Canada Exports/Imports in Organic Agri-Food and Organic Share of Total Agri-Food Trade

Panel A. U.S. Exports Destinations

Panel B. Source of U.S. Imports

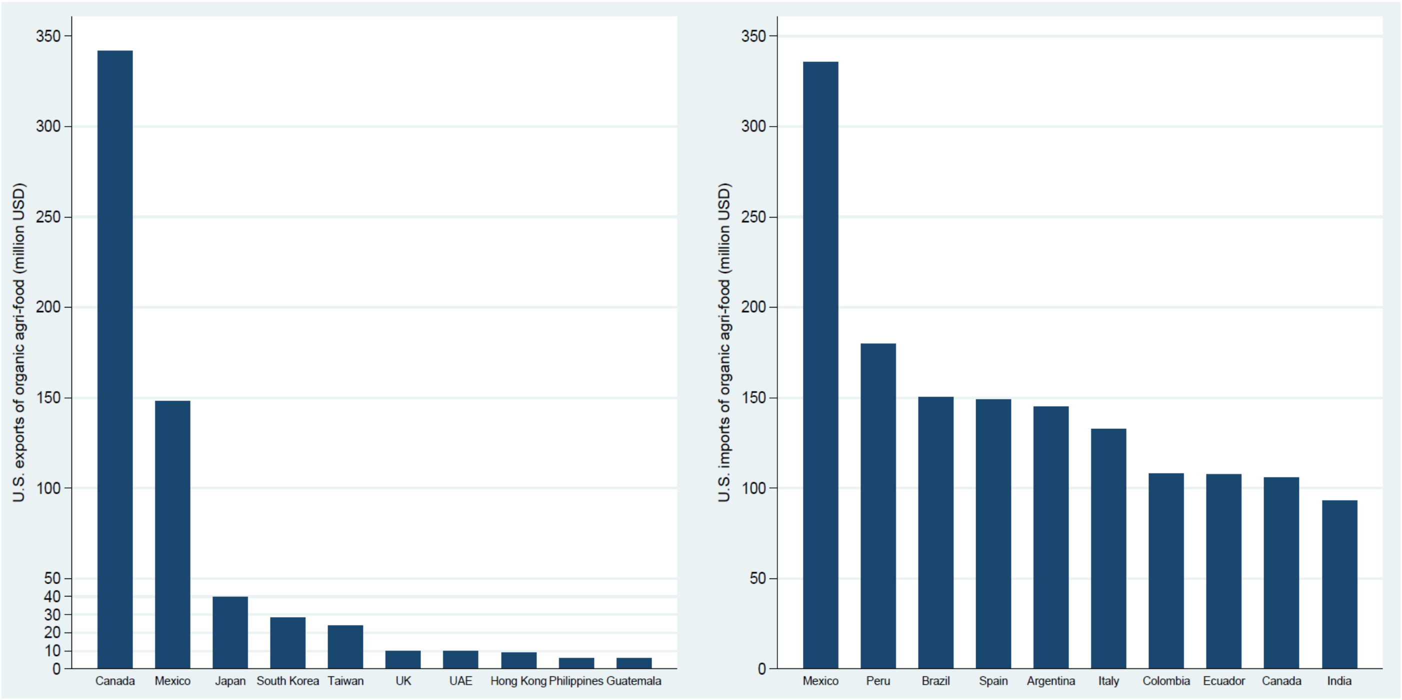


Figure 3.4: Top U.S. Trading Partners of Organic Agri-Food Products, 2017-2019

Panel A. Canada Exports Destinations

Panel B. Source of Canada Imports

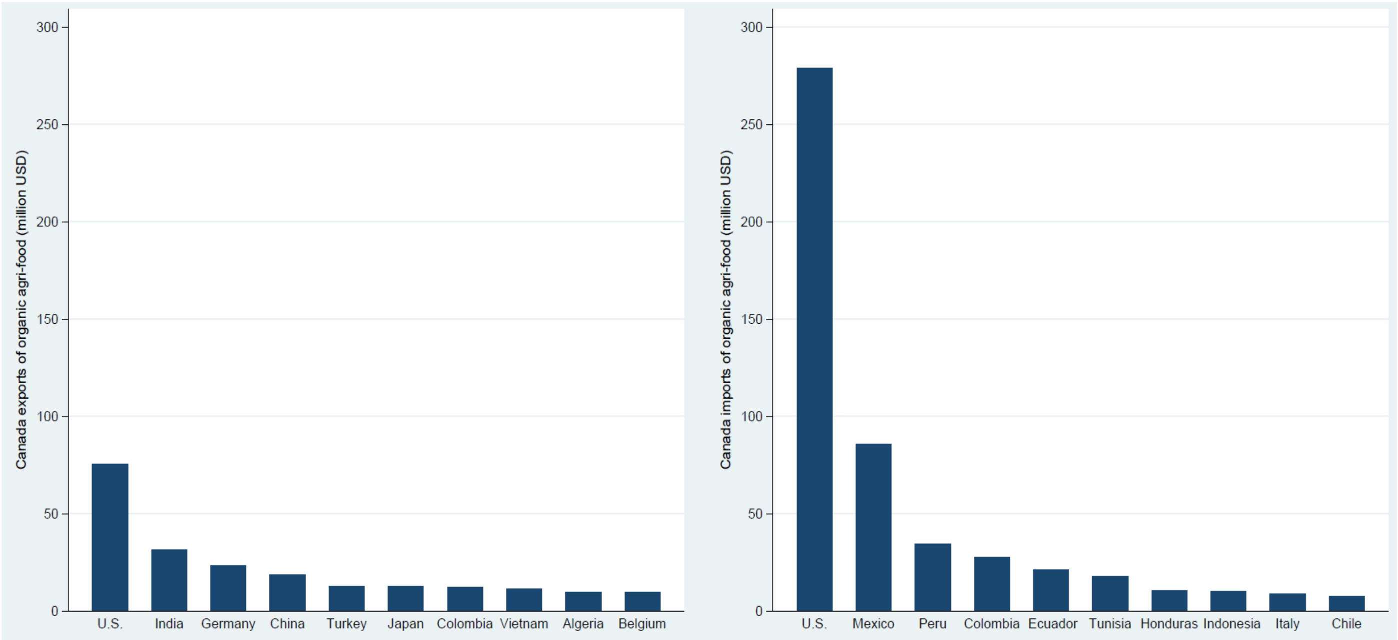


Figure 3.5: Top Canada Trading Partners of Organic Agri-Food Products, 2017-2019

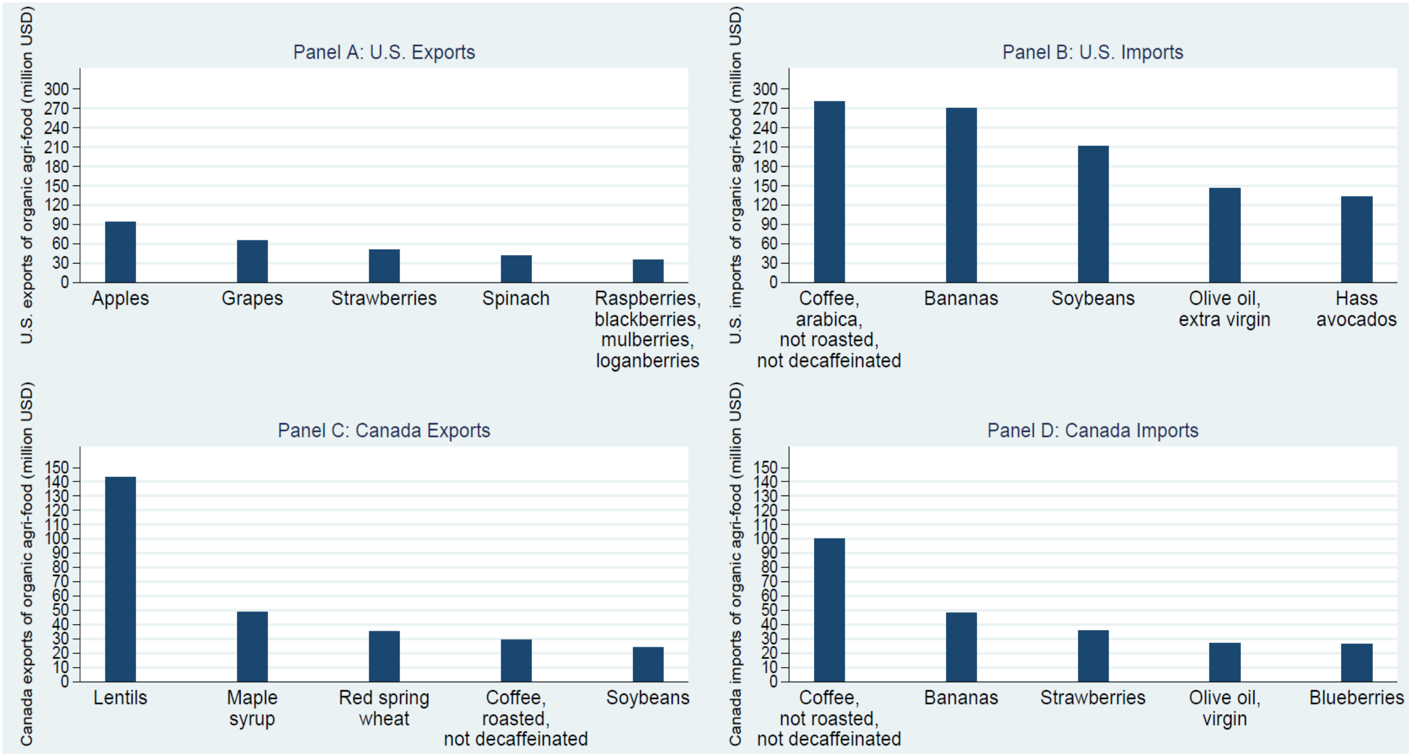


Figure 3.6: Top Organic Food Products Imported and Exported by the U.S. and Canada, 2017-2019

APPENDICES

Appendix A Proof of the Probability of Market Share

I denote the exporter's product-specific cost of land input $a_{ik}^{-\alpha_i(1-\beta_i)}$ as $\widetilde{a_{ik}}$, then the probability that price of exporter i's product k in market j is lower than p is:

$$\begin{aligned} G_{ijk}(p) &= Pr(P_{ijk} \leqslant p) = Pr(\frac{\widetilde{a_{ik}} c_i \tau_{ijk}}{z_{ik}} \leqslant p) = Pr(z_{ik} \geqslant \frac{\widetilde{a_{ik}} c_i \tau_{ijk}}{p}) \\ &= 1 - F_i(\frac{\widetilde{a_{ik}} c_i \tau_{ijk}}{p}) = 1 - e^{-T_i(\frac{\widetilde{a_{ik}} c_i \tau_{ijk}}{p})^{-\theta}} \\ &= 1 - e^{-p^\theta T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \end{aligned} \tag{A.1}$$

The probability that country j actually buys product k is the probability that at least one exporter i's price of product k in market j is lower than p, so the distribution of price in market j is:

$$\begin{aligned} G_{jk}(p) &= 1 - \prod_{i=0}^{I} Pr(P_{ijk} > p) = 1 - \prod_{i=0}^{I}[1 - G_{ijk}(p)] \\ &= 1 - \prod_{i=0}^{I}\{1 - (1 - e^{-T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta} p^\theta})\} = 1 - \prod_{i=0}^{I} e^{-T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta} p^\theta} \\ &= 1 - e^{-p^\theta \sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \end{aligned} \tag{A.2}$$

Therefore, the probability that exporter i offers the lowest price for product k in market j is:

$$\begin{aligned} \pi_{ijk} &= Pr[P_{ijk} \leqslant min\{P_{sjk}; s \neq i\}] \\ &= \int_0^\infty \prod_{s \neq i}[1 - G_{sj}(p)] dG_{ij}(p) \\ &= \int_0^\infty \frac{\prod_{i=0}^{I}(1 - G_{ij}(p))}{1 - G_{ij}(p)} dG_{ij}(p) \end{aligned} \tag{A.3}$$

Recall that $\prod_{i=0}^{I}(1 - G_{ij}(p)) = 1 - G_j(p) = e^{-p^\theta \sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}$;
and $1 - G_{ij}(p) = e^{-p^\theta T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}$; so I have:

$$
\begin{aligned}
\pi_{ijk} &= \int_0^\infty \frac{e^{-p^\theta \sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}}{e^{-p^\theta T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}} d[1 - e^{-p^\theta T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}] \\
&= \int_0^\infty e^{-p^\theta \sum\limits_{l \neq i}^{I} T_l(\widetilde{a_{lk}} c_l \tau_{ljk})^{-\theta}} \cdot -e^{-p^\theta T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \cdot -T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta} \cdot \theta p^{\theta-1} dp \\
&= \int_0^\infty e^{-p^\theta \sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \cdot T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta} \theta p^{\theta-1} dp \\
&= \frac{T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}{\sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \cdot \int_0^\infty \sum_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta} \cdot e^{-p^\theta \sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \theta p^{\theta-1} dp \qquad \text{(A.4)} \\
&= \frac{T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}{\sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}} \cdot \int_0^\infty dG_j(p) \\
&= \frac{T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}{\sum\limits_{i=0}^{I} T_i(\widetilde{a_{ik}} c_i \tau_{ijk})^{-\theta}}
\end{aligned}
$$

Appendix B Estimation Procedures

I have linear parameters ϕ_1 and nonlinear parameters ϕ_2, where $\phi_1 = (\varphi, \eta, \gamma, \hat{\lambda}_i, \hat{\lambda}_t, \hat{\lambda}_j)$; $\phi_2 = (\Sigma_E, \Sigma_t, \sigma)$. In equation (6), I specify that the random coefficients logit model is as the following:

$$\pi_{ijt} = \int \frac{exp(S_{it} + \theta\alpha_i(1-\beta_i)lna_{ikt}(V^E_{ikt}) - \theta ln\tau_{ijkt}(V^t_{ijkt}, \nu_{ijkt}))}{1 + \sum_{l=1}^{I} exp(S_{lt} + \theta\alpha_l(1-\beta_l)lna_{lkt}(V^E_{lkt}) - \theta ln\tau_{ljkt}(V^t_{ljkt}, \nu_{ljkt}))} dV^E_{ikt} dV^t_{ijkt} d\nu_{ijkt} \tag{B.1}$$

I denote that:

$\delta_{ijt} = X_{it}\varphi + \lambda_i + \lambda_t + t_{ijt}\eta + \gamma OEA_{ijt} + \lambda_j + \xi_{ijt}$

$\mu_{ijkt} = X_{it}\Sigma_E V^E_{ikt} + t_{ijt}\Sigma_t V^t_{ijkt} + \sigma\nu_{ijkt} OEA_{ijt}$

I can rewrite the random coefficients logit model as the following:

$$\pi_{ijt} = \int \frac{exp(\delta_{ijt} + \mu_{ijkt}(V^E_{ikt}, V^t_{ijkt}, \nu_{ijkt}; \phi_2))}{1 + \sum_{l=1}^{I} exp(\delta_{ljt} + \mu_{ljkt}(V^E_{lkt}, V^t_{ljkt}, \nu_{ljkt}; \phi_2))} dV^E_{ikt} dV^t_{ijkt} d\nu_{ijkt} \tag{B.2}$$

where δ_{ijt} represents the mean effect of exporter i's characteristics on exporter i's market share in market j at time t;

where μ_{ijkt} represents the product-specific deviation from the mean effect.

I illustrate the estimation procedure step by step.

Step 1 I draw V^E_{ikt} and V^t_{ijkt} from standard multivariate normal distribution, and draw random variable ν_{ijkt} from standard normal distribution.

Step 2 Compute market shares.

I give initial values to $\phi_2 = (\Sigma_E, \Sigma_t, \sigma)$, use V^E_{ikt}, V^t_{ijkt}, ν_{ijkt} collected from step 1, then I compute the predicted market share $\hat{\pi_{ijt}}$ using the following estimator:

$$\pi_{ijt} = \frac{1}{ns} \sum_{j=1}^{ns} \frac{exp(\delta_{ijt} + \mu_{ijkt}(V^E_{ikt}, V^t_{ijkt}, \nu_{ijkt}; \phi_2))}{1 + \sum_{l=1}^{I} exp(\delta_{ljt} + \mu_{ljkt}(V^E_{lkt}, V^t_{ljkt}, \nu_{ljkt}; \phi_2))} \tag{B.3}$$

where ns is the number of products in our sample data, set as 79. Because the number of HS code for organic food collected from GATS website in U.S. market is 32, and the number of HS code for organic food collected from Statistics Denmark in Danish market is 47, the total number of organic food in our sample data is 79.

Step 3 Contraction mapping (fixed-point iteration) to get mean effect δ_{ijt}.

Given a guess of ϕ_2 and initial value of δ^0_{ijt}, iterate on

$$\delta^{h+1}_{ijt}(\phi_2) = \delta^h_{ijt}(\phi_2) + ln(\pi_{ijt}) - ln(\hat{\pi_{ijt}})(\delta^h_{ijt}, \phi_2) \tag{B.4}$$

where π_{ijt} is the observed market share, $\hat{\pi_{ijt}}$ is the predicted market share based on initial value of δ^h_{ijt} and guess of ϕ_2. The process stops when $\|\delta^{h+1}_{ijt} - \delta^h_{ijt}\| \leqslant tolerance$. Then I obtain estimate of $\delta_{ijt}(\phi_2)$.

Step 4

A. Given $\delta_{ijt}(\phi_2)$, estimate ϕ_1 and compute ξ_{ijt}. Recall that $\delta_{ijt} = X_{it}\varphi + \lambda_i + \lambda_t + t_{ijt}\eta + \gamma OEA_{ijt} + \lambda_j + \xi_{ijt}$, I simplify δ_{ijt} as the following: $\delta_{ijt} = X\phi_1 + \xi$, where X contains variables for $X_{it}, t_{ijt}, \lambda_i, \lambda_t, \lambda_j, OEA_{ijt}$, and Z are instrument variables. Then, $\hat{\phi_1} = (X'ZWZ'X)^{-1}(X'ZWZ'\delta)$, and $\xi_{ijt}(\phi_2) = \delta_{ijt} - X\hat{\phi_1}$.

B. Minimize the GMM objective: Min $\xi(\phi)'ZWZ'\xi(\phi)$, where W is the GMM weight matrix, $[E(Z'\xi(\phi)\xi(\phi)'Z)]^{-1}$. Start with $W = I$ to get initial estimates, use them to compute W, and minimize GMM objective function for new estimates. After minimizing GMM objective function, I get new ϕ_2, I use new estimates of ϕ_2 as initial guess and go back to step 1, get new $\delta_{ijt}(\phi_2), \xi_{ijt}(\phi_2)$ and minimize GMM again, and continue to move on until converge.

Appendix C Supplementary Materials

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Albania (22.93)	Greece (-0.01), Italy (-0.05), Spain (-0.2), France (-0.28), Netherlands (-0.50), Romania (-0.77)	Portugal (0.11), United Kingdom (0.30), Poland (0.55), Belgium (0.66), Japan (0.97), Denmark (1.06), Canada (1.44), Republic of Korea (1.64), Austria (3.29), Hungary(3.45), Lithuania (3.64), Germany (4.48), Croatia (4.80), Slovenia (5.43), Ireland (7.38), Bulgaria (9.97), Switzerland (10.68)	Sweden (66.46)	Bosnia and Herzegovina (-0.02), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Tunisia (-0.94), Ukraine (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.24), Brazil (0.26), Lebanon (0.52), Guatemala (0.59), Zambia (0.61), Uganda (0.82), Nigeria (0.84), Australia (1.03), Peru (1.15), Nicaragua (1.18), Namibia (1.32), Kenya (1.45), Rwanda (1.89), Honduras (1.90), Cambodia (2.08), Madagascar (2.13), Viet Nam (2.43), South Africa (2.88), Sri Lanka (2.91), Dominican Republic (2.92), Georgia (4.05), Bolivia (4.23), China (4.99), Thailand (6.06), Panama (8.39)	Philippines (58.34)
United Arab Emirates (5.43)	Greece (-0.01), Italy (-0.05), Spain (-0.2), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.55), Belgium (0.66), Japan (0.97), Denmark (1.06), Canada (1.44), Republic of Korea (1.63), Austria (3.28), Hungary (3.44), Lithuania (3.64), Germany (4.47), Croatia (4.80), Slovenia (5.42)	Ireland (7.37), Bulgaria (9.95), Switzerland (10.67), Sweden (66.39)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Tunisia (-0.94), Ukraine (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.23), Brazil (0.26), Lebanon (0.52), Guatemala (0.58), Zambia (0.61), Albania (0.68), Uganda (0.82), Nigeria (0.84), Australia (1.03), Peru (1.15), Nicaragua (1.18), Namibia (1.31), Kenya (1.44), Honduras (1.89), Rwanda (1.89), Cambodia (2.07), Madagascar (2.13), Viet Nam (2.43), South Africa (2.88), Sri Lanka (2.90), Dominian Republic (2.92), Georgia (4.04), Bolivia (4.22), China (4.99)	Thailand (6.05), Panama (8.38), Philippines (58.28)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Argentina (1.71)	Portugal (-0.06), Greece (-0.16), Italy (-0.19), Spain (-0.32), France (-0.39), Netherlands (-0.58), Romania (-0.80)	United Kingdom (0.10), Poland (0.32), Belgium (0.41), Japan (0.67), Denmark (0.75), Canada (1.07), Republic of Korea (1.24)	Austria (2.65), Hungary (2.78), Lithuania (2.95), Germany (3.66), Croatia (3.93), Slovenia (4.47), Ireland (6.13), Bulgaria (8.33), Switzerland (8.93), Sweden (56.36)	Costa Rica (-0.02), Bangladesh (-0.05), Bosnia and Herzegovina (-0.17), Mexico (-0.25), Paraguay (-0.40), Colombia (-0.56), United Arab Emirates (-0.61), Ecuador (-0.64), Indonesia (-0.70), Ethiopia (-0.76), Uruguay (-0.76), Russian Federation (-0.77), New Zealand (-0.84), Israel (-0.90), India (-0.94), Turkey (-0.94), Tunisia (-0.95), Ukraine (-0.95)	Chile (0.01), Lao People's Democratic Republic (0.05), Brazil (0.07), Lebanon (0.30), Guatemala (0.35), Zambia (0.37), Albania (0.43), Uganda (0.55), Nigeria (0.56), Australia (0.72), Peru (0.83), Nicaragua (0.85), Namibia (0.97), Kenya (1.08), Rwanda (1.46), Honduras (1.47), Cambodia (1.62), Madagascar (1.66)	Viet Nam (1.92), South Africa (2.31), Sri Lanka (2.32), Dominican Republic (2.34), Georgia (3.30), Bolivia (3.45), China (4.09), Thailand (5.01), Panama (7.00), Philippines (49.47)
Australia (27.68)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.65), Japan (0.95), Denmark (1.05), Canada (1.42), Republic of Korea (1.62), Austria (3.26), Hungary (3.42), Lithuania (3.62), Germany (4.44), Croatia (4.76), Slovenia (5.39), Ireland (7.33), Bulgaria (9.90), Switzerland (10.60)	Sweden (66.02)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Tunisia (-0.94), Ukraine (-0.94)	Dominican Republic (2.90), Georgia (4.01), Bolivia (4.20), China (4.96), Thailand (6.02), Panama (8.34)	Philippines (57.96)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Bangladesh (14.94)	Greece (-0.02), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.11), United Kingdom (0.29), Poland (0.55), Belgium (0.66), Japan (0.97), Denmark (1.06), Canada (1.44), Republic of Korea (1.64), Austria (3.29), Hungary (3.45), Lithuania (3.64), Germany (4.48), Croatia (4.80), Slovenia (5.43), Ireland (7.38), Bulgaria (9.96), Switzerland (10.67)	Sweden (66.43)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Tunisia (-0.94), Ukraine (-0.94)	Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.24), Brazil (0.26), Lebanon (0.52), Guatemala (0.59), Zambia (0.61), Albania (0.68), Uganda (0.82), Nigeria (0.84), Australia (1.03), Peru (1.15), Nicaragua (1.18), Namibia (1.32), Kenya (1.45), Rwanda (1.89), Honduras (1.90), Cambodia (2.08), Madagascar (2.13), Viet Nam (2.43), South Africa (2.88), Sri Lanka (2.90), Dominican Republic (2.92), Georgia (4.04), Bolivia (4.23), China (4.99), Thailand (6.06), Panama (8.39)	Philippines (58.32)
Bosnia and Herzegovina (12.79)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.65), Japan (0.96), Denmark (1.05), Canada (1.43), Republic of Korea (1.62), Austria (3.27), Hungary (3.43), Lithuania (3.62), Germany (4.45), Croatia (4.77), Slovenia (5.40), Ireland (7.34), Bulgaria (9.91), Switzerland (10.62)	Sweden (66.12)	Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Tunisia (-0.94), Ukraine (-0.94)	Bangladesh (0.12), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.67), Uganda (0.82), Nigeria (0.83), Australia (1.02), Peru (1.14), Nicaragua (1.17), Namibia (1.30), Kenya (1.43), Rwanda (1.87), Honduras (1.88), Cambodia (2.06), Madagascar (2.11), Viet Nam (2.41), South Africa (2.86), Sri Lanka (2.89), Dominican Republic (2.90), Georgia (4.02), Bolivia (4.20), China (4.96), Thailand (6.03), Panama (8.35)	Philippines (58.04)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Bolivia (66.87)	Greece (-0.10), Italy (-0.13), Spain (-0.27), France (-0.34), Netherlands (-0.55), Romania (-0.79)	Portugal (0.01), United Kingdom (0.18), Poland (0.41), Belgium (0.52), Japan (0.80), Denmark (0.88), Canada (1.23), Republic of Korea (1.41), Austria (2.92), Hungary (3.06), Lithuania (3.24), Germany (4.01), Croatia (4.30), Slovenia (4.87), Ireland (6.65), Bulgaria (9.01), Switzerland (9.67), Sweden (60.65)	None	Bosnia and Herzegovina (-0.11), Mexico (-0.19), Paraguay (-0.36), Colombia (-0.53), United Arab Emirates (-0.59), Ecuador (-0.61), Indonesia (-0.68), Ethiopia (-0.74), Uruguay (-0.74), Russian Federation (-0.76), Argentina (-0.79), New Zealand (-0.83), Israel (-0.89), India (-0.93), Turkey (-0.93), Tunisia (-0.94), Ukraine (-0.95)	Bangladesh (0.02), Costa Rica (0.05), Chile (0.08), Lao People's Democratic Republic (0.13), Brazil (0.15), Lebanon (0.39), Guatemala (0.45), Zambia (0.47), Albania (0.54), Uganda (0.67), Nigeria (0.68), Australia (0.86), Peru (0.96), Nicaragua (0.99), Namibia (1.11), Kenya (1.23), Honduras (1.64), Rwanda (1.64), Cambodia (1.81), Madagascar (1.86), Viet Nam (2.13), South Africa (2.55), Sri Lanka (2.57), Dominican Republic (2.58), Georgia (3.60), China (4.48), Thailand (5.45), Panama (7.58), Philippines (53.18)	None
Brazil (8.23)	Belgium (-0.14), Poland (-0.20), United Kingdom (-0.33), Portugal (-0.43), Greece (-0.49), Italy (-0.51), Spain (-0.59), France (-0.63), Netherlands (-0.74), Romania (-0.88)	Japan (0.02), Denmark (0.07), Canada (0.26), Republic of Korea (0.36), Austria (1.23), Hungary (1.30), Lithuania (1.41), Germany (1.83), Croatia (2.00), Slovenia (2.33), Ireland (3.33), Bulgaria (4.67), Switzerland (5.05)	Sweden (34.01)	Nigeria (-0.05), Uganda (-0.06), Albania (-0.13), Zambia (-0.17), Guatemala (-0.18), Lebanon (-0.21), Lao People's Democratic Republic (-0.36), Chile (-0.39), Costa Rica (-0.40), Bangladesh (-0.42), Bosnia and Herzegovina (-0.49), Mexico (-0.54), Paraguay (-0.64), Colombia (-0.73), United Arab Emirates (-0.77), Ecuador (-0.78), Indonesia (-0.82), Ethiopia (-0.85), Uruguay (-0.85), Russian Federation (-0.86), Argentina (-0.88), New Zealand (-0.90), Israel (-0.94), India (-0.96), Turkey (-0.96), Tunisia (-0.97), Ukraine (-0.97)	Australia (0.05), Peru (0.11), Nicaragua (0.13), Namibia (0.20), Kenya (0.27), Honduras (0.50), Rwanda (0.50), Cambodia (0.59), Madagascar (0.62), Viet Nam (0.77), South Africa (1.01), Sri Lanka (1.02), Dominican Republic (1.03), Georgia (1.61), Bolivia (1.70), China (2.09), Thailand (2.65), Panama (3.86)	Philippines (29.68)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Chile (10.71)	United Kingdom (-0.10), Portugal (-0.23), Greece (-0.31), Italy (-0.33), Spain (-0.44), France (-0.50), Netherlands (-0.66), Romania (-0.84)	Poland (0.08), Belgium (0.16), Japan (0.36), Denmark (0.43), Canada (0.70), Republic of Korea (0.83), Austria (2.00), Hungary (2.09), Lithuania (2.23), Germany (2.82), Croatia (3.03), Slovenia (3.47), Ireland (4.82), Bulgaria (6.62), Switzerland (7.13)	Sweden (46.08)	Brazil (-0.13), Lao People's Democratic Republic (-0.14), Costa Rica (-0.20), Bangladesh (-0.22), Bosnia and Herzegovina (-0.33), Mexico (-0.39), Paraguay (-0.51), Colombia (-0.64), United Arab Emirates (-0.69), Ecuador (-0.71), Indonesia (-0.76), Ethiopia (-0.80), Uruguay (-0.80), Russian Federation (-0.82), Argentina (-0.84), New Zealand (-0.87), Israel (-0.92), India (-0.95), Turkey (-0.95), Tunisia (-0.96), Ukraine (-0.96)	Lebanon (0.05), Guatemala (0.10), Zambia (0.11), Albania (0.16), Uganda (0.27), Nigeria (0.28), Australia (0.42), Peru (0.50), Nicaragua (0.51), Namibia (0.61), Kenya (0.70), Rwanda (1.00), Honduras (1.01), Cambodia (1.13), Madagascar (1.17), Viet Nam (1.38), South Africa (1.69), Sri Lanka (1.71), Dominican Republic (1.73), Georgia (2.49), Bolivia (2.63), China (3.17), Thailand (3.90), Panama (5.51)	Philippines (40.24)
China (35.30)	Denmark (-0.12), Japan (-0.16), Belgium (-0.29), Poland (-0.34), United Kingdom (-0.45), Portugal (-0.53), Greece (-0.58), Italy (-0.59), Spain (-0.66), France (-0.69), Netherlands (-0.79), Romania (-0.9)	Canada (0.04), Republic of Korea (0.13), Austria (0.84), Hungary (0.91), Lithuania (0.99), Germany (1.34), Croatia (1.49), Slovenia (1.76), Ireland (2.59), Bulgaria (3.70), Switzerland (4.01), Sweden (27.95)	None	Namibia (-0.01), Nicaragua (-0.06), Peru (-0.08), Australia (-0.13), Nigeria (-0.21), Uganda (-0.22), Albania (-0.28), Zambia (-0.31), Guatemala (-0.32), Lebanon (-0.34), Brazil (-0.46), Lao People's Democratic Republic (-0.47), Chile (-0.49), Costa Rica (-0.51), Bangladesh (-0.52), Bosnia and Herzegovina (-0.58), Mexico (-0.62), Paraguay (-0.70), Colombia (-0.78), United Arab Emirates (-0.81), Ecuador (-0.82), Indonesia (-0.85), Ethiopia (-0.88), Uruguay (-0.88), Russian Federation (-0.89), Argentina (-0.90), New Zealand (-0.92), Israel (-0.95), India (-0.97), Turkey (-0.97), Tunisia (-0.97), Ukraine (-0.97)	Kenya (0.05), Rwanda (0.24), Honduras (0.24), Cambodia (0.32), Madagascar (0.34), Viet Nam (0.47), South Africa (0.66), Sri Lanka (0.67), Dominican Republic (0.68), Georgia (1.17), Bolivia (1.24), Thailand (2.02), Panama (3.03), Philippines (24.39)	None

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Colombia (4.83)	Portugal (-0.12), Greece (-0.22), Italy (-0.24), Spain (-0.37), France (-0.43), Netherlands (-0.61), Romania (-0.81)	United Kingdom (0.03), Poland (0.23), Belgium (0.32), Japan (0.55), Denmark (0.63), Canada (0.93), Republic of Korea (1.08), Austria (2.40), Hungary (2.52), Lithuania (2.68), Germany (3.34), Croatia (3.59), Slovenia (4.09)	Ireland (5.63), Bulgaria (7.68), Switzerland (8.25), Sweden (52.5)	Brazil (-0.01), Lao People's Democratic Republic (-0.02), Chile (-0.06), Costa Rica (-0.09), Bangladesh (-0.11), Bosnia and Herzegovina (-0.23), Mexico (-0.30), Paraguay (-0.45), United Arab Emirates (-0.64), Ecuador (-0.66), Indonesia (-0.72), Uruguay (-0.77), Ethiopia (-0.78), Russian Federation (-0.79), Argentina (-0.82), New Zealand (-0.85), Israel (-0.91), India (-0.94), Turkey (-0.94), Tunisia (-0.95), Ukraine (-0.95)	Lebanon (0.20), Guatemala (0.25), Zambia (0.27), Albania (0.33), Uganda (0.44), Nigeria (0.45), Australia (0.61), Peru (0.70), Nicaragua (0.72), Namibia (0.83), Kenya (0.94), Rwanda (1.28), Honduras (1.29), Cambodia (1.43), Madagascar (1.47), Viet Nam (1.71), South Africa (2.07), Sri Lanka (2.09), Dominican Republic (2.11), Georgia (2.98), Bolivia (3.14), China (3.75), Thailand (4.58)	Panama (6.42), Philippines (45.94)
Costa Rica (14.50)	Greece (-0.06), Italy (-0.09), Spain (-0.24), France (-0.32), Netherlands (-0.53), Romania (-0.78)	Portugal (0.05), United Kingdom (0.23), Poland (0.47), Belgium (0.58), Japan (0.87), Denmark (0.95), Canada (1.31), Republic of Korea (1.50), Austria (3.07), Hungary (3.22), Lithuania (3.41), Germany (4.20), Croatia (4.50), Slovenia (5.10), Ireland (6.95), Bulgaria (9.40), Switzerland (10.08)	Sweden (63.02)	Bosnia and Herzegovina (-0.08), Mexico (-0.16), Paraguay (-0.33), Colombia (-0.51), United Arab Emirates (-0.57), Ecuador (-0.60), Indonesia (-0.67), Uruguay (-0.73), Ethiopia (-0.73), Russian Federation (-0.75), Argentina (-0.79), New Zealand (-0.82), Israel (-0.89), India (-0.93), Turkey (-0.93), Tunisia (-0.94), Ukraine (-0.94)	Bangladesh (0.06), Chile (0.13), Lao People's Democratic Republic (0.17), Brazil (0.19), Lebanon (0.44), Guatemala (0.50), Zambia (0.52), Albania (0.59), Uganda (0.73), Nigeria (0.74), Australia (0.93), Peru (1.04), Nicaragua (1.06), Namibia (1.20), Kenya (1.32), Rwanda (1.74), Honduras (1.75), Cambodia (1.92), Madagascar (1.97), Viet Nam (2.25), South Africa (2.68), Sri Lanka (2.70), Dominican Republic (2.72), Georgia (3.78), Bolivia (3.96), China (4.69), Thailand (5.70), Panama (7.90)	Philippines (55.28)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Dominican Republic (50.39)	Greece (-0.09), Italy (-0.12), Spain (-0.26), France (-0.34), Netherlands (-0.54), Romania (-0.78)	Portugal (0.02), United Kingdom (0.19), Poland (0.43), Belgium (0.53), Japan (0.81), Denmark (0.90), Canada (1.25), Republic of Korea (1.43), Austria (2.94), Hungary (3.10), Lithuania (3.28), Germany (4.05), Croatia (4.35), Slovenia (4.92), Ireland (6.73), Bulgaria (9.11), Switzerland (9.75)	Sweden (61.07)	Bosnia and Herzegovina (-0.10), Mexico (-0.19), Paraguay (-0.35), Colombia (-0.52), United Arab Emirates (-0.58), Ecuador (-0.61), Indonesia (-0.68), Uruguay (-0.74), Ethiopia (-0.74), Russian Federation (-0.76), Argentina (-0.79), New Zealand (-0.83), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.95)	Bangladesh (0.03), Costa Rica (0.06), Chile (0.10), Lao People's Democratic Republic (0.14), Brazil (0.16), Lebanon (0.41), Guatemala (0.46), Zambia (0.48), Albania (0.55), Uganda (0.68), Nigeria (0.69), Australia (0.87), Peru (0.98), Nicaragua (1.01), Namibia (1.14), Kenya (1.26), Rwanda (1.66), Honduras (1.67), Cambodia (1.84), Madagascar (1.88), Viet Nam (2.16), South Africa (2.58), Sri Lanka (2.60), Georgia (3.65), Bolivia (3.82), China (4.53), Thailand (5.51), Panama (7.66)	Philippines (53.71)
Ecuador (3.49)	United Kingdom (-0.03), Portugal (-0.17), Greece (-0.26), Italy (-0.29), Spain (-0.40), France (-0.46), Netherlands (-0.63), Romania (-0.82)	Poland (0.16), Belgium (0.24), Japan (0.47), Denmark (0.54), Canada (0.82), Republic of Korea (0.97), Austria (2.21), Hungary (2.32), Lithuania (2.47), Germany (3.10), Croatia (3.33)	Slovenia (3.80), Ireland (5.25), Bulgaria (7.18), Switzerland (7.73), Sweden (49.47)	Bosnia and Herzegovina (-0.27), Mexico (-0.34), Paraguay (-0.48), Colombia (-0.61), United Arab Emirates (-0.66), Indonesia (-0.74), Ethiopia (-0.79), Uruguay (-0.79), Russian Federation (-0.80), Argentina (-0.83), New Zealand (-0.86), Israel (-0.91), India (-0.94), Turkey (-0.95), Ukraine (-0.95), Tunisia (-0.96)	Lebanon (0.13), Guatemala (0.18), Zambia (0.20), Albania (0.25), Uganda (0.36), Nigeria (0.37), Australia (0.52), Peru (0.61), Nicaragua (0.62), Namibia (0.73), Kenya (0.83), Rwanda (1.15), Honduras (1.16), Cambodia (1.29), Madagascar (1.33), Viet Nam (1.56), South Africa (1.90), Sri Lanka (1.91), Dominican Republic (1.93), Georgia (2.76), Bolivia (2.90), China (3.48)	Thailand (4.27), Panama (6.00), Philippines (43.29)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Ethiopia (2.80)	Greece (-0.07), Italy (-0.10), Spain (-0.24), France (-0.32), Netherlands (-0.53), Romania (-0.78)	Portugal (0.05), United Kingdom (0.23), Poland (0.46), Belgium (0.57), Japan (0.86), Denmark (0.95), Canada (1.31), Republic of Korea (1.50)	Austria (3.06), Hungary (3.21), Lithuania (3.39), Germany (4.19), Croatia (4.49), Slovenia (5.08), Ireland (6.93), Bulgaria (9.37), Switzerland (10.05), Sweden (62.85)	Bosnia and Herzegovina (-0.08), Mexico (-0.16), Paraguay (-0.34), Colombia (-0.51), United Arab Emirates (-0.57), Ecuador (-0.60), Indonesia (-0.67), Uruguay (-0.73), Russian Federation (-0.75), Argentina (-0.79), New Zealand (-0.82), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.06), Costa Rica (0.09), Chile (0.12), Lao People's Democratic Republic (0.17), Brazil (0.19), Lebanon (0.44), Guatemala (0.50), Zambia (0.52), Albania (0.59), Uganda (0.73), Nigeria (0.74), Australia (0.92), Peru (1.04), Nicaragua (1.06), Namibia (1.19), Kenya (1.32), Rwanda (1.73), Honduras (1.74), Cambodia (1.91), Madagascar (1.96), Viet Nam (2.24), South Africa (2.67), Sri Lanka (2.69), Dominican Republic (2.71)	Georgia (3.77), Bolivia (3.95), China (4.67), Thailand (5.68), Panama (7.89), Philippines (55.14)
Georgia (70.56)	Greece (-0.02), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.66), Japan (0.96), Denmark (1.05), Canada (1.43), Republic of Korea (1.63), Austria (3.28), Hungary (3.44), Lithuania (3.63), Germany (4.47), Croatia (4.79), Slovenia (5.41), Ireland (7.36), Bulgaria (9.94), Switzerland (10.65), Sweden (66.29)	None	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.68), Uganda (0.82), Nigeria (0.83), Australia (1.03), Peru (1.15), Nicaragua (1.17), Namibia (1.31), Kenya (1.44), Rwanda (1.88), Honduras (1.89), Cambodia (2.07), Madagascar (2.12), Viet Nam (2.42), South Africa (2.87), Sri Lanka (2.90), Dominican Republic (2.91), Bolivia (4.22), China (4.98), Thailand (6.04), Panama (8.37), Philippines (58.19)	None

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Guatemala (15.84)	United Kingdom (-0.03), Portugal (-0.17), Greece (-0.26), Italy (-0.28), Spain (-0.40), France (-0.46), Netherlands (-0.63), Romania (-0.82)	Poland (0.16), Belgium (0.25), Japan (0.47), Denmark (0.54), Canada (0.83), Republic of Korea (0.97), Austria (2.22), Hungary (2.33), Lithuania (2.48), Germany (3.12), Croatia (3.34), Slovenia (3.82), Ireland (5.27), Bulgaria (7.21), Switzerland (7.76)	Sweden (49.68)	Brazil (-0.06), Lao People's Democratic Republic (-0.08), Chile (-0.11), Costa Rica (-0.14), Bangladesh (-0.16), Bosnia and Herzegovina (-0.27), Mexico (-0.34), Paraguay (-0.48), Colombia (-0.61), United Arab Emirates (-0.66), Ecuador (-0.68), Indonesia (-0.74), Ethiopia (-0.79), Uruguay (-0.79), Russian Federation (-0.80), Argentina (-0.83), New Zealand (-0.86), Israel (-0.91), India (-0.94), Turkey (-0.95), Ukraine (-0.95), Tunisia (-0.96)	Lebanon (0.14), Zambia (0.20), Albania (0.25), Uganda (0.37), Nigeria (0.38), Australia (0.53), Peru (0.61), Nicaragua (0.63), Namibia (0.73), Kenya (0.83), Rwanda (1.15), Honduras (1.16), Cambodia (1.30), Madagascar (1.34), Viet Nam (1.57), South Africa (1.90), Sri Lanka (1.92), Dominican Republic (1.94), Georgia (2.76), Bolivia (2.91), China (3.50), Thailand (4.28), Panama (6.02)	Philippines (43.45)
Honduras (21.81)	Belgium (-0.08), Poland (-0.14), United Kingdom (-0.28), Portugal (-0.38), Greece (-0.45), Italy (-0.47), Spain (-0.55), France (-0.60), Netherlands (-0.72), Romania (-0.87)	Japan (0.09), Denmark (0.15), Canada (0.36), Republic of Korea (0.46), Austria (1.39), Hungary (1.47), Lithuania (1.58), Germany (2.06), Croatia (2.22), Slovenia (2.57), Ireland (3.65), Bulgaria (5.09), Switzerland (5.50)	Sweden (36.62)	Albania (-0.07), Zambia (-0.11), Guatemala (-0.12), Lebanon (-0.16), Brazil (-0.30), Lao People's Democratic Republic (-0.32), Chile (-0.34), Costa Rica (-0.36), Bangladesh (-0.38), Bosnia and Herzegovina (-0.46), Mexico (-0.51), Paraguay (-0.61), Colombia (-0.71), United Arab Emirates (-0.75), Ecuador (-0.76), Indonesia (-0.81), Ethiopia (-0.84), Uruguay (-0.84), Russian Federation (-0.85), Argentina (-0.87), New Zealand (-0.90), Israel (-0.93), India (-0.96), Turkey (-0.96), Ukraine (-0.96), Tunisia (-0.97)	Uganda (0.01), Nigeria (0.02), Australia (0.13), Peru (0.20), Nicaragua (0.21), Namibia (0.28), Kenya (0.36), Rwanda (0.60), Cambodia (0.70), Madagascar (0.73), Viet Nam (0.90), South Africa (1.15), Sri Lanka (1.17), Dominican Republic (1.18), Georgia (1.79), Bolivia (1.90), China (2.34), Thailand (2.92), Panama (4.20)	Philippines (31.98)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Indonesia (3.49)	Greece (-0.10), Italy (-0.13), Spain (-0.27), France (-0.34), Netherlands (-0.55), Romania (-0.79)	Portugal (0.00), United Kingdom (0.18), Poland (0.41), Belgium (0.51), Japan (0.79), Denmark (0.87), Canada (1.21), Republic of Korea (1.40), Austria (2.90), Hungary (3.04), Lithuania (3.22)	Germany (3.98), Croatia (4.27), Slovenia (4.84), Ireland (6.61), Bulgaria (8.96), Switzerland (9.61), Sweden (60.34)	Bosnia and Herzegovina (-0.11), Mexico (-0.20), Paraguay (-0.36), Colombia (-0.53), United Arab Emirates (-0.59), Ecuador (-0.61), Ethiopia (-0.74), Uruguay (-0.74), Russian Federation (-0.76), Argentina (-0.80), New Zealand (-0.83), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.95)	Bangladesh (0.02), Costa Rica (0.04), Chile (0.08), Lao People's Democratic Republic (0.12), Brazil (0.14), Lebanon (0.38), Guatemala (0.44), Zambia (0.46), Albania (0.53), Uganda (0.66), Nigeria (0.67), Australia (0.85), Peru (0.95), Nicaragua (0.98), Namibia (1.10), Kenya (1.22), Rwanda (0.62), Honduras (1.63), Cambodia (1.80), Madagascar (1.84), Viet Nam (2.11), South Africa (2.53), Sri Lanka (2.55), Dominican Republic (2.57)	Georgia (3.58), Bolivia (3.75), China (4.44), Thailand (5.41), Panama (7.53), Philippines (52.90)
India (0.04)	Greece (-0.05), Italy (-0.09), Spain (-0.24), France (-0.31), Netherlands (-0.53), Romania (-0.77)	None	Portugal (0.06), United Kingdom (0.24), Poland (0.48), Belgium (0.59), Japan (0.88), Denmark (0.97), Canada (1.34), Republic of Korea (1.53), Austria (3.11), Hungary (3.26), Lithuania (3.45), Germany (4.25), Croatia (4.56), Slovenia (5.16), Ireland (7.03), Bulgaria (9.51), Switzerland (10.19), Sweden (63.63)	Bosnia and Herzegovina (-0.07), Mexico (-0.15), Paraguay (-0.33), Colombia (-0.50), United Arab Emirates (-0.57), Ecuador (-0.59), Ethiopia (-0.73), Uruguay (-0.73), Russian Federation (-0.75), Argentina (-0.78), New Zealand (-0.82), Israel (-0.89), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	None	Bangladesh (0.07), Costa Rica (0.10), Chile (0.14), Lao People's Democratic Republic (0.18), Brazil (0.20), Lebanon (0.46), Guatemala (0.52), Zambia (0.54), Albania (0.61), Uganda (0.75), Nigeria (0.76), Australia (0.94), Peru (1.06), Nicaragua (1.09), Namibia (1.22), Kenya (1.34), Rwanda (1.77), Honduras (1.78), Cambodia (1.95), Madagascar (2.00), Viet Nam (2.29), South Africa (2.72), Sri Lanka (2.74), Dominican Republic (2.76), Georgia (3.83), Bolivia (4.01), China (4.74), Thailand (5.77), Panama (8.00), Philippines (55.85)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Israel (0.68)	Greece (-0.02), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.66)	Japan (0.96), Denmark (1.05), Canada (1.43), Republic of Korea (1.63), Austria (3.27), Hungary (3.43), Lithuania (3.63), Germany (4.46), Croatia (4.78), Slovenia (5.41), Ireland (7.35), Bulgaria (9.92), Switzerland (10.63), Sweden (63.20)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.68)	Uganda (0.82), Nigeria (0.83), Australia (1.02), Peru (1.14), Nicaragua (1.17), Namibia (1.31), Kenya (1.44), Rwanda (1.88), Honduras (1.89), Cambodia (2.07), Madagascar (2.12), Viet Nam (2.42), South Africa (2.87), Sri Lanka (2.89), Dominican Republic (2.91), Georgia (4.03), Bolivia (4.21), China (4.97), Thailand (6.03), Panama (8.36), Philippines (58.11)
Kenya (33.63)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.65), Japan (0.96), Denmark (1.05), Canada (1.43), Republic of Korea (1.62), Austria (3.27), Hungary (3.43), Lithuania (3.62), Germany (4.45), Croatia (4.77), Slovenia (5.40), Ireland (7.34), Bulgaria (9.91), Switzerland (10.62)	Sweden (66.14)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.67), Uganda (0.82), Nigeria (0.83), Australia (1.02), Peru (1.14), Nicaragua (1.17), Namibia (1.31), Rwanda (1.87), Honduras (1.88), Cambodia (2.06), Madagascar (2.11), Viet Nam (2.41), South Africa (2.87), Sri Lanka (2.89), Dominican Republic (2.91), Georgia (4.02), Bolivia (4.20), China (4.97), Thailand (6.03), Panama (8.35)	Philippines (58.06)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Cambodia (42.32)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.29), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.28), Poland (0.53), Belgium (0.65), Japan (0.95), Denmark (1.04), Canada (1.41), Republic of Korea (1.61), Austria (3.25), Hungary (3.40), Lithuania (3.60), Germany (4.43), Croatia (4.74), Slovenia (5.37), Ireland (7.30), Bulgaria (9.86), Switzerland (10.56)	Sweden (65.79)	Bosnia and Herzegovina (-0.03), Mexico (-0.13), Paraguay (-0.31), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.66), Ethiopia (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.82), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.22), Brazil (0.24), Lebanon (0.51), Guatemala (0.57), Zambia (0.59), Albania (0.67), Uganda (0.81), Nigeria (0.82), Australia (1.01), Peru (1.13), Nicaragua (1.16), Namibia (1.29), Rwanda (1.86), Honduras (1.87), Madagascar (2.10), Viet Nam (2.39), South Africa (2.85), Sri Lanka (2.87), Dominican Republic (2.89), Georgia (3.99), Bolivia (4.18), China (4.93), Thailand (5.99), Panama (8.30)	Philippines (57.75)
Lao People's Democratic Republic (16.47)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.65), Japan (0.96), Denmark (1.05), Canada (1.42), Republic of Korea (1.62), Austria (3.27), Hungary (3.42), Lithuania (3.62), Germany (4.45), Croatia (4.77), Slovenia (5.40), Ireland (7.34), Bulgaria (9.90), Switzerland (10.61)	Sweden (66.09)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.14), Chile (0.18), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.67), Uganda (0.81), Nigeria (0.83), Australia (1.02), Peru (1.14), Nicaragua (1.17), Namibia (1.30), Rwanda (1.87), Honduras (1.88), Cambodia (2.06), Madagascar (2.11), Viet Nam (2.41), South Africa (2.86), Sri Lanka (2.88), Dominican Republic (2.90), Georgia (4.02), Bolivia (4.20), China (4.96), Thailand (6.02), Panama (8.34)	Philippines (58.01)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Lebanon (20.47)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.28), Poland (0.53), Belgium (0.65), Japan (0.95), Denmark (1.04), Canada (1.42), Republic of Korea (1.61), Austria (3.25), Hungary (3.41), Lithuania (3.60), Germany (4.43), Croatia (4.75), Slovenia (5.38), Ireland (7.31), Bulgaria (9.87), Switzerland (10.58)	Sweden (65.89)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.22), Brazil (0.25), Guatemala (0.57), Zambia (0.59), Albania (0.67), Uganda (0.81), Nigeria (0.82), Australia (1.01), Peru (1.13), Nicaragua (1.16), Namibia (1.30), Kenya (1.43), Rwanda (1.86), Honduras (1.87), Cambodia (2.05), Madagascar (2.10), Viet Nam (2.40), South Africa (2.85), Sri Lanka (2.87), Dominican Republic (2.89), Georgia (4.00), Bolivia (4.18), China (4.94), Thailand (6.00), Panama (8.31)	Philippines (57.83)
Sri Lanka (49.07)	Greece (-0.11), Italy (-0.14), Spain (-0.28), France (-0.35), Netherlands (-0.55), Romania (-0.79)	Portugal (0.00), United Kingdom (0.17), Poland (0.40), Belgium (0.50), Japan (0.77), Denmark (0.86), Canada (1.20), Republic of Korea (1.38), Austria (2.87), Hungary (3.01), Lithuania (3.19), Germany (3.94), Croatia (4.23), Slovenia (4.80), Ireland (6.56), Bulgaria (8.89), Switzerland (9.53)	Sweden (59.82)	Bosnia and Herzegovina (-0.12), Mexico (-0.20), Paraguay (-0.37), Colombia (-0.53), United Arab Emirates (-0.59), Ecuador (-0.62), Indonesia (-0.69), Uruguay (-0.74), Russian Federation (-0.76), Argentina (-0.80), New Zealand (-0.83), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.95)	Bangladesh (0.01), Costa Rica (0.04), Chile (0.07), Lao People's Democratic Republic (0.11), Brazil (0.13), Lebanon (0.37), Guatemala (0.43), Zambia (0.45), Albania (0.52), Uganda (0.65), Nigeria (0.66), Australia (0.83), Peru (0.94), Nicaragua (0.96), Namibia (1.09), Kenya (1.21), Rwanda (1.60), Honduras (1.61), Cambodia (1.77), Madagascar (1.82), Viet Nam (2.09), South Africa (2.50), Dominican Republic (2.54), Georgia (3.55), Bolivia (3.72), China (4.41), Thailand (5.37), Panama (7.47)	Philippines (52.51)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Madagascar (43.27)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.65), Japan (0.96), Denmark (1.05), Canada (1.43), Republic of Korea (1.62), Austria (3.27), Hungary (3.43), Lithuania (3.62), Germany (4.45), Croatia (4.77), Slovenia (5.40), Ireland (7.34), Bulgaria (9.91), Switzerland (10.62)	Sweden (66.14)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.67), Uganda (0.82), Nigeria (0.83), Australia (1.02), Peru (1.14), Nicaragua (1.17), Namibia (1.31), Kenya (1.44), Rwanda (1.87), Honduras (1.88), Cambodia (2.06), Viet Nam (2.41), South Africa (2.87), Dominican Republic (2.91), Georgia (4.02), Bolivia (4.20), China (4.97), Thailand (6.03), Panama (8.35)	Philippines (58.05)
Mexico (4.73)	Denmark (-0.06), Japan (-0.10), Belgium (-0.24), Poland (-0.29), United Kingdom (-0.41), Portugal (-0.49), Greece (-0.55), Italy (-0.56), Spain (-0.64), France (-0.67), Netherlands (-0.77), Romania (-0.89)	Canada (0.11), Republic of Korea (0.20), Austria (0.97), Hungary (1.03), Lithuania (1.12), Germany (1.50), Croatia (1.65), Slovenia (1.94), Ireland (2.83), Bulgaria (4.01), Switzerland (4.34)	Sweden (29.89)	Nicaragua (-0.01), Peru (-0.02), Australia (-0.07), Nigeria (-0.16), Uganda (-0.17), Albania (-0.23), Zambia (-0.27), Guatemala (-0.28), Lebanon (-0.30), Brazil (-0.43), Lao People's Democratic Republic (-0.44), Chile (-0.46), Costa Rica (-0.47), Bangladesh (-0.49), Bosnia and Herzegovina (-0.55), Paraguay (-0.68), Colombia (-0.76), United Arab Emirates (-0.79), Ecuador (-0.81), Indonesia (-0.84), Ethiopia (-0.87), Uruguay (-0.87), Russian Federation (-0.88), Argentina (-0.90), New Zealand (-0.91), Israel (-0.95), India (-0.97), Turkey (-0.97), Ukraine (-0.97), Tunisia (-0.97)	Namibia (0.06), Kenya (0.12), Honduras (0.32), Rwanda (0.32), Cambodia (0.41), Madagascar (0.43), Viet Nam (0.57), South Africa (0.77), Sri Lanka (0.78), Dominican Republic (0.79), Georgia (1.31), Bolivia (1.39), China (1.73), Thailand (2.23), Panama (3.29)	Philippines (26.10)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Namibia (31.92)	Greece (-0.01), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.11), United Kingdom (0.29), Poland (0.55), Belgium (0.66), Japan (0.97), Denmark (1.06), Canada (1.44), Republic of Korea (1.64), Austria (3.29), Hungary (3.45), Lithuania (3.64), Germany (4.48), Croatia (4.80), Slovenia (5.43), Ireland (7.38), Bulgaria (9.96), Switzerland (10.67)	Sweden (66.43)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.24), Brazil (0.26), Lebanon (0.52), Guatemala (0.59), Zambia (0.61), Albania (0.68), Uganda (0.82), Nigeria (0.84), Australia (1.03), Peru (1.15), Nicaragua (1.18), Kenya (1.45), Rwanda (1.89), Honduras (1.90), Cambodia (2.08), Madagascar (2.13), Viet Nam (2.43), South Africa (2.88), Sri Lanka (2.90), Dominican Republic (2.92), Georgia (4.04), Bolivia (4.23), China (4.99), Thailand (6.06), Panama (8.39)	Philippines (58.31)
Nigeria (25.03)	Greece (-0.02), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.66), Japan (0.96), Denmark (1.05), Canada (1.43), Republic of Korea (1.63), Austria (3.27), Hungary (3.43), Lithuania (3.63), Germany (4.46), Croatia (4.78), Slovenia (5.41), Ireland (7.35), Bulgaria (9.92), Switzerland (10.63)	Sweden (66.21)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.68), Uganda (0.82), Australia (1.02), Peru (1.14), Nicaragua (1.17), Namibia (1.31), Kenya (1.44), Rwanda (1.88), Honduras (1.89), Cambodia (2.07), Madagascar (2.12), Viet Nam (2.42), South Africa (2.87), Sri Lanka (2.89), Dominican Republic (2.91), Georgia (4.03), Bolivia (4.21), China (4.97), Thailand (6.04), Panama (8.36)	Philippines (58.12)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Nicaragua (23.80)	Portugal (-0.11), Greece (-0.21), Italy (-0.23), Spain (-0.36), France (-0.42), Netherlands (-0.60), Romania (-0.81)	United Kingdom (0.04), Poland (0.24), Belgium (0.33), Japan (0.58), Denmark (0.65), Canada (0.96), Republic of Korea (1.12), Austria (2.45), Hungary (2.57), Lithuania (2.73), Germany (3.41), Croatia (3.65), Slovenia (4.16), Ireland (5.72), Bulgaria (7.80), Switzerland (8.38)	Sweden (53.23)	Lao People's Democratic Republic (-0.01), Chile (-0.05), Costa Rica (-0.08), Bangladesh (-0.10), Bosnia and Herzegovina (-0.22), Mexico (-0.29), Paraguay (-0.44), Colombia (-0.58), United Arab Emirates (-0.64), Ecuador (-0.66), Indonesia (-0.72), Ethiopia (-0.77), Uruguay (-0.77), Russian Federation (-0.79), Argentina (-0.82), New Zealand (-0.85), Israel (-0.91), India (-0.94), Turkey (-0.94), Ukraine (-0.95), Tunisia (-0.95)	Brazil (0.01), Lebanon (0.22), Guatemala (0.27), Zambia (0.29), Albania (0.35), Uganda (0.46), Nigeria (0.47), Australia (0.63), Peru (0.73), Namibia (0.86), Kenya (0.96), Rwanda (1.31), Honduras (1.32), Cambodia (1.47), Madagascar (1.51), Viet Nam (1.75), South Africa (2.11), Sri Lanka (2.13), Dominican Republic (2.15), Georgia (3.04), Bolivia (3.19), China (3.82), Thailand (4.67), Panama (6.53)	Philippines (46.62)
New Zealand (1.54)	Greece (-0.06), Italy (-0.09), Spain (-0.24), France (-0.31), Netherlands (-0.53), Romania (-0.78)	Portugal (0.06), United Kingdom (0.24), Poland (0.48), Belgium (0.59), Japan (0.88), Denmark (0.97), Canada (1.33), Republic of Korea (1.52)	Austria (3.10), Hungary (3.25), Lithuania (3.44), Germany (4.24), Croatia (4.55), Slovenia (5.15), Ireland (7.01), Bulgaria (9.49), Switzerland (10.17), Sweden (63.54)	Bosnia and Herzegovina (-0.07), Mexico (-0.15), Paraguay (-0.33), Colombia (-0.50), United Arab Emirates (-0.57), Ecuador (-0.59), Indonesia (-0.67), Ethiopia (-0.73), Uruguay (-0.73), Russian Federation (-0.75), Argentina (-0.79), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.07), Costa Rica (0.10), Chile (0.14), Lao People's Democratic Republic (0.18), Brazil (0.20), Lebanon (0.46), Guatemala (0.52), Zambia (0.54), Albania (0.61), Uganda (0.75), Nigeria (0.76), Australia (0.94), Peru (1.06), Nicaragua (1.08), Namibia (1.21), Kenya (1.34)	Rwanda (1.76), Honduras (1.77), Cambodia (1.94), Madagascar (1.99), Viet Nam (2.28), South Africa (2.71), Sri Lanka (2.73), Dominican Republic (2.75), Georgia (3.82), Bolivia (4.00), China (4.73), Thailand (5.75), Panama (7.98), Philippines (55.75)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Panama (132.25)	Greece (-0.01), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.66), Japan (0.96), Denmark (1.05), Canada (1.43), Republic of Korea (1.63), Austria (3.28), Hungary (3.44), Lithuania (3.63), Germany (4.47), Croatia (4.79), Slovenia (5.42), Ireland (7.36), Bulgaria (9.94), Switzerland (10.65), Sweden (66.30)	None	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.68), Uganda (0.82), Nigeria (0.83), Australia (1.03), Peru (1.15), Nicaragua (1.17), Namibia (1.31), Kenya (1.44), Rwanda (1.88), Honduras (1.89), Cambodia (2.07), Madagascar (2.12), Viet Nam (2.42), South Africa (2.88), Sri Lanka (2.90), Dominican Republic (2.92), Georgia (4.03), Bolivia (4.22), China (4.98), Thailand (6.05), Philippines (58.20)	None
Peru (10.11)	Republic of Korea (-0.04), Canada (-0.11), Denmark (-0.25), Japan (-0.29), Belgium (-0.40), Poland (-0.44), United Kingdom (-0.53), Portugal (-0.60), Greece (-0.64), Italy (-0.65), Spain (-0.71), France (-0.74), Netherlands (-0.82), Romania (-0.91)	Austria (0.56), Hungary (0.62), Lithuania (0.69), Germany (0.99), Croatia (1.11), Slovenia (1.34), Ireland (2.04), Bulgaria (2.98), Switzerland (3.25)	Sweden (23.54)	Kenya (-0.11), Namibia (-0.16), Nicaragua (-0.21), Australia (-0.26), Nigeria (-0.33), Uganda (-0.34), Albania (-0.39), Guatemala (-0.42), Zambia (-0.42), Lebanon (-0.45), Brazil (-0.54), Lao People's Democratic Republic (-0.55), Chile (-0.57), Costa Rica (-0.58), Bangladesh (-0.59), Bosnia and Herzegovina (-0.65), Mexico (-0.68), Paraguay (-0.75), Colombia (-0.81), United Arab Emirates (-0.84), Ecuador (-0.85), Indonesia (-0.87), Ethiopia (-0.90), Russian Federation (-0.90), Uruguay (-0.90), Argentina (-0.92), New Zealand (-0.93), Israel (-0.96), India (-0.97), Turkey (-0.97), Ukraine (-0.98), Tunisia (-0.98)	Honduras (0.05), Rwanda (0.05), Cambodia (0.12), Madagascar (0.14), Viet Nam (0.25), South Africa (0.41), Sri Lanka (0.42), Dominican Republic (0.43), Georgia (0.83), Bolivia (0.90), China (1.18), Thailand (1.57), Panama (2.41)	Philippines (20.56)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Philippines (841.60)	Greece (-0.01), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.55), Belgium (0.66), Japan (0.96), Denmark (1.06), Canada (1.43), Republic of Korea (1.63), Austria (3.28), Hungary (3.44), Lithuania (3.64), Germany (4.47), Croatia (4.79), Slovenia (5.42), Ireland (7.37), Bulgaria (9.95), Switzerland (10.66), Sweden (66.37)	None	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.23), Brazil (0.26), Lebanon (0.52), Guatemala (0.58), Zambia (0.60), Albania (0.68), Uganda (0.82), Nigeria (0.84), Australia (1.03), Peru (1.15), Nicaragua (1.17), Namibia (1.31), Kenya (1.44), Rwanda (1.88), Honduras (1.89), Cambodia (2.07), Madagascar (2.12), Viet Nam (2.42), South Africa (2.88), Sri Lanka (2.90), Dominican Republic (2.92), Georgia (4.04), Bolivia (4.22), China (4.99), Thailand (6.05), Panama (8.38)	None
Paraguay (8.61)	Greece (-0.05), Italy (-0.08), Spain (-0.23), France (-0.30), Netherlands (-0.52), Romania (-0.77)	Portugal (0.07), United Kingdom (0.25), Poland (0.49), Belgium (0.60), Japan (0.90), Denmark (0.98), Canada (1.35), Republic of Korea (1.54), Austria (3.13), Hungary (3.29), Lithuania (3.48), Germany (4.28), Croatia (4.59), Slovenia (5.20), Ireland (7.07)	Bulgaria (9.56), Switzerland (10.25), Sweden (64.02)	Bosnia and Herzegovina (-0.06), Mexico (-0.15), Colombia (-0.50), United Arab Emirates (-0.56), Ecuador (-0.59), Indonesia (-0.66), Ethiopia (-0.73), Uruguay (-0.73), Russian Federation (-0.75), Argentina (-0.78), New Zealand (-0.82), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.08), Costa Rica (0.11), Chile (0.14), Lao People's Democratic Republic (0.19), Brazil (0.21), Lebanon (0.47), Guatemala (0.53), Zambia (0.55), Albania (0.62), Uganda (0.76), Nigeria (0.77), Australia (0.96), Peru (1.07), Nicaragua (1.10), Namibia (1.23), Kenya (1.36), Rwanda (1.78), Honduras (1.79), Cambodia (1.96), Madagascar (2.01), Viet Nam (2.30), South Africa (2.74), Sri Lanka (2.76), Dominican Republic (2.78), Georgia (3.86), Bolivia (4.04), China (4.78), Thailand (5.80), Panama (8.05)	Philippines (56.17)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Russian Federation (2.73)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.28), Poland (0.54), Belgium (0.65), Japan (0.95), Denmark (1.04), Canada (1.42), Republic of Korea (1.62)	Austria (3.25), Hungary (3.41), Lithuania (3.61), Germany (4.43), Croatia (4.75), Slovenia (5.38), Ireland (7.31), Bulgaria (9.87), Switzerland (10.58), Sweden (65.91)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.51), Guatemala (0.57), Zambia (0.59), Albania (0.67), Uganda (0.81), Nigeria (0.82), Australia (1.01), Peru (1.13), Nicaragua (1.16), Namibia (1.30), Kenya (1.43), Rwanda (1.86), Honduras (1.87), Cambodia (2.05), Madagascar (2.10), Viet Nam (2.40)	South Africa (2.85), Sri Lanka (2.87), Dominican Republic (2.89), Georgia (4.00), Bolivia (4.19), China (4.94), Thailand (6.00), Panama (8.32), Philippines (57.85)
Rwanda (39.57)	Greece (-0.02), Italy (-0.06), Spain (-0.21), France (-0.29), Netherlands (-0.51), Romania (-0.77)	Portugal (0.09), United Kingdom (0.28), Poland (0.53), Belgium (0.64), Japan (0.94), Denmark (1.04), Canada (1.41), Republic of Korea (1.61), Austria (3.24), Hungary (3.40), Lithuania (3.59), Germany (4.42), Croatia (4.73), Slovenia (5.35), Ireland (7.28), Bulgaria (9.84), Switzerland (10.54)	Sweden (65.67)	Bosnia and Herzegovina (-0.04), Mexico (-0.13), Paraguay (-0.31), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.66), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.82), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.17), Lao People's Democratic Republic (0.22), Brazil (0.24), Lebanon (0.51), Guatemala (0.57), Zambia (0.59), Albania (0.66), Uganda (0.80), Nigeria (0.82), Australia (1.01), Peru (1.13), Nicaragua (1.15), Namibia (1.29), Kenya (1.42), Honduras (1.86), Cambodia (2.05), Madagascar (2.10), Viet Nam (2.40), Cambodia (2.04), Madagascar (2.09), Viet Nam (2.39), South Africa (2.84), Sri Lanka (2.86), Dominican Republic (2.88), Georgia (3.98), Bolivia (4.17), China (4.92), Thailand (5.98), Panama (8.28)	Philippines (57.64)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Thailand (66.25)	United Kingdom (-0.13), Portugal (-0.26), Greece (-0.34), Italy (-0.36), Spain (-0.46), France (-0.52), Netherlands (-0.67), Romania (-0.84)	Poland (0.04), Belgium (0.11), Japan (0.32), Denmark (0.38), Canada (0.64), Republic of Korea (0.77), Austria (1.89), Hungary (1.98), Lithuania (2.12), Germany (2.68), Croatia (2.89), Slovenia (3.31), Ireland (4.62), Bulgaria (6.35), Switzerland (6.85), Sweden (44.40)	None	Brazil (-0.16), Lao People's Democratic Republic (-0.17), Chile (-0.20), Costa Rica (-0.23), Bangladesh (-0.25), Bosnia and Herzegovina (-0.35), Mexico (-0.41), Paraguay (-0.53), Colombia (-0.65), United Arab Emirates (-0.70), Ecuador (-0.72), Indonesia (-0.77), Ethiopia (-0.81), Uruguay (-0.81), Russian Federation (-0.82), Argentina (-0.85), New Zealand (-0.87), Israel (-0.92), India (-0.95), Turkey (-0.95), Ukraine (-0.96), Tunisia (-0.96)	Lebanon (0.02), Guatemala (0.06), Zambia (0.08), Albania (0.12), Uganda (0.22), Nigeria (0.23), Australia (0.37), Peru (0.44), Nicaragua (0.46), Namibia (0.55), Kenya (0.64), Rwanda (0.93), Honduras (0.94), Cambodia (1.06), Madagascar (1.10), Viet Nam (1.30), South Africa (1.60), Sri Lanka (1.62), Dominican Republic (1.64), Georgia (2.37), Bolivia (2.50), China (3.02), Panama (5.29), Panama (38.78)	None
Tunisia (-0.16)	Greece (-0.02), Italy (-0.06), Spain (-0.21), France (-0.29), Netherlands (-0.51), Romania (-0.77)	Portugal (0.09), United Kingdom (0.28), Poland (0.53), Belgium (0.64), Japan (0.94), Denmark (1.03), Canada (1.41), Republic of Korea (1.61), Austria (3.24), Hungary (3.40), Lithuania (3.59), Germany (4.41), Croatia (4.73), Slovenia (5.35), Ireland (7.28), Bulgaria (9.83), Switzerland (10.54), Sweden (65.65)	None	Bosnia and Herzegovina (-0.04), Mexico (-0.13), Paraguay (-0.31), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.66), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.82), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.17), Lao People's Democratic Republic (0.22), Brazil (0.24), Lebanon (0.51), Guatemala (0.57), Zambia (0.59), Albania (0.66), Uganda (0.80), Nigeria (0.82), Australia (1.01), Peru (1.13), Nicaragua (1.15), Namibia (1.29), Kenya (1.42), Rwanda (1.85), Honduras (1.86), Cambodia (2.04), Madagascar (2.09), Viet Nam (2.39), South Africa (2.84), Sri Lanka (2.86), Dominican Republic (2.88), Georgia (3.98), Bolivia (4.17), China (4.92), Thailand (5.98), Panama (8.28), Philippines (57.63)	None

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Turkey (-0.09)	Portugal (-0.02), Greece (-0.12), Italy (-0.15), Spain (-0.29), France (-0.36), Netherlands (-0.56), Romania (-0.79)	United Kingdom (0.15), Poland (0.37), Belgium (0.48), Japan (0.75), Denmark (0.83), Canada (1.16), Republic of Korea (1.34), Austria (2.81), Hungary (2.95), Lithuania (3.13), Germany (3.87), Croatia (4.15), Slovenia (4.71), Ireland (6.44), Bulgaria (8.74), Switzerland (9.37), Sweden (58.93)	None	Bosnia and Herzegovina (-0.13), Mexico (-0.22), Paraguay (-0.38), Colombia (-0.54), United Arab Emirates (-0.60), Ecuador (-0.62), Indonesia (-0.69), Ethiopia (-0.75), Uruguay (-0.75), Russian Federation (-0.77), Argentina (-0.80), New Zealand (-0.83), Israel (-0.89), India (-0.93), Ukraine (-0.94), Tunisia (-0.95)	Bangladesh (0.00), Costa Rica (0.02), Chile (0.06), Lao People's Democratic Republic (0.10), Brazil (0.12), Lebanon (0.35), Guatemala (0.41), Zambia (0.43), Albania (0.50), Uganda (0.62), Nigeria (0.63), Australia (0.80), Peru (0.91), Nicaragua (0.93), Namibia (1.06), Kenya (1.17), Honduras (1.57), Rwanda (1.57), Cambodia (1.73), Madagascar (1.78), Viet Nam (2.05), South Africa (2.45), Sri Lanka (2.47), Dominican Republic (2.49), Georgia (3.48), Bolivia (3.64), China (4.32), Thailand (5.27), Panama (7.34), Philippines (51.70)	None
Uganda (22.95)	Greece (-0.09), Italy (-0.12), Spain (-0.26), France (-0.33), Netherlands (-0.54), Romania (-0.78)	Portugal (0.02), United Kingdom (0.20), Poland (0.43), Belgium (0.53), Japan (0.82), Denmark (0.90), Canada (1.25), Republic of Korea (1.44), Austria (2.96), Hungary (3.11), Lithuania (3.29), Germany (4.06), Croatia (4.35), Slovenia (4.94), Ireland (6.74), Bulgaria (9.12), Switzerland (9.78)	Sweden (61.29)	Bosnia and Herzegovina (-0.10), Mexico (-0.18), Paraguay (-0.35), Colombia (-0.52), United Arab Emirates (-0.58), Ecuador (-0.61), Indonesia (-0.68), Ethiopia (-0.74), Uruguay (-0.74), Russian Federation (-0.76), Argentina (-0.79), New Zealand (-0.83), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.95)	Bangladesh (0.04), Costa Rica (0.06), Chile (0.10), Lao People's Democratic Republic (0.14), Brazil (0.16), Lebanon (0.41), Guatemala (0.46), Zambia (0.48), Albania (0.55), Nigeria (0.70), Australia (0.87), Peru (0.99), Nicaragua (1.01), Namibia (1.14), Kenya (1.26), Honduras (1.67), Rwanda (1.67), Cambodia (1.84), Madagascar (1.89), Viet Nam (2.17), South Africa (2.59), Sri Lanka (2.60), Dominican Republic (2.62), Georgia (3.66), Bolivia (3.83), China (4.54), Thailand (5.52), Panama (7.67)	Philippines (53.78)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Ukraine (-0.10)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.29), Netherlands (-0.51), Romania (-0.77)	Portugal (0.09), United Kingdom (0.28), Poland (0.53), Belgium (0.65), Japan (0.95), Denmark (1.04), Canada (1.41), Republic of Korea (1.61), Austria (3.25), Hungary (3.40), Lithuania (3.60), Germany (4.42), Croatia (4.74), Slovenia (5.37), Ireland (7.30), Bulgaria (9.85), Switzerland (10.56), Sweden (65.78)	None	Bosnia and Herzegovina (-0.03), Mexico (-0.13), Paraguay (-0.31), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.66), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.82), Israel (-0.88), India (-0.92), Turkey (-0.93), Tunisia (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.22), Brazil (0.24), Lebanon (0.51), Guatemala (0.57), Zambia (0.59), Albania (0.67), Uganda (0.81), Nigeria (0.82), Australia (1.01), Peru (1.13), Nicaragua (1.16), Namibia (1.29), Kenya (1.42), Rwanda (1.86), Honduras (1.87), Cambodia (2.05), Madagascar (2.10), Viet Nam (2.39), South Africa (2.85), Sri Lanka (2.87), Dominican Republic (2.89), Georgia (3.99), Bolivia (4.18), China (4.93), Thailand (5.99), Panama (8.30), Philippines (57.74)	None
Uruguay (3.02)	Greece (-0.02), Italy (-0.05), Spain (-0.21), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.10), United Kingdom (0.29), Poland (0.54), Belgium (0.65), Japan (0.95), Denmark (1.04), Canada (1.42), Republic of Korea (1.62)	Austria (3.26), Hungary (3.42), Lithuania (3.61), Germany (4.44), Croatia (4.76), Slovenia (5.38), Ireland (7.32), Bulgaria (9.88), Switzerland (10.59), Sweden (65.94)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.49), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.11), Costa Rica (0.14), Chile (0.18), Lao People's Democratic Republic (0.23), Brazil (0.25), Lebanon (0.51), Guatemala (0.57), Zambia (0.60), Albania (0.67), Uganda (0.81), Nigeria (0.82), Australia (1.01), Peru (1.14), Nicaragua (1.16), Namibia (1.30), Kenya (1.43), Rwanda (1.87), Honduras (1.88), Cambodia (2.06), Madagascar (2.11), Viet Nam (2.40), South Africa (2.86), Sri Lanka (2.88), Dominican Republic (2.90)	Georgia (4.01), Bolivia (4.19), China (4.95), Thailand (6.01), Panama (8.32), Philippines (57.90)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Viet Nam (46.17)	Greece (-0.04), Italy (-0.08), Spain (-0.23), France (-0.30), Netherlands (-0.52), Romania (-0.77)	Portugal (0.07), United Kingdom (0.25), Poland (0.50), Belgium (0.61), Japan (0.90), Denmark (0.99), Canada (1.36), Republic of Korea (1.55), Austria (3.15), Hungary (3.30), Lithuania (3.49), Germany (4.30), Croatia (4.61), Slovenia (5.22), Ireland (7.11), Bulgaria (9.61), Switzerland (10.30)	Sweden (64.28)	Bosnia and Herzegovina (-0.06), Mexico (-0.14), Paraguay (-0.32), Colombia (-0.50), United Arab Emirates (-0.56), Ecuador (-0.59), Indonesia (-0.66), Uruguay (-0.72), Ethiopia (-0.73), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.82), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Namibia (1.24), Kenya (1.37),Rwanda (1.79), Honduras (1.80), Cambodia (1.98), Madagascar (2.03), South Africa (2.76), Sri Lanka (2.78), Dominican Republic (2.80), Georgia (3.88), Bolivia (4.06), China (4.80), Thailand (5.83), Panama (8.09)	Philippines (56.41)
South Africa (52.55)	Greece (-0.04), Italy (-0.07), Spain (-0.23), France (-0.30), Netherlands (-0.52), Romania (-0.77)	Portugal (0.07), United Kingdom (0.26), Poland (0.50), Belgium (0.61), Japan (0.91), Denmark (1.00), Canada (1.36), Republic of Korea (1.56), Austria (3.16), Hungary (3.31), Lithuania (3.51), Germany (4.32), Croatia (4.63), Slovenia (5.24), Ireland (7.13), Bulgaria (9.63), Switzerland (10.33)	Sweden (64.45)	Bosnia and Herzegovina (-0.05), Mexico (-0.14), Paraguay (-0.32), Colombia (-0.50), United Arab Emirates (-0.56), Ecuador (-0.59), Indonesia (-0.66), Uruguay (-0.72), Ethiopia (-0.73), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.82), Israel (-0.89), India (-0.93), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.09), Costa Rica (0.12), Chile (0.15), Lao People's Democratic Republic (0.20), Brazil (0.22), Lebanon (0.48), Guatemala (0.54), Zambia (0.56), Albania (0.63), Uganda (0.77), Nigeria (0.78), Australia (0.97), Peru (1.09), Nicaragua (1.11), Namibia (1.25), Kenya (1.37), Rwanda (1.80), Honduras (1.81), Cambodia (1.98), Madagascar (2.03), Viet Nam (2.33), Sri Lanka (2.79), Dominican Republic (2.81), Georgia (3.89), Bolivia (4.07), China (4.81), Thailand (5.85), Panama (8.11)	Philippines (56.55)

Table 2.6: (Continued) Response of the Remaining Exporters to One More OEA Partner with U.S. in 2016

	OEA partners of United States			Non-OEA partners of United States		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Zambia (21.84)	Greece (-0.01), Italy (-0.05), Spain (-0.20), France (-0.28), Netherlands (-0.51), Romania (-0.77)	Portugal (0.11), United Kingdom (0.30), Poland (0.55), Belgium (0.66), Japan (0.97), Denmark (1.06), Canada (1.44), Republic of Korea (1.64), Austria (3.29), Hungary (3.45), Lithuania (3.64), Germany (4.48), Croatia (4.80), Slovenia (5.43), Ireland (7.38), Bulgaria (9.96), Switzerland (10.68)	Sweden (66.44)	Bosnia and Herzegovina (-0.03), Mexico (-0.12), Paraguay (-0.30), Colombia (-0.48), United Arab Emirates (-0.55), Ecuador (-0.58), Indonesia (-0.65), Ethiopia (-0.72), Uruguay (-0.72), Russian Federation (-0.74), Argentina (-0.78), New Zealand (-0.81), Israel (-0.88), India (-0.92), Turkey (-0.93), Ukraine (-0.94), Tunisia (-0.94)	Bangladesh (0.12), Costa Rica (0.15), Chile (0.19), Lao People's Democratic Republic (0.24), Brazil (0.26), Lebanon (0.52), Guatemala (0.59), Albania (0.68), Uganda (0.82), Nigeria (0.84), Australia (1.03), Peru (1.15), Nicaragua (1.18), Namibia (1.32), Kenya (1.45), Rwanda (1.89), Honduras (1.90), Cambodia (2.08), Madagascar (2.13), Viet Nam (2.43), Sri Lanka (2.90), Dominican Republic (2.92), Georgia (4.04), Bolivia (4.23), China (4.99), Thailand (6.06), Panama (8.39)	Philippines (58.33)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Bosnia and Herzegovina (39.49)	Portugal (-0.03), New Zealand (-0.09), Germany (-0.35), Canada (-0.46), Poland (-0.48), Hungary (-0.59), Australia (-0.66), Greece (-0.69), Finland (-0.72), Lithuania (-0.73), Romania (-0.74), Sweden (-0.77), Slovenia (-0.79), Austria (-0.81), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.41), Netherlands (0.47), United Kingdom (0.52), Italy (0.72), United States of America (0.92), Belgium (1.06), Switzerland (1.25), Czech Republic (1.35), Croatia (2.16), Tunisia (5.24), India (5.28), Japan (9.53), Costa Rica (12.95), Argentina (28.72)	None	Peru (-0.09), Viet Nam (-0.20), Honduras (-0.27), Bolivia (-0.34), Turkey (-0.41), Uganda (-0.58), Nicaragua (-0.63), Thailand (-0.67), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.22), Colombia (0.65), Brazil (1.04), Guatemala (1.52), Ethiopia (5.40), Chile (26.13)	Indonesia (39.67)
Bolivia (8.48)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.59), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.43), Netherlands (0.50), United Kingdom (0.55), Italy (0.75), United States of America (0.95), Belgium (1.10), Switzerland (1.28), Czech Republic (1.39), Croatia (2.21), Tunisia (5.34), India (5.38)	Japan (9.71), Costa Rica (13.19), Argentina (29.21)	Peru (-0.08), Viet Nam (-0.19), Honduras (-0.26), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.24), Colombia (0.68), Brazil (1.08), Guatemala (1.56), Bosnia and Herzegovina (1.90), Ethiopia (5.51)	Chile (26.60), Indonesia (40.36)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Brazil (26.94)	Portugal (-0.07), New Zealand (-0.12), Germany (-0.37), Canada (-0.48), Poland (-0.50), Hungary (-0.61), Australia (-0.67), Greece (-0.71), Finland (-0.73), Lithuania (-0.74), Romania (-0.75), Sweden (-0.77), Slovenia (-0.80), Austria (-0.81), Spain (-0.82), Ireland (-0.82), Latvia (-0.84), Bulgaria (-0.96)	France (0.35), Netherlands (0.42), United Kingdom (0.47), Italy (0.66), United States of America (0.84), Belgium (0.98), Switzerland (1.16), Czech Republic (1.26), Croatia (2.04), Tunisia (5.00), India (5.04), Japan (9.13), Costa Rica (12.43)	Argentina (27.57)	Peru (-0.13), Viet Nam (-0.23), Honduras (-0.30), Bolivia (-0.37), Turkey (-0.43), Uganda (-0.60), Nicaragua (-0.64), Thailand (-0.68), Madagascar (-0.82), Sri Lanka (-0.83), China (-0.89), Paraguay (-0.89), South Africa (-0.92), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.17), Colombia (0.59), Guatemala (1.42), Bosnia and Herzegovina (1.74), Ethiopia (5.16), Chile (25.10)	Indonesia (38.11)
Chile (382.21)	Portugal (-0.04), New Zealand (-0.09), Germany (-0.35), Canada (-0.46), Poland (-0.48), Hungary (-0.59), Australia (-0.66), Greece (-0.70), Finland (-0.72), Lithuania (-0.73), Romania (-0.74), Sweden (-0.77), Slovenia (-0.79), Austria (-0.81), Spain (-0.81), Ireland (-0.82), Latvia (-0.83), Bulgaria (-0.96)	France (0.40), Netherlands (0.46), United Kingdom (0.51), Italy (0.71), United States of America (0.90), Belgium (1.05), Switzerland (1.23), Czech Republic (1.33), Croatia (2.13), Tunisia (5.20), India (5.24), Japan (9.46), Costa Rica (12.86), Argentina (28.51)	None	Peru (-0.10), Viet Nam (-0.21), Honduras (-0.28), Bolivia (-0.35), Turkey (-0.41), Uganda (-0.58), Nicaragua (-0.63), Thailand (-0.67), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.21), Colombia (0.64), Brazil (1.03), Guatemala (1.50), Bosnia and Herzegovina (1.83), Ethiopia (5.36), Indonesia (39.40)	None

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
China (0.59)	Portugal (-0.09), New Zealand (-0.15), Germany (-0.39), Canada (-0.49), Poland (-0.51), Hungary (-0.62), Australia (-0.68), Greece (-0.71), Finland (-0.73), Lithuania (-0.74), Romania (-0.75), Sweden (-0.78), Slovenia (-0.81), Austria (-0.82), Spain (-0.82), Ireland (-0.83), Latvia (-0.84), Bulgaria (-0.96)	France (0.32), Netherlands (0.38), United Kingdom (0.43)	Italy (0.62), United States of America (0.80), Belgium (0.93), Switzer-land (1.11), Czech Republic (1.20), Croatia (1.96), Tunisia (4.85), India (4.88), Japan (8.87), Costa Rica (12.09), Argentina (26.85)	Peru (-0.15), Viet Nam (-0.25), Honduras (-0.32), Bolivia (-0.39), Turkey (-0.45), Uganda (-0.61), Nicaragua (-0.65), Thailand (-0.69), Madagascar (-0.82), Sri Lanka (-0.83), Paraguay (-0.89), South Africa (-0.92), Pakistan (-0.97), Cambodia (-0.98), Philippines (-0.98)	Mexico (0.14), Colombia (0.55)	Brazil (0.92), Guatemala (1.36), Bosnia and Herzegov-ina (1.67), Ethiopia (5.00), Chile (24.45), Indonesia (37.13)
Colombia (22.92)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.50), United Kingdom (0.55), Italy (0.76), United States of America (0.95), Belgium (1.10), Switzerland (1.29), Czech Republic (1.39), Croatia (2.22), Tunisia (5.36), India (5.40), Japan (9.73), Costa Rica (13.23)	Argentina (29.28)	Peru (-0.07), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.24), Brazil (1.08), Guatemala (1.57), Bosnia and Herzegovina (1.90), Ethiopia (5.53)	Chile (26.66), Indonesia (40.46)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Ethiopia (90.04)	Portugal (-0.03), New Zealand (-0.09), Germany (-0.35), Canada (-0.46), Poland (-0.48), Hungary (-0.59), Australia (-0.66), Greece (-0.69), Finland (-0.72), Lithuania (-0.73), Romania (-0.74), Sweden (-0.77), Slovenia (-0.79), Austria (-0.81), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.41), Netherlands (0.47), United Kingdom (0.53), Italy (0.72), United States of America (0.92), Belgium (1.06), Switzerland (1.25), Czech Republic (1.35), Croatia (2.16), Tunisia (5.24), India (5.28), Japan (9.53), Costa Rica (12.96), Argentina (28.71)	None	Peru (-0.09), Viet Nam (-0.20), Honduras (-0.27), Bolivia (-0.34), Turkey (-0.41), Uganda (-0.58), Nicaragua (-0.63), Thailand (-0.67), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.22), Colombia (0.65), Brazil (1.04), Guatemala (1.52), Bosnia and Herzegovina (1.85), Chile (26.14), Indonesia (39.68)	None
Guatemala (35.44)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.43), Netherlands (0.50), United Kingdom (0.55), Italy (0.75), United States of America (0.95), Belgium (1.10), Switzerland (1.28), Czech Republic (1.39), Croatia (2.21), Tunisia (5.35), India (5.39), Japan (9.71), Costa Rica (13.20), Argentina (29.23)	None	Peru (-0.08), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.24), Colombia (0.68), Brazil (1.08), Bosnia and Herzegovina (1.90), Ethiopia (5.52), Chile (26.62)	Indonesia (40.39)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Honduras (9.45)	Portugal (-0.02), New Zealand (-0.08), Germany (-0.34), Canada (-0.45), Poland (-0.47), Hungary (-0.59), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.74), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.42), Netherlands (0.49), United Kingdom (0.54), Italy (0.74), United States of America (0.94), Belgium (1.08), Switzerland (1.27), Czech Republic (1.37), Croatia (2.19), Tunisia (5.31), India (5.34)	Japan (9.64), Costa Rica (13.11), Argentina (29.02)	Peru (-0.08), Viet Nam (-0.20), Bolivia (-0.34), Turkey (-0.40), Uganda (-0.58), Nicaragua (-0.63), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.23), Colombia (0.67), Brazil (1.07), Guatemala (1.54), Bosnia and Herzegovina (1.88), Ethiopia (5.47)	Chile (26.43), Indonesia (40.10)
Indonesia (586.81)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.59), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.43), Netherlands (0.50), United Kingdom (0.55), Italy (0.75), United States of America (0.95), Belgium (1.10), Switzerland (1.28), Czech Republic (1.38), Croatia (2.21), Tunisia (5.34), India (5.38), Japan(9.70), Costa Rica (13.19), Argentina (29.20)	None	Peru (-0.08), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.24), Colombia (0.68), Brazil (1.08), Guatemala (1.56), Bosnia and Herzegovina (1.90), Ethiopia (5.51), Chile (26.59)	None

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Cambodia (-0.62)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.44), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.43), Netherlands (0.50), United Kingdom (0.55), Italy (0.75), United States of America (0.95), Belgium (1.10), Switzerland (1.28), Czech Republic (1.38), Croatia (2.21), Tunisia (5.34), India (5.38), Japan(9.70), Costa Rica (13.19), Argentina (29.20)	None	Peru (-0.07), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.25), Colombia (0.69), Brazil (1.09), Guatemala (1.58), Bosnia and Herzegovina (1.91), Ethiopia (5.55), Chile (26.76), Indonesia (40.60)	None
Sri Lanka (1.59)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.34), Canada (-0.45), Poland (-0.47), Hungary (-0.59), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.43), Netherlands (0.50), United Kingdom (0.55), Italy (0.75), United States of America (0.95), Belgium (1.09), Switzerland (1.28), Czech Republic (1.38)	Croatia (2.21), Tunisia (5.34), India (5.38), Japan (9.70), Costa Rica (13.18), Argentina (29.18)	Peru (-0.08), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.24), Colombia (0.68), Brazil (1.08), Guatemala (1.56)	Bosnia and Herzegov-ina (1.89), Ethiopia (5.50), Chile (26.57), Indonesia (40.32)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Madagascar (1.72)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.44), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.51), United Kingdom (0.56), Italy (0.76), United States of America (0.96), Belgium (1.11), Switzerland (1.30), Czech Republic (1.40)	Croatia (2.23), Tunisia (5.38), India (5.42), Japan (9.77), Costa Rica (13.28), Argentina (29.40)	Peru (-0.07), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.25), Colombia (0.69), Brazil (1.09), Guatemala (1.58)	Bosnia and Herzegov-ina (1.92), Ethiopia (5.55), Chile (26.77), Indonesia (40.62)
Mexico (15.86)	Portugal (-0.06), New Zealand (-0.11), Germany (-0.36), Canada (-0.47), Poland (-0.49), Hungary (-0.60), Australia (-0.67), Greece (-0.70), Finland (-0.73), Lithuania (-0.74), Romania (-0.75), Sweden (-0.77), Slovenia (-0.80), Austria (-0.81), Spain (-0.81), Ireland (-0.82), Latvia (-0.84), Bulgaria (-0.96)	France (0.37), Netherlands (0.43), United Kingdom (0.48), Italy (0.68), United States of America (0.86), Belgium (1.00), Switzerland (1.18), Czech Republic (1.28), Croatia (2.07), Tunisia (5.06), India (5.10), Japan (9.23), Costa Rica (12.56	Argentina (27.85)	Peru (-0.12), Viet Nam (-0.23), Honduras (-0.29), Bolivia (-0.36), Turkey (-0.43), Uganda (-0.59), Nicaragua (-0.64), Thailand (-0.68), Madagascar (-0.82), Sri Lanka (-0.83), China (-0.88), Paraguay (-0.89), South Africa (-0.92), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Colombia (0.60), Brazil (0.98), Guatemala (1.45), Bosnia and Herzegovina (1.77), Ethiopia (5.22)	Chile (25.36), Indonesia (38.50)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Nicaragua (4.36)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.50), United Kingdom (0.55), Italy (0.76), United States of America (0.95), Belgium (1.10), Switzerland (1.29), Czech Republic (1.39), Croatia (2.22)	Tunisia (5.36), India (5.40), Japan (9.74), Costa Rica (13.23), Argentina (29.29)	Peru (-0.07), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.24), Colombia (0.68), Brazil (1.08), Guatemala (1.57), Bosnia and Herzegovina (1.91)	Ethiopia (5.53), Chile (26.67), Indonesia (40.47)
Pakistan (-0.57)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.50), United Kingdom (0.55), Italy (0.76), United States of America (0.95), Belgium (1.10), Switzerland (1.29), Czech Republic (1.39), Croatia (2.22), Tunisia (5.36), India (5.40), Japan (9.74), Costa Rica (13.23), Argentina (29.29)	None	Peru (-0.07), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Pakistan (-0.57), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Philippines (-0.98)	Mexico (0.25), Colombia (0.68), Brazil (1.08), Guatemala (1.57), Bosnia and Herzegovina (1.91), Ethiopia (5.53), Chile (26.68), Indonesia (40.48)	None

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Peru (11.85)	Portugal (-0.03), New Zealand (-0.09), Germany (-0.35), Canada (-0.46), Poland (-0.48), Hungary (-0.59), Australia (-0.66), Greece (-0.70), Finland (-0.72), Lithuania (-0.73), Romania (-0.74), Sweden (-0.77), Slovenia (-0.79), Austria (-0.81), Spain (-0.81), Ireland (-0.82), Latvia (-0.83), Bulgaria (-0.96)	France (0.40), Netherlands (0.47), United Kingdom (0.52), Italy (0.72), United States of America (0.91), Belgium (1.05), Switzerland (1.24), Czech Republic (1.34), Croatia (2.14), Tunisia (5.21), India (5.25), Japan (9.49)	Costa Rica (12.90), Argentina (28.59)	Viet Nam (-0.21), Honduras (-0.28), Bolivia (-0.35), Turkey (-0.41), Uganda (-0.58), Nicaragua (-0.63), Thailand (-0.67), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.22), Colombia (0.64), Brazil (1.04), Guatemala (1.51), Bosnia and Herzegovina (1.84), Ethiopia (5.38)	Chile (26.03), Indonesia (39.51)
Philippines (-0.66)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.44), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.51), United Kingdom (0.56), Italy (0.76), United States of America (0.96), Belgium (1.11), Switzerland (1.30), Czech Republic (1.40), Croatia (2.23), Tunisia (5.39), India (5.42), Japan (9.78), Costa Rica (13.29), Argentina (29.40)	None	Peru (-0.07), Viet Nam (-0.18), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97)	Mexico (0.25), Colombia (0.69), Brazil (1.09), Guatemala (1.58), Bosnia and Herzegovina (1.92), Ethiopia (5.55), Chile (26.78), Indonesia (40.63)	None

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Paraguay (0.65)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.50), United Kingdom (0.56)	Italy (0.76), United States of America (0.96), Belgium (1.10), Switzer-land (1.29), Czech Republic (1.40), Croatia (2.22), Tunisia (5.37), India (5.41), Japan (9.75), Costa Rica (13.25), Argentina (29.33)	Peru (-0.07), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.25)	Colombia (0.69), Brazil (1.09), Guatemala (1.57), Bosnia and Herzegov-ina (1.91), Ethiopia (5.54), Chile (26.71), Indonesia (40.52)
Thailand (3.68)	Portugal (-0.04), New Zealand (-0.10), Germany (-0.35), Canada (-0.46), Poland (-0.49), Hungary (-0.60), Australia (-0.66), Greece (-0.70), Finland (-0.72), Lithuania (-0.73), Romania (-0.74), Sweden (-0.77), Slovenia (-0.79), Austria (-0.81), Spain (-0.81), Ireland (-0.82), Latvia (-0.84), Bulgaria (-0.96)	France (0.39), Netherlands (0.46), United Kingdom (0.51), Italy (0.71), United States of America (0.90), Belgium (1.04), Switzerland (1.22), Czech Republic (1.32), Croatia (2.12)	Tunisia (5.18), India (5.21), Japan (9.42), Costa Rica (12.81), Argentina (28.41)	Peru (-0.10), Viet Nam (-0.21), Honduras (-0.28), Bolivia (-0.35), Turkey (-0.42), Uganda (-0.58), Nicaragua (-0.63), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.21), Colombia (0.63), Brazil (1.02), Guatemala (1.49), Bosnia and Herzegovina (1.82)	Ethiopia (5.34), Chile (25.86), Indonesia (39.26)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Turkey (7.25)	Portugal (-0.04), New Zealand (-0.10), Germany (-0.35), Canada (-0.46), Poland (-0.49), Hungary (-0.60), Australia (-0.66), Greece (-0.70), Finland (-0.72), Lithuania (-0.73), Romania (-0.74), Sweden (-0.77), Slovenia (-0.80), Austria (-0.81), Spain (-0.81), Ireland (-0.82), Latvia (-0.84), Bulgaria (-0.96)	France (0.39), Netherlands (0.45), United Kingdom (0.50), Italy (0.70), United States of America (0.89), Belgium (1.03), Switzerland (1.21), Czech Republic (1.31), Croatia (2.11), Tunisia (5.15), India (5.19)	Japan (9.38), Costa Rica (12.76), Argentina (28.29)	Peru (-0.11), Viet Nam (-0.21), Honduras (-0.28), Bolivia (-0.35), Uganda (-0.59), Nicaragua (-0.64), Thailand (-0.67), Sri Lanka (-0.82), Madagascar (-0.82), China (-0.88), Paraguay (-0.89), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.20), Colombia (0.63), Brazil (1.01), Guatemala (1.48), Bosnia and Herzegovina (1.81), Ethiopia (5.31)	Chile (25.76), Indonesia (39.09)
Uganda (5.07)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.34), Canada (-0.45), Poland (-0.47), Hungary (-0.59), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.43), Netherlands (0.50), United Kingdom (0.55), Italy (0.75), United States of America (0.95), Belgium (1.09), Switzerland (1.28), Czech Republic (1.38), Croatia (2.21)	Tunisia (5.34), India (5.38), Japan (9.69), Costa Rica (13.18), Argentina (29.17)	Peru (-0.08), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.24), Colombia (0.68), Brazil (1.08), Guatemala (1.56), Bosnia and Herzegovina (1.89)	Ethiopia (5.50), Chile (26.57), Indonesia (40.31)

Table 2.7: (Continued) Response of the Remaining Exporters to One More OEA Partner with Denmark in 2016

	OEA partners of Denmark			Non-OEA partners of Denmark		
Exporter under experiment	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country	countries that shrink value of export	countries whose growth rate of export are lower than this country	countries whose growth rate of export are higher than this country
Viet Nam (10.56)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	France (0.44), Netherlands (0.50), United Kingdom (0.56), Italy (0.76), United States of America (0.96), Belgium (1.10), Switzerland (1.29), Czech Republic (1.40), Croatia (2.22), Tunisia (5.37), India (5.41), Japan (9.75)	Costa Rica (13.25), Argentina (29.34)	Peru (-0.07), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), South Africa (-0.91), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.25), Colombia (0.69), Brazil (1.09), Guatemala (1.57), Bosnia and Herzegovina (1.91), Ethiopia (5.54)	Chile (26.72), Indonesia (40.53)
South Africa (0.27)	Portugal (-0.01), New Zealand (-0.07), Germany (-0.33), Canada (-0.45), Poland (-0.47), Hungary (-0.58), Australia (-0.65), Greece (-0.69), Finland (-0.71), Lithuania (-0.72), Romania (-0.73), Sweden (-0.76), Slovenia (-0.79), Austria (-0.80), Spain (-0.81), Ireland (-0.81), Latvia (-0.83), Bulgaria (-0.96)	None	France (0.44), Netherlands (0.50), United Kingdom (0.56), Italy (0.76), United States of America (0.95), Belgium (1.10), Switzerland (1.29), Czech Republic (1.39), Croatia (2.22), Tunisia (5.37), India (5.40), Japan (9.74), Costa Rica (13.24), Argentina (29.31)	Peru (-0.07), Viet Nam (-0.19), Honduras (-0.26), Bolivia (-0.33), Turkey (-0.40), Uganda (-0.57), Nicaragua (-0.62), Thailand (-0.66), Madagascar (-0.81), Sri Lanka (-0.82), China (-0.88), Paraguay (-0.88), Cambodia (-0.97), Pakistan (-0.97), Philippines (-0.98)	Mexico (0.25)	Colombia (0.68), Brazil (1.09), Guatemala (1.57), Bosnia and Herzegovina (1.91), Ethiopia (5.53), Chile (26.69), Indonesia (40.50)

Appendix D Organic Trade Agreements Fact Sheet

Table D1: Bilateral Organic Equivalency Agreement Fact Sheet

Signatory Countries	Effective Year
EU - Switzerland	1997
Canada - U.S.	2009
EU - Japan	2010
Canada - EU	2011
EU - U.S.	2012
Canada - Switzerland	2012
Canada – Costa Rica	2013
Japan - Switzerland	2013
U.S. – South Korea	2014
U.S. - Japan	2014
Canada - Japan	2015
EU – South Korea	2015
U.S. - Switzerland	2015
China – New Zealand	2016
EU - Chile	2018
Taiwan - Australia	Jan 23, 2020
Taiwan - Japan	Feb 1, 2020
Taiwan – New Zealand	Feb 26, 2020
Taiwan - Canada	May 30, 2020
Taiwan – U.S.	May 30, 2020

Table D2: Unilateral Organic Equivalency Agreement Fact Sheet

Import Market	OEA Partner	Effective Year
EU	Australia	1996
EU	Argentina	1997
EU	Israel	1997
Japan	Argentina	2001
EU	New Zealand	2002
EU	Costa Rica	2003
EU	India	2006
EU	Tunisia	2009
Taiwan	U.S.	2009
Taiwan	Canada	2009
Taiwan	EU	2009
Taiwan	Switzerland	2009
Taiwan	Chile	2010
Taiwan	New Zealand	2010
Taiwan	Australia	N/A
Japan	Australia	2016
Switzerland	Argentina	N/A
Switzerland	Australia	N/A
Switzerland	Costa Rica	N/A
Switzerland	India	N/A
Switzerland	Israel	N/A
Switzerland	New Zealand	N/A
Switzerland	Tunisia	N/A
Japan	Australia	N/A
Japan	New Zealand	N/A

Table D3: U.S. Recognition Agreement Fact Sheet

Import Market	OEA Partner	Effective Year
U.S.	New Zealand	2003
U.S.	India	2006
U.S.	Israel	2007

Notes: An additional new development is Taiwan's Organic Agriculture Promotion Act, which took effect on May 30 2019 and is expected to have wide implications for international trade. For other countries to be allowed to export organic products to Taiwan, the act requires that they must either have signed a bilateral agreement with Taiwan that recognizes Taiwan's organic produce for import into their own market, or else certify their products to Taiwanese standards. The 22 countries currently allowed to sell organic produce to Taiwan were given a one-year grace period to meet the new requirements.

Appendix E U.S. and Canada Imported and Exported Organic Product Categories

Table E1: U.S. Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

HTSNumber	Periods	Description
0409.00.0005	2012-2019	Natural Honey, Certified Organic
0703.20.0005	2013-2019	Certified Organic Garlic, Fresh Whole Bulbs
0709.60.4015	2011-2019	Peppers, Sweet Bell-Type (Capsicum Annum), Greenhouse, Certified Organic, Fresh Or Chilled
0709.60.4065	2011-2019	Peppers, Sweet Bell-Type (Capsicum Annum), Certified Organic, Fresh Or Chilled, Other Than Greenhouse
0709.93.2010	2018-2019	Squash, Certified Organic, Fresh Or Chilled
0713.10.4005	2016-2019	Yellow Peas, Except Seed, Dried, Shelled, Whether Or Not Skinned Or Split Certified Organic
0713.40.2015	2016-2019	Green Lentils, Including French Green (Dark Speckled), Except Seed, Dried, Shelled, Certified Organic
0802.12.0005	2013-2019	Certified Organic Almonds, Fresh Or Dried, Shelled
0803.90.0025	2013-2019	Certified Organic Bananas
0804.40.0020	2011-2019	Hass Avocados And Avocados Determined By The Secretary Of Agriculture To Be Hass-Like, Certified Organic, Fresh Or Dried
0804.50.4045	2013-2019	Certified Organic Mangoes, Fresh, If Entered During The Period From September 1, In Any Year, To The Following May 31, Inclusive
0804.50.6045	2013-2019	Certified Organic Mangoes Fresh, If Entered During The Period From June 1 To August 31, Of The Following Year, Inclusive
0805.50.2010	2018-2019	Lemons (Citrus Limon, Citrus Limonum), Certified Organic, Fresh Or Dried

Table E1: (Continued) U.S. Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

0808.10.0045	2011-2019	Apples, Certified Organic, Valued Over 22 Cents Per Kilogram, Fresh
0808.20.2015	2011	Pears And Quinces, Certified Organic, Entered During The Period From April 1 To June 30, Inclusive, In Any Year, Fresh
0808.20.4015	2011	Pears And Quinces, Certified Organic, Entered During The Period From July 1 Of Any Year To March 31 Of The Following Year, Fresh
0808.30.2015	2012-2019	Pears, Certified Organic, Entered During The Period From April 1 To June 30, Inclusive, In Any Year, Fresh
0808.30.4015	2012-2019	Pears, Certified Organic, Entered During The Period From July 1 Of Any Year To March 31 Of The Following Year, Fresh
0808.40.2015	2012-2019	Quinces, Certified Organic, Entered During The Period From April 1 To June 30, Inclusive, In Any Year, Fresh
0808.40.4015	2012-2019	Quinces, Certified Organic, Entered During The Period From July 1 Of Any Year To March 31 Of The Following Year, Fresh
0810.40.0026	2011-2019	Blueberries, Certified Organic, Cultivated (Including Highbush), Fresh
0811.90.2030	2018-2019	Blueberries, Certified Organic, Cultivated (Including Highbush), Frozen, Uncooked Or Cooked By Steaming Or Boiling In Water
0901.11.0015	2011-2019	Coffee, Certified Organic, Arabica, Not Decaffeinated, Not Roasted
0901.11.0045	2011-2019	Coffee, Certified Organic, Not Arabica, Not Decaffeinated, Not Roasted
0901.12.0015	2011-2019	Coffee, Certified Organic, Decaffeinated, Not Roasted

Table E1: (Continued) U.S. Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

0901.21.0035	2011-2019	Coffee, Certified Organic, In Retail Containers Weighing 2 Kg Or Less, Roasted, Not Decaffeinated
0901.21.0055	2011-2019	Coffee, Certified Organic, Roasted, Not In Retail Containers Weighing 2 Kg Or Less, Not Decaffeinated
0901.22.0035	2011-2019	Coffee, Certified Organic, In Retail Containers Weighing 2 Kg Or Less, Decaffeinated, Roasted
0902.10.1015	2011-2019	Green Tea (Not Fermented), Certified Organic, Flavored, In Immediate Packings Of A Content Not Exceeding 3 Kg
0902.10.9015	2011-2019	Green Tea (Not Fermented), Certified Organic, In Immediate Packings Of A Content Not Exceeding 3Kg, Not Flavored
0902.20.9015	2011-2019	Green Tea (Not Fermented), Certified Organic, Not Flavored, Not In Immediate Packings Of A Content Not Exceeding 3 Kg
0902.30.0015	2011-2019	Black Tea (Fermented) And Partly Fermented Tea, Certified Organic, In Tea Bags, In Immediate Packings Of A Content Not Exceeding 3 Kg
0910.11.0010	2013-2019	Certified Organic Ginger, Not Ground
1001.10.0025	2011	Durum Wheat, Certified Organic, Except Seed
1001.19.0025	2012-2019	Durum Wheat, Certified Organic, Except Seed
1003.90.4020	2016-2019	Barley, Certified Organic
1004.90.0010	2017-2019	Oats, Certified Organic, Except Seed
1005.90.2015	2013-2019	Certified Organic Yellow Dent Corn (Maize), Except Seed

Table E1: (Continued) U.S. Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

1006.30.9015	2011-2019	Rice, Certified Organic, Semi-Milled Or Wholly Milled, Whether Or Not Polished Or Glazed, Other Than Parboiled
1008.50.0010	2017-2019	Quinoa (Chenopodium Quinoa), Certified Organic
1101.00.0050	2019	Wheat Or Meslin Flour, Certified Organic, Nesoi
1201.00.0045	2011	Soybeans, Certified Organic, Whether Or Not Broken, Except Seeds Of A Kind Used For Sowing Or Used As Oil Stock
1201.90.0010	2012-2019	Soybeans, Certified Organic, Whether Or Not Broken, Except Seeds Of A Kind Used For Sowing Or Used As Oil Stock
1204.00.0025	2013-2019	Certified Organic Flaxseed (Linseed) For Use As Oil Stock, Whether Or Not Broken
1208.10.0010	2017-2019	Flours And Meals Of Soybeans, Certified Organic
1509.10.2015	2013	Certified Organic Olive Oil And Its Fractions, Virgin, Not Chemically Modified, Weighing With The Immediate Container Under 18Kg
1509.10.2030	2013-2019	Certified Organic Olive Oil And Its Fractions, Labeled As Extra Virgin, Not Chemically Modified, Weighing With The Immediate Container Under 18Kg
1509.10.2040	2013-2019	Certified Organic Olive Oil And Its Fractions, Virgin, Not Chemically Modified, Weighing With The Immediate Container Under 18Kg
1509.10.4015	2013	Certified Organic Olive Oil And Its Fractions, Virgin, Not Chemically Modified, Weighing With The Immediate Container 18 Kg Or Over

Table E1: (Continued) U.S. Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

1509.10.4030	2013-2019	Certified Organic Olive Oil And Its Fractions, Labeled As Extra Virgin, Not Chemically Modified, Weighing With The Immediate Container 18 Kg Or Over
1509.10.4040	2013-2019	Certified Organic Olive Oil And Its Fractions, Virgin, Not Chemically Modified, Weighing With The Immediate Container 18 Kg Or Over
1701.99.1015	2016-2019	Specialty Cane Or Beet Sugars And Chemically Pure Sucrose, Refined, Not Containing Added Flavoring Or Coloring Matter,Add Us Note 5,Certified Organic
2009.79.0015	2018-2019	Apple Juice, Certified Organic, Frozen, Concentrated, Unfermented
2204.10.0065	2013-2019	Certified Organic Sparkling Wine Of Fresh Grapes Valued Over $1.59/Liter
2204.21.5035	2013-2019	Cert Organic Red Wine Of Fresh Grapes Of Alcoholic Strength By Volume Not Over 14% Vol, In Contners Holdn 2 Litrs Or Less, Value Ovr $1.05/Litr Nesoi
2204.21.5050	2013-2019	Cert Organic White Wine, Except Icewine, Of Alcoholc Strength By Vol Nt Ovr 14% Vol, In Contners Holdng 2 Liters Or Less, Valued Over $1.05/Litr,Nesoi

Table E2: U.S. Export Organic 10-digit HS Codes, Descriptions, and Existing Periods

HTSNumber	Periods	Description
0401.20.1000	2016-2019	Milk And Cream, Not Concentrated Nor Sweetened, Of A Fat Content, By Weight, Exceeding 1% But Not Exceeding 6%, Certified Organic
0701.90.0070	2011-2019	Potatoes, Certified Organic, Fresh Or Chilled, Except Seed, Not In Immediate Containers Of Not Over 1200 Kg Net Weight
0702.00.0015	2011-2019	Cherry Tomatoes, Certified Organic, Fresh Or Chilled
0702.00.0025	2011-2019	Roma (Plum Type) Tomatoes, Certified Organic, Fresh Or Chilled
0702.00.0035	2011-2019	Tomatoes, Certified Organic, Fresh Or Chilled, Excluding Cherry Or Roma (Plum Type)
0703.10.0010	2011-2019	Onion Sets, Certified Organic, Fresh Or Chilled
0704.10.0010	2011-2019	Cauliflower And Headed Broccoli (Brassica Oleracea Var. Botrytis), Certified Organic, Fresh Or Chilled
0704.90.2010	2012-2019	Cabbage, Certified Organic, Fresh Or Chilled
0704.90.4025	2011-2019	Broccoli, Including Sprouting Broccoli (Brassica Oleracea Var. Italica), Certified Organic, Fresh Or Chilled, Excluding Headed Broccoli
0705.11.0010	2011-2019	Head Lettuce (Cabbage Lettuce), Certified Organic, Fresh Or Chilled
0705.19.0010	2011-2014	Lettuce (Lactuca Sativa), Certified Organic, Fresh Or Chilled, Excluding Head Lettuce
0705.19.0020	2015-2019	Packaged Fresh Salad Cut Mixes, Of A Weight Not Exceeding 1Kg (Lactuca Sativa), Certified Organic, Fresh Or Chilled, Excluding Head Lettuce

Table E2: (Continued) U.S. Export Organic 10-digit HS Codes, Descriptions, and Existing Periods

0705.19.0030	2015-2019	Packaged Fresh Salad Cut Mixes, Of A Weight Exceeding 1Kg (Lactuca Sativa), Certified Organic, Fresh Or Chilled, Excluding Head Lettuce
0705.19.0040	2015-2019	Lettuce (Lactuca Sativa), Certified Organic, Fresh Or Chilled, Excluding Head Lettuce, Nesoi
0706.10.3010	2011-2014	Carrots, Certified Organic, Fresh Or Chilled
0706.10.3020	2015-2019	Carrots, Certified Organic, Of A Length Not Exceeding 11Cm, Fresh Or Chilled
0706.10.3030	2015-2019	Carrots, Certified Organic, Fresh Or Chilled, Nesoi
0706.90.3100	2015-2019	Beets (Salad Beetroot), Certified Organic, Fresh Or Chilled
0707.00.0010	2012-2019	Cucmbers And Gherkins, Certified Organic, Fresh Or Chilled
0708.10.1000	2015-2019	Peas (Pisum Sativum), Certified Organic, Fresh Or Chilled
0709.20.2000	2015-2019	Asparagus, Certified Organic, Fresh Or Chilled
0709.40.0010	2011-2019	Celery, Certified Organic, Fresh Or Chilled, Excluding Celeriac
0709.60.0010	2011-2019	Fruits Of The Genus Capsicum (Peppers) Or Of The Genus Pimenta (E.G., Allspice), Certified Organic, Fresh Or Chilled
0709.70.0010	2011-2019	Spinach, New Zealand Spinach And Orache Spinach (Garden Spinach), Certified Organic, Fresh Or Chilled
0805.10.0045	2011-2019	Oranges, Certified Organic, Fresh Or Dried, Excluding Temple Oranges
0805.40.0010	2012-2019	Grapefruit Including Pomelos, Certified Organic, Fresh Or Dried

Table E2: (Continued) U.S. Export Organic 10-digit HS Codes, Descriptions, and Existing Periods

0805.50.2010	2011-2019	Lemons (Citrus Limon, Citrus Limonum), Certified Organic, Fresh Or Dried
0805.50.5010	2015-2019	Limes (Citrus Aurantifolia, Citrus Latifolia), Certified Organic, Fresh Or Dried
0806.10.0010	2011-2019	Grapes, Certified Organic, Fresh
0807.11.1000	2015-2019	Watermelons, Certified Organic, Fresh
0808.10.0010	2011-2019	Apples, Certified Organic, Fresh
0808.20.0010	2011	Pears And Quinces, Certified Organic, Fresh
0808.30.0010	2012-2019	Pears, Certified Organic, Fresh
0809.20.0010	2011	Cherries, Certified Organic, Fresh
0809.29.0010	2012-2019	Cherries, Other Than Sour Cherries, Certified Organic, Fresh
0809.30.1000	2015-2019	Peaches, Including Nectarines, Certified Organic, Fresh
0810.10.0010	2011-2019	Strawberries, Certified Organic, Fresh
0810.20.2000	2015-2019	Raspberries, Blackberries, Mulberries And Loganberries, Certified Organic, Fresh
0810.40.0026	2011-2019	Blueberries, Certified Organic, Cultivated (Including Highbush), Fresh
0901.21.0010	2011-2019	Coffee, Roasted, Not Decaffeinated, Certified Organic
2005.10.0010	2017-2019	Vegetables, Certified Organic, Homogenized (See Subheading Note 1), Not Frozen
2007.10.0010	2017-2019	Fruit Preparations, Certified Organic, Homogenized (See Subheading Note 2)

Table E2: (Continued) U.S. Export Organic 10-digit HS Codes, Descriptions, and Existing Periods

2103.20.4010	2011-2019	Tomato Sauces, Certified Organic, Excluding Tomato Ketchup
2209.00.0010	2018-2019	Vinegar And Substitutes For Vinegar, Obtained From Acetic Acid, Certified Organic

Table E3: Canada Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

HTSNumber	Periods	Description
0403.10.1010	2007-2019	Yogourt,Concentrated Or N,Sweetened Or N,Flav Or Cont Fruit/Cocoa,W/A,Cert Orgn
0403.10.2010	2007-2019	Yogourt,Concentrated Or Not,Sweet Or Not,Flav Or Cont Fruit/Cocoa,O/A, Cert Orgn
0407.21.1020	2012-2019	Eggs,Of Gallus Dom,Fr,Organic & Specialty,Free Run/Range,Etc,F Ret/Table,W/A Com
0701.90.0010	2007-2019	Potatoes, O/T Seed, Fresh Or Chilled, Certified Organic
0702.00.2910	2007-2019	Tomatoes, Cherry, O/T For Processing, Fresh Or Chilled, Certified Organic
0702.00.9911	2017	Tomatoes, Certified Organic, Greenhouse, Fresh Or Chilled
0702.00.9912	2017	Tomatoes, Certified Organic, Roma, O/T Greenhouse, Fresh Or Chilled
0702.00.9913	2017-2019	Tomatoes, Certified Organic, Roma, Greenhouse, Fresh Or Chilled
0702.00.9914	2017-2019	Tomatoes, Certified Organic, Greenhouse, O/T Roma, Fresh Or Chilled
0702.00.9915	2017-2019	Tomatoes, Certified Organic, Roma, O/T Greenhouse, Fresh Or Chilled
0702.00.9919	2017-2019	Tomatoes, Certified Organic, Fresh Or Chilled, Nes
0702.00.9921	2007-2016	Tomatoes, Roma, O/T Greenhouse, Fresh Or Chilled, Nes, Certified Organic
0702.00.9929	2007-2016	Tomatoes, O/T Greenhouse, Fresh Or Chilled, Nes, Certified Organic

Table E3: (Continued) Canada Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

0703.10.3910	2007-2019	Onions Or Shallots, Green, Fresh Or Chilled, Certified Organic
0703.10.9910	2007-2019	Onions, Fresh Or Chilled, Nes, Certified Organic
0704.10.9010	2007-2019	Cauliflowers And Headed Broccoli, Fresh Or Chilled, Nes, Certified Organic
0704.20.9010	2007-2019	Brussels Sprouts, Fresh Or Chilled, Nes, Certified Organic
0704.90.2910	2007-2019	Broccoli, Nes, Fresh Or Chilled, Certified Organic
0704.90.3910	2007-2019	Cabbage, Nes, O/T Chinese, Fresh Or Chilled, Certified Organic
0704.90.4910	2007-2019	Chinese Cabbage Or Chinese Lettuce, Fresh Or Chilled, Nes, Certified Organic
0705.11.9020	2007-2016	Cabbage Lettuce, Head Lettuce, Certified Organic, Fresh/Chilled ,Nes
0705.11.9020	2017-2019	Cabbage Lettuce,Head Lettuce,O/T Greenhouse,Fresh/Chilled,Nes,Certified Organic
0705.19.9020	2007-2008	Lettuce, Fresh Or Chilled, Nes, Certified Organic
0705.19.9021	2008-2019	Lettuce,Fr/Chd,Nes,Certified Organic, Pack Fresh Salad Cut Mixes,Of A Wt <= 1Kg
0705.19.9022	2008-2019	Lettuce, Fr/Chd,Nes,Certified Organic, Pack Fresh Salad Cut Mixes, Of A Wt >1Kg
0705.19.9029	2008-2019	Lettuce, Fresh Or Chilled, Nes, Certified Organic
0706.10.2011	2008-2019	Baby Carrots,Nes,Fresh/Chilled,Certified Organic,In Pack Of A Weight <=1 Kg Each

Table E3: (Continued) Canada Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

0706.10.2012	2008-2019	Baby Carrots,Nes,Fresh/Chilled,Certified Organic,In Bulk/Pack Of A Wt >1 Kg Each
0706.10.4010	2007-2019	Carrots, Fresh Or Chilled, Nes, Certified Organic
0706.90.3010	2007-2019	Beets, Fresh Or Chilled, Nes, Certified Organic
0706.90.5910	2007-2019	Radishes, Fresh Or Chilled, Nes, Certified Organic
0707.00.9911	2017-2019	Cucumbers And Gherkins, Certified Organic, Greenhouse, Fresh Or Chilled, Nes
0707.00.9919	2017-2019	Cucumbers And Gherkins, Certified Organic,O/T Greenhouse, Fresh Or Chilled, Nes
0707.00.9920	2007-2016	Cucumbers And Gherkins, O/T Greenhouse, Fresh Or Chilled, Nes, Certified Organic
0708.10.9910	2008-2019	Peas, Fresh Or Chilled, Certified Organic
0709.20.9910	2007-2019	Asparagus, Fresh Or Chilled, Nes, Certified Organic
0709.30.0010	2007-2019	Eggplants, Aubergines, Fresh Or Chilled, Certified Organic
0709.40.9010	2007-2019	Celery, Other Than Celeriac, Fresh Or Chilled, Nes, Certified Organic
0709.60.9011	2017-2019	Peppers Of Genus Capsicum/Pimenta,Certified Organic,Greenhouse,Fresh/Chilled,Nes
0709.60.9019	2017-2019	Peppers Of Genus Capsicum/Pimenta,Certified Organic,O/T Greenhouse,Fresh/Chd,Nes
0709.60.9020	2007-2016	Peppers Genus Capsicum/Pimenta,O/T Greenhouse,Fr/Chilled,Nes,Certified Organic

Table E3: (Continued) Canada Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

0709.70.0011	2008-2019	Spinach,Nz & Orache Spinach Garden,Fresh/Chd,Certified Organic,In Pack <=500G
0709.70.0012	2008-2016	Spinach,Nz & Orache Spinach Garden,Fresh/Chilled,Certified Organic,In Pack >500G
0709.70.0019	2008-2016	Spinach, New Zealand & Orache Spinach Garden,Fresh/Chilled,Certified Organic,Nes
0709.90.4010	2007-2011	Sweet Corn-On-The-Cob, Fresh Or Chilled, Nes, Certified Organic
0709.99.4010	2012-2019	Other Sweet Corn-On-The-Cob, Fresh Or Chilled, Nes, Certified Organic
0803.00.0011	2007-2011	Bananas, Including Plantains, Fresh, Certified Organic
0803.90.0010	2017-2019	Bananas, Other Than Plantains, Certified Organic, Fresh Or Dried
0803.90.0011	2012-2016	Bananas, Other Than Plantains, Fresh, Certified Organic
0804.30.0011	2007-2019	Pineapples, Fresh, Certified Organic
0805.10.0010	2017-2019	Oranges, Certified Organic, Fresh Or Dried
0805.10.0012	2007-2016	Oranges, Except Temple, Fresh, Certified Organic
0805.40.0010	2007-2019	Grapefruit, Including Pomelos, Fresh Or Dried, Certified Organic
0805.50.0011	2007-2019	Lemons, Fresh, Certified Organic
0805.50.0012	2007-2019	Limes, Fresh, Certified Organic
0806.10.9110	2009-2019	Grapes,O/T Species Vitis Labrusca,Fresh,In Their Natural State,Certified Organic
0807.11.0010	2007-2019	Watermelons, Fresh, Certified Organic
0807.20.0010	2007-2019	Papaws (Papayas), Fresh, Certified Organic

Table E3: (Continued) Canada Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

0808.10.1081	2007-2019	Apples,Golden Delicious,Fr,In Their Natural State, O/T For Processing, Cert Orgn
0808.10.1082	2007-2019	Apples, Red Delicious,Fresh, In Their Natural State,O/T For Processing,Cert Orgn
0808.10.1083	2007-2019	Apples,Granny Smith,Fresh,In Natural State,O/T For Processing,Certified Organic
0808.10.1084	2007-2019	Apples, Gala,Fresh, In Their Natural State,O/T For Processing,Certified Organic
0808.10.1089	2007-2019	Apples,Fresh,In Their Natural State,O/T For Processing,Certified Organic, Nes
0808.20.2910	2007-2011	Pears, Fresh, Nes, Certified Organic
0808.30.9910	2012-2019	Pears, Fresh, Nes, Certified Organic
0809.20.3910	2008-2011	Cherries, Fresh, Nes, In Their Natural State, Certified Organic
0809.29.2910	2012-2019	Cherries, Fresh, In Their Natural State, Certified Organic, Nes
0809.30.2910	2007-2019	Peaches, O/T Nectarines, Fresh, Nes, In Their Natural State, Certified Organic
0810.10.9910	2008-2019	Strawberries, Fresh, O/T For Processing, Nes, Certified Organic
0810.20.0011	2019	Raspberries & Loganberries, Fresh, Certified Organic
0810.20.1910	2008-2018	Raspberries & Loganberries, Fresh,Nes,In Their Natural State, Certified Organic
0810.40.0011	2019	Cranberries, Fresh, Certified Organic
0810.40.0022	2019	Blueberries, Cultivated, Fresh, Certified Organic

Table E3: (Continued) Canada Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

0810.40.1011	2008-2018	Cranberries, Fresh, In Their Natural State, Certified Organic
0810.40.1022	2007-2018	Blueberries, Cultivated, Fresh, In Their Natural State, Certified Organic
0901.11.0010	2009-2019	Coffee, Not Roasted, Not Decaffeinated, Certified Organic
0901.21.0010	2009-2019	Coffee, Roasted, Not Decaffeinated, Certified Organic
0902.10.1010	2008-2019	Green Tea, Not Fermented, In Bags For Individual Servings, Certified Organic
0902.10.9010	2008-2019	Green Tea, Not Fermented, Nes, In Packages <= 3 Kg, Certified Organic
0902.20.0010	2008-2019	Green Tea, Not Fermented, In Packages Exceeding 3 Kg,Certified Organic
0902.30.1011	2008-2019	Black Tea, Ferm & Partly Ferm, Not Decaf, Bags For Indiv Servings,Cert Organic
0902.30.9011	2008-2019	Black Tea, Ferm & Partly Ferm, Not Decaf, Nes, In Pack <= 3 Kg, Cert Organic
1211.90.1010	2008-2019	Herbal Tea,Of Plants & Pts Of Plants,In Bags,Nes,For Indiv Servings,Cert Organic
1509.10.0011	2008-2019	Olive Oil, Virgin, In Container Sizes Of Less Than 18 Kg, Certified Organic
1901.10.2010	2008-2019	Food Prep Cont >10% Dry Wt Basis Mlk Sld,Infant/Young Child Use,Frs,Cert Organic
2103.20.9091	2008-2019	Tomato Sauces, Nes, Certified Organic

Table E3: (Continued) Canada Import Organic 10-digit HS Codes, Descriptions, and Existing Periods

2202.90.4910	2007-2016	Milk Beverages, Nes, Certified Organic
2202.99.3910	2017-2019	Milk Beverages, Nes, Certified Organic

Table E4: Canada Export Organic 8-digit HS Codes, Descriptions, and Existing Periods

HTSNumber	Periods	Description
0702.00.11	2017-2019	Tomatoes, Certified Organic, Greenhouse, Fresh Or Chilled
0702.00.19	2017-2019	Tomatoes, Certified Organic, O/T Greenhouse, Fresh Or Chilled
0713.10.21	2017-2019	Peas,Certified Organic,Yellow,Dried,Shelled,W/N Skinned/Split,O/T Seeds F Sowing
0713.10.29	2017-2019	Peas,Certified Organic,O/T Yellow,Dried,Shelled,W/N Skinned/Split,O/T For Sowing
0713.40.21	2017-2019	Lentils,Certified Organic,Green,Incl French,Dried,Shelled,W/N Skinned/Split,Nes
0713.40.22	2017-2019	Lentils, Certified Organic, Red, Dried, Shelled, W/N Skinned/Split, Nes
0713.40.29	2017-2019	Lentils,Certified Organic,Nes,Dried,Shelled,W/N Skinned/Split,O/T Seeds F Sowing
0901.21.10	2017-2019	Coffee, Certified Organic, Roasted, Not Decaffeinated
1001.19.10	2017-2019	Durum Wheat, Certified Organic, O/T Seed For Sowing
1001.99.21	2017-2019	Red Spring Wheat, Certified Organic, O/T Seed For Sowing
1001.99.29	2017-2019	Wheat & Meslin, Certified Organic,O/T Red Spring/Durum Wheat,O/T Seed For Sowing
1003.90.10	2017-2019	Barley, Certified Organic, O/T Seed For Sowing
1004.90.10	2017-2019	Oat, Certified Organic, O/T Seed For Sowing
1005.90.10	2017-2019	Corn (Maize), Certified Organic, O/T Seed For Sowing
1201.90.20	2017-2019	Soya Beans, Certified Organic, W/N Broken, O/T Seed For Sowing
1204.00.30	2017-2019	Linseed, Certified Organic, W/N Broken, O/T For Sowing
1702.20.21	2017-2019	Maple Syrup, Certified Organic, Not Containing Added Flavouring/Colouring Matter

Appendix F Regional Trade Agreements Fact Sheet

Table F1: RTAs between Canada and its trading partners (2005-2019)

Canada RTAs	Country	ISO country code	Effective date
2005	Mexico	MEX	Jan-01-1994
	United States	USA	Jan-01-1994
	Israel	ISR	Jan-01-1997
	Chile	CHL	Jul-05-1997
	Costa Rica	CRI	Nov-01-2002
2009	Switzerland	CHE	Jul-01-2009
	Iceland	ISL	Jul-01-2009
	Liechtenstein	LIE	Jul-01-2009
	Norway	NOR	Jul-01-2009
	Peru	PER	Aug-01-2009
2011	Colombia	COL	Aug-15-2011
2012	Jordan	JOR	Oct-01-2012
2013	Panama	PAN	Apr-01-2013
2014	Honduras	HND	Oct-01-2014
2015	Republic of Korea	KOR	Jan-01-2015
2017	Ukraine	UKR	Aug-01-2017
	EU	EU	Sep-21-2017

Table F1: (Continued) RTAs between Canada and its trading partners (2005-2019)

2019 Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)	Australia	AUS	Dec-30-2018
	Brunei Darussalam	BRN	Dec-30-2018
	Japan	JPN	Dec-30-2018
	Malaysia	MYS	Dec-30-2018
	New Zealand	NZL	Dec-30-2018
	Singapore	SGP	Dec-30-2018
	Viet Nam	VNM	Dec-30-2018

Table F2: RTAs between the U.S. and its trading partners (2005-2019)

U.S. RTAs	Country	ISO country code	Effective date
2005	Israel	ISR	Aug-19-1985
	Canada	CAN	Jan-01-1994
	Mexico	MEX	Jan-01-1994
	Jordan	JOR	Dec-17-2001
	Chile	CHL	Jan-01-2004
	Singapore	SGP	Jan-01-2004
2006	Morocco	MAR	Jan-01-2006
	Costa Rica	CRI	Mar-01-2006
	Dominican Republic	DOM	Mar-01-2006
	Guatemala	GTM	Mar-01-2006
	Honduras	HND	Mar-01-2006
	Nicaragua	NIC	Mar-01-2006
	EI Salvador	SLV	Mar-01-2006
	Bahrain	BHR	Aug-01-2006
2009	Oman	OMN	Jan-01-2009
	Peru	PER	Feb-01-2009
2012	Republic of Korea	KOR	Mar-15-2012
	Colombia	COL	May-15-2012
	Panama	PAN	Oct-31-2012