ESSAYS IN INTERNATIONAL TRADE AND FINANCE

ESSAYS IN INTERNATIONAL TRADE AND FINANCE

By STEPHANIE M. HOULE , B.A., M.A.

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AUTHOR: Stephanie M. Houle

ADVISORS: Michael Veall and Pau Pujolas

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Abstract

There has been a huge increase in the volume of trade in the last fifty years, fueled in part by the proliferation of international agreements. This thesis studies two important implications of these agreements as well as a third implication of a comparison of specific patterns of rising trade across countries. After an overview of the thesis in Chapter 1, Chapter 2 examines detailed firm-level microdata on firms who invested and traded with Peru, before and after the Canada-Peru Foreign Investment Protection Agreement enacted in 2007. It finds little evidence that the agreement contributed to outsourcing in Canada. It also finds that in this case, the firm's Foreign Direct Investment was more likely to have expanded their production structures horizontally rather than vertically, although the evidence is incomplete. Chapter 3 uses a theoretical model to show potential shortcomings of reducing tariffs through international agreements when governments may face a sovereign debt crisis, especially when their institutions have limited ability to collect other forms of taxes. Chapter 4 examines trade data on imports of luxury goods, finding no robust evidence of different rates of changes across countries that have been estimated by others to have had large or small increases in top end incomes.

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This thesis is dedicated to my late mother Ginette Houle who taught me about courage and tenacity and who supported my fascination with science and mathematics at a young age.

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Declaration of Academic Achievement

The content of the research in this thesis is composed of work by Stephanie Houle, Pau S. Pujolas and Michael R. Veall. Chapters 2 and 3 are solely the work of Stephanie Houle while Chapter 4 was joint work with Pau S. Pujolas and Michael R. Veall. To Chapter 4, I contributed all the data work, tables and graphs, and the writing for Section 4.5.

Chapter 1

Introduction

The international trade and finance literature has long been concerned with how international agreements structure our global framework for doing business. Since there is no globally recognized and sanctioned judicial court of law, these international agreements have played a huge part in shaping how countries interact with each other. They help determine guidelines for foreign investment, international borrowing and international trade among many things.

Some agreements are more multilateral in nature and are overseen by one single organization, such as the WTO which includes more than 164 members countries. However, such multilateral structures have run into complications in recent years with countries such as the United States threatening to exit it. Although the WTO concluded eight successful rounds of negotiations to multilaterally lower tariffs on a variety of goods since 1947, back when it was known at the GATT, its most recent round of negotiations, the Doha round, has proved problematic and has been under negotiation since 2001. For this reason, some countries have chosen to secure tariff guarantees bilaterally by signing regional trade agreements amongst themselves. There are currently 287 regional trade agreements in force around the world, between country pairs or between group of countries pairs, (WTO Statistics, 2018a) and 32 bi- and multi-lateral preferential trade agreements (WTO Statistics, 2018b).

There also exist many other international agreements, not just those related to trade.

Other agreements such as tax agreements or investment agreements also exist in isolation or in combinations with trade agreements. Most tax agreements between countries are based on the Model Tax Convention outlined by the OECD (2017). International investment agreements will allow for the flow of investment between countries and stipulate mechanisms for dispute resolutions through international courts such as the International Centre for Settlement of Investment Disputes (ICSID) of the World Bank.

This thesis explores three vastly different aspects related to these international agreements. First, it studies Canadian firms' investment behaviour following the signing of such an agreement. By applying empirical methods to comprehensive firm level data, the second chapter examines a particular investment agreement signed between Canada and Peru and the resulting investment behaviour of firms. Then, in the third chapter, the question shifts to examining the impact of constraining tariffs as a result of these agreements in a time of sovereign debt crisis. Finally, the fourth chapter utilises the fact that a large portion of a country's domestic consumption is now done through international trade. The existence of large amounts of trade between countries and the data that tracks it, are used to examine consumption patterns using imports of luxury goods as a proxy for changes in consumption inequality.

The methodologies for the second and fourth chapters are similar in nature. They use an empirical specification to test for observable changes in the data. The novelty of the second chapter lies in the data it uses. Three administrative firm-level microdata sets are merged in order to get a very clear picture of firm behaviour. Although the third chapter contains some empirical analysis, the main exercise employs a fundamentally different approach. It utilises a structural model which is then simulated via dynamic optimization in order to examine a theoretical situation that cannot readily be observed in the data. The following details the contributions of each chapter.

Chapter 2 captures how firms change their production structures abroad around investment agreements by using confidential Statistics Canada firm-level tax filing microdata

merged with raw firm-level import microdata. These data are available only from 2002 to 2012. Due to the small number of agreements Canada signed during this time period, the chapter focuses on the Canada-Peru Foreign Investment Protection Agreement (FIPA) enactment in 2007. In the aggregate data there is a three-fold increase in Foreign Direct Investment (FDI) by Canadian firms to Peru and a change in the composition of Canadian firm imports from Peru from raw unprocessed ore to manufactured metals, seemingly indicating that Canadian firms increased offshoring by moving the manufacturing of this raw material to take place in Peru instead of Canada, or by expanding production to include new manufacturing plants in Peru. However, the microdata show that neither of these outcomes have occured. Firms conducting FDI into Peru did so in the mining industry as opposed to manufacturing. These same firms also did not have large increases in imports of the manufacturing good from Peru. Moreover, firms that increased their Peru investment did not reduce their Canadian employment. Hence, these findings in the microdata show that the large increase in investment to Peru was not associated with offshoring developments of manufacturing in Peru.

Chapter 3 examines the use import tariffs as an instrument for countries to avoid a sovereign default. When a country is facing sovereign default risk, increasing tariff rates leads to a tradeoff between raising sufficient revenues to be able to borrow for the next period while trying to mitigate the cost on output resulting from taxing imports at a higher rate. This tradeoff is examined by using the model of sovereign default developed by Eaton & Gersovitz (1981) and adding an imported intermediate good to which a tariff can be applied. The result is that for countries who rely heavily on import tariffs, such as countries with weaker institutions and less capacity to reliably collect income or capital tax, there is a cost to having tariffs bounded by trade agreements. A sovereign that can set its tariff will be able to sustain higher levels of debt at a lower price yielding higher levels of output in times when the sovereign would have defaulted if it could not set its tariff rate.

In Chapter 4 results from Atkinson, Piketty, & Saez (2011) are tested. They find a

post-1980 surge in taxfiler top income shares in English speaking countries (surge countries) but not in continental European countries and Japan (no-surge countries). It is found puzzling that Comtrade import-to-GDP ratios and import-to-total-import ratios for apparent luxuries pearls, precious stones, diamonds, works of art, jewellery, furs and coins do not increase post-1980 in surge countries relative to no-surge countries. Explanations could include issues with the taxfiler or import data or that top income individuals do not have a particularly high marginal to propensity to consume these luxury goods, at least within their own country. Overall, this is a fragment of evidence that there may not have been a large post-1980 increase in top-end domestic consumption inequality in surge countries compared to no-surge countries.

Chapter 2

Do Investment Agreements Necessarily Cause Offshoring? The Canada-Peru Case

2.1 Introduction

There is no worldwide enforceable framework for resolving legal disputes across countries. This leaves countries with the need to form bilateral and multilateral legal international agreements to deal with institutional differences. These agreements cover matters such as taxation, ownership, labour rules and environmental regulations. The potential blurriness between the different legal frameworks is intensified for developed and developing countries, particularly for countries who have incomplete legal institutions. An investment agreement can help establish a reliable contracting environment and may foster foreign investment.

Foreign Direct Investment (FDI) can provide potential costs savings to firms. First, vertical integration with foreign input suppliers can lower the marginal cost of inputs, as

in Antras & Helpman (2004). Second, horizontal integration with a foreign distributer can lower the marginal cost of selling to a new market, as in Helpman, Melitz, & Yeaple (2004).

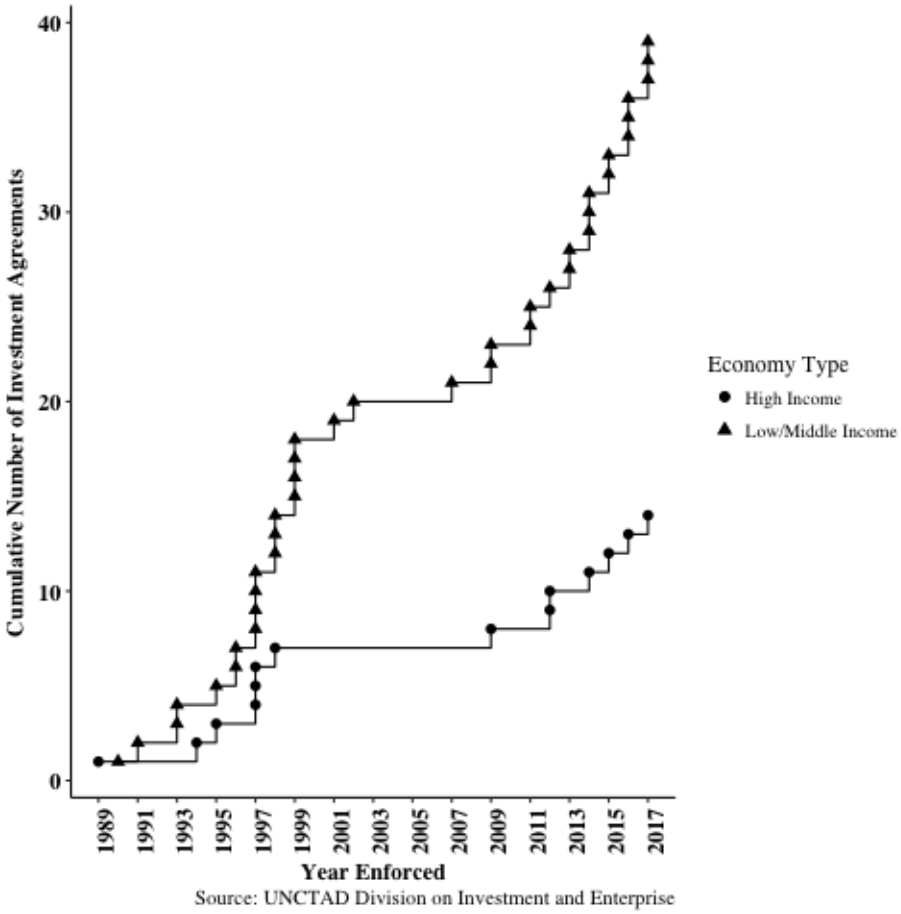
Figure 2.1 shows the cumulative count of all International Investment Agreements (IIA) Canada has signed over the years.[1] These IIAs are separated by whether they were signed with a high income country, or a low to middle income country, at the time of enforcement. The cut-offs for income levels are determined using the World Bank income classification method.[2] Forty-one of Canada's IIAs were signed with low to middle income countries[3]. A salient characteristic of direct investment between a developed and an emerging country, as reported in Antràs & Yeaple (2014), is that investment tends to flow in larger proportions from the developed country to the emerging country.

[1]The types of agreements considered are Free Trade Agreements (FTA), Foreign Investment Protection Agreements (FIPA) and Trade and Economic Cooperation Agreements (TECA). Both FTAs and TECAs normally include clauses regarding investment provisions, or build on pre-existing FIPAs to incorporate investment provisions.

[2]The World Bank classifies countries according to GNI per capita, calculated using the World Bank Atlas method.

[3]Low-income economies are those with a GNI per capita of $1,045 or less; middle-income economies are those with a GNI per capita of more than $1,045 but less than $12,736; high-income economies are those with a GNI per capita of $12,736 or more.

Figure 2.1: Canadian International Investment Agreements

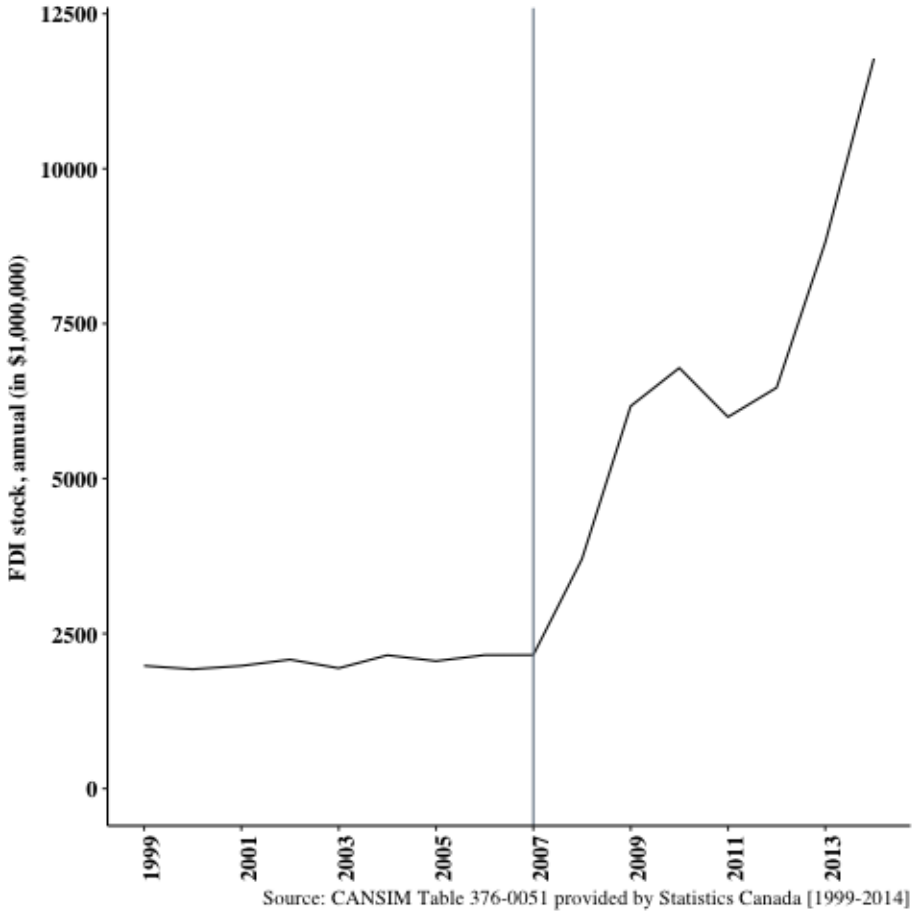


This paper focuses on the Canada-Peru FIPA for the following reason[4]. When this research was conducted in 2017, the availability of dependable firm-level Canadian import registry data begin in 2002 and ended in 2012. Most of Canada's agreements with low or middle income countries were signed in the 1990s, with only three agreements signed after 2002 and before 2011, the Canada-Peru FIPA enforced in 2007, the Canada-Jordan FIPA enforced in 2009 and the Canada-Peru FTA enforce in 2009. The Canada-Jordan agreement is omitted from this paper since even the values of aggregate FDI following the Canada-Jordan FIPA are suppressed to meet the confidentiality requirements of Canada's

[4]Signed on November 14, 2006 and put into force on June 20, 2007. Following the signing of the Canada-Peru FIPA, a Free Trade Agreement between the two countries was proposed on June 7, 2007, signed on May 29, 2008 and brought into force on August 1, 2009.

Statistics Act, meaning that it would not be possible to report any firm-level results. In contrast, Figure 2.2 shows aggregate FDI from Canada to Peru. The year of enforcement of the FIPA in Figure 2.2 is denoted by the gray vertical line in 2007. There was a three-fold increase in investment from Canada to Peru. Peru grew from representing, on average, 0.5% of of Canada's investments abroad (2000-2007) to, on average, 1% of Canada's foreign investment (2008-2014).

Figure 2.2: Canada's outward FDI position with Peru



A tax treaty between Canada and Peru that was signed on July 20, 2001 preceding the FIPA. This tax treaty went into effect February 17, 2003. The pre-existence of a tax treaty may have contributed to the signing of the FIPA and the resulting increase in investment.

In this case, the tax treaty might serve as a necessary, but not sufficient condition for an increase in FDI.

The rest of the paper is as follows. Section 2.2 goes through the prior literature and outlines where this paper falls within. Section 2.3 describes the confidential firm-level data. Section 2.4 outlines the empirical results. Section 2.5 concludes.

2.2 Literature

There are many theoretical models explaining either vertical FDI or horizontal FDI. This paper focuses on the offshoring model of Antras & Helpman (2004). Their heterogenous firm model follows from the model of firm ownership by Helpman (1984) and Antràs (2003). Other monopolistic competition models have examined the trade-off between FDI and outsourcing at home, Grossman & Helpman (2002), and outsourcing abroad, Grossman & Helpman (2003).

The model of Antras & Helpman (2004) has heterogenous firms of varying productivity with a North and South country where final goods producers are located in the North. The main driver for offshoring is that wages in the North are higher than wages in the South, making the marginal cost of producing in the South lower. The fixed cost of producing in the South is higher than in the North for these final good producers. As a result, only the most productive Northern firms will offshore production of their intermediate inputs in the South. The degree of offshoring depends on the wage gap between the North and the South, the trading costs, the degree of productivity dispersion and the intensity of headquarter services within a particular sector. Here, we theorize the international investment agreement represents a fall in the fixed cost of investing and examine the associated increase in offshoring done by firms. The signing of an IIA represents a fall in the fixed cost of investment since these agreements typically lower barriers for firms' foreign investment to enter the country.

Another class of models studies horizontal FDI. In Helpman et al. (2004), heterogenous firms of varying productivity can sell their goods domestically, export them to sell to another country or sell them in foreign markets using subsidiaries abroad. This model, in standard form, would predict that a fall in fixed costs of investing in Peru would lead to an increase in exports from Canada to Peru. As will be shown in Figure 2.3, the increase in total trade between the two countries was driven by an increase in imports from Peru to Canada, while exports remained low and constant.

Related empirical work includes Nunn (2007) who shows empirically that having a reliable contracting environment can serve as a comparative advantage for countries in attracting relationship-specific investment. Also, work on the determinants of vertical FDI includes Antràs (2003) and S. R. Yeaple (2006) using industry-level analysis. Nunn & Trefler (2008) use U.S. firm-level cross-sectional data to study the determinants of FDI and find supporting evidence for the theory of Antras & Helpman (2004). Bernard, Jensen, Redding, & Schott (2010) also use cross-sectional firm-level data to determine the product and country characteristics that are associated with more intrafirm trade. They both use countries of all income levels in their analysis. Finally, on the Canadian side, Baldwin & Gu (2003) look at export-market participation and productivity performance in Canadian manufacturing plants.

This paper contributes to this literature in the following way. Using Canadian firm-level microdata, it finds that the Canada-Peru FIPA was followed by an increase in Canadian firms' foreign investment, mainly in the mining industry, but did not lead to offshoring in maufacturing, even though the composition of imports between the two countries changed from being primarily raw natural resources to manufactured mining intermediates. This paper contributes a detailed examination of an Investment Agreement between a developed and an emerging economy, in particular, an emerging economy whose main exports world-wide are in natural resources. This is important to Canada since a growing share of its FDI to all countries is in the mining industry (NAICS industry code 21); from 12% in 2000

to 20% in 2012. Identifying the salient outcomes of this agreement can help guide future policy with similar resource-focused emerging economies.

2.3 Data

While aggregate Global Affairs Canada data, Statistics Canada data, World Bank (2002–2014) data and United Nations Division (2002–2014) data are used to produce some of the aggregate results, the microdata sets used for this study are a combination of three different firm-level data sets, spanning from 2002 to 2012.

The first microdata set used is the National Accounts Longitudinal Microdata File, containing firm information on Sales, Individual Labour Units (ILU), Revenue, Expenses and North American Industry Classification System (NAICS) code.

The second microdata set is the Canadian Direct Investment Abroad (CDIA) with information on firm investment to and from other countries (FDI flow) and the corresponding NAICS industry code for that investment. Both previously mentioned data sets were collected from firms' Canadian tax filing data.

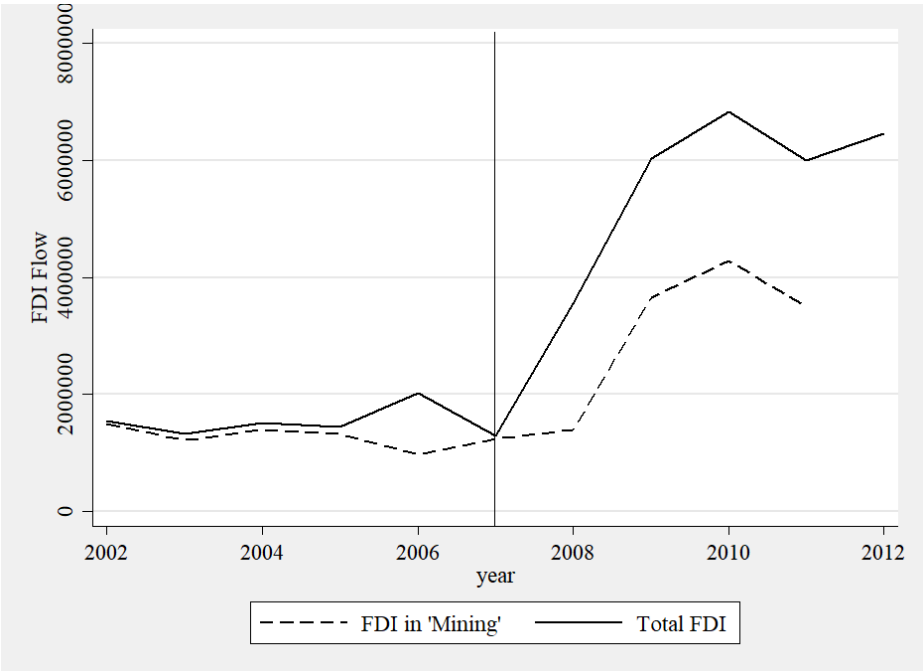
The final microdata set used is Raw Import Data for Research Purposes provided by the Canada Border Services Agency. It specifies firm imports classified according to the Harmonized System at the six-digit level. All firms can be matched across data sets using an enterprise ID code identifier. The data are confidential and can only be accessed at the Centre for Data Development and Economic Research in Ottawa, Canada. To preserve anonymity of individual firms, Statistics Canada will only permit the disclosures of results that contain a sufficient number of firms. This has restricted the results that may be reported in this study.

2.4 Empirical Findings

The empirical findings are presented in the following manner. The first and second sections break down the main results related to FDI and International Trade data independently. The third section discusses firm-level offshoring results. It is found that the firms that increased FDI did not use it to offshore production. As a check, the fourth part of these empirical results presents a regression analysis demonstrating that Canadian firms that increased investment in Peru did not significantly change their employment in Canada. Finally, an aggregate look at Peru's exports to other top destinations will explore the possibility that Canadian firms might have invested in Peru in order to then use it as an export platform to access closer markets.

2.4.1 Foreign Direct Investment

Figure 2.3: Composition of FDI



Source: Author's calculation on CDIA data set (Statistics Canada), 2002-2012

As Figure 2.2 previously showed, there is a 3 fold increase in FDI stock from Canada to Peru within 3 years of the introduction of their FIPA in 2007. Figure 2.3 uses the microdata to show the aggregate flow of FDI, and also breaks down the amount of this FDI that went specifically into NAICS industry code 21. NAICS code 21 denotes all mining, quarrying, and oil and gas extraction related enterprises. It is the largest category receiving Canadian investment in Peru, both in sheer amount and in the number of firms investing under that industry code. Any other NAICS code that received FDI cannot be reported for confidentiality reasons, as the reporting number of firms is too small.[5]

When using the microdata to examine the extensive margin of Canadian firms investing in Peru the following breakdown is observed. There were, in total, 53 distinct firms in the CDIA data set between 2002 and 2012. Of them, 22 firms have recorded investments in Peru both before, and after the enforcement of the FIPA in 2007. On the extensive margin, 18 new firms began investing post-FIPA.

Labour productivity is measured using a simple measure of sales over individual labour units. Specific kernel density graphical representations of productivity cannot be shown to maintain data confidentiality for firms. On average, firms that invested in Peru were 27.7% less productive relative to all other Canadian firms investing abroad in any other country.

2.4.2 International Trade

Figure 2.4 shows the total trade as a percentage of Canada's nominal GDP, to control for exchange rate fluctuations, between Canada and Peru, from 2002 to 2012. It shows a large increase in total trade after 2004 that was driven mainly by imports from Peru to Canada. Aggregate Canadian exports to Peru are small and show no sharp change in trend.

[5] In fact, the observation for FDI flow into the mining industry for 2014 had to be suppressed to maintain confidentiality

Figure 2.4: Canada's Trade with Peru

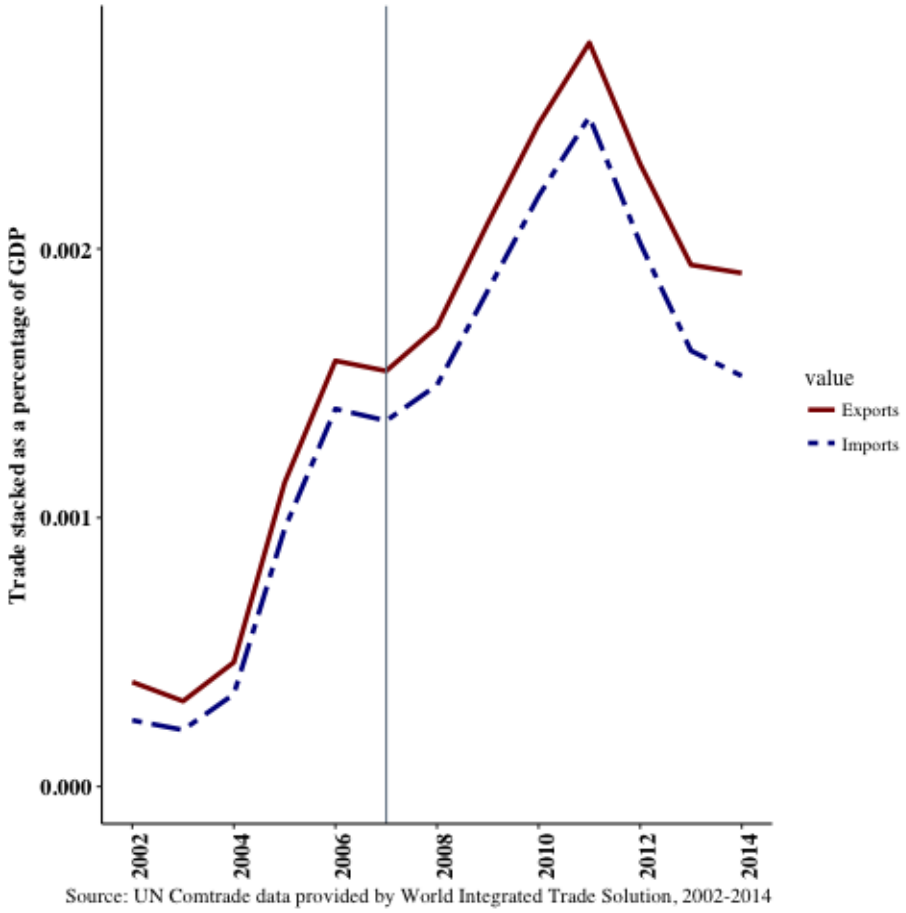


Figure 2.5 shows the change in the composition of overall Canadian imports from Peru, following the Harmonized System categorization. Within the top two import categories, HS code 26, ores, slag and ash, represented the largest share of imports prior to 2004 whereas, HS code 71, pearls, precious stones, metals, coins, etc., jumped to over 60% share of imports post 2004. HS category 26 commonly represents a rawer form of the mining material than HS category 71. This would be an indication of a shift towards more processing of ore to metal within Peru's borders. Mineral ores are heavier to ship and less valuable than the processed metals they produce. This processing stage for mineral ores can be chemically intensive and requires the development of manufacturing processing plants.

Figure 2.5: Main import categories

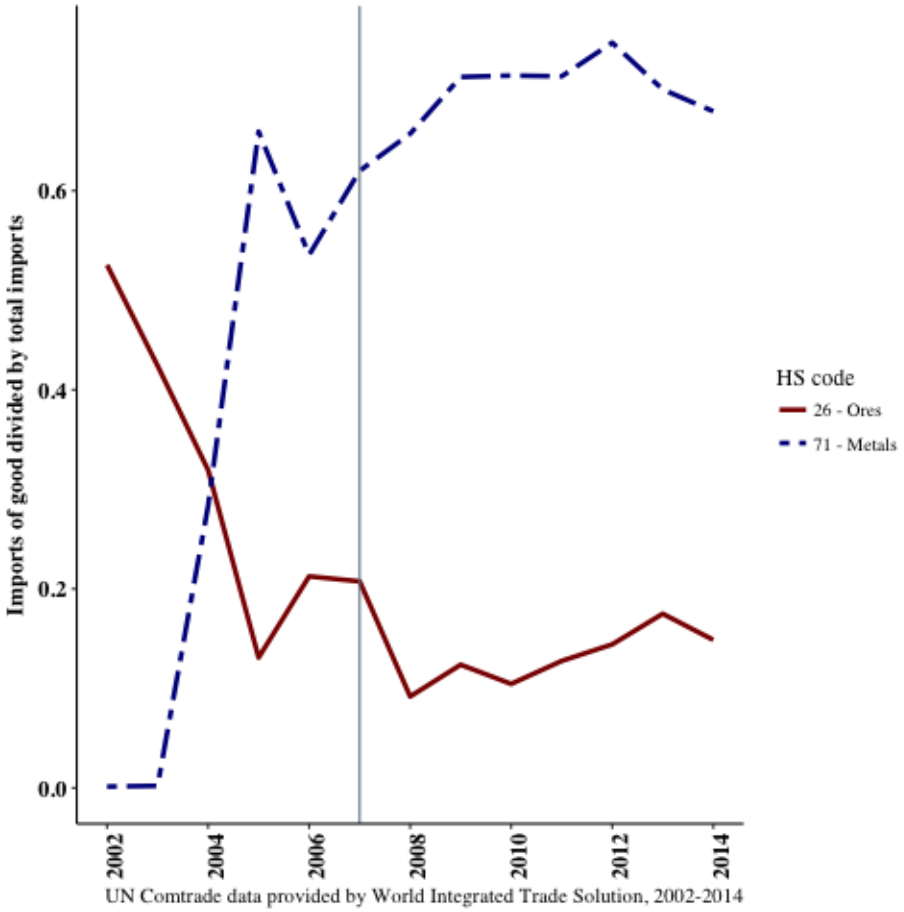
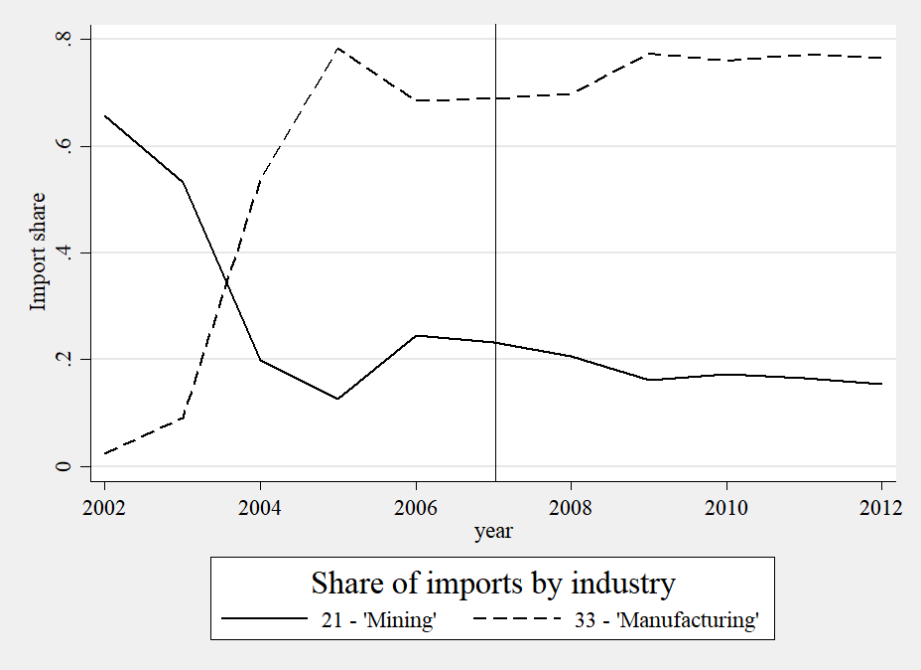


Figure 2.6 uses the microdata to show that the top NAICS Sector 2-digit industry codes of the Canadian firms importing from Peru as a share of total imports. This confirms that there is a switch from the largest share of importing firms being listed under NAICS Sector code 21, which designates the mining sector, to the largest share of importing firms listed under NAICS Sector code 33, which is one of the codes designating the manufacturing sector.

Seemingly, this data indicates that the increase in FDI might be associated with an increase in offshoring of Canadian intermediate inputs, developing these manufacturing processing plants in Peru and allowing them to import the more valuable refined mining product. However as we will show in detail in the next section, at the firm level the firms that

are importing more of the manufacturing good from Peru are not the same firms conducting the FDI.

Figure 2.6: Composition of imports from Peru



Source: Author's calculation on Raw Import microdata (Statistics Canada), 2002-2012

Moreover, there is a time discrepancy between when the switch in imports occurred and when Canadian firms began investing in Peru. The growth of imports is more tightly tied to the initial announcement in August 2002 of the launch of negotiations between Canada and the Andean Community to discuss the formation of a bilateral trade agreement. As mentioned previously, this Free Trade Agreement was signed in 2008 and came into effect in 2009, afer the FIPA. As such, the signing or enactment of this FTA was not associated with all of the increase or change in composition of trade.

Labour productivity for the sample of importing firms is measured using a simple measure of sales over individual labour units. Canadian firms importing from Peru were on average 14.4% more productive than all other Canadian firms in the import registry, that is all firms that reported imports from abroad.

2.4.3 Offshoring

Now the key premise of this paper is examined. Was the observed increase in FDI associated with Canadian firms offshoring their production of the intermediate mining input? Using firm-level data, it is possible to identify firms that both invested and imported goods from Peru to answer this. As such, it is feasible to disentangle if the shift from importing the primary resource to importing more of its manufactured product was due to the offshoring of the intermediate stage of production from Canada to Peru. As mentioned previously, minerals in their ore form are less valuable, in terms of dollar per pound, than their more refined versions. This creates an incentive for Canadian firms that were importing the mineral ore from Peru to locate this intermediate processing stage closer to the extraction site in Peru, rather than in Canada.

The firm-level microdata, however, tell a different story, perhaps foretold by the aggregate import shift beginning around 2004, before the Canada-Peru agreement. Only 14 firms are reported to have both invested and imported goods from Peru for the whole 2002 to 2012 period. Overall, these dual firms' share of investment was 8.55 fold higher than their share of imports.

The majority of the investment these dual firms reported was listed under the industry NAICS code 21, mining, and none of their imports were listed under NAICS code 33, manufacturing. This sub-sample of firms does not follow the results from the previous section, where aggregate imports show a reversal from industry NAICS code 21 to NAICS code 33. Hence, the bulk of Canadian FDI done in Peru was not for the purpose of offshoring since these firms were not importing the manufactured product and they were investing in the mining sector, not the manufacturing sector. Because there are only 14 dual firms, Statistics Canada restrictions do not permit any more detailed analysis to be conducted on them.

It was verified that firm trade was not being done through a third party wholesale trader under NAICS code 41. There was virtually no increase in imports for firms recorded under

this category.

There are three potential outcomes of this agreement that cannot be precisely measured with the data sets available. First, firms may have been using horizontal FDI in Peru indirectly by using Peru as a production platform, specifically in mining-derived goods, in order to then export them to nearby markets, such as in other South American countries, Oceania or Asia. Section 2.4.5 will attempt to answer this. Second, contracting done by firms is not recorded in the data. It cannot be observed to what extent firms contracted out some of their activity to Peruvian firms. Third, there exists an argument for firms using FDI abroad in order to secure mining rights in Peru. This would be green field investment use of FDI expenditure in the country. It does not support the possibility that Canadian firms were offshoring production to Peru.

2.4.4 Employment

In order to confirm that firms investing in Peru did not offshore by transferring manufacturing on the mining goods from Canada to Peru, an analysis is conducted on domestic employment. A simple regression analysis using the microdata on Canadian firms investing in Peru from 2002 to 2012 is conducted. It finds no significant change in the domestic employment of these firms after the FIPA in 2007. The following regressions test for a structural break in Canadian employment after 2007:

1. Basic:

$$\ln Empl_{i,t} = \alpha + \beta_1 \ln FDI_{i,t} + \beta_2 D_{07} + \beta_3(\ln FDI_{i,t} * D_{07}) + \epsilon_{i,t}$$

2. With control for the mining industry:

$$\begin{aligned}\ln Empl_{i,t} = \alpha &+ \beta_1 \ln FDI_{i,t} + \beta_2 D_{07} \\ &+ \beta_3(\ln FDI_{i,t} * D_{07}) + \beta_4 MIN + \beta_5(MIN * D07) \\ &+ \beta_6(MIN * \ln FDI) + \beta_7(MIN * \ln FDI * D07) + \epsilon_{i,t}\end{aligned}$$

$Empl$ is the Individual Labour Units employed by firm i in year t.[6] FDI is a firm's FDI flow per year. D_{07} is a dummy variable indicating the year is 2007 or later, after the FIPA was implemented. MIN is another dummy variable indicating if the firm's industry code designates NAICS code 21, mining.

Table 2.1: Employment Regression

VARIABLES	lnEmpl	lnEmpl
lnFDI	-0.136	0.0121
	(0.0992)	(0.116)
D07	-1.491	-2.098
	(1.154)	(1.213)
lnFDI*D07	0.161	0.216
	(0.13)	(0.159)
MIN		-5.611***
		(1.373)
Min*lnFDI		0.129
		(0.163)
MIN*lnFDI*D07		-0.0642
		0.217
MIN*D07		0.853
		(1.897)
Constant	6.339***	7.499***
	(0.843)	(0.876)
Observations 224		
*** $p < 0.001$,	** $p < 0.01$,	* $p < 0.05$

[6]For a particular business, it measures every individual who appears on the T4 file. They are counted as one ILU if this was their only employer. If an individual received more than one T4 slip, the ILU is split between firms on the basis of their share of wages in different firms.

Table 2.1 shows the interaction terms containing $\ln CDIA$ and the 2007 dummy are not statistically significant. Hence, firms investing more in Peru did not significantly decrease their Canadian employment after the enactment of the FIPA. This supports the argument that the FDI was not used for offshoring production by Canadian firms.

More variations of the regression analysis were conducted. These robustness exercises include controlling for the exchange and tariff rate in both a linear and semi-parametric method. The year of the structural break was also tested to be in 2006 or in 2008. Finally, since the Great Recession falls within this time frame, employment of each firm was divided by total annual employment and firm FDI by total annual FDI, to smooth out any aggregate changes due to the recession and not the agreement. None of these robustness checks yielded results that varied significantly from the results reported in Table 2.1.

2.4.5 Peru as an Export Platform

To explore the possibility that Canadian firms were investing in Peruvian mines in order to then export their product to "nearby" locations, such as other South American and Asians markets, Figure 2.7 shows aggregate exports to each country normalized to Peru's total world exports.[7] Many of these exports increased right around the same time when Peru started exporting more overall, and more metals, to Canada. Splitting these exports into categories, in Figures 2.8 and 2.9, it is shown that this increase was mainly in the exports of the natural resources derived from mining, HS good category 26, not of the manufactured mining products, HS good category 71. Canada is the largest importer of Peru's manufactured mining product of all these countries representing almost a 30% share of all of Peru's exports of this good. Due to the aggregate nature of this data, it is not possible to discern how much of these exports to other South American and Asians markets might have been done by Canadian owned enterprises in Peru.

[7] Other South American and Asian markets include: Brazil, Chile, China, Colombia, Japan and Venezuela.

Figure 2.7: Total Exports from Peru to other South American and Asian Markets

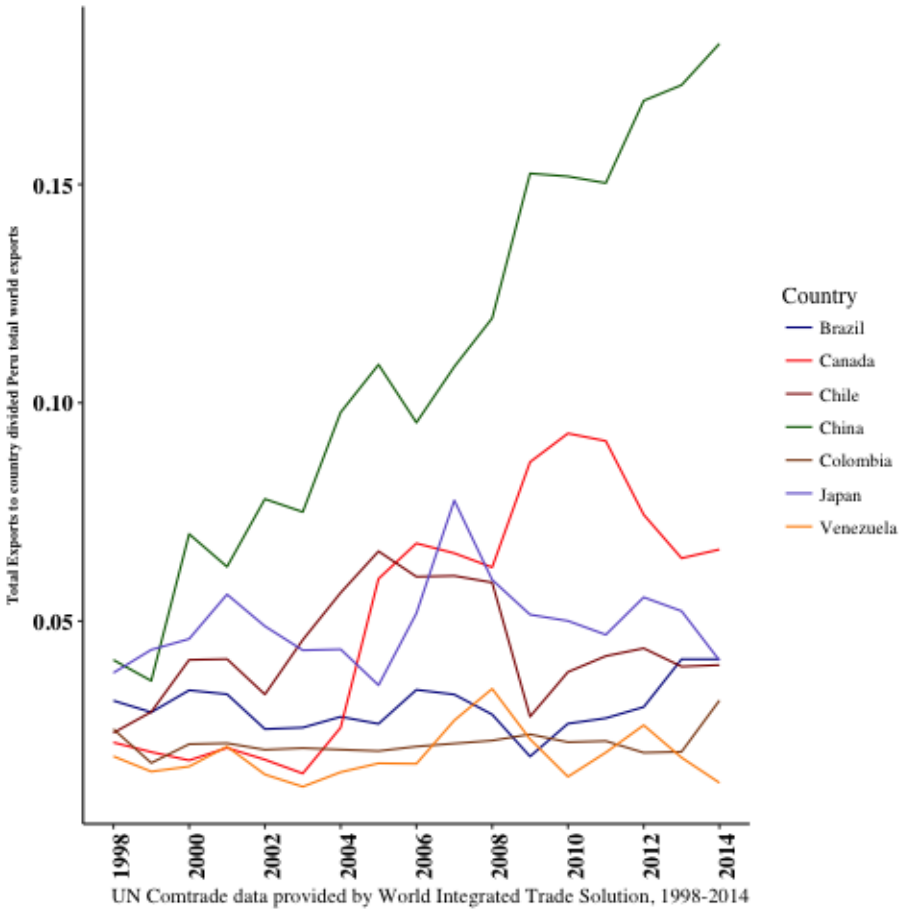


Figure 2.8: Exports of raw mining good from Peru to other South American and Asian Markets

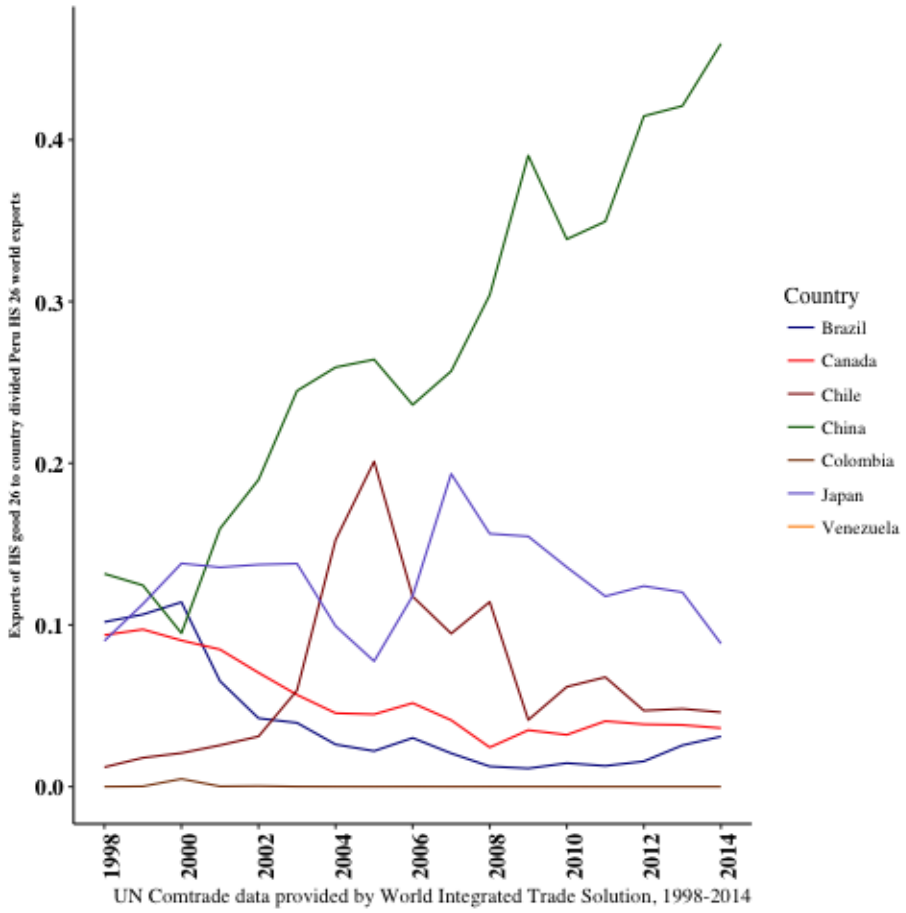
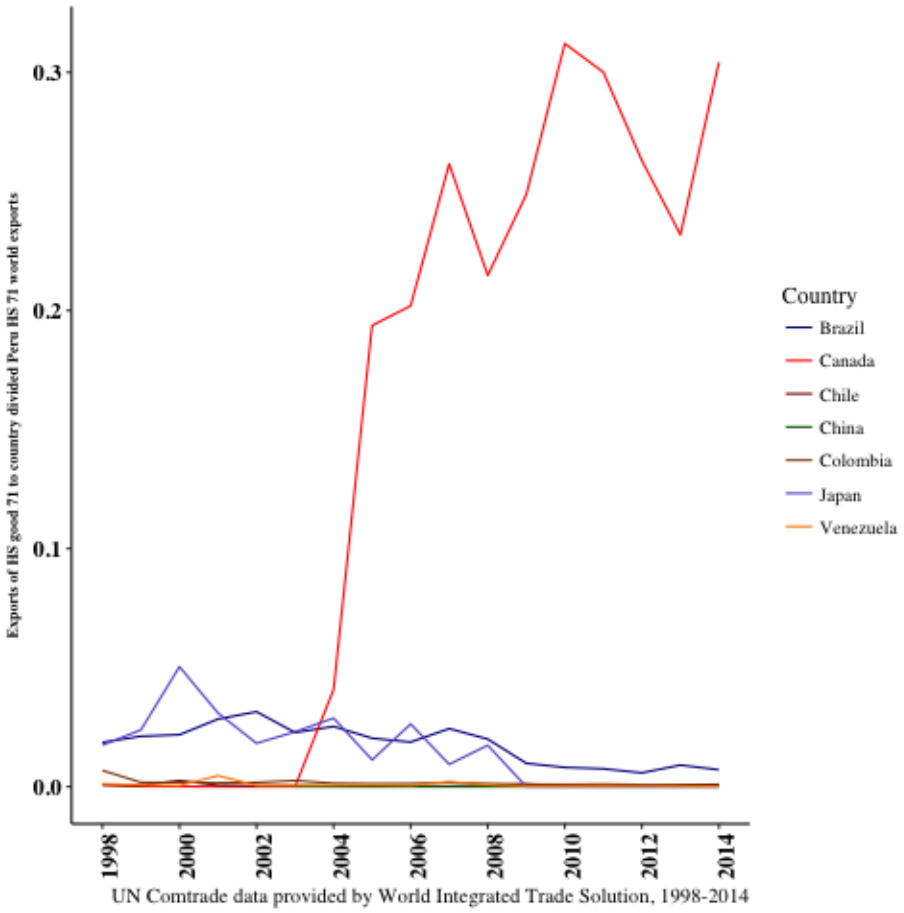


Figure 2.9: Exports of manufactured mining good from Peru to other South American and Asian Markets



2.5 Concluding Remarks

This paper has demonstrated, using firm-level data, that the Canada-Peru FIPA did not lead to more offshoring by Canadian firms, even if the aggregate data seem to indicate such an increase. There is however, no indication that the model of Antras & Helpman (2004) is contradicted in this exercise. Peru only represents 0.5% of Canada's world imports and the distance separating them is fairly significant, making trading costs higher. Higher trading costs are predicted to lead to lower offshoring in their model. As well, Peru is a country that mainly produces natural resources and most of the FDI into Peru went into the mining

sector. The mining sector is not very R&D or headquarter intensive sector which also tends to be associated with low offshoring in Antras & Helpman (2004).

Overall, the observed changes following the implementation of the Canada-Peru FIPA include an increase in investment, mainly in the mining sector. There was also an increase and change in the composition of imports that is not found to be related to this particular investment agreement or the subsequent increase in investment. There is no statistically significant fall in domestic employment of Canadian firms investing in Peru after the agreement. All these findings combined lead to the conclusion that the Canada-Peru FIPA did not produce an increase in offshoring of Canadian manufacturing. These results may be helpful in evaluating future investment agreements with emerging economies whose primary exports are in natural resources.

Chapter 3

Protectionism when the going gets tough: Trade agreements and sovereign default

3.1 Introduction

Signing multilateral and bilateral trade agreements can represent many benefits for developing countries. This paper looks at the potentially negative impact of having tariffs tied down by such tariff treaties in the context of a sovereign default episode.

In general, fiscal policy in developed countries is different than in emerging economies. Whereas most developed economies increase spending and lower taxes when faced with a negative shock, developing countries lower spending and raise taxes as is shown in Talvi & Vegh (2000).

The procyclicality of fiscal policy with the business cycle is represented in this model with the only tax instrument being the import tariff. For countries with less extensive

institutions, one of the primary channels to raise revenues is through tariffs on imports. Countries with large informal sectors will find that there is likely a binding limit in their ability to collect income or capital tax from business and individuals and hence may find it attractive to raise government revenues through taxes on goods brought across the border.

Table 3.1 shows the average revenue raised from customs and other import duties, as a % of tax revenue, for a sample small countries fitting this definition and having enough years of data.[1] Some of these countries such as Bahrain and Madagascar collected annually almost more than half of their government revenues from import tariffs.

Table 3.1: Importance of Import Tariffs in Revenues

Country	Mean revenue from import tariffs (% of total revenue)
Afghanistan	40.38
Bahrain	57.29
Benin	25.34
Botswana	37.67
Congo, Dem. Rep.	32.97
Ghana	22.83
Liberia	41.89
Madagascar	48.76
Namibia	35.34
Togo	22.61

The framework presented in this paper works from a basic sovereign default model, Eaton & Gersovitz (1981), and adds a production function with an imported input from abroad. A tariff rate τ is imposed on imports of this intermediate good. This tariff rate is chosen by the sovereign. If the sovereign raises tariffs, output in the home country falls from an increase in tariffs. However, raising the tariff rate might allow it to repay its debt and

[1] Data provided by World Development Indicators, World Bank (1990-2016)

continue borrowing the next period. When the country defaults, it faces an asymmetric cost to TFP in the production function, similarly to the output loss presented in Arellano (2008), as well as temporary exclusion from international borrowing markets.

This paper makes the following contributions. By adding the use of the imported good in the production function we can endogenize the following tradeoff. Increasing the tariff raises the government's ability to borrow on international financial markets. As the import tariff increases, the sovereign needs to pay more for its input, making output fall. At some point the consumption loss from the fall in output will outweigh the consumption loss from the cost of default and the sovereign will choose to default. In this model, default will occur at higher levels of debt to GDP than in a sovereign default models where tariffs are set to zero. Where in classical trade theory, the optimal tariff for a small open economy is zero, this model delivers positive and non-zero optimal tariffs when the risk of default rises. It illustrates the importance of flexible tariffs for small countries with large informal sectors that rely heavily on import tariffs as a source of government revenue.

The remainder of the paper is as follows. Section 2 relates this paper to the sovereign default literature. Section 3 examines the data. Section 4 describes the structural model. Section 5 discusses numerical simulations of this model. Section 6 looks at some sensitivity analysis and section 7 concludes.

3.2 Related Literature

The sovereign default literature studies a wide variety of cases and considerations. As its pillar, the Eaton & Gersovitz (1981) model with non-state-contingent contracts, which was further developed by the Aguiar & Gopinath (2006) and Arellano (2008), generates endogenous default decisions for poor endowment realizations. Also at its core, the Cole & Kehoe (1996) and Cole & Kehoe (2000) models, followed by Conesa & Kehoe (2012), deliver multiple equilibria with self-fulfilling defaults.

This paper is related to two main branches of this sovereign default literature; fiscal policy and trade. Many papers look at various aspects of fiscal policy. Cuadra, Sanchez, & Sapriza (2010) develop a procyclical model for fiscal policy and sovereign default. As well, Amador & Aguiar (2011) consider labour and capital taxes, finding an optimal long-run labour tax of zero in a Ramsey equilibrium. Jeon & Kabukcuoglu (2016) examine the role of sovereign default and taxation in increasing income inequality within a country. In the case of the Eurozone, Fernandez-de-Cordoba, Pujolas, & Torres (2017) highlight the consequence of elevated debt levels, rather than fiscal discipline, in leading to default.

Trade costs resulting from sovereign default were empirically examined by Rose (2002) who finds a large cost, namely that international trade falls by 8% for many years following default. However, Martinez & Sandleris (2011) find that after default, trade only fell for non-creditor countries not with creditor countries. Popov & Wiczer (2014) show most of the trade costs come through a deterioration in terms-of-trade for the defaulting country. This paper abstracts from change in terms-of-trade by using a small open economy with a fixed price for the foreign good. This is more representative of the small country with informal institutions that are modeled in this paper. This paper does not impose a trade cost of default, only the usual asymmetric output costs and international borrowing exclusion.

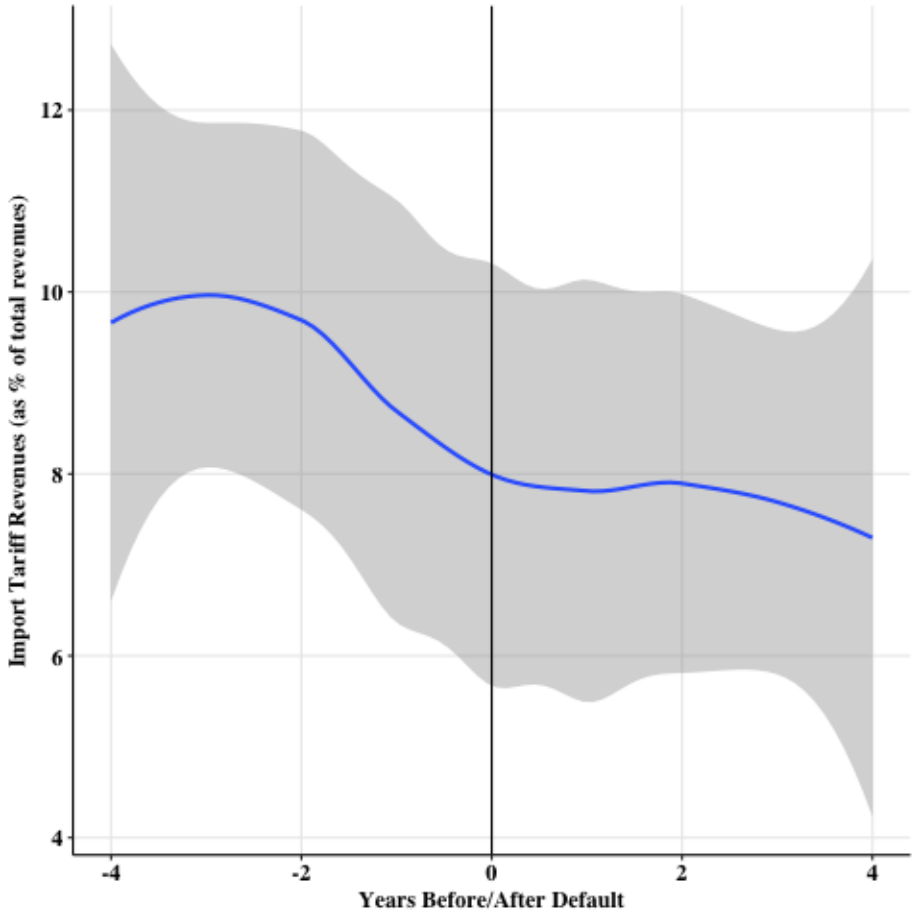
3.3 Empirical Analysis

This Section examines how tariffs change empirically around a sovereign default episode. There are some complications related to looking at exact tariff rate movements. Tariffs are applied differently to different countries depending on whether they are both in the WTO or are part of a bilateral or multilateral regional trade agreement. Adding to the complexity, sometimes tariff lines are re-organized to tax more heavily goods that are imported more. This compositional effect will raise revenues overall but may not show up in the aggregated tariff rates. Further complicating things, WTO developing country members typically get

unilateral preferential treatment with developed countries, through programs including the Generalized System of Preferences or Everything But Arms. As well, the types of countries that are most applicable to this problem, those with less formal institutions, are also less likely to collect reliable data, if at all. For this reason, we start by looking at mean reported tariff revenues on imports, then attempt to look at the empirical distribution of tariff rates.

Figure 3.1 shows tax revenues from imports as a percentage of total revenues using World Development Indicators data for five countries who went through recent defaults: Argentina, Dominican Republic, Paraguay, Uruguay with defaults in 2001, 2005, 2003, 2003, respectively, and two for Venezuela (1995 and 2004). The horizontal axis shows years around the default, where $T = 0$ indicates the year of default.

Figure 3.1: Tax Revenue from Import Tariffs



In the years prior to default, a higher percentage of government revenue comes from import tariffs. Once a state of default is reached, there is no longer a need for higher government revenue to continue borrowing, and any remaining tariffs are only hurting output. Hence, tariff revenues would be expected to fall.

Figures 3.2 and 3.3 show the distribution of the Most Favoured Nation (MFN) Applied rate and Bound rate using UNCTAD-TRAINS (Trade Analysis and Information System) data. MFN Applied rates are the applied tariff rates for commodities traded between members of the WTO, unless the trading partners are part of a preferential trade agreement. MFN Bound rates are the maximum MFN tariff level, for a given commodity line, for countries within the WTO. It is not necessarily the rate that is actually applied.

Figure 3.2: MFN Applied Tariff Rate

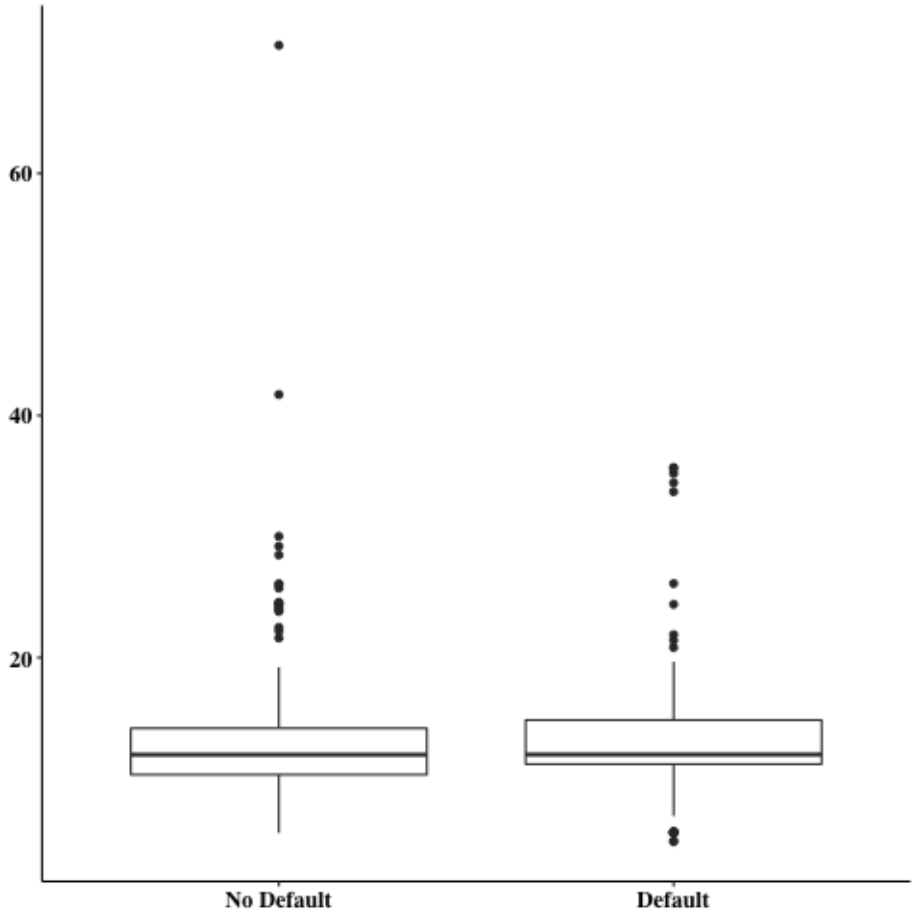
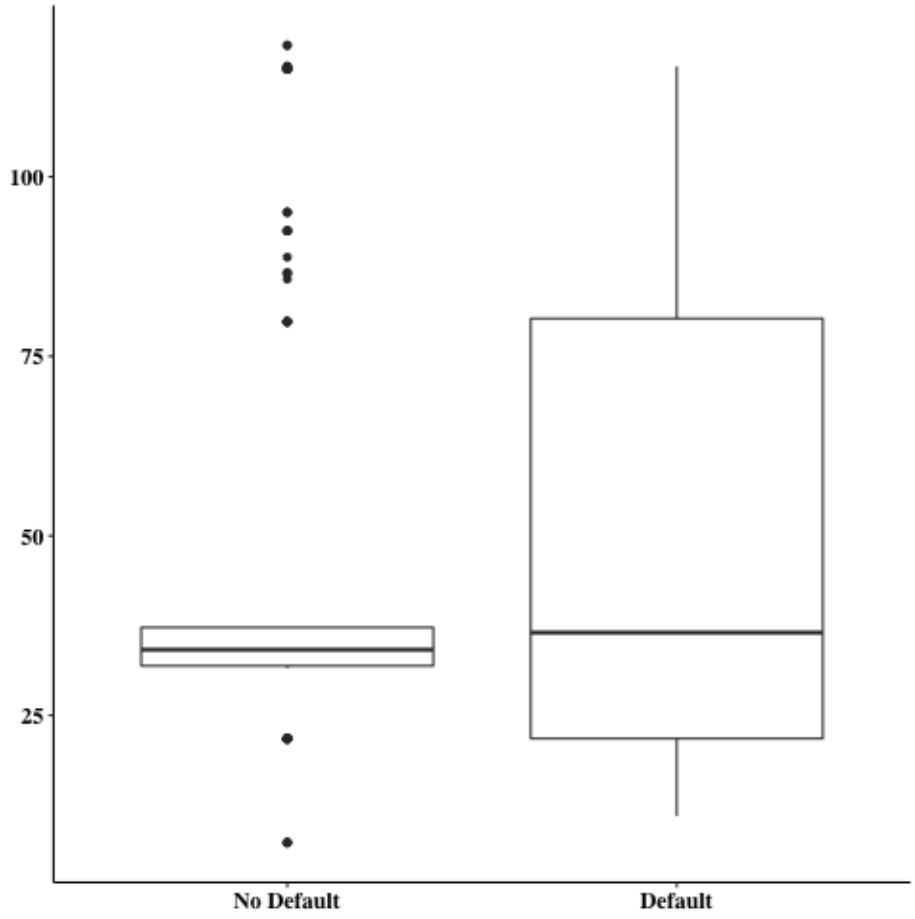


Figure 3.3: MFN Bound Tariff Rate



We can see that both the MFN applied tariff and MFN bound tariff rates have a higher 3rd quintile when the country is default rather than not in default. The bound rate's distribution in default is not well defined since there are not many countries that have recorded bound rates when in default and they usually do not change over the years. These tariff data are available for more countries than in Figure 3.1. The list of countries and years of default for these two figures are shown in the Appendix. A dummy variable denotes whether or not the country was in default that year and the distributions for annual observations of tariff rates in default versus distribution of annual tariff rates when not in default are shown in Figures 3.2 and 3.3. For reasons mentioned above, this way of looking at tariffs may not yield the right amount of actual tariff revenues. Hence, given the limitations of the data, empirical

analysis can at best provide an incomplete guide as to the relationship between tariffs and sovereign default.

3.4 Model

The model is based on the Eaton & Gersovitz (1981) model with the addition of a production function that pays a tariff τ on imports of its input from abroad f. There are two types of agents: international bankers and a benevolent sovereign.

3.4.1 International Banker

There is a continuum with measure one of identical risk-neutral international bankers who maximize their expected utility:

$$\max_{d'} \ \Psi = \left(\frac{1-\delta}{1+r*}\right) d - q(d', z)d' \tag{3.1}$$

The bankers lend next period debt, d', to the sovereign at price $q(d', z)$ and receive d this period. The debt payment received this period is determined by δ, the probability the sovereign defaults, and $r*$ is the risk-free interest rate.

The bankers first order condition is:

$$q(d', z) = \frac{1-\delta(d', z)}{1+r*} \tag{3.2}$$

The price of next period's debt is determined by how likely the country is to default and the discount rate. If there is zero risk of default, δ is 0, q is 1 and the sovereign will receive the full amount d'. As the probability of default increases and delta gets closer to 1, the more q approaches 0 and the sovereign receives d' that approaches 0. The probability of sovereign default is a function of how much next period debt is borrowed and the stochastic productivity z this period.

3.4.2 Sovereign

A benevolent government maximizes the households' lifetime utility $E\sum_{t=0}^{\infty}\beta^t u(c_t, g_t)$ according to the value function:

$$V(z,d) = \max_{c,g,d'}\{u(c,g) + \beta EV(z',d')\} \tag{3.3}$$

The utility function follows a log separable utility functional form with consumption tax rate ϕ which is borrowed from Cole & Kehoe (1996)

$$u(c) = \log(c) + \gamma\log(g)$$

where

$$c = (1-\phi)[zf^{\alpha} - (1+\tau)p_f f] \tag{3.4}$$

$$g = \tau p_f f - d + qd' + \phi c \tag{3.5}$$

Each period, a sovereign in good standing imports a foreign input, f to produce output, receives new debt d' at price q and collects revenues from the import tariff, τ and the consumption tax, ϕ. This amount is allocated towards private consumption, c, government spending, g and to repay d, if it chooses not to default. The price of the foreign good p_f is normalized to one.

The productivity in the production function z faces the AR(1) process:

$\ln z_t = \rho \ln z_{t-1} + \epsilon_t$

3.4.3 Timing

The sequence of events within a period is as follows:

1. The sovereign chooses f given the realization of the productivity process for z and

the previous period default choice.

2. Given f, the government decides whether to repay or default and tariff rate τ. If it chooses to repay, then it chooses d', taking the price schedule $q(d', z)$ and the budget constraints as given.
3. The international lender chooses to lend d' at price $q(d', z)$.
4. Private and government consumption c and g take place.

3.4.4 Recursive Equilibrium

Value of continuation:

Every period, a government in good standing faces the choice whether to default or continue repaying its debt. It will continue repaying if the value of defaulting, $V^b(z^b)$ is less than the value of repaying, $V^g(z, d')$.

$$V^0(z, d) = \max\{V^b(z^b), V^g(z, d')\} \tag{3.6}$$

Value of good state:

A sovereign in a good state maximizes consumption and next period debt according to:

$$V^g(z, d) = \max_{\tau, d'}\{u(c, g) + \beta E V^0(z', d')\} \tag{3.7}$$

Value of bad state

When the sovereign defaults, he faces the following value function:

$$V^b(z) = u(c^b, g^b) + \beta E[\theta V(0, z') + (1 - \theta)V(z')] \tag{3.8}$$

The cost of default is a function of the stochastic productivity z. This cost of default is asymmetric, similarly to how output is altered under default in Arellano (2008) and

Chatterjee & Eyigungor (2009). The financial autarky productivity level is:

$$z^b = z - \begin{cases} 0, \text{ if } z \leq -\frac{a_o}{a_1} \\ a_o z + a_1 z^2, \text{ if } z > -\frac{a_o}{a_1} \end{cases}$$

This specification allows for increasingly higher loss of productivity at greater levels of productivity, so that a country does not want to default in good times. The value of parameters a_o, a_1 are discussed in the section below. The country consumes $c^b = (1-\phi)[z^b f^\alpha + (1+\tau)p_f f]$ under default where the lower productivity will impact the output of the final good. There is no imposed cost of default on imports, f.

Every period after a default, there is a probability θ that the sovereign will re-enter international financial markets and restart at a debt level of zero.

3.5 Computation

First, the model is simulated according to the values in Table 3.2. The values for a_0, a_1 and θ were borrowed from Chatterjee & Eyigungor (2009). The AR(1) process for productivity shocks is modeled as in Uribe & Schmitt-Grohe (2017).

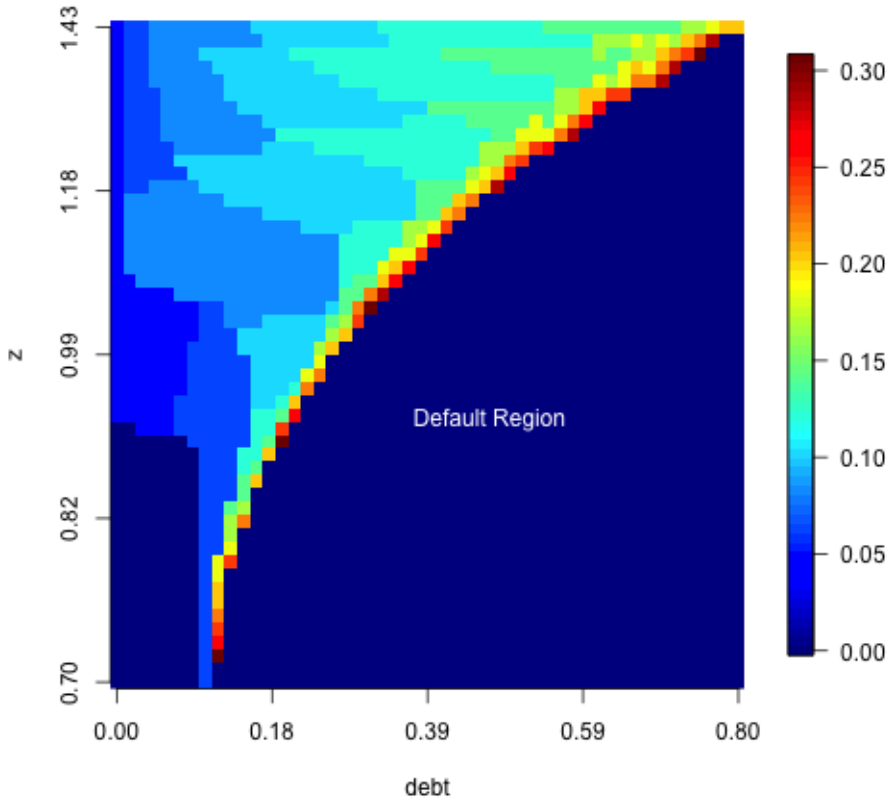
Table 3.2: Parameter Values

Parameter	Description	Value
r	Risk free Interest Rate	0.01
β	Discount Factor	0.99
α	Production Function Scale Factor	0.7
ϕ	Consumption tax	0.3
γ	Preference for government consumption	0.5
θ	Probability of re-entry	0.0385
a_o	Cost of default parameter ($a_o z + a_1 z^2$)	-0.18819

Parameter	Description	Value
a_1	Cost of default parameter ($a_o z + a_1 z^2$)	0.24558
ρ	Coefficient on z_{t-1} in the AR(1) process	0.948503
ϵ	Standard deviation in the AR(1) process	0.027092

The optimal tariff is plotted according to the different levels of debt and productivity in Figure 3.4. The dark blue area in the bottom right portion is the region the sovereign optimally defaults for high levels of debt and low levels of productivity. The import tariff rate in this region is optimally zero since this is a simulated small open economy, so it is expected that the optimal tariff would be zero if the country is in autarky (financial autarky - not trade autarky). As the level of debt increases or productivity falls, we approach the default line. Near the default line, the government seeks to raise tariffs, up to 0.306 in order to avoid defaulting.

Figure 3.4: Optimal tariff for each level of productivity and debt



This model generates higher levels of debt and debt-to-GDP relative to the no-tariff benchmark. Figure 3.5 shows the optimal next period debt, d' according to current debt, d and productivity, z. The left-hand side figure (a) shows next period debt levels when the sovereign can set tariffs. In the right-hand side figure (b) where tariffs are set to zero. We see that the sovereign can choose a higher next period debt for all levels of current debt and productivity greater than zero. As well, he can avoid default for higher levels of the debt. As the default line has shifted to the right, the default region has become smaller.

Figure 3.5: Debt levels

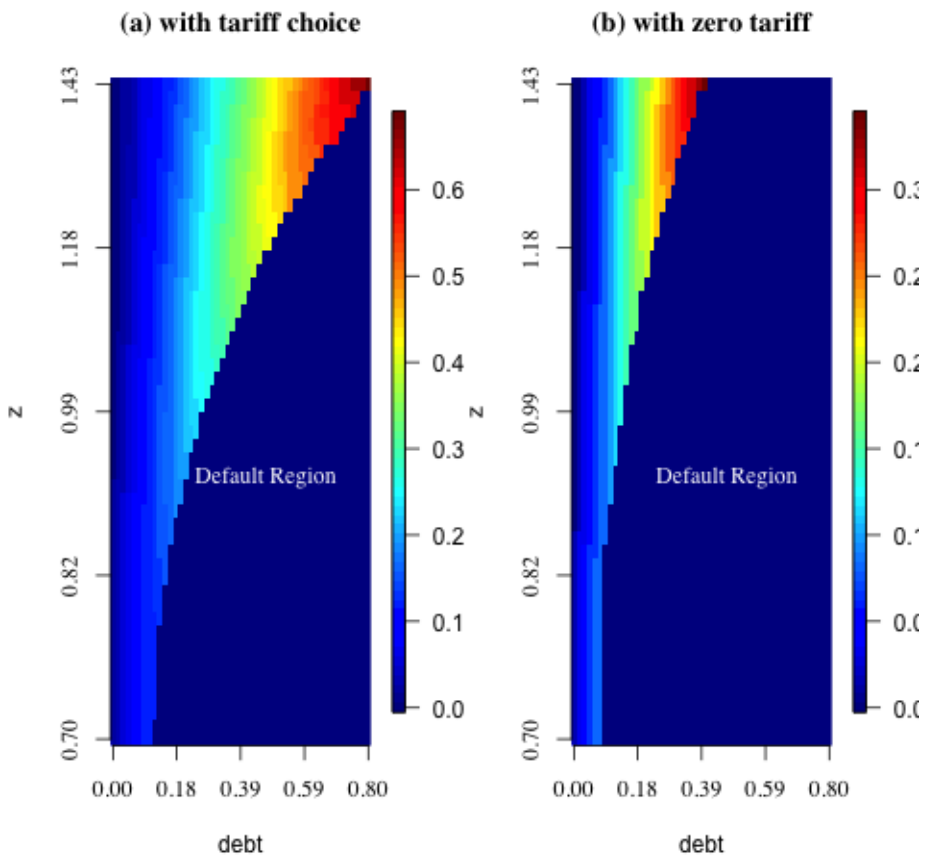
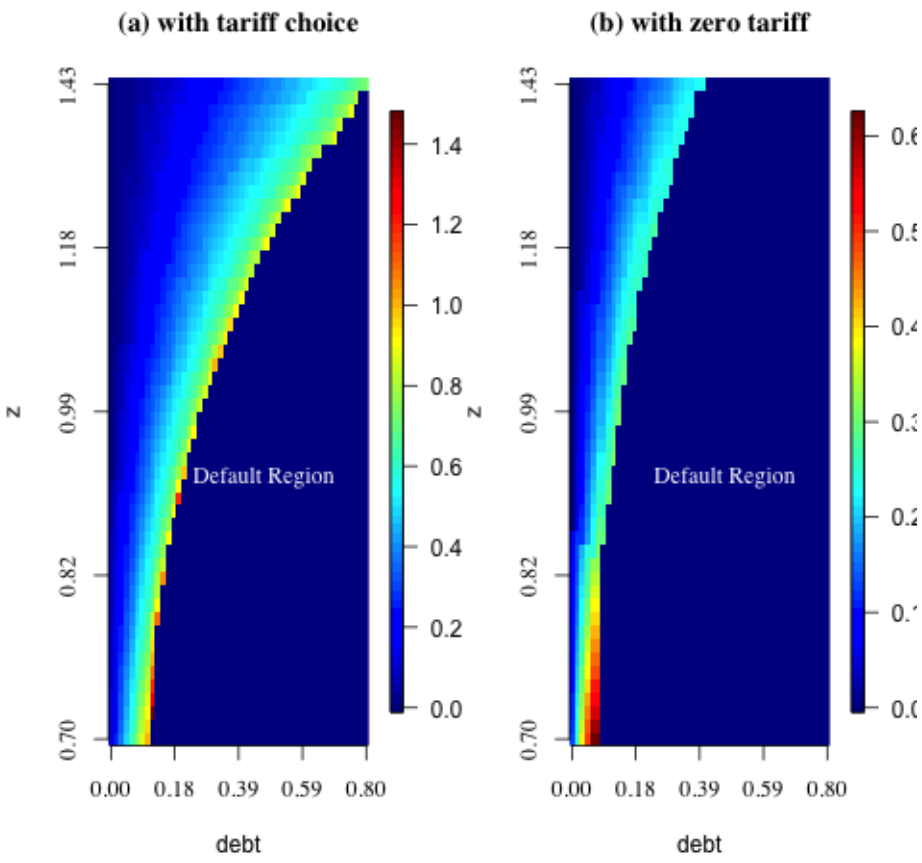


Figure 3.6, shows debt to GDP levels where the sovereign can optimally set the tariff level in (a) and where the tariff is tied down to zero (b). When the sovereign can set tariffs, higher levels of debt to GDP can be sustained without defaulting. The default line shifts to the right, allowing for higher levels of debt to output at both lower and higher levels of productivity.

Figure 3.6: Debt/GDP levels



Imports to GDP will fall in response to increased tariffs. Figure 3.7 shows the different levels of imports-to-output ratios for different debt and productivity grid points. When tariffs are set to zero, Imports/GDP are constant at 0.7. As we saw in Figure 3.4, the sovereign starts to tax imports more as it approaches the default line lowering imports more than GDP because of the decreasing returns to scale in the production function. However, if we look at Figure 3.8, we see that output is higher for all the productivity and debt levels the sovereign would have otherwise defaulted at.

Figure 3.7: Imports/GDP with tariff choice

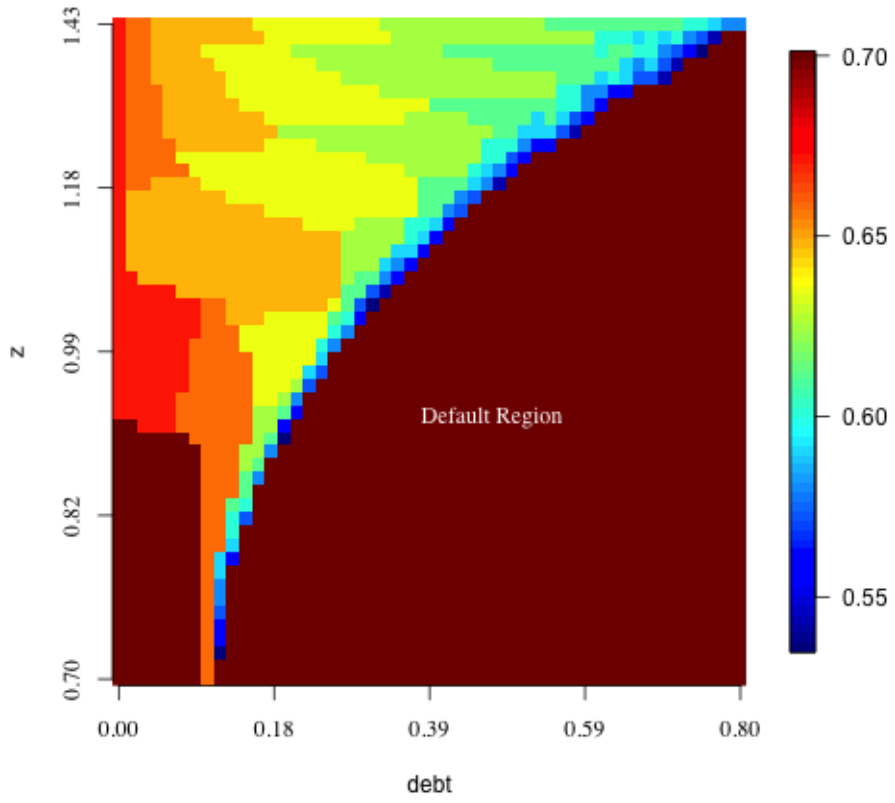
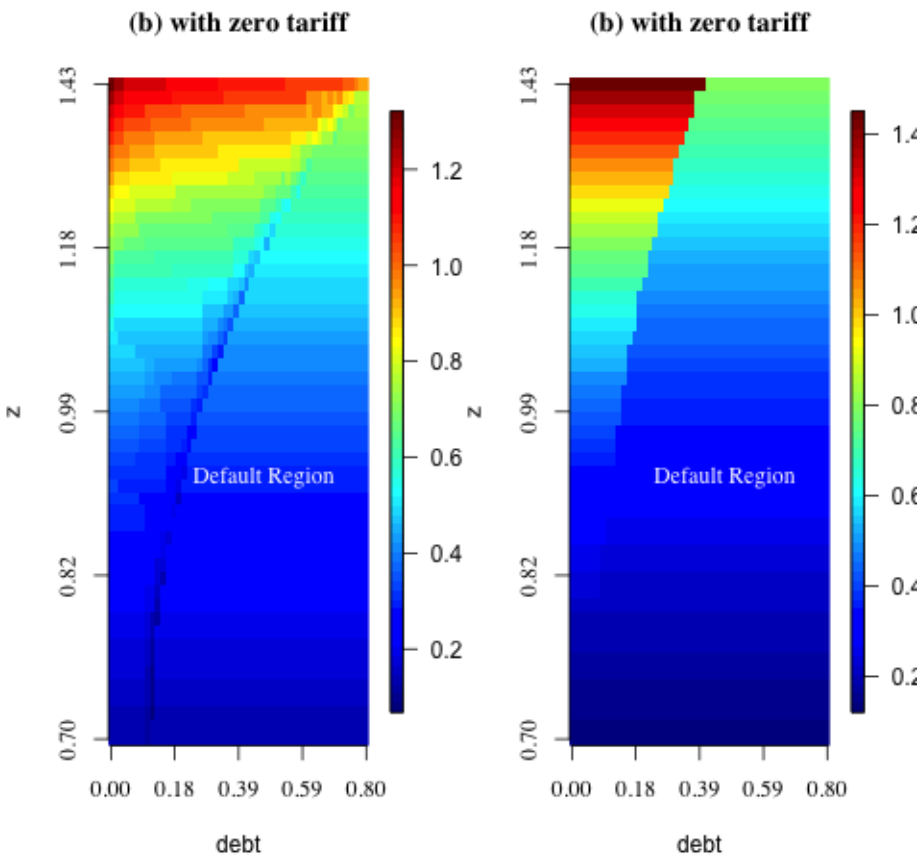
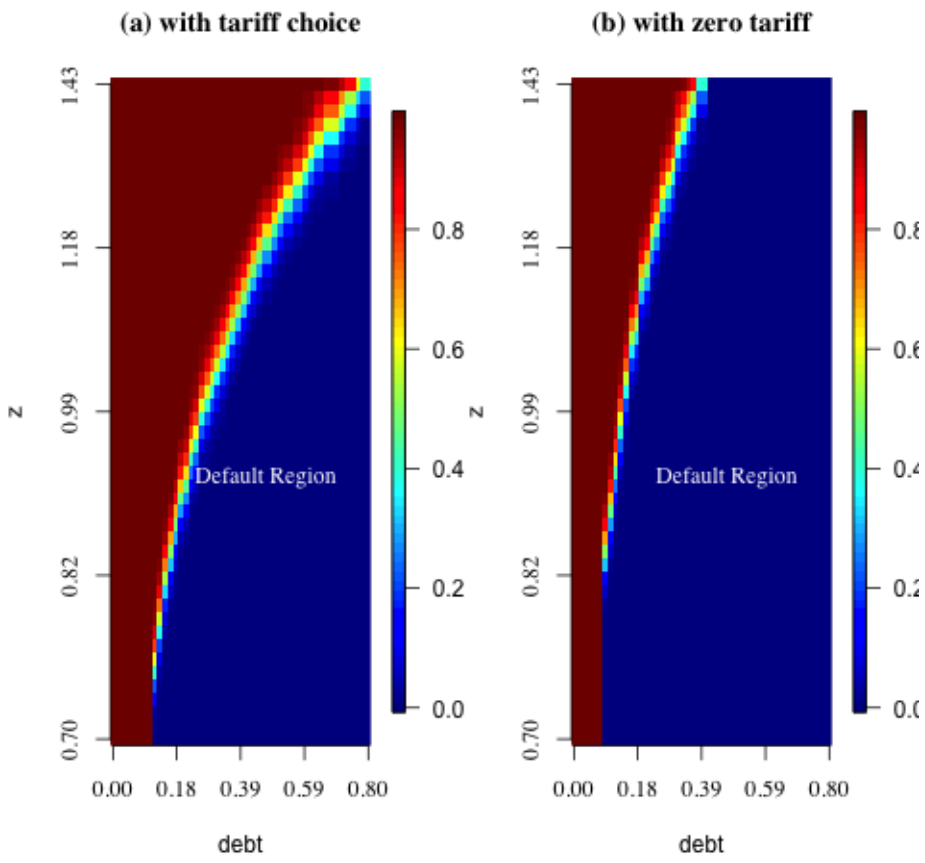


Figure 3.8: Output levels



Finally, Figure 3.9 shows the price schedule for debt according to the productivity and debt states. The closer q is to 1, the lower the probability of default and the more the sovereign receives in next period debt $q(z, d')d'$. The sovereign that can increase its tariffs can pay a lower price for higher levels of debt since it directly impacts its ability to repay and lowers the probability of default δ in Equation 2.

Figure 3.9: q(z,d) levels



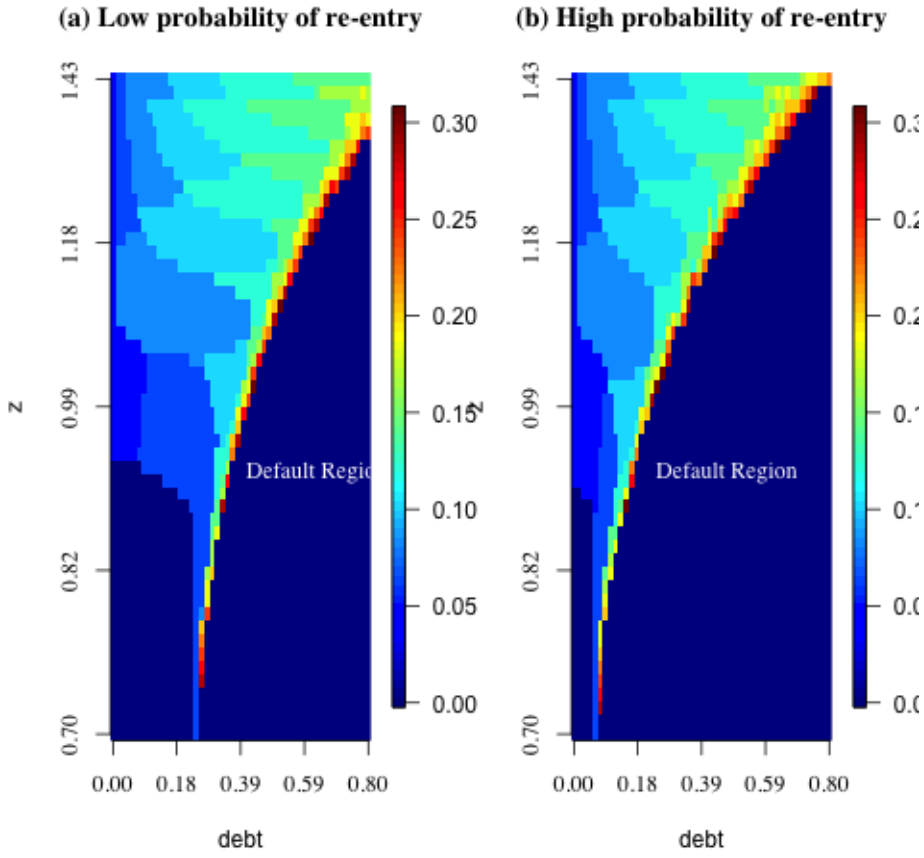
3.6 Sensitivity

Since the cost of default plays an important role in incentivising the sovereign to raise tariff, different values are considered for the probability of re-entry, θ. We also test for different values of the consumption tax, ϕ, and the preference for government consumption, γ.

For θ, the probability of re-entering international financial markets after default the values tested are of 0 in (a) and 0 in (b). For a lower probability of re-entering, the average exclusion time is longer, making default more costly. We expect government to be willing to set the tariff higher to avoid default since it is so costly. This is what we can see from

Figure 3.10 (a).

Figure 3.10: Re-entry Probability θ



For ϕ, the consumption tax, values of 0 and 0.5 are shown in Figure 3.11. Interestingly, when the consumption tax is set to zero, the optimal tariff will be higher, but the government will not be able to sustain as much debt as we see the default region becomes larger in Figure 3.11 (a). When ϕ is large, the government relies less on the import tariff for revenues and can support higher levels of debt for lower levels of tariffs.

Figure 3.11: Consumption Tax ϕ

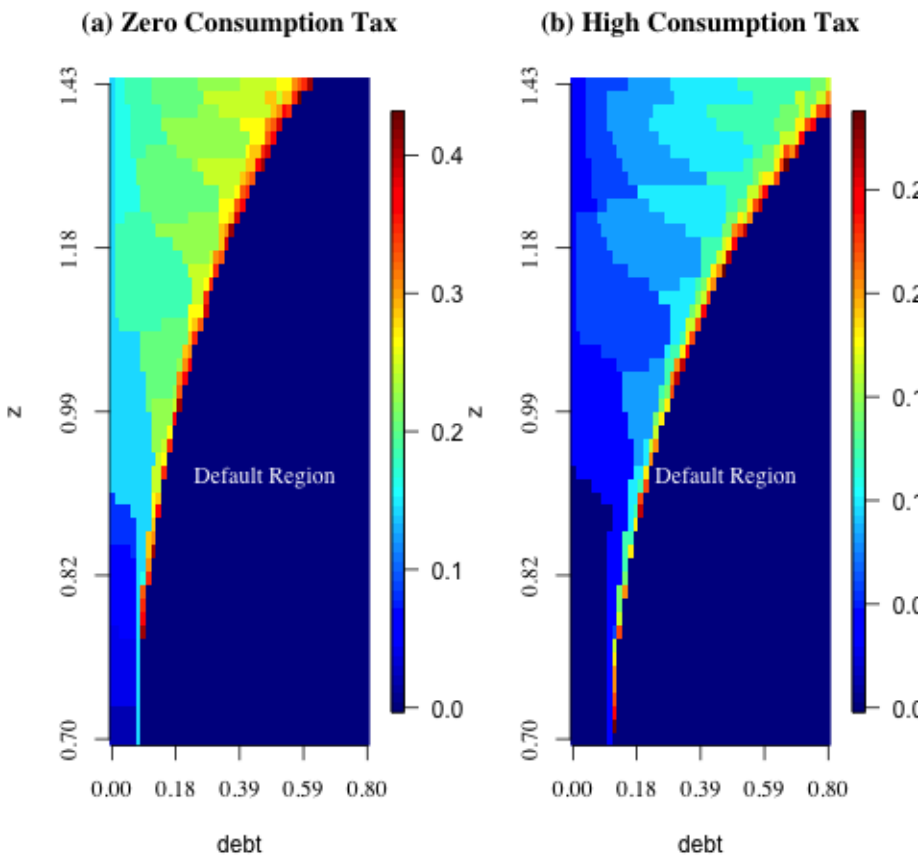
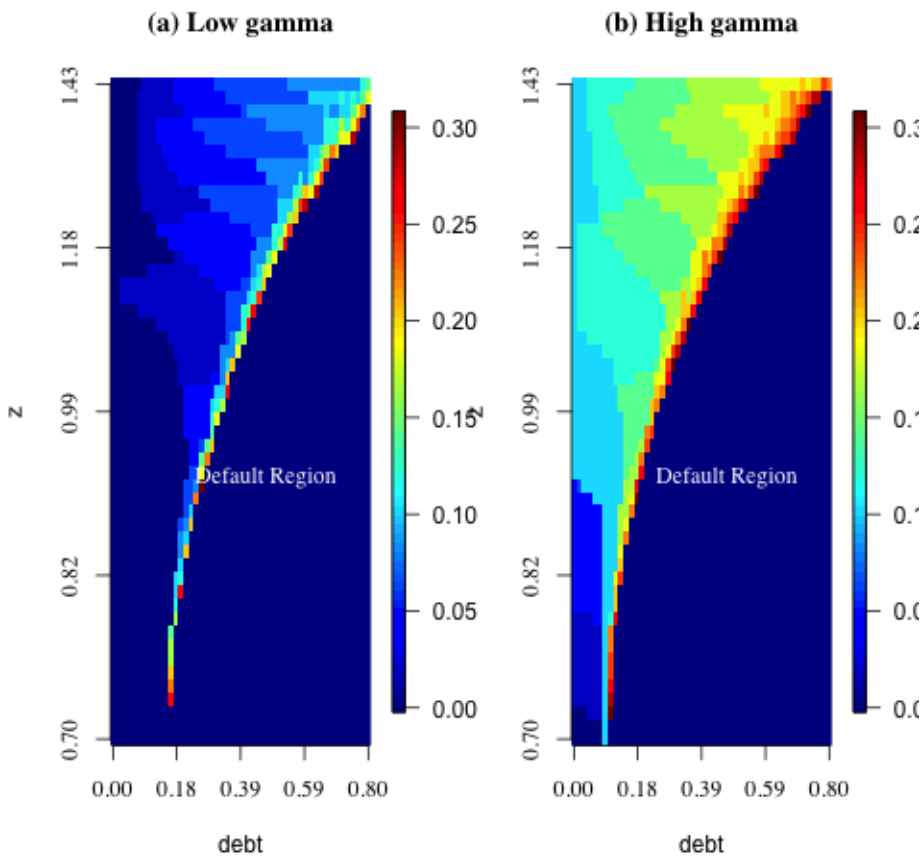


Figure 3.12 shows other values of γ of 0.2 and 0.8. γ represents the relative preference for government consumption. As expected, a lower value of γ yields a lower tariff for every level of debt and productivity. The default region does not shift much in either of these graphs for high levels of productivity. However, for low productivity shocks the sovereign can sustain more debt at a lower tariff rate.

Figure 3.12: Preference for government spending γ



3.7 Conclusion

This paper evaluates import tariffs as an instrument the sovereign can use to raise revenues and avoid sovereign default. The model presented is very simple but captures the basic tradeoff a sovereign is faced with when setting an import tariff in a time of crisis. He would like to set them high enough to be able to repay its debt and hence continue borrowing, but if he sets them too high, imports will fall and the drop in output will outweigh the benefits from international borrowing. This is done by imposing the same costs of default as in the traditional sovereign default models.

This model is most applicable to a small open economy with incomplete institutions. That is, a government has a binding limit on the amount of revenue it can achieve through consumption, labour or capital taxes due to the presence of a large informal sector, but is more able to tax imports entering its country. Such a country would be cautious when entering into trade agreements that limit its ability to set its tariff rate.

Appendix

Table 3.3: Countries in Figure 3.2 and 3.3

Country	Year in Default
Algeria	1993
Argentina	1993, 2001-2005
Cote d'Ivoire	1993-2010
Dominican Republi	c 2005
Ecuador	1993-1995, 1999-2000, 2008
Indonesia	1998-2000, 2002
Kenya	1994-2002
Myanmar	2002-2010
Nigeria	2001, 2005
Paraguay	2003-2004
Russian Federatio	n 1993-1997
Uruguay	2004
Venezuela	1995-1997, 2004-2005
Zimbabwe	2000-2007

Chapter 4

The Curious Incident of Luxury Imports during the Top-Income Surge

4.1 Introduction

Atkinson, Piketty and Saez (2011, henceforward APS) show that the top 1% share of income in developed countries, measured using administrative taxfiler data, increased sharply in the late 1980s and 1990s in English speaking countries (henceforward: surge countries) but not in continental European countries and Japan (henceforward no-surge countries). This difference had not been apparent in survey data, because of survey sampling error, top-coding and under-response by those with high incomes.

What have been the trends in consumption by those with top-end incomes? Expenditure survey data share the same flaws at the top end as income survey data and there is no comprehensive administrative expenditure microdata. As an imperfect attempt, we use the Comtrade administrative trade data set for international comparisons of imports. One might expect a higher rate of increase of imports (corrected for re-import) of luxury goods for

those countries with a measured top income surge. We report the puzzle that there is no such pattern.

In section 2, we provide additional context. Section 3 describes our empirical findings. In section 4, we suggest as possible explanations either measurement issues, e.g. that top-income trends have been mismeasured by taxfiler data or that top-income individuals do not have a particularly high marginal propensity to consume these luxury goods, at least within their own countries. Regardless, our results provide a fragment of evidence that there may not have been a relative increase in top-end domestic consumption inequality in surge countries relative to no-surge countries. In section 5, various robustness exercises are conducted. Section 6 concludes.

4.2 Context

Atkinson et al. (2011) summarizes a large literature (e.g. Antràs (2003), Piketty (2013) and Leigh (2007)) examining international differences in the rate of change of taxfiler top income shares across developed countries. As noted in the introduction, a principal APS finding is that some countries experienced top-income surges beginning about 1980 and some did not. Figure 4.1 illustrates using the top 1% income shares for the G7 countries, excepting Germany.[1] [,2] For each year, we compute the average of the values for Canada, the United Kingdom and the United States and then smooth these averages over time.[3] The top-income surge found by APS for these countries is clear. When the same calculation is performed for France, Italy and Japan, there is clearly no surge, again consistent with the

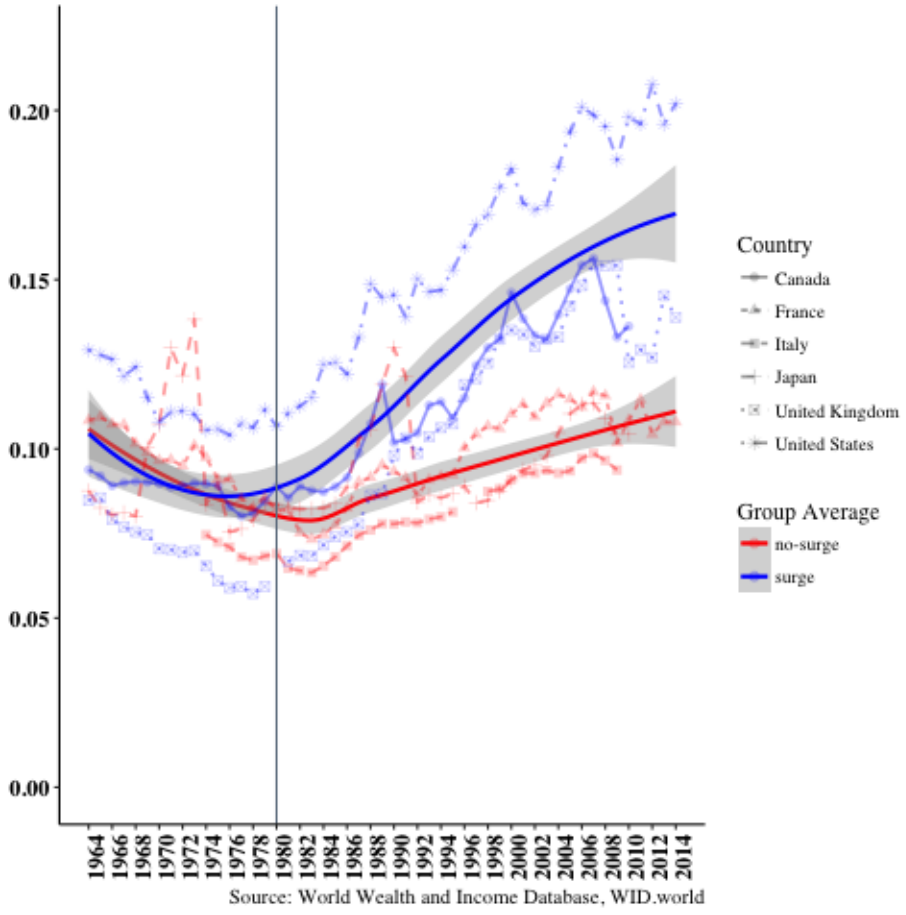
[1] Data are from the World Inequality Database (Alvaredo, Atkinson, Piketty, & Saez (2012)) for 1962 to 2014, as available. Income is market income either per tax unit or per adult without capital gains (except for the U.K. prior to 1965, when they are unavoidably included).

[2] APS included Germany as a no-surge country based on the data of Dell (2007) which has little evidence of a surge up to its endpoint of 1998. But we omit Germany because more recent estimates in the World Inequality Database suggest a significant surge since 1998 and the alternative estimates of Stefan, Giacomo, & Viktor (n.d.) suggest there was an earlier top-end surge, concentrated at the very top, a finding with some support in the case of German CEOs in Francesca & Dalia (n.d.) and in wage data in Dustmann, Ludsteck, & Schönberg (2009)

[3] Smoothing is done using the LOESS procedure in R, with 95% confidence intervals added.

APS finding for these countries.

Figure 4.1: Top 1% income shares by countries



4.3 Luxury Imports

The longest available data series (Standard International Trade Classification, Revision 1) are available from 1962 to 2014. We study the following apparent luxury goods:

1. pearls, not set or strung (SITC 6671);
2. other precious & semi precious stones not set (SITC 6673));
3. diamonds, not industrial, not set or strung (SITC 6672);
4. works of art, collectors pieces and antiques (SITC 8960);

5. gold, silver and platinum jewellery less watchcases (SITC, 8971);
6. fur clothing (SITC 8420); and
7. coin, other than gold, not being legal tender (SITC, 9610).

We aggregate these annually for each country using U.S. dollar values and graph over time each import aggregate by country as fraction of that country's GDP.

Figure 4.2: Pearls, not set or strung

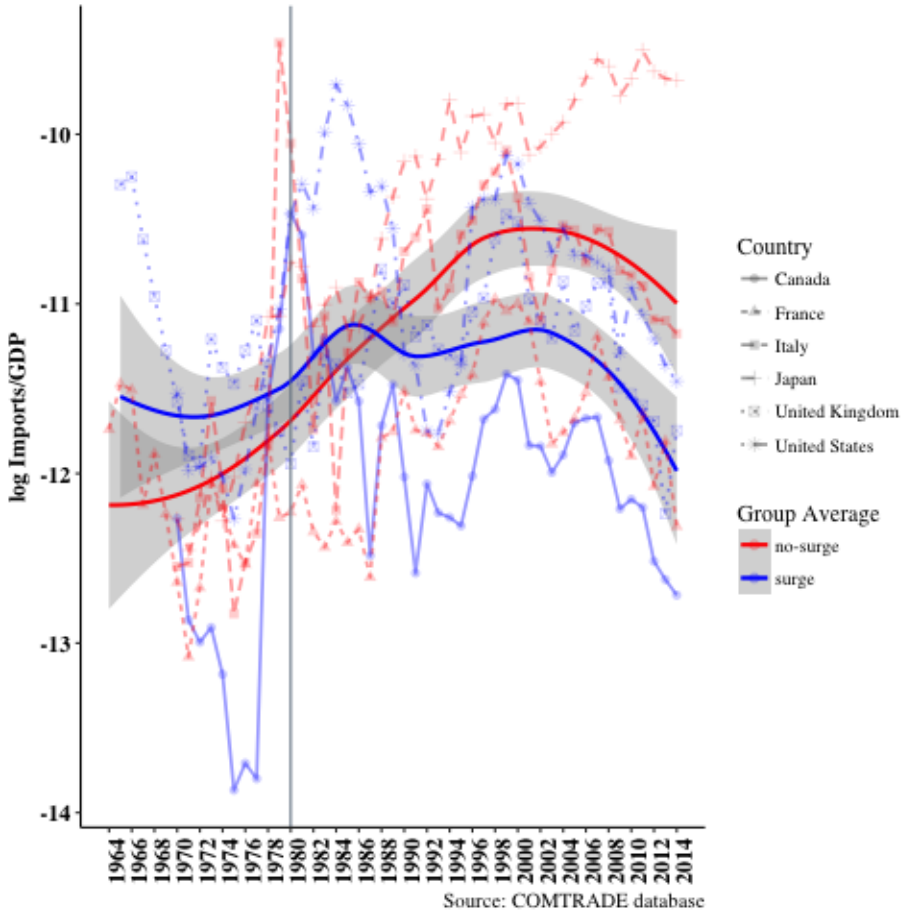


Figure 4.3: Other precious & semi precious stones not set

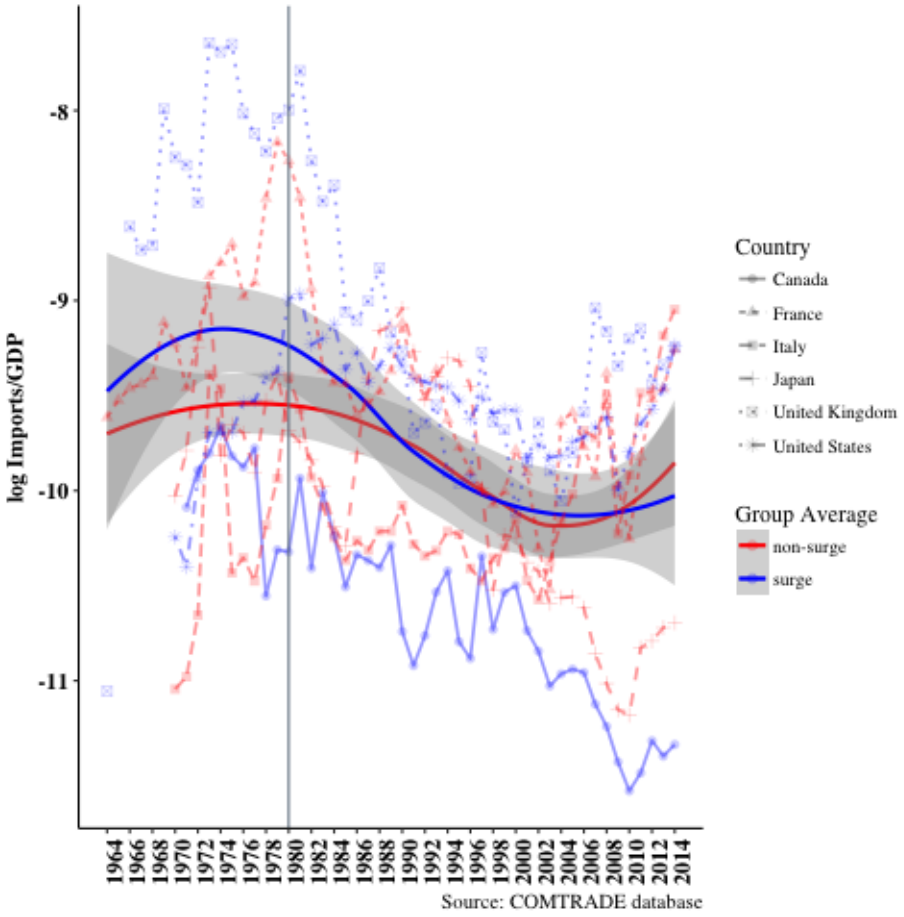


Figure 4.4: Diamonds, not industrial, not set or strung

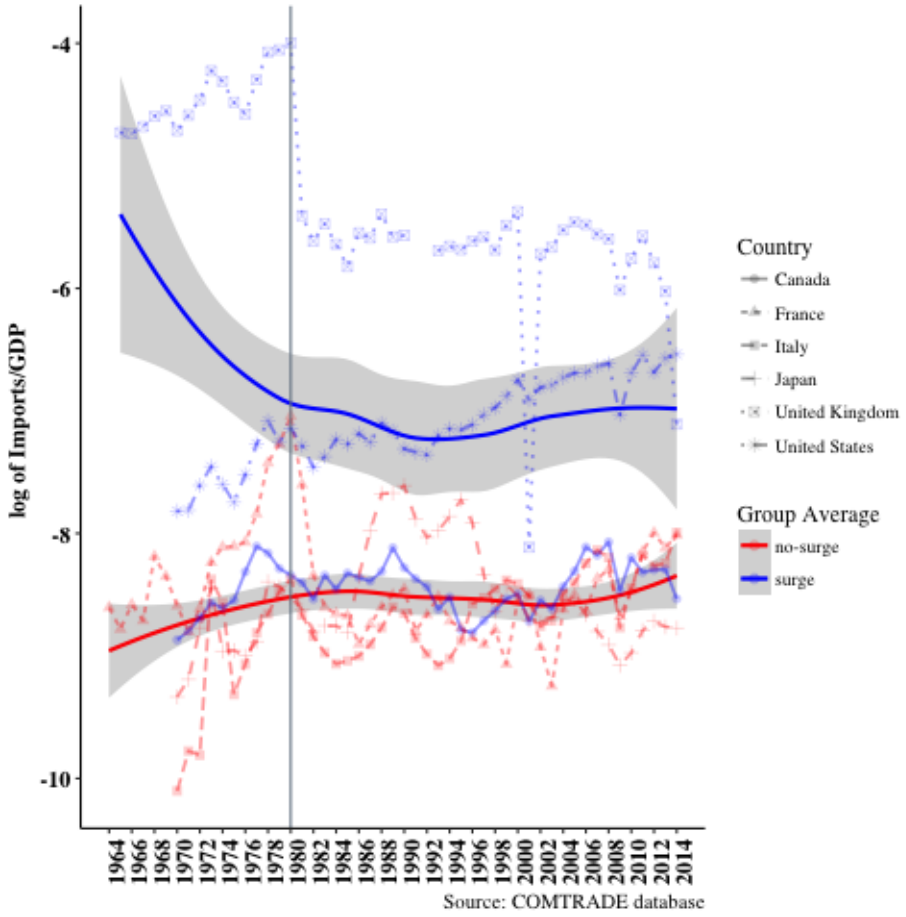


Figure 4.5: Works of art,collectors pieces

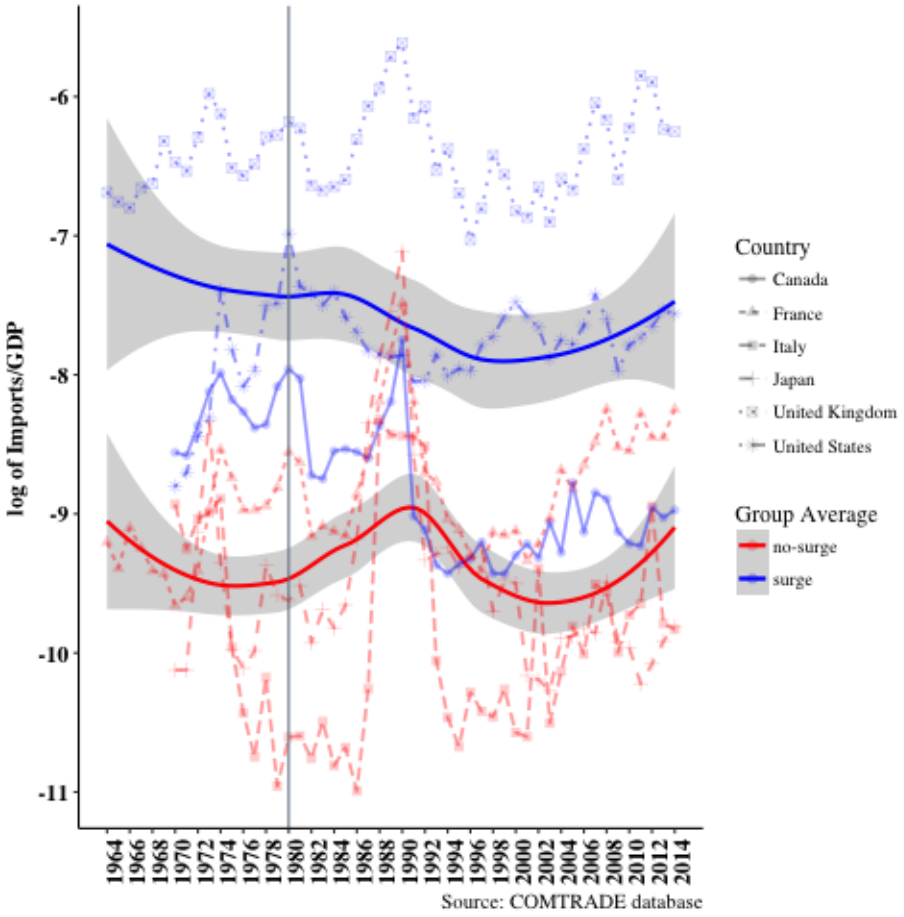


Figure 4.6: Gold, silver and platinum jewellery less watchcases

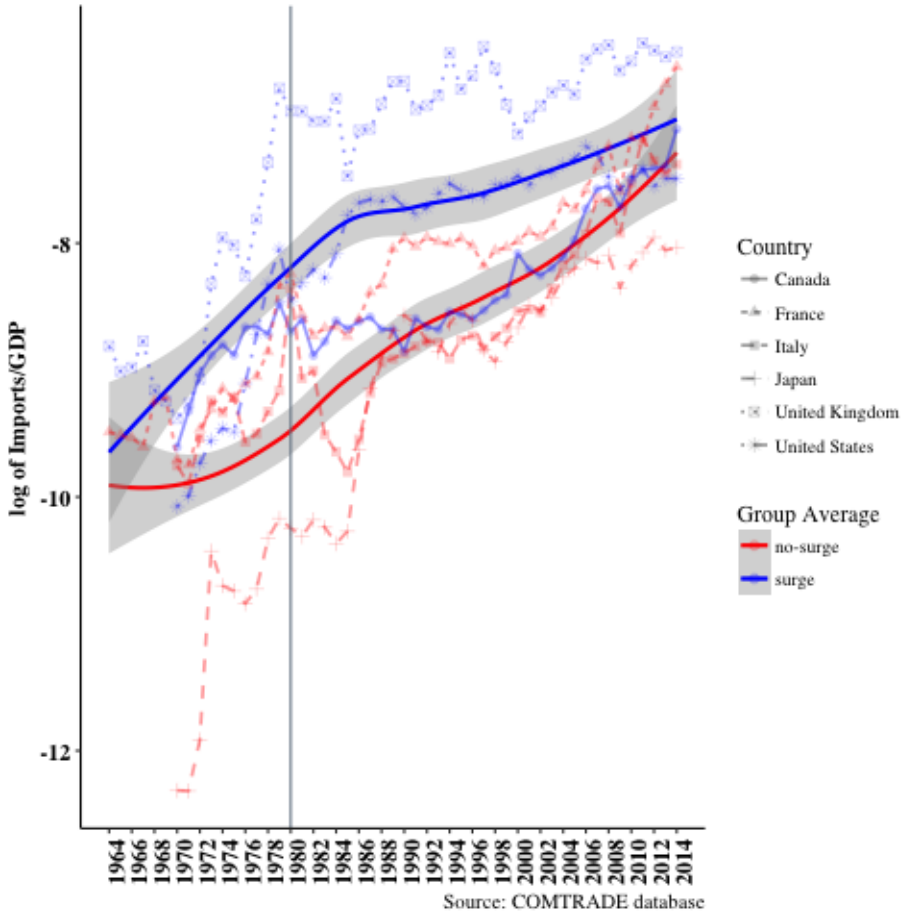


Figure 4.7: Fur Clothing

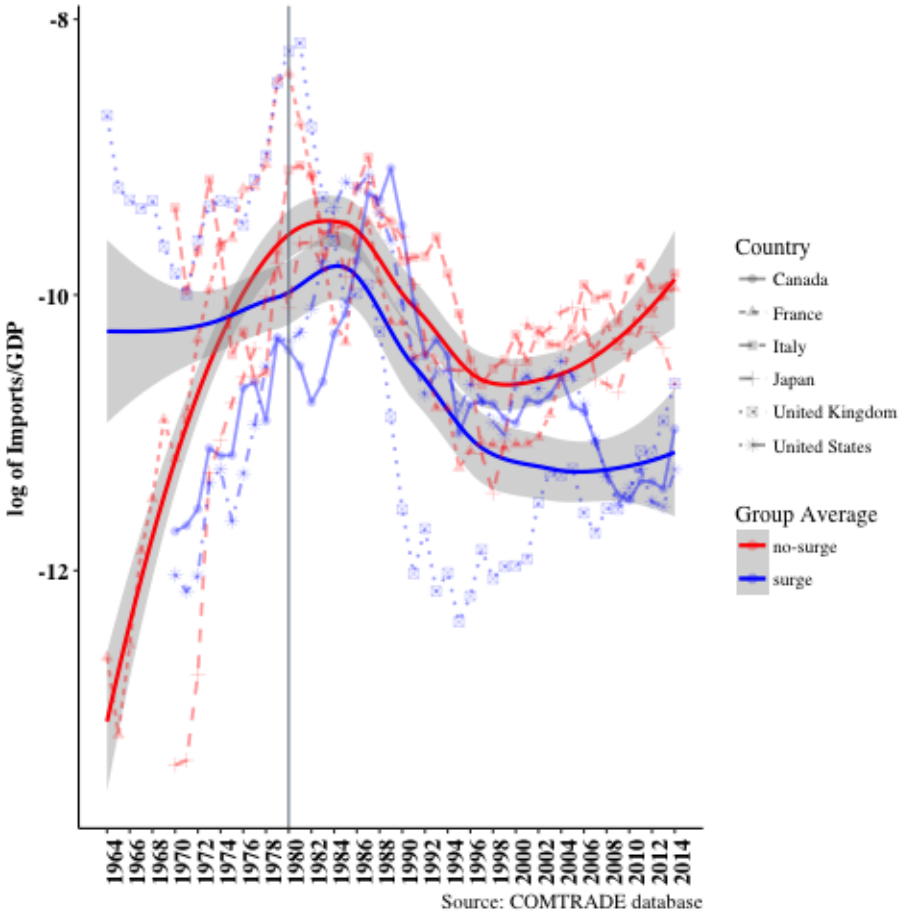
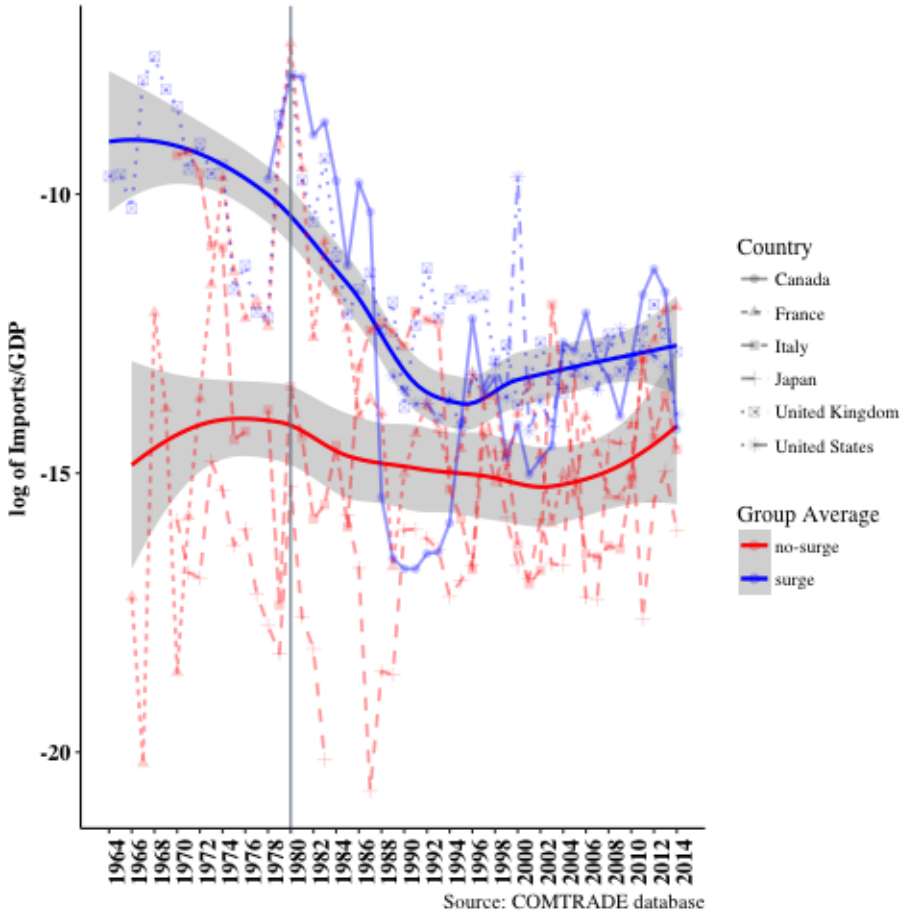


Figure 4.8: Coin, other than gold, not being legal tender



Even with a log scale, the resulting Figures 4.2 to 4.8 are somewhat noisy. But when we calculate smoothed averages in the same manner as in Figure 4.1, it is clear that despite the various idiosyncratic shocks for the different luxury goods, if anything the no-surge countries France, Italy and Japan had a larger average increase in the import-to-GDP ratios since 1980 than did the surge countries Canada, the U.K. and the U.S. Specifically while measured top incomes were increasing sharply post-1980 in surge countries, the figures show that the import-to-GDP ratios (a) for pearls declined slightly for all countries except there was an increase in Japan, a no-surge country (b) for precious stones mostly declined, with the sharpest falls for surge country Canada and no-surge Japan (c) continued at higher levels for the surge countries U.S. and U.K. for diamonds, works of Artwork and jewellery,

but with no differential trends between the surge and no-surge countries except perhaps for jewellery, where the no-surge country trend appears greater (d) for furs declined uniformly with some rebound in the no-surge countries and (e) fell erratically for coins, but with a sharper initial fall in surge countries followed by no differential trend in the averages.

A simple example of a difference-in-difference regression with import-to-GDP ratios as the dependent variables and as right-hand-side variables an intercept, a surge country dummy, a post-1980 dummy and an interaction of the two dummies is:

$$IM_{i,t} = \alpha_i + \beta_1 \text{Surge} + \beta_2 1980 + \beta_3 (\text{Surge} * 1980) + u_{i,t}$$

The coefficient of the last variable, β_3, is an estimate of the post-1980 change in mean import ratios for surge as compared to no-surge countries. Table 4.1 shows that these coefficients for the sample of countries in Figure 4.1 are always negative in sign and sometimes even statistically significant. Hence, the post-1980 top-income surge appears to be associated with if anything a smaller rather than a larger post-1980 increase in luxury import ratios in those countries that had it in comparison to those countries that did not. In the next section, we find similar graphical results for import-to-total-import ratios and when other APS surge and no-surge countries are included. We also have estimated a number of regressions using various sets of surge and no-surge countries, all yielding results consistent with our graph-based discussion here. This result holds as well under a number of changes, such as when the break year is changed from 1980 to 1983 or 1985, when the import ratio denominator is changed to total imports from GDP, when GNI is used instead of GDP or when different countries are added.

4.4 Possible Explanations

It is possible that the import data are inadequate to the task, although we find it striking that the results are so consistent across the imported goods. It is also possible that the surge has

Table 4.1: Difference-in-Difference Coefficient Estimates of Differential Effects of Top-Income Surge on Import Shares of Surge Countries, 1962-2014 (unbalanced panel)

	Dependent variable:						
	Pearls	Precious	Diamonds	Artwork	Jewellery	Fur	Coins
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	-0.554^{***}	-0.285	-0.709^{**}	-0.320	-0.144	-0.846^{***}	-2.407^{***}
	(0.205)	(0.196)	(0.296)	(0.259)	(0.182)	(0.205)	(0.710)
Observations	281	280	279	282	282	282	251

Note: *p<0.1; **p<0.05; ***p<0.01

been overestimated in the countries we call surge countries or underestimated in the no-surge countries, in the latter case perhaps because of misreporting in income tax filings.[4] The other explanation is that there really was a differential surge but that high-income individuals in surge countries do not have a particularly high marginal propensity to consume these luxury goods, at least domestically. The possibility remains that they purchase these goods in other countries, perhaps in small tax havens (a proposition we have been unable to test because of data quality issues). We test the average elasticity of these goods in the next section.

There are also other less tangible items the top 1% may be spending consuming more differentially across countries such as education, housing and services. We attempted to look for sources of data on nationally averaged housing or education prices across countries, but were unable to find readily available data series that begins earlier than the 1990s.

4.5 Robustness

This section outlines the following robustness checks:

[4]There is some debate as to whether the U.S. top income surge is as large as indicated by Figure 4.1, based on the World Inequality Database. Saez & Veall (2005) and R. (n.d.) argue that the Canadian surge was in part caused by, and hence indirectly provides evidence of, a U.S. surge. But others e.g. Armour, Burkhauser, & Larrimore (2013) and Auten & Splinter (2017) find that the measured U.S. surge is smaller when different definitions of income are used that incorporate in-kind government transfers and accommodate changes in U.S. tax law. One recent major paper Jones & Kim (forthcoming) takes as given that there has been a large U.S. top income surge in comparison to small increases in France and Japan and then develops a theoretical model to explain the difference.

- Dividing trade in each good's category by total imports instead of GDP.
- Using a broader range of countries.[5]
- Checking the overall elasticities of the set of luxury goods we used in our analysis.
- Checking alternate break points in 1983 and 1985 instead of 1980.
- Testing another potential luxury good, imports of Swedish cars.

Overall, there is not much difference in the sign or significance of the coefficients, except in the third exercise where we use the top 1% share of income for each country instead of a difference-in-difference comparing Group 1 countries versus none Group 1 countries.

4.5.1 Total Imports

In this robustness check, we use the same difference-in-difference regression as before, however, this time we use imports of the luxury good as a share of total imports, instead of as a share of GDP. The same group of countries is used as in the main difference-in-difference regression. The results in Table 4.2 are very similar to the previous with coefficients that are all negative in sign and some are statistically significant. Figures 4.9 to 4.15 in the appendix reinforce the difference-in-difference results.

Table 4.2: Difference-in-Difference Coefficient Estimates of Differential Effects of Top-Income Surge on Import Shares of Surge Countries, 1962-2014 (Total imports)

	Dependent variable:						
	Pearls	Precious	Diamonds	Artwork	Jewellery	Fur	Coins
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	-0.763^{***}	-0.543^{*}	-0.442^{*}	-0.176	-0.258^{*}	-0.913^{***}	-1.273^{**}
	(0.279)	(0.294)	(0.247)	(0.255)	(0.149)	(0.190)	(0.627)
Observations	305	303	298	306	306	306	262

Note: *p<0.1; **p<0.05; ***p<0.01

[5]Country list available in Table 4.9 of the Appendix

4.5.2 Larger country sample

A larger sample of countries is used. Namely: Australia, Canada, Denmark, Finland, France, Italy, Japan, Netherlands, Norway, New Zealand, Sweden, Switzerland, United Kingdom, United States. The classification of each country follows Atkinson et al. (2011) to categorize them into Group 1, 2 or 3 countries. Countries in Group 1 are assigned a 1 for the Group 1 dummy and Groups 2 and 3 are assigned a 0. Table 4.9 in the appendix contains the full list of countries with their classification. The results in Table 4.3 are mixed, some coeffients remain negative, while those for pearls, jewellery and fur become positive. The coefficient for fur even becomes positive and significant.

Table 4.3: Difference-in-Difference Coefficient Estimates of Differential Effects of Top-Income Surge on Import Shares of Surge Countries, 1962-2014 (larger sample)

	Dependent variable:						
	Pearls	Precious	Diamonds	Artwork	Jewellery	Fur	Coins
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	0.226	-0.324	-0.352	-0.482^{**}	0.189	0.707^{***}	-2.310^{***}
	(0.200)	(0.278)	(0.286)	(0.203)	(0.183)	(0.179)	(0.501)
Observations	644	643	642	647	647	647	523

Note: *p<0.1; **p<0.05; ***p<0.01

4.5.3 Real Incomes

$$\ln IM_{i,t} = \alpha_i + \beta_1 \text{GNI}^{real}_{i,t} + \beta_2 \ln \text{Share}_{i,t} + u_{i,t}$$

This time imports are defined as the natural logarithm of the ratio of imports of each good divided by nominal Gross National Income and GNI^{real} is real Gross National Income. For this analysis, the United Kingdom had to be removed due to real Gross National Income not being available before 1999. The idea is to control for changes in real incomes in each country and check the validity of using the HS categories of goods we selected as luxury goods. Table 4.4 shows that for a higher share of income at the top 1%, imports of luxury

Table 4.4: Difference-in-Difference Coefficient Estimates of Differential Effects of Top-Income Surge on Import Shares of Surge Countries, 1962-2014 (real incomes)

	Dependent variable:						
	Pearls	Precious	Diamonds	Artwork	Jewellery	Fur	Coins
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share	-1.500^{***}	1.826^{***}	0.022	2.933^{***}	1.341^{***}	-0.918^{***}	4.476^{***}
	(0.218)	(0.149)	(0.197)	(0.252)	(0.246)	(0.207)	(0.910)
Real GNI	0.735^{***}	0.286^{***}	0.287^{***}	-0.004	-0.158^{**}	0.017	-1.210^{***}
	(0.058)	(0.039)	(0.052)	(0.067)	(0.065)	(0.055)	(0.261)
Observations	212	212	211	212	212	212	181

Note: *p<0.1; **p<0.05; ***p<0.01

goods were associated with no significant change for diamonds, a positive significant change for jewellery, coins, precious stones, fur and artwork, and an opposite change for pearls and fur.

As real income goes up, the imports as a fraction of income fall for coins, fur and artwork (although not significantly for artwork). Therefore there is some doubt as to whether they are empirically luxury goods.

4.5.4 Structural break in 1983 and 1985

The following two regression a run as a simple test regarding the choice for the cutoff year:

$$IM_{i,t} = \alpha_i + \beta_1 \text{Group1} + \beta_2 1983{,}1985 + \beta_3(\text{Group1} * 1983{,}1985) + u_{i,t}$$

The sample of countries is used as in our main exercise. The results in Tables 4.5 and 4.6. They show no change in the sign of the coefficients of interest, which remain negative for all goods, although in some cases the levels of significance vary

Table 4.5: Robustness check for break in 1983

	Dependent variable:						
	Pearls	Precious	Diamonds	Artwork	Jewellery	Fur	Coins
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	-0.649^{***}	-0.547^{**}	-0.271	-0.466^{*}	-0.210	-0.696^{***}	-2.726^{***}
	(0.189)	(0.278)	(0.183)	(0.241)	(0.170)	(0.194)	(0.623)
Observations	281	279	280	282	282	282	251
Note:							*p<0.1; **p<0.05; ***p<0.01

Table 4.6: Robustness check for break in 1985

	Dependent variable:						
	Pearls	Precious	Diamonds	Artwork	Jewellery	Fur	Coins
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	-0.798^{***}	-0.529^{*}	-0.348^{**}	-0.523^{**}	-0.324^{**}	-0.703^{***}	-2.877^{***}
	(0.180)	(0.269)	(0.176)	(0.233)	(0.164)	(0.188)	(0.587)
Observations	281	279	280	282	282	282	251
Note:							*p<0.1; **p<0.05; ***p<0.01

4.5.5 Swedish Cars

Most passenger car brands exported from Sweden namely, Koenigsegg, Volvo, Saab, Esther and Caresto, are regarded as sports/luxury brands of cars. The same difference-in-difference regression as in the main exercise is run, but with imports of passenger motor vehicles from Sweden as the variable of interest. The same set of initial countries is used (Table 4.8). The

Table 4.7: Swedish cars

	Dependent variable:	
	Cars/GDP	Cars/Total Imports
	(1)	(2)
	-0.019	-0.011
	(0.036)	(0.020)
Observations	282	282
Note:	*p<0.1; **p<0.05; ***p<0.01	

first columnof Table 4.7 shows results as a share of each country's GDP and the second one is as share of each country's total imports. Both coefficients of interest are negative, and neither is significant.

4.6 Conclusions

The curious incident in our title refers to a Sherlock Holmes case where something should have happened (the dog should have barked) but did not. For countries where Atkinson, Piketty and Saez (2011, APS) found post-1980 top-end income surges using tax-filer data, we expected to find sharp increases in imports of luxury goods pearls, precious stones, diamonds, works of artwork, jewellery, furs and coins. But we found no evidence that the ratio of the value of these imported goods either to GDP or to total imports increased relative to those countries for which APS found no surge.

From the robustness exercises, there was not much change when looking at the import of the good as a share of trade, adding more countries and changing the cutoff years. The results show an interesting change when using the top share of income as a continous variable as opposed to separating countries in group 1 versus non group 1 countries. However, this result is somewhat attenuated by controlling for changes in real incomes.

This might suggest issues in import or top-income measurement in either surge or no-surge countries or it might indicate that the domestic marginal propensity to consume these luxury goods by top-income individuals in surge countries is not particularly large. Regardless this is a fragment of evidence that there may not have been a large post-1980 increase in top-end domestic consumption inequality in countries with a top-end surge in taxfiler-reported income as compared to those countries that did not have a surge.

4.7 Appendix

Table 4.8: G7 countries minus Germany

Group 1 Countries	Group 2 Countries
Canada	France
United Kingdom	Italy
United States	Japan

Table 4.9: Larger sample of countries

Group 1 Countries	Group 2 Countries	Group 3 Countries
English speaking	**Continental EU and Japan**	**North/South EU and other**
Australia	Denmark	Finland
Canada	France	Italy
New Zealand	Japan	Sweden
United Kingdom	Netherlands	Norway
United States	Switzerland	-

Figure 4.9: Pearls, not set or strung

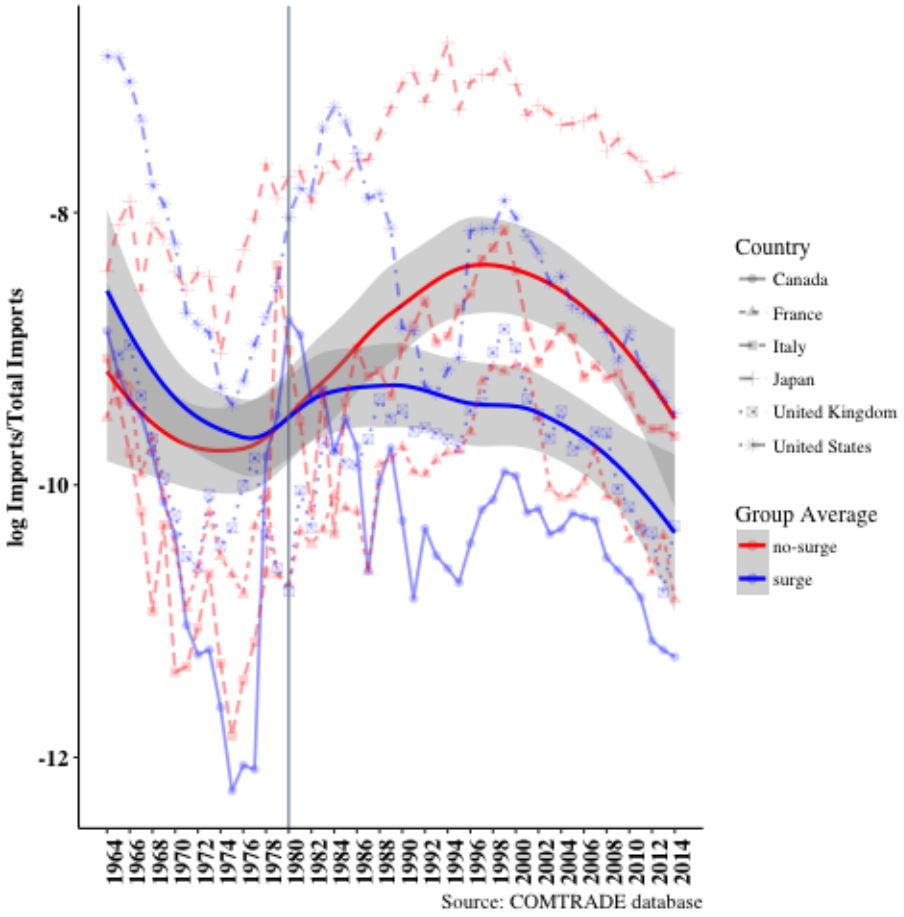


Figure 4.10: Other precious & semi precious stones not set

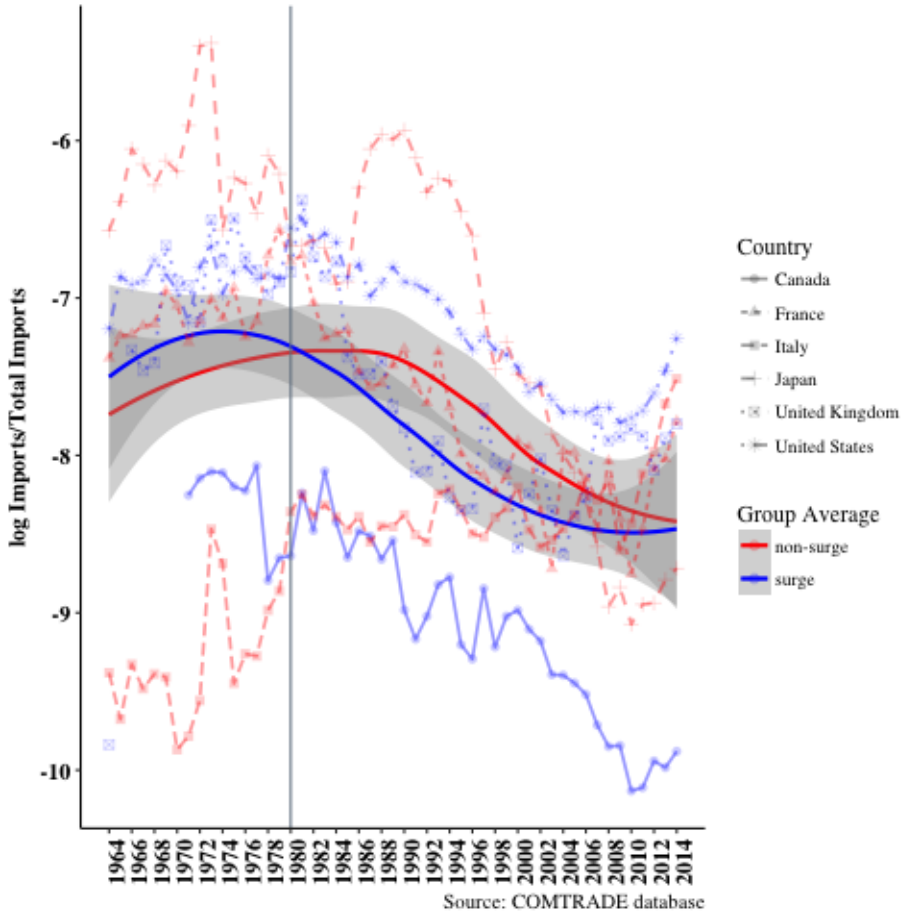


Figure 4.11: Diamonds, not industrial, not set or strung

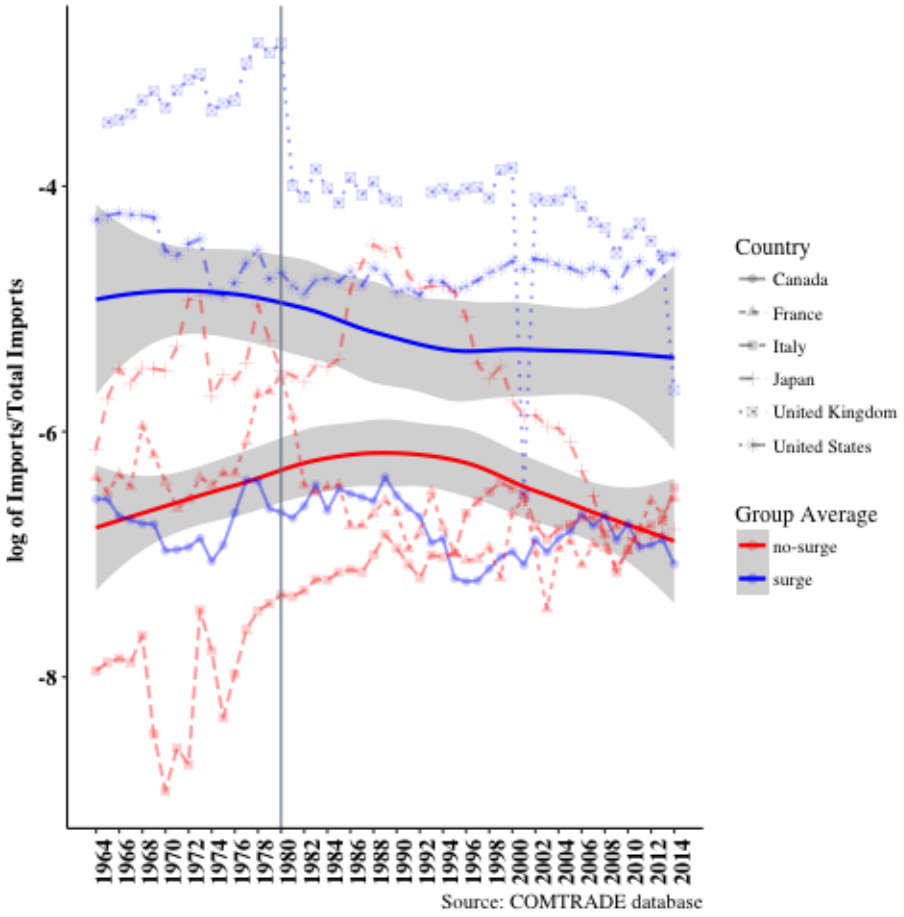


Figure 4.12: Works of art, collectors pieces

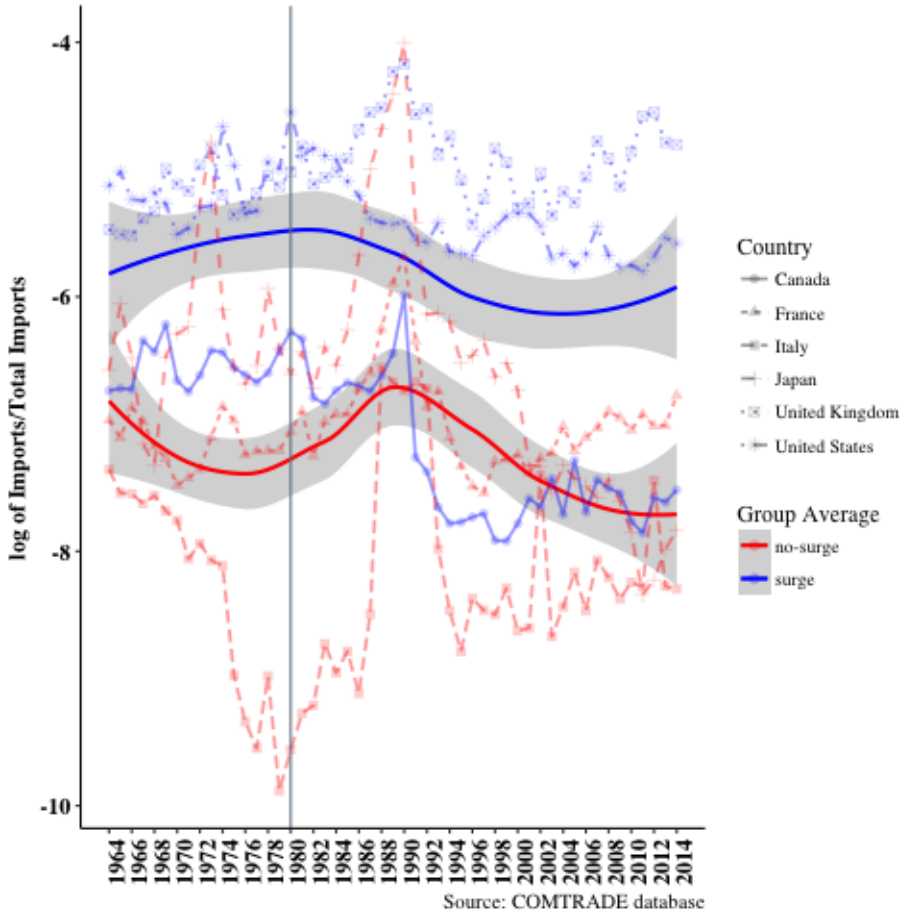


Figure 4.13: Gold, silver and platinum jewellery less watchcases

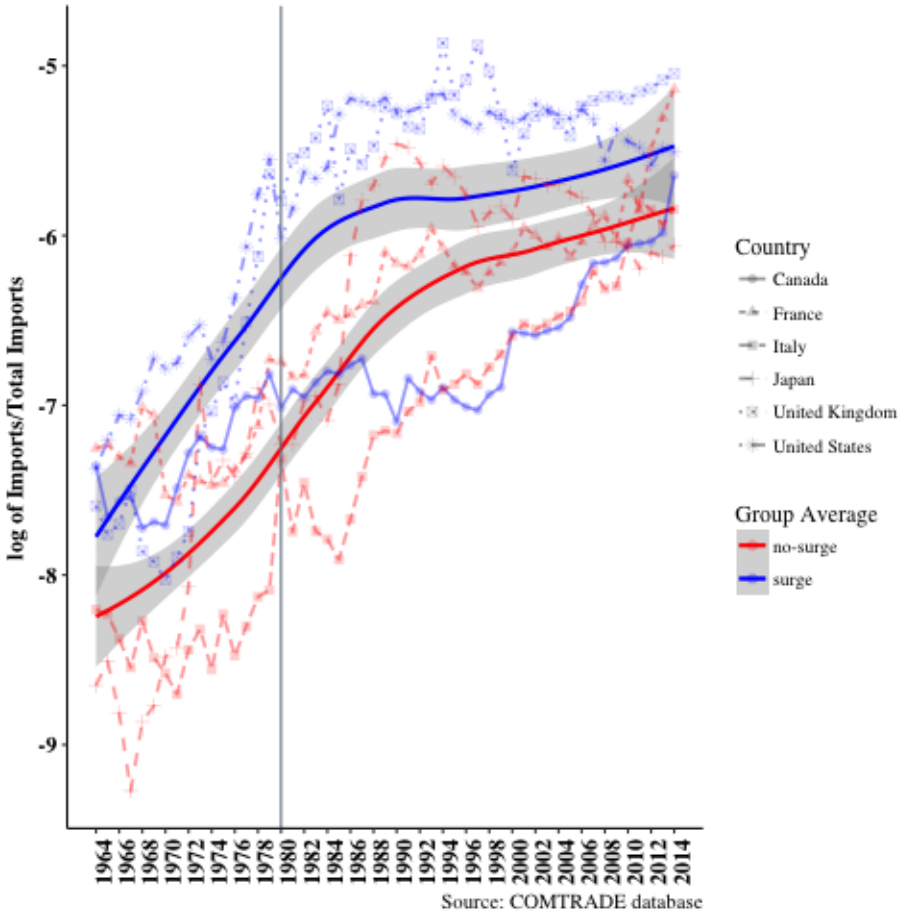


Figure 4.14: Fur Clothing

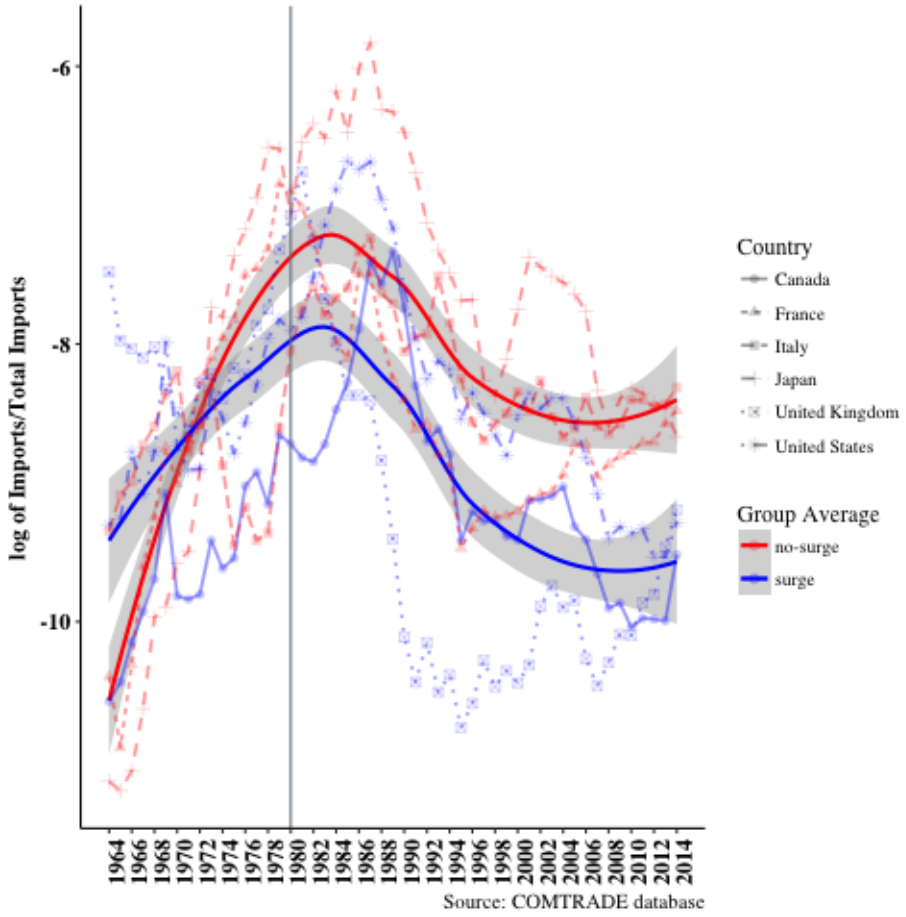
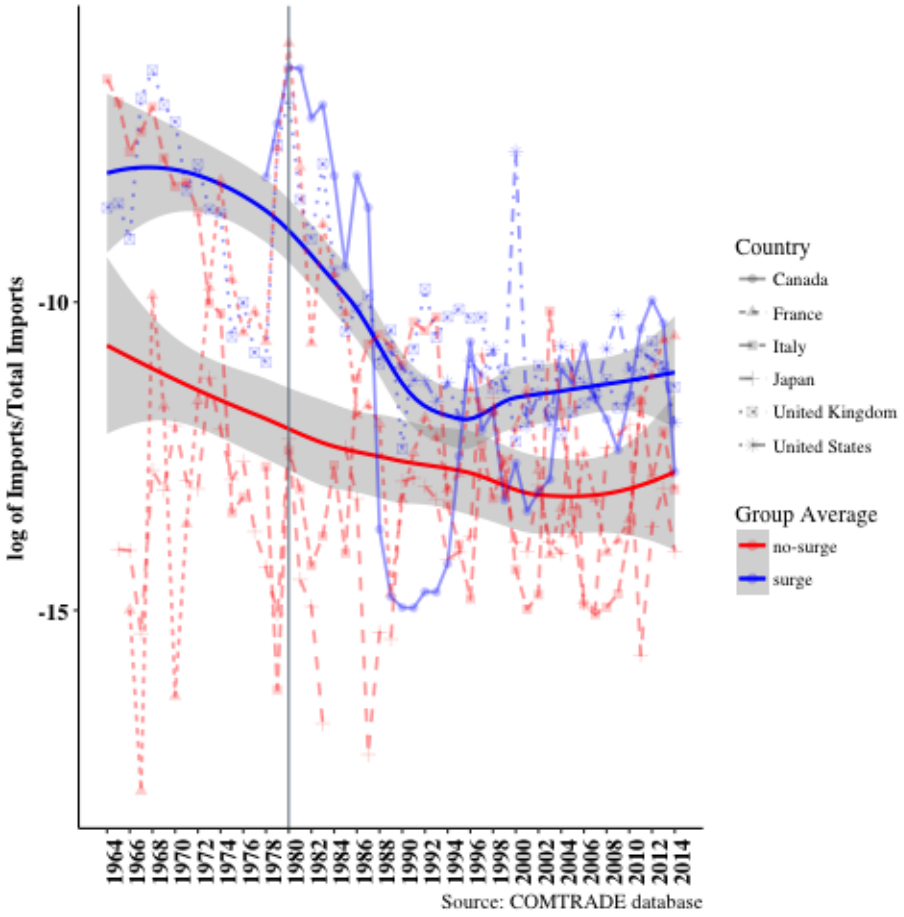


Figure 4.15: Coin, other than gold, not being legal tender



Conclusion

This thesis is composed of three essays that explore wide-ranging aspects of international agreements. The chapters are disparate in the puzzles they analyse, and the approaches taken to tackle them. First, Chapter 2 uses an empirical approach and novel firm-level data to establish firm behaviour following the signing of a Foreign Investment Protection Agreement between Canada and Peru. Second, Chapter 3 uses a dynamic programming structural approach to evaluate the impact of having tariffs tied down by international agreements when a government is confronted with a sovereign debt crisis. Third, Chapter 4 uses the immense amount of international trade and detailed data that was generated from these international agreements to compare changes in consumption patterns for countries that saw different increases in the income shares of the top 1% of income recipients.

In Chapter 2 it is demonstrated that while there was a large increase in investment from Canada into Peru after the Canada-Peru FIPA was enacted, it did not lead to Canadian firms offshoring production to Peru. Even though the aggregate and industry-level data seemed to indicate there might be offshoring, the detailed firm-level demonstrated this was not the case. More likely explanations are that the investment Canadian firms made was as greenfield FDI to secure mining rights in Peru, or that it was used to gain more direct access to sell products in adjoining countries. It is outside the scope of the Canadian firm-level data to be able to answer how this Canadian investment was used.

In Chapter 3 a theoretical model is used to simulate the use of tariffs as an instrument for governments to utilise when faced with a sovereign default crisis. It explores the tradeoff the

sovereign faces when raising tariffs between being able to raise higher revenues to continue borrowing and lowering output. Tariff revenues are especially crucial for countries with less formal institutions, who are unable to readily collect other forms of tax revenues. This chapter highlights the importance of schemes such as the Everything but Arms, a European Union program, which allows for Least Developed Countries within the WTO to unilaterally export goods tariff-free while being able to maintain some freedom over their own tariffs. More importantly, it calls to consideration the issue of these countries needing flexibility over their tariff rates when negotiating regional trade agreements.

In Chapter 4 an empirical analysis uses widely available import data to attempt to capture changes in consumption patterns for countries that saw a surge in the top 1% share of income versus those that did not observe such a surge. It is found that there was no larger increase in the imports of luxury goods for countries that experienced larger surges in the top share of income. This acts as evidence against a large increase in top-end consumption inequality associated with this top income surge. Overall, the insights that this dissertation provides improves our understanding of international agreements and the data that they generate.

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