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Abstract

On the day before Brazil was to start imposing retaliatory sanctions against the US in the WTO dispute settlement case regarding unfair domestic and export upland cotton subsidies, the parties have reached a preliminary concession aimed at settling this 8-year-long trade dispute. In this paper, we explore the economy wide impacts of a no deal with specific emphasis on intellectual property retaliation in a computable general equilibrium framework. As awarded by a WTO dispute settlement panel, Brazil would have been entitled to \$591 million in retaliatory sanctions in goods sectors and \$238 million in intellectual property sanctions. We find that retaliation by Brazil would have led to welfare gains for all countries except the US. Most importantly however, had Brazil not been allowed to retaliate in the form of suspension of intellectual property rights, the impact of trade retaliation alone would have been negative for both Brazil and the US, a case of shooting oneself in the foot to shoot at the other person's foot.

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1 Introduction

In September 2002, the government of Brazil initiated consultations with the United States under the dispute settlement procedures of the World Trade Organization (WTO) claiming that various provisions of the US cotton programme were in violation of WTO obligations (WTO, 2002). The contested measures included certain domestic and export subsidies provided to US producers, users and exporters of upland cotton¹.

After unsuccessful consultations, in September 2004 a WTO Dispute Settlement Panel found in favour of Brazil (WTO, 2004). Following a failed appeal in March 2005, the US was required to implement changes in its policies of the cotton programme. Later, in December 2007 a compliance panel arrived at the conclusion that the US had not fully complied with previous WTO recommendations. As a result, at the Dispute Settlement Body (DSB) meeting in March 2009, Brazil claimed the right to impose \$2.5 billion in retaliatory sanctions against the US in the form of the suspension of tariff concessions and cross-retaliation in the form of suspension of intellectual property obligations under the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS).

Finally, in September 2009 the Panel granted Brazil the right to impose sanctions worth \$294.7 million (2006 base-year). In 2008 figures, this was equivalent to \$829 million in sanctions against the United States. In April 2009, Brazil published a list of 102 US products that would be subject to retaliatory tariffs worth \$591 million and a list of 21 proposed intellectual property sanctions up to \$238 million.

The WTO dispute settlement mechanism allows for countermeasures to be imposed against a member country that has been proved to be in violation of WTO rules and obligations. According to the WTO dispute settlement rules, retaliation should be equivalent to the level of damage and should concern the same sector whenever practicable.

Cross-retaliation as a concept has not been directly defined in any of the WTO's dispute settlement articles, but it refers to the situation where the initiating country suspends concessions or other obligations under a sector or an agreement that are *not* the subject of the dispute. Cross-retaliation is an instrument that is authorized in cases where the complaining country is able to prove that retaliation in the same sector or agreement where the violation occurred is not practicable or effective.

Intellectual Property Rights (IPR) cross-retaliation entails the right of (developing) countries to suspend their obligations under TRIPS if conventional methods prove to be inefficient. When compared to traditional market access retaliation, the suspension of IPR has proved to be an

¹Upland cotton is defined as raw upland cotton and primary processed forms of such cotton including upland cotton lint and cottonseed (WTO, 2004).

effective negotiating instrument for developing countries to enforce compliance with the decisions of the Dispute Settlement Body (DSB).

In the specific case of the US-Brazil cotton dispute, Brazil argued that the suspension of concessions exclusively under trade in goods was not practicable or effective since higher trade barriers to Brazilian imports of U.S. goods would impose additional costs on the Brazilian economy. Brazil pointed out that 95% of Brazil's imports from the U.S. comprise of capital goods, intermediate goods and other essentials for the Brazilian economy. In addition 86% of the imports of consumer goods correspond to medical supplies, food and automotive products.

The US-Brazil cotton case is not without precedence as cross-retaliation under TRIPS has been authorized twice by the WTO Dispute Settlement Body. The first request for the suspension of intellectual property rights came from Ecuador against the European Community (EC) claiming that the EC's banana trading regime was in violation of certain aspects of the General Agreement on Tariffs and Trade (GATT) and the General Agreement of Trade in Services (GATS). The arbitrators found in favour of Ecuador and permitted the suspension of obligations of TRIPS. In this case, the parties reached a settlement agreement before Ecuador was to start implementing the retaliation. The second dispute settlement case involving a request for the suspension of concessions under TRIPS was initiated by Antigua and Barbuda against the US. Antigua claimed that US restrictions on cross-border gambling services were in violation of GATS. The WTO arbitrators ruled in favour of Antigua and authorized suspension of TRIPS obligations by Antigua. Up to the present, Antigua has not yet imposed sanctions nor has a settlement been reached with the US.

With respect to the US-Brazil cotton dispute, on April 6, 2010, the day before Brazil was to start imposing retaliatory sanctions, a preliminary deal with the US was reached. The deal entailed \$147 million a year for setting up an assistance fund for the cotton industry in Brazil while US negotiators agreed to reevaluate the possibility of imports of fresh beef from Brazil.

The fact that in none of these disputes IPR cross-retaliation has actually been implemented proves that the simple threat of IPR retaliation is serious enough to convince parties to reach an agreement. Apart from the pressure of entertainment and pharmaceutical industries on the national governments, it is expected that the economic costs of the suspension IPR concessions may be substantial and widespread across the economy.

This paper examines those economic costs by exploring the economic impact of a no deal in the US-Brazil cotton dispute using a global computable general equilibrium framework, the GTAP model ([Hertel, 1997](#)). As awarded by a WTO dispute settlement panel, Brazil would have been entitled to \$591 million in retaliatory sanctions in the goods sectors and \$238 million in intellectual property and services sanctions.

While quantifying the impacts of trade retaliation does not pose any challenges, implementing

IPR retaliation requires us to modify the underlying model. The framework we develop is unique in the sense that it provides the possibility for quantifying intellectual property related issues in a framework that is consistent with international accounting standards² and general equilibrium.

The paper is structured as follows. Section 2 describes in detail the US-Brazil upland cotton dispute. Section 3 provides a short summary of the economic analysis used in WTO dispute arbitration. Section 4 presents our modelling framework, while Section 5 details the economic impacts of a no deal. Finally, Section 6 concludes.

2 Dispute DS267 - US Subsidies on Upland Cotton

Dispute DS267 initiated in September 2002 by Brazil (a major cotton exporter), found prohibited and actionable subsidies on upland cotton³ imposed by US producers, users and exporters of upland cotton. Brazil claimed that these subsidies were in violation of certain provisions of the Agreement on Subsidies and Countervailing Measures (SCM), the Agreement on Agriculture and Article III:4 of GATT 1994.

Cotton subsidies have proved to be a sensitive issue not only in dispute settlements, but also in the current round of multilateral WTO negotiations⁴. The cotton market in developed countries is subject to significant subsidies that have resulted in the continued decrease in world cotton prices (see Figure 1) to the detriment of cotton producers in the developing world.

In 1999 - the reference year of Brazil's complaint to the Dispute Settlement Body, - assistance to cotton producers was highest in the United States (\$3.4 billion) followed by China (\$1.53 billion) and Greece (\$0.59 billion). In the same year, the United States was the third biggest cotton producer with \$16.9 billion bales after China (17.6 billion bales) and India (12.1 billion bales), but the largest exporter (6.75 billion bales), followed by China and Pakistan (Figure 2).

Cotton subsidies in the United States were introduced with the Agricultural Adjustment Act in 1933 as a part of the commodity programs⁵. Main categories of cotton subsidies in the U.S. include:

- Price based payments (marketing loan payments) provide support when market prices fall

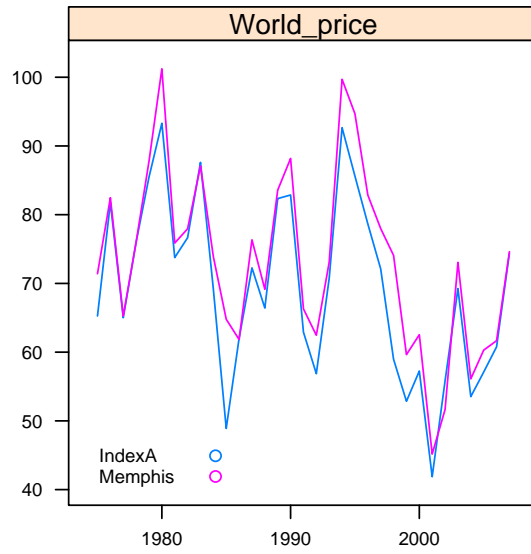
²System of National Accounts (SNA) 1993.

³According to the SCM Agreement, subsidies can be categorized as prohibited (e.g. export subsidies and local content subsidies) and actionable (e.g. production subsidies) that are not prohibited but subject to dispute settlement or countervailing action.

⁴Four West African cotton exporters (Benin, Burkina Faso, Chad and Mali) referred to as the Cotton Four (C-4) have introduced the Cotton Initiative demanding that the Doha Development Agenda include cutting cotton subsidies and tariffs (WTO, 2003).

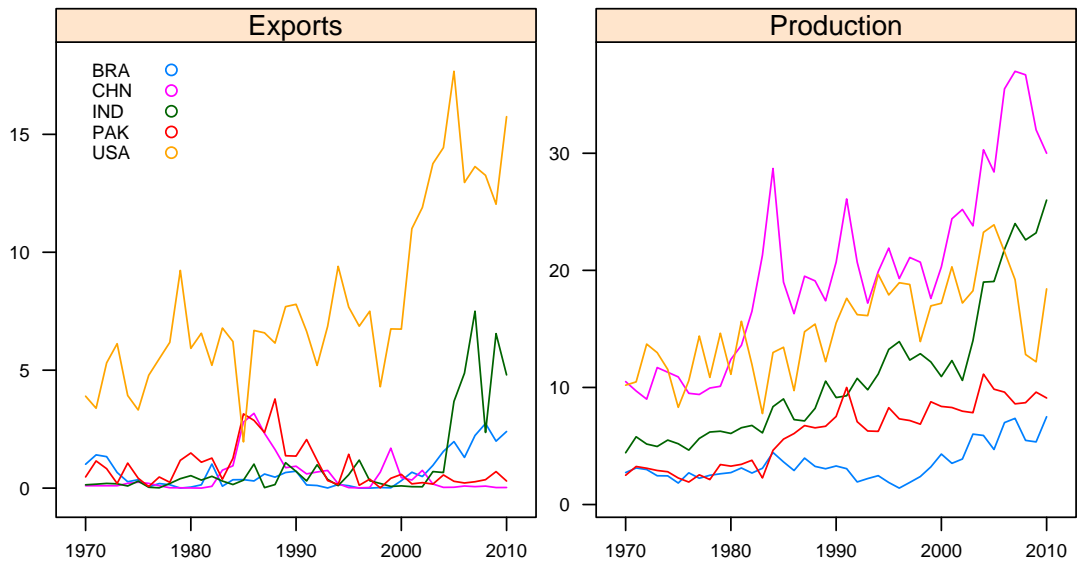
⁵Other covered commodities include wheat, feed grains, rice, soybeans and other oilseeds.

Figure 1: World Price of Cotton (nominal \$cents/lb)



Source: USDA Cotton Outlook. Index A is an average of the cheapest five types of cotton; Memphis quotes are based on middling 1-1/32 inch cotton

Figure 2: Major Cotton Producers and Exporters (billion bales)



Source: USDA Cotton and Wool Yearbook 2010

Table 1: Budgetary transfers to the US cotton sector (\$mil)

| | 1992 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|--------------|--------------|--------------|--------------|--------------|
| Coupled payments | 866 | 1,840 | 820 | 2,609 | 947 |
| Direct payments | 1,017 | 616 | 574 | 473 | 617 |
| Countercyclical payments | 0 | 613 | 612 | 654 | 1,309 |
| Crop insurance payments | 26 | 169 | 161 | 262 | 194 |
| Step 2 payments | 102 | 165 | 260 | 144 | 72 |
| TOTAL | 2,012 | 3,404 | 2,429 | 4,144 | 3,140 |

Source: [WTO \(2004\)](#)

below loan rates. Different forms include loan deficiency payments (LDPs), marketing loan gains (MLGs) and commodity certificates.

- Step 2 programme is a special marketing loan provided to exporters and end-users of upland cotton in case domestic prices exceed world prices.
- Decoupled or direct payments (production flexibility payments) are annual payments unrelated to production or market prices aimed at supporting producers based on historical acreage and yields.
- Crop insurance is annual crop yield or revenue insurance coverage for losses due to natural disasters or market fluctuations.
- Countercyclical payments (formerly known as deficiency payments) are automatic payments that make up for the difference between lower market prices and a target price.

Measures contested by Brazil in DS267 included domestic and export subsidies to US upland cotton producers during 1999-2002; subsidies mandated to be provided during 2002-2007; marketing loans; loan deficiency payments; commodity certificates; direct payments; countercyclical payments; i.e. virtually every type of domestic or export support measure to the US cotton industry. Further, Brazil alleged that Step 2 payments (described above) functioned as WTO *prohibited* export subsidies. Step 2 payments have been declared to the WTO as amber-box⁶ domestic support payments and consequently not subject to any limitations concerning export subsidies. Brazil also claimed that export credit guarantees⁷ (previously not considered as export subsidies by the US) functioned as export subsidies as well.

⁶The amber-box contains domestic support measures considered to distort production and trade that countries agreed to reduce but not eliminate.

⁷Insurance policy that protects an exporter against default by an importer.

Brazil argued that these measures caused serious prejudice to the interests of Brazil (WTO, 2002) since the use of these measures lead to: 1) a significant decline in the price of upland cotton in Brazil and everywhere else during 1999-2002; 2) an increase in the world market share of the US for upland cotton in 2001 and 3) a decrease/displacement of Brazilian exports of cotton to the rest of the world. Finally, Brazil argued that the US was not eligible to be exempt from the dispute settlement process under the "peace clause" of the Agreement on Agriculture as total subsidies provided to the cotton industry were in excess of the 1992 benchmark (see Table 1).

The dispute settlement panel (WTO, 2004) and the Appellate Body (WTO, 2005) of the DSB arrived at the conclusion that export credit guarantees and the Step 2 programme qualified as prohibited export subsidies in violation of WTO commitments and called for the their withdrawal without delay.

As the US did not comply with rulings of the Panel within the given timeline, in March 2009 Brazil claimed the right to impose \$2.5 billion in retaliatory sanctions against the US: \$300 million compensation for the US Step 2 programme, \$1.2 billion for the export credit guarantee programme, and the remaining \$1 billion for the marketing loan and countercyclical payments. In addition Brazil claimed the right to suspend intellectual property obligations under TRIPS. Finally, in September 2009 the Panel granted Brazil the right to impose trade sanctions worth \$294.7 million (2006 base-year) and the right to engage in IPR cross-retaliation.

In 2008 figures, Brazil would have been entitled to \$829 millions in retaliatory sanctions against the US, composed of:

- \$591 millions in retaliatory tariffs in goods sectors and
- \$238 millions in intellectual property and services sanctions⁸

With respect to trade retaliation, Brazil released a list of 102 U.S. products that would be subject to higher tariffs. The exact list is presented in Table 7 in the Appendix. As direct retaliation, cotton and cotton products face the highest tariff increase from 6% to 100% for raw cotton, and from 26% to 100% for certain cotton products. Cross-retaliatory tariffs cover a wide range of sectors from agricultural products, processed food to electronics. Tariffs on agricultural products such as wheat and certain fresh fruits (cherries, pears and plums) increased from 10% to 30%. Several food sectors were also affected: tariffs on ketchup doubles from 18% to 38% and on sugar-free chewing gum from 16% to 36%.

Concerning IPR retaliation, in February 2010 the Brazilian Government issued Provisional Measure No. 482 containing details about the implementation of the IPR retaliation. The document defines the following measures that could be undertaken: suspension of intellectual

⁸Note that, originally, there was no monetary value given for IPR cross-retaliation.

property rights, limitation of intellectual property rights, change of measures for the implementation of standards of protection of intellectual property rights, change of measures for obtaining and maintaining intellectual property rights and temporarily blocking the remittance of royalties or compensation on the exercise of intellectual property rights.

On the day before Brazil was to start imposing retaliatory sanctions worth \$829 millions, a preliminary deal with the US has been reached on April 6, 2010. Finally, on June 17, 2010 the parties signed a Framework Agreement that requires the US to set up an assistance fund to help Brazilian farmers worth \$147.3 million per year while the US agreed to establish a limit on trade distorting cotton subsidies.

3 The Economics of Retaliation

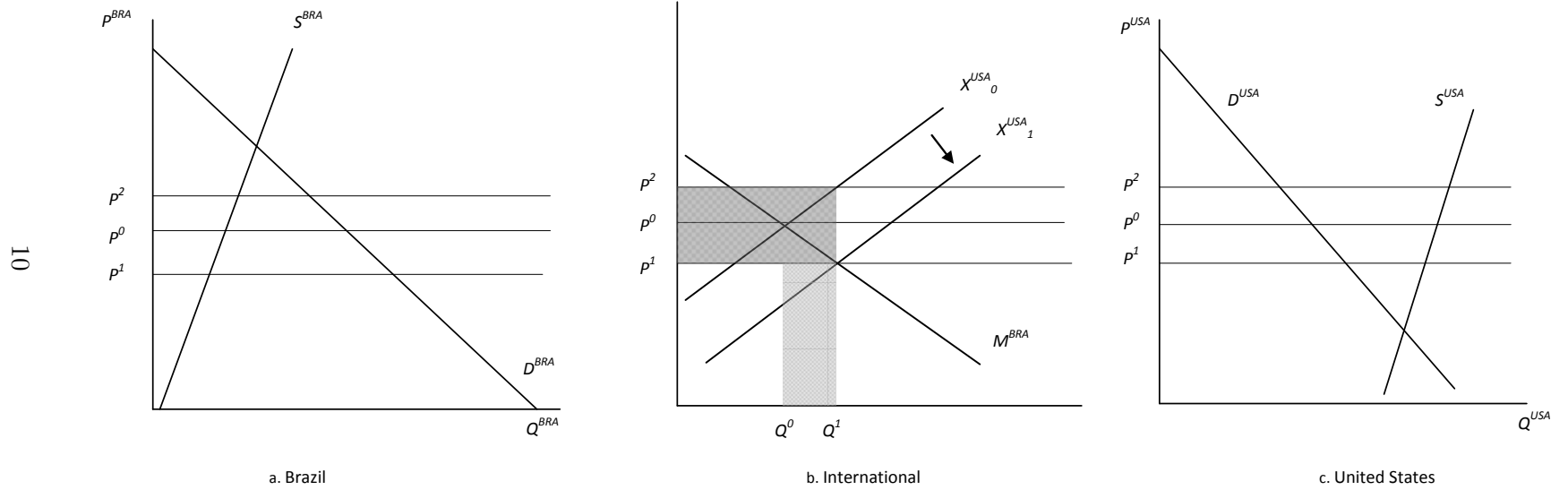
Article 22 of the Dispute Settlement Understanding ([WTO, 1995](#)) governs the "Compensation and the Suspension of Concessions" of the dispute resolution process of the WTO and it can be summarized by four main principles:

- Parties are given the choice between compensation (undertaken by the respondent in the form of lowering trade barriers) and retaliation (by the complainant in the form of retaliatory tariffs or suspension of other WTO obligations). As pointed out by [Anderson \(2002\)](#), retaliation is usually preferred to compensation as it asserts more pressure on the respondent to comply with WTO obligations.
- The level of retaliatory measures should be equivalent to the harm caused by the WTO inconsistent measure to the complainant.
- The complainant should first seek to suspend concession in the same sector in which the violation occurred. If this proves to be not practicable or effective, retaliatory measures can target other sectors.
- Retaliatory measures should be temporary and applied until the respondent complies with WTO obligations.

In the specific case of DS267, Brazil had initially sought \$2.5 billion in retaliatory sanctions against the US, but was awarded only a small fraction, \$294.7 million by WTO arbitrators.

Figure 3 provides an illustration of the theoretical framework for how reciprocal compensation is determined by WTO arbitrators in case of a WTO inconsistent export subsidy.

Figure 3: Reciprocity Compensation for a WTO Inconsistent Export Subsidy



Source: [Bown and Ruta \(2008\)](#)

Suppose Figure 3 describes a domestic and international market for cotton (in a partial equilibrium setting). There are two trading countries, Brazil and the United States. The supply (S^{BRA} and S^{USA}) and demand (D^{BRA} and D^{USA}) curves for the two countries are shown in panels A and C, respectively. At the initial equilibrium price P^0 Brazil has excess demand and the US has excess supply. The international market is described in panel B: at this initial equilibrium Brazil's import demand curve is M^{BRA} and the export supply curve of the US is X^{USA_0} . Brazil imports cotton from the US of Q^0 .

Assume that the US introduces Step 2 and export credit guarantees for cotton, - measures determined by the WTO panel to function as prohibited export subsidies. As a result of the export subsidy, US cotton producers export more leading to a downward shift in the export supply curve to X^{USA_1} . Excess supply in the international market for cotton causes prices to fall to P^1 . At the same time, domestic cotton prices in the US increase to P^2 . At the new equilibrium, Brazil imports Q^1 . As a result of the export subsidy, the market of the US increases and world cotton prices fall hurting Brazilian cotton producers.

As pointed out above, based on the principle of equivalence, retaliation by Brazil has to equal the damage caused by the prohibited export subsidy. More specifically, permissible Brazilian retaliation should correspond to the volume of distorted trade ($Q^1 - Q^0$) at the original export price P^0 , represented by the shaded area in Figure 3 (Bown and Ruta, 2008).

Now assume that Brazil chooses to retaliate by introducing prohibitive tariffs against US exports. Equation 1 defines the value of permissible retaliation under the principle of equivalence (Bown and Ruta, 2008):

$$P^0[Q^0 - Q^1] = P^0(\tau^{Ret})[Q^0 - Q^{Ret}(\tau^{Ret})] \quad (1)$$

or more specifically, the value of distorted trade at initial prices (the left hand side of the equation) has to equal the value of trade lost due to retaliatory tariffs τ^{Ret} (the right hand side of the equation).

While Equation 1 ensures equivalence between the harm caused to the reporting country and the permissible retaliation in terms of value of trade, it does not by any means ensure equivalence in terms of welfare effects (Anderson, 2002). More specifically, the net loss of export earnings is not equivalent with net welfare effects (except by coincidence) given that welfare is a more comprehensive measure that includes not only terms of trade effects, but allocative efficiency, technological change effects, etc. Traditional trade retaliation has often been referred to as equivalent to "shooting oneself in the foot" (especially in the case of developing countries). It is thus not an effective and credible threat as it leads to a decline in welfare in the retaliating country (Subramanian and Watal, 2000) and is therefore unlikely to be implemented.

On the other hand, cross-retaliation under TRIPS in the form of suspension of intellectual property obligations has proved to be both beneficial for the retaliating country and is a credible threat in forcing countries to comply with WTO obligations as it does not affect negatively the retaliating country's welfare.

4 Modeling Framework

The framework we use for carrying out the analysis is the comparative static GTAP model (Hertel, 1997). With respect to trade retaliation, this model is ready for implementing the policy shocks⁹. However, for implementing IPR retaliation the model needs to be modified.

As a first step, we identify the channels of impact of IPR retaliation.

From the consumers' point of view, IPR retaliation could lead to desirable consequences: as opposed to trade retaliation where the consumer carries the burden of the price increase for imported goods, the suspension of obligations under TRIPS could lead to an increase in consumer welfare by increasing access to pharmaceutical products, education, entertainment etc. through reduced price.

Finally, IPR retaliation will also have an impact on the remittance of royalties to right holders. For instance in the case of the US-Brazil dispute, Brazil threatened to suspend the transfer of royalty payments to Pfizer and other pharmaceutical companies.

The following subsections describe the international accounting standards for quantifying intellectual property and we present the extended GTAP model with explicit treatment of the royalty services sector.

4.1 Quantifying Intellectual Property

The increasing knowledge-intensity of economic activities over the years has led to increased interest in quantifying intellectual property, intangibles and innovation and their impact on the economy. In spite of this interest, issues with data availability, quality and measurement of intellectual property has prevented such analysis from being carried out. The following subsections give further details on the international accounting standards for quantifying intellectual property and describe how intellectual property is present in Input-Output accounting and trade data.

⁹Although the model could be further improved to endogenously match the exact amount of retaliation.

4.1.1 International accounting standards

The United Nations' System of National Accounts 1993 introduced important methodological changes with respect to the measurement of intellectual property in macroeconomic accounts. Accordingly, SNA 1993 states that it is necessary to distinguish between income received from licencing or leasing-type transactions and income from the purchase or sale of intellectual property assets.¹⁰ We thus differentiate between the *use* of intellectual property related assets (recorded under services-royalties and license fees) and the *purchase or sale* of intellectual property related assets (recorded in the intangible assets category of the capital account).

In line with these recommendations, the IMF's Balance of Payments database contains two entries with respect to royalty payments:

- In the current account under trade in services: "inclusion of this item under services, rather than under income, is in accordance with the SNA treatment of such items as payments for production of services for intermediate consumption or receipts from sales of output used as intermediate inputs". Royalties and license fees in this case refers to receipts (exports) and payments (imports) for the authorized use of trademarks, copyrights, patents, processes, techniques, designs, manufacturing rights, franchises, etc.
- In the capital account referring to income payments or receipts from the sales of intangible assets such as trademarks, copyrights etc.

To sum up, the purchase of all the rights of ownership of intellectual property assets is an income flow, while the purchase of the right to use intellectual property is recorded as a service transaction.

Note that the treatment of royalties and implicitly that of intellectual property (knowledge capital) transactions is very different from how traditional capital inputs and the associated foreign investment/foreign income are treated in the System of National Accounts. Thus, the contribution capital inputs to the production is treated as capital service, a component of value added, while royalties are treated as intermediate service input. Further, international capital mobility is not associated with movement across borders, as opposed to royalties that are recorded as international services transactions. Finally, income from change in ownership are recorded in the capital account for both.

4.1.2 Royalty services in Input-Output accounting

As international accounting standards require payments for the use of intellectual property or royalties to be treated as payments for a service, we should find that Input-Output accounts

¹⁰Previously all intellectual property transactions have been recorded as income flows.

describe the supply and use of royalties as a sector. Indeed, at the most disaggregated level (498 industry detail), the United States' Input-Output accounts, separately identifies and describes the supply and use of the royalty services sector. In the North American Industrial Classification System (NAICS) royalty and licensing income received by industries is described as a primary activity, separated from the rest of the activities. NAICS 533, *Lessors of non-financial intangible assets*, is the industry that rents intellectual property such as trademarks, patents, brand-names to the other industries.

We could not find Input-Output tables of other countries that separately identify this sector, thus the IO table of the US will serve as a base for the disaggregation of the GTAP sectoral classification to include a royalty services sector. According to the GTAP database conventions, we have to define the supply of the royalty services sector and separately identify the domestic and imported royalty services usage of royalty services by other sectors. Given that we use the US IO table to disaggregate both the supply/use structure and the output structure of the royalties sector in Brazil, it is possible that we overestimate the share of royalties in total Other business services in Brazil.

For disaggregating trade flows we complement the information from the IO tables with royalty services data from external data sources such as the BEA International Transactions Accounts, EUROSTAT and the National Bank of Brazil.

Table 2 reports the top 15 shares in the composition of the supply and use of the royalty services sector of the US as found at the most disaggregated level. We find that sectors that consume most royalty services are oil and gas extraction (25.3%), pharmaceutical and medicine manufacturing (4.7%) and food and drinking services (4.2%). These sectors correspond to GTAP sectors Oil (OIL) and Gas (GAS), Chemical, rubber and plastic products (CRP) and Trade (TRD), respectively. On the other hand, in the supply of the royalties sector non-comparable imports¹¹ (45.2%), monetary authorities and depository credit intermediation¹² (18%) and management consulting services (8%) are the most significant inputs. These sectors correspond to GTAP sectors Recreational and other services (ROS), Financial services (OFI) and Other business services (OBS), respectively.

¹¹Noncomparable imports include expenditures on personal and business travel while abroad by U.S. residents, royalties and license fees paid to foreign residents etc. This sector has no direct domestic counterpart.

¹²Establishments primarily engaged in accepting deposits and in lending funds from these deposits and performing central bank operations.

Table 2: The composition of the royalties sector in the US Input-Output table

| Use | | Supply | |
|---|-------|--|-------|
| Sector | %* | Sector | %* |
| Oil and gas extraction | 25.3% | Noncomparable imports | 45.2% |
| Pharmaceutical and medicine manufacturing | 4.7% | Monetary authorities and depository credit intermediation | 18.0% |
| Food services and drinking | 4.2% | Management consulting serv. | 8.0% |
| Retail trade | 3.7% | Couriers and messengers | 5.9% |
| Automobiles | 3.3% | Nondepository credit intermediation and related activities | 4.8% |
| Hotels | 2.4% | Business support services | 3.4% |
| Wholesale trade | 2.2% | Management of companies and enterprises | 1.9% |
| Telephone apparatus manufact. | 2.0% | Civic, social, professional and similar organizations | 1.9% |
| Broadcast and wireless communications equipment | 2.0% | Services to buildings and dwellings | 1.5% |
| Soft drink and ice manufact. | 1.6% | Paperboard container manufacturing | 1.2% |
| Petroleum refineries | 1.4% | Paper and paperboard mills | 1.1% |
| Home health care services | 1.4% | Coated and uncoated paper bag manufacturing | 0.9% |
| Cigarette manufacturing | 1.3% | Other computer related serv. | 0.9% |
| Semiconductor machinery manufact. | 1.3% | Employment services | 0.8% |
| Motor vehicle parts manufact. | 1.3% | Securities, commodity contracts, investments | 0.7% |

Source: BEA U.S. Input-Output Data
 *% of total use and supply, respectively.

4.2 Royalty Services in the GTAP Model

Based on our findings described above, we model royalty services as a separate industry, similar to any other production sector in the standard GTAP model.

Note that we do not describe the market for the purchase and sale of intellectual property (capital account), but only the purchase and sale of use of intellectual property (services trade). Implicitly we assume that IPR retaliation concerns royalty payments for the current *use* of intellectual property assets.

The modelling framework used here is inherently static and short run in nature, that is the suspension of IPR rights do not impact R&D incentives and there is no formation of new knowledge. This limitation could be overcome by introducing dynamic features to describe the formation of new knowledge, however we consider that a comparative static framework is suitable for the carrying out the analysis at hand. The underlying assumption would imply that the suspension of IPR rights does not impact on R&D incentives in the two countries, a reasonable assumption given that royalty payments are waived only temporarily.

4.3 Simulation Design

The model is calibrated using version 8 pre-release 1 of the GTAP database which has a base year of 2007. The 112 regions of the full database have been aggregated into 10 composite ones while the 57 sectors have been originally aggregated into 21 sectors described in Table 8. Finally, we disaggregated other business services (OBS) into royalty services (ROY) and business services (OBO) using SplitCom, a set of programs developed by [Horridge \(2005\)](#) to facilitate the addition of a sector to the GTAP database.

The implemented policy shocks correspond to the two main two areas of retaliation granted to Brazil by the DSB: first, countermeasures in trade in goods (trade retaliation) and second, countermeasures on intellectual property rights (IPR retaliation).

With respect to trade retaliation, we refer the list of 102 U.S. products subject to higher duties published by the Brazilian government (see Table 7) to define the level of retaliatory tariffs. We use TASTE ([Horridge and Laborde, 2008](#)) to aggregate product level (HS8) retaliatory tariffs into sectors that correspond to the level of aggregation defined above¹³. Results of the aggregation are presented in Table 3 below. As expected, we find highest retaliatory tariffs in the plant based fibers sector (cotton) with an increase from 9.17% to 99.93%¹⁴. Further, US exports of other agricultural goods to Brazil would be subject to a 334.69% hike of import

¹³Note that the sectoral aggregation has been developed such as to keep the maximum level of information about the new tariff structure as allowed by the GTAP database

¹⁴Aggregated tariffs have been calculated using bilateral trade weights.

Table 3: Initial and retaliatory tariffs on US exports applied by Brazil (% AVE)

| | Initial | Retaliatory | % Difference |
|--------------------------|----------------|--------------------|---------------------|
| Agriculture | 1.96 | 8.52 | 334.69 |
| Vegetables, fruits, nuts | 11.15 | 24.08 | 115.96 |
| Plant based fibers | 9.17 | 99.93 | 989.75 |
| Mining | 0.36 | 0.42 | 16.67 |
| Food products | 12.8 | 13.01 | 1.64 |
| Vegetable oils | 11.5 | 16.28 | 41.57 |
| Milk products | 22.52 | 33.34 | 48.05 |
| Other food | 13.42 | 20.27 | 51.04 |
| Beverages and tobacco | 21.78 | 21.83 | 0.23 |
| Textiles | 14.93 | 19.84 | 32.89 |
| Wearing apparel | 20.11 | 31.09 | 54.60 |
| Manufacturing | 7.28 | 7.39 | 1.51 |
| Chemicals | 9.68 | 10.29 | 6.30 |
| Metal products | 17.55 | 18.38 | 4.73 |
| Motor vehicles | 15.57 | 16.15 | 3.73 |
| Transport equipment | 3.54 | 3.59 | 1.41 |
| Electronics | 9.76 | 10.19 | 4.41 |
| Other machinery | 12.5 | 12.93 | 3.44 |
| Other manufactures | 18.58 | 20.5 | 10.33 |

Source: TASTE ([Horridge and Laborde, 2008](#))

duties, followed by vegetable oils with 115.96% increase in tariffs. In addition, Brazil would impose significant retaliatory duties in manufacturing sectors such as wearing apparel (54.6% increase) and other foods (51.04% increase). Overall, we find that 21 of the 42 GTAP goods sectors are impacted by increased tariffs.

Implementing intellectual property retaliation on the other hand is not straightforward. As pointed out previously, our modelling framework is short run in nature: the suspension of IPR obligations do not impact R&D incentives and we exclude dynamic effects due to the temporary nature of the shock.

As a short run effect, Brazilian firms and consumers are entitled to refuse payment of royalties and license fees to US intellectual property holders. By assumption, IPR retaliation would entail

a decline of royalty services exports from US to Brazil implemented as a decline in the fob export price of royalties. Note that the amount of IPR retaliation awarded to Brazil amounted to \$231 millions, or 17.23% of \$1,381 million total royalties exports from US to Brazil. Consequently, the corresponding shock is a -17.23% decline in the export price of royalties from US to Brazil.

To implement IPR retaliation, we need to introduce adjustments to the model closure. As a first step, we exogenize the fob export price of royalties from the US to Brazil while any resulting negative rents are borne by the US representative household. As in [McDonald and Walmsley \(2008\)](#) we use rents similar to export tax equivalents to be able to track these rent associated with IPR retaliation and to differentiate them from tariff revenues.

Further, we set the elasticity of substitution between domestic and imported royalty services (ESUBD) and the elasticity of substitution between imported royalty services (ESUBM) equal to zero. The underlying assumption for the Leontief technology implemented can be explained by the fact that royalties are usually paid on a per unit basis, that is if the demand of goods using royalties inputs increases then the import quantity of royalties should increase as well.

Finally, the quantity of royalty exports is endogenous and allowed to respond to the price decline: we assume that given that Brazilian firms already have the IP, reducing the export price of royalties will increase the supply of goods that use royalties as an input. Consequently, Brazil pays more royalties to the US although at a lower price.

5 Impacts of a No Deal

On the day before Brazil was to start imposing retaliatory sanctions worth \$829 million against the US, the parties reached a preliminary agreement on April 6, 2010 and signed a Memorandum of Understanding two weeks later. Although Brazil initially claimed that the harm caused by prohibited domestic and export cotton subsidies in the US is equivalent to \$2.5 billion, the final Framework Agreement signed on July 16, 2010 awarded Brazil \$147 million yearly assistance fund for the Brazilian cotton industry, only a small fraction (5%) of Brazil's initial claim.

This section discusses the impacts of a no-deal between Brazil and the US on trade flows, producers, consumers and welfare.

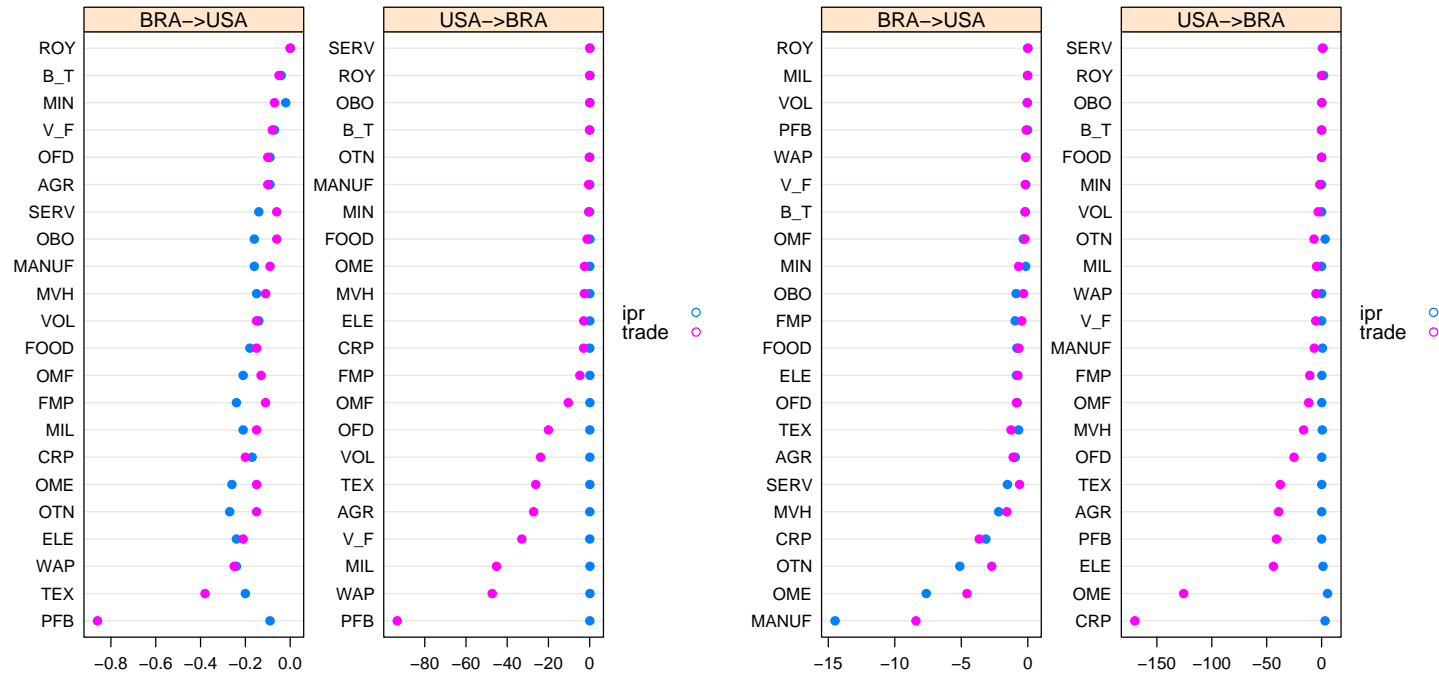
5.1 Impact on Trade Flows

Figure 4 depicts changes in exports between the US and Brazil (percentage and volume), for both trade and IPR retaliation.

Figure 4: Changes in US-Brazil Exports

(a) % changes

(b) Volume changes (\$mil)



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Source: Authors' simulations

Result represent changes for trade and IPR retaliation implemented separately.

It is no surprise that imposing higher import tariffs on US exports by Brazil leads to a decrease in trade between the two countries. As argued before, the sectors most impacted by retaliatory tariffs are cotton (PFB), agriculture, fruits and vegetables and the textile industry. Indeed, we find that as a result of trade retaliation exports of cotton from US to Brazil almost disappear (-93.3%). Other US exports to Brazil impacted most significantly are wearing apparel (-47.2%), raw milk (-45.2%), fruits and vegetables (-32.9%) and agriculture (-27.1%).

In volume terms, trade retaliation changes the ordering of the most significantly impacted sectors. Exports of chemicals (CRP) from US to Brazil decrease by -\$170.1 million, followed by machinery (OME) with -\$125.6 millions and electronics with -\$43.8 millions. Although, in percentage terms we find an almost 100% decrease in US exports of cotton (PFB) to Brazil, this translates to a -\$41.1 million decrease.

The impact on trade retaliation on Brazilian exports is moderate. Thus we find a decrease of manufacturing (MANUF) to the US by -\$8.3 million followed by exports of machinery (OME) with a fall of -\$4.5 million.

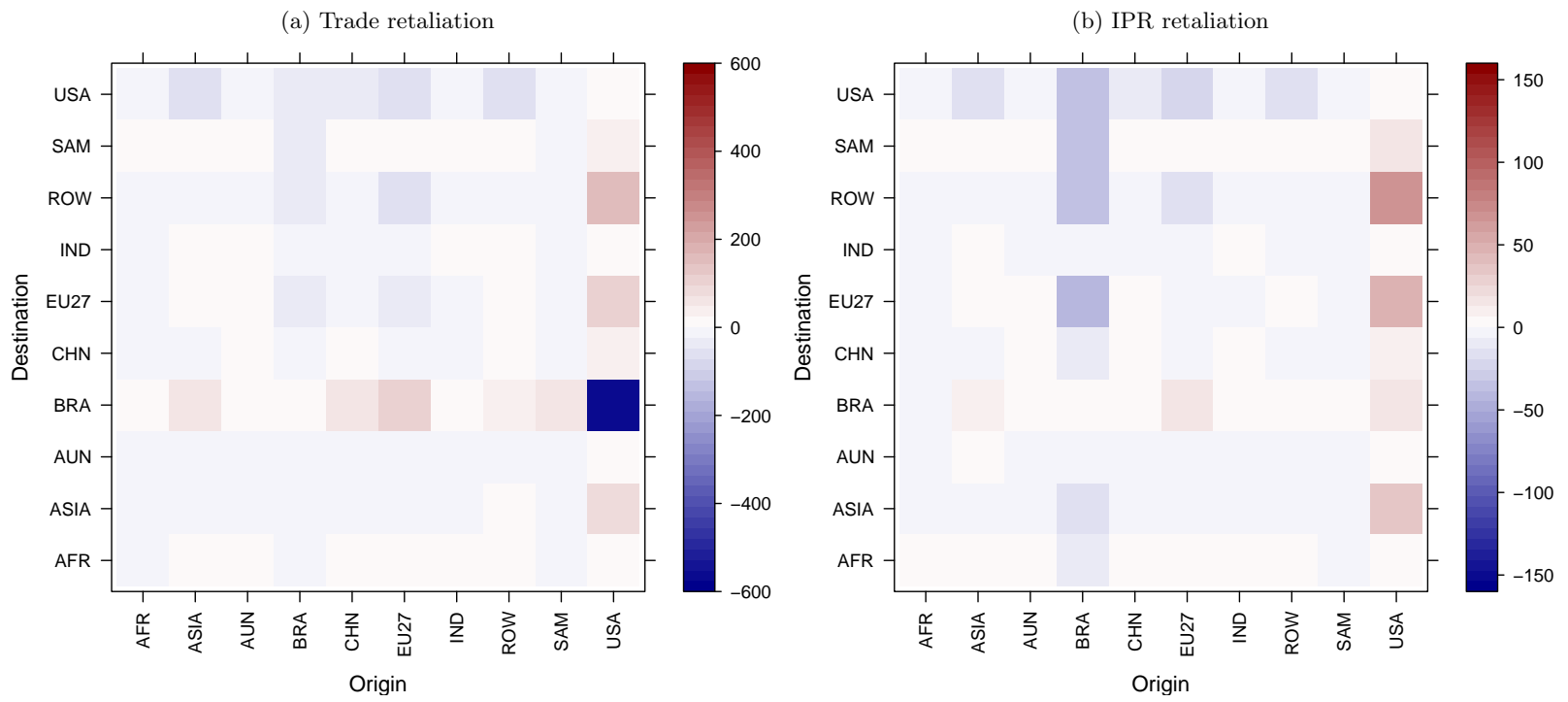
Interestingly, we note that trade retaliation conform to the list of 102 products subject to higher tariffs published by the Brazilian government leads to a decrease of -\$554.1 million in the exports from US to Brazil in the goods sector - an amount that is very close to that awarded to Brazil by WTO arbitrators of \$591 million¹⁵.

As shown in Figure 4, the impact of the IPR retaliation on US-Brazil trade flows is relatively small. First of all, exports of royalties from US to Brazil increase by \$1.79 million: as a result of the lower export price sell more units of the goods that use IP as an input and thus pay more royalties to the US. Most negatively impacted exports from Brazil to the US are manufactures that fall by -\$14.49 million, of machinery by -\$7.63 million and that transportation equipment by -\$5.11 million. On the other hand, exports from US to Brazil increase mainly in sectors such as machinery and equipment by \$5.43 million, transportation equipment by \$3.2 million and chemicals by \$3.16 million.

Figure 5 details changes in the volume of bilateral exports between all countries. Apart from the changes in bilateral exports between US and Brazil already discussed above, we find that while Brazil imports less from the US, it imports from more from all other regions (most significantly from EU27 by \$136.6 million and the rest of South America by \$73.4 million). At the same time, Brazil exports less not only to the US, but to all other regions. The case of the US is exactly the opposite: while it exports less to Brazil, it exports more and imports less from all other regions.

¹⁵Differences would arise also due to that fact that the amount awarded by the WTO refers to 2008, while we calibrate our model on 2007 data.

Figure 5: Volume Changes in Bilateral Exports (\$mil)



Source: Authors' simulations

To sum up, this section does not bring forward any surprises with respect to the impact of trade retaliation on trade flows. However, it is interesting to see that the impact of the trade retaliation on trade flows resulting from this CGE framework is very close to the retaliatory amount awarded by WTO.

5.2 Impact on Consumers and Producers

Although retaliation is aimed at impacting trade flows, it has an indirect impact on all agents of the domestic economies of participating countries such as producers, consumers and government.

Accordingly, Tables 4 and 5 depict changes in the volume of private consumption and output by sector for the US and Brazil decomposed into the impact of both trade and IPR retaliation.

Overall, consumers in the US are negatively impacted as private consumption falls by -\$338 million mainly driven by the significant fall in consumption of services of -\$224.5 million. As shown in Table 4, IPR retaliation hurts US consumers more than trade retaliation, most importantly with respect to services where trade retaliation leads to a fall in consumption by -\$52.9 million while IPR retaliation results in a fall of services consumption of -\$171.5 million.

On the other hand, consumers in Brazil benefit from retaliatory measures against the US. More specifically, in Brazil private consumption of most goods and services increases adding up to an overall \$147 million: consumption of services increases the most by 84.8 million. If we decompose these changes into changes by origin (domestic and imported goods), we find that Brazilian consumers increase their consumption of domestic goods, while that of imported goods decreases. Further, as depicted in Table 4, the overall positive impact on Brazilian consumers result from the positive impact of IPR retaliation that overcome the negative impacts of trade retaliation. More specifically, we note that trade retaliation decreases private consumption of most goods and services most significantly that of other food products (-\$4.03 million). In contrast, IPR retaliation positively impacts private consumption in Brazil most significantly that of services (\$88 million).

The impact of Brazil's retaliation plan on output is different. Overall, manufacturing (MANUF), food and agriculture and transport equipment are among the most negatively impacted in Brazil while total output decreases by -\$180.4 million. On the other hand, total output in the US increases by \$172.7 million.

We note that trade retaliation increases the price of imported intermediates in Brazil and as a result output decreases. As shown in Table 5, trade retaliation negatively impacts the output of several sectors in Brazil most importantly that of services (\$-38.5 million) and manufactures (\$-32.9 million).

Finally, we focus on the impact of IPR retaliation on output in Brazil. We start by looking at the share of royalties in the cost structure of firms. Royalties represent a significant share in

the cost of services (60%) and other business services (10%) and thus we expect these sectors to be the most significantly impacted by IPR retaliation. Indeed, we find that IPR retaliation increases the output of both services (\$148 million) and other business services (\$12.1 million). The output of most other sectors are negatively impacted in Brazil.

5.3 Welfare impacts

It has been pointed out that authorizing trade retaliation as a remedy against a prohibited trade barrier (export subsidies in this case) seems somewhat of a dilemma in the context of an organization (WTO) whose overall objective is trade liberalization ([Bown and Pauwelyn, 2010](#)). Moreover, equivalence between the damage and the retaliation as awarded by the WTO does not guarantee equivalence in terms of welfare effects ([Anderson, 2002](#)).

This subsection is aimed to explore the welfare impacts of Brazil's retaliation plan. In addition we are able to isolate the effects of trade retaliation from the effects of IPR retaliation (see [Table 6](#)).

Table 4: Volume Changes in Private Consumption (\$mil)

| | Trade retaliation | | IPR retaliation | |
|------------------------------------|-------------------|--------|-----------------|--------|
| | United States | Brazil | United States | Brazil |
| Agriculture | 0.05 | -0.45 | -1.06 | 1.38 |
| Vegetables, fruit and nuts | 0.00 | -0.13 | -0.02 | 0.15 |
| Plant-based fibers | 0.61 | -2.71 | -0.05 | 0.15 |
| Mining | -0.01 | 0.00 | -0.01 | 0.00 |
| Food products | -0.39 | -0.72 | -3.34 | 4.75 |
| Vegetable, oils and fats | -0.06 | -0.25 | -0.13 | 1.16 |
| Dairy products | -0.17 | -0.55 | -1.43 | 2.17 |
| Other agricultural products | -3.10 | -4.03 | -5.84 | 9.20 |
| Beverages and tobacco products | -1.53 | -0.38 | -2.70 | 2.36 |
| Textiles | -1.28 | -1.21 | -1.67 | 1.20 |
| Wearing apparel | -4.71 | -1.73 | -4.59 | 3.10 |
| Manufactures | -8.65 | -0.39 | -10.00 | 5.97 |
| Chemical, rubber, plastic products | -6.05 | -3.47 | -7.05 | 7.54 |
| Metal products | -0.48 | -0.13 | -0.55 | 0.67 |
| Motor vehicles and parts | -8.68 | -1.71 | -8.93 | 8.63 |
| Transport equipment nec | -0.81 | -0.06 | -1.12 | 0.51 |
| Electronic equipment | -3.78 | -1.18 | -3.18 | 4.24 |
| Machinery and equipment nec | -4.44 | -0.86 | -4.87 | 2.50 |
| Manufactures nec | -4.84 | -0.68 | -4.28 | 2.81 |
| Royalty services | -0.06 | 0.01 | -0.05 | 5.12 |
| Other business services | -1.03 | -0.78 | -3.19 | 19.97 |
| Services | -52.98 | -3.20 | -171.53 | 88.03 |
| Total | -102.39 | -24.59 | -235.59 | 171.63 |

Source: Authors' simulations

Table 5: Volume Changes in Output (\$mil)

| | Trade retaliation | | IPR retaliation | |
|------------------------------------|-------------------|--------|-----------------|---------|
| | United States | Brazil | United States | Brazil |
| Agriculture | -15.25 | 0.26 | 6.18 | -29.56 |
| Vegetables, fruit and nuts | -1.17 | 2.29 | 0.60 | -0.72 |
| Plant-based fibers | -26.71 | 21.47 | 0.32 | -0.64 |
| Mining | 26.26 | -14.54 | 4.54 | -14.46 |
| Food products | 10.76 | -19.52 | 1.91 | -21.97 |
| Vegetable, oils and fats | -0.66 | -2.23 | 1.14 | -6.40 |
| Dairy products | -3.26 | 2.65 | -1.13 | 2.01 |
| Other agricultural products | -21.36 | 10.17 | -1.01 | 4.96 |
| Beverages and tobacco products | 0.70 | -1.34 | -2.03 | 2.31 |
| Textiles | -27.77 | 14.79 | 7.52 | -7.29 |
| Wearing apparel | 2.01 | 0.20 | 1.75 | 1.54 |
| Manufactures | 79.22 | -32.92 | 48.38 | -96.06 |
| Chemical, rubber, plastic products | -99.61 | 55.61 | 56.39 | -50.77 |
| Metal products | 12.36 | 3.53 | 14.89 | -18.52 |
| Motor vehicles and parts | 27.38 | -12.11 | 17.07 | -15.76 |
| Transport equipment nec | 41.61 | -11.27 | 26.21 | -29.27 |
| Electronic equipment | 32.62 | 2.19 | 41.67 | -7.68 |
| Machinery and equipment nec | 24.63 | 22.84 | 77.33 | -56.99 |
| Manufactures nec | 2.34 | 4.65 | 5.13 | 0.13 |
| Royalty services | -0.60 | -0.74 | 1.77 | 2.49 |
| Other business services | 11.01 | -5.46 | 5.95 | 12.19 |
| Services | -22.89 | -38.56 | -193.49 | 148.08 |
| Total | 51.59 | 1.97 | 121.12 | -182.39 |

Source: Authors' simulations

Table 6: Welfare decomposition (\$USmil)

| | Trade retaliation | | | | IPR retaliation | | | | Total | | | |
|----------------|-------------------|--------|--------|---------|-----------------|---------|-------|---------|--------|---------|--------|---------|
| | AE | ToT | INV | Total | AE | ToT | INV | Total | AE | ToT | INV | Total |
| United States | 2.04 | -91.86 | -35.58 | -125.40 | -12.37 | -289.10 | -3.66 | -305.13 | -10.32 | -381.03 | -39.26 | -430.62 |
| Brazil | -51.63 | 27.66 | -6.18 | -30.14 | 23.55 | 277.95 | -9.78 | 291.72 | -28.05 | 305.58 | -15.97 | 261.56 |
| South America | 3.91 | 8.63 | -0.71 | 11.83 | 2.17 | -2.78 | -0.83 | -1.43 | 6.09 | 5.86 | -1.53 | 10.41 |
| EU27 countries | -3.80 | 13.46 | 12.29 | 21.95 | -7.86 | -1.06 | 5.56 | -3.36 | -11.66 | 12.41 | 17.86 | 18.61 |
| China | -1.19 | 4.18 | 9.02 | 12.00 | -0.82 | 5.52 | -0.94 | 3.76 | -2.02 | 9.71 | 8.09 | 15.78 |
| India | 0.31 | 1.22 | 2.44 | 3.97 | -0.18 | -0.64 | 1.98 | 1.16 | 0.13 | 0.58 | 4.43 | 5.14 |
| Rest of Asia | 1.87 | 9.60 | 8.64 | 20.11 | 0.39 | 4.36 | -0.33 | 4.42 | 2.26 | 13.97 | 8.32 | 24.54 |
| Africa | 0.67 | 3.65 | 1.37 | 5.69 | -0.34 | -0.73 | 1.44 | 0.36 | 0.33 | 2.92 | 2.81 | 6.06 |
| AustraliaNZ | 0.32 | 1.76 | 1.05 | 3.13 | 0.11 | 0.93 | 0.70 | 1.74 | 0.43 | 2.69 | 1.76 | 4.88 |
| Rest of World | -2.75 | 21.70 | 7.65 | 26.60 | -4.47 | 5.50 | 5.85 | 6.88 | -7.22 | 27.22 | 13.51 | 33.51 |

Source: Authors' simulations. Decomposition into Allocative efficiency (AE), Terms of Trade (ToT) and Capital Goods Effect (INV)

Overall welfare impacts of Brazil's retaliation plan for the world as a whole are negative (-\$50.1 million). We find that the only loser is the US (-\$430.6 million), whereas Brazil gains \$261.5 million in terms of welfare. The rest of the regions' welfare gain adds up to \$118.9 million, with EU27 and Asia being the main beneficiaries. A closer look at the decomposition of total welfare effects¹⁶ shows that the main driver of the US's welfare losses are significant deterioration of its terms of trade (-\$381 million), adding to a small loss of allocative efficiency (-\$10.2 million) and negative capital goods effect (-\$39.2 million). For Brazil on the other hand there are significant contributions to the increase in national welfare arising from improvement in terms of trade (\$305.5 million), but there is an allocative efficiency loss (-\$28 million).

Is trade retaliation equivalent with "shooting oneself in the foot" from the point of view the retaliating country? Results show that indeed, trade retaliation results in a welfare loss of -\$30.1 million for Brazil. This loss is mainly driven by a significant allocative efficiency loss of -\$51.6 million as a result of imposing more distortions (higher tariffs). 26.2% of this efficiency loss arises in cotton sector, 15.8% in chemicals and 14.9% in machinery. Meanwhile, we find a moderate improvement in terms of trade of \$27.6 counterweights the efficiency loss. In addition, trade retaliation results in welfare losses in the US as well (-\$125.4 million) resulting from deterioration of terms of trade of -\$91.8 million in addition to negative capital goods effect. All other regions benefit from trade retaliation against the US.

We finally turn to the impacts of IPR retaliation. First, note that the rents used to exogenize the export price of US royalty exports to Brazil directly impact the welfare of the representative households in the US. More specifically, as the US representative household bears the impact of negative rents of the IPR retaliation of -\$287.4 million equivalent with 0.002% of total income. Compared to trade retaliation that hurt both the complainant and the respondent, we find that IPR retaliation benefits Brazil (welfare gain of \$291.7 million) but hurts the US (welfare loss of -\$305.1 million). There are significant improvements in terms of trade in Brazil of \$277.9 million mainly due to the fall in the price of royalties imported from the US. On the other hand, terms of trade in the US deteriorate by \$289.1 million governed by the fall in the export price of royalties to Brazil.

To sum up, if Brazil had not been allowed to retaliate in the form of suspension of intellectual property rights, the impact of trade retaliation alone would have been negative, a case of shooting oneself in the foot to shoot at the other person's foot.

¹⁶For detailed description of welfare decomposition in GTAP see [Huff and Hertel \(2001\)](#).

6 Conclusion

The Framework Agreement that went into effect June 21, 2010 secured a deal between the US and Brazil in the nine year long upland cotton dispute, a deal that would avert the imposition of countermeasures against the US worth \$829 million.

This paper explored the impacts of a no deal between the US and Brazil. As awarded by a WTO dispute settlement panel, Brazil would have been entitled to \$591 million in retaliatory sanctions in goods sectors and \$238 million in intellectual property and services sanctions.

While trade retaliation does not pose any challenges with respect to quantifying its impacts in an applied general equilibrium framework, implementing IPR retaliation required us to modify the underlying model.

The framework we develop is unique in the sense that it provides the possibility for quantifying intellectual property related issues in a framework that is consistent with international accounting standards and computable general equilibrium modelling.

The overall impact of Brazil's retaliation plan has a negative impact on world welfare. However, we find that the only loser is the US (-\$430.6 million), whereas Brazil gains \$261.5 million in terms of welfare. The welfare effects of the retaliation plan are close but not equal to the \$829 million awarded as retaliatory amount by the WTO to Brazil (the gain of Brazil and the absolute value of the loss of the US amounts to \$682 million or 82% of the amount awarded by the WTO). Finally, has Brazil not been allowed to retaliate in the form of suspension of intellectual property rights, the impact of trade retaliation alone would have been negative for both Brazil and the US, a case of shooting oneself in the foot to shoot at the other person's foot.

Table 7: List of US products subject to increased tariffs in Brazil

| Nr. | HS8 Code | GTAP | HS8 Code Description | Current | Retaliatory |
|------------|-----------------|-------------|--------------------------------|----------------|--------------------|
| 1 | 1001.90.90 | WHT | Wheat and meslin | 10% | 30% |
| 2 | 0802.21.00 | V_F | Fresh or dried hazelnuts | 6% | 26% |
| 3 | 0802.31.00 | V_F | Fresh or dried walnuts | 10% | 30% |
| 4 | 0802.32.00 | V_F | Fresh or dried walnuts | 10% | 30% |
| 5 | 0806.20.00 | V_F | Dried grapes | 10% | 30% |
| 6 | 0808.20.10 | V_F | Fresh pears | 10% | 30% |
| 7 | 0809.20.00 | V_F | Fresh cherries | 10% | 30% |
| 8 | 0809.40.00 | V_F | Fresh plums | 10% | 30% |
| 9 | 5201.00.20 | PFB | Cotton, not carded | 6% | 100% |
| 10 | 5201.00.90 | PFB | Other types of cotton | 6% | 100% |
| 11 | 9102.11.10 | OME | Wrist-watches | 20% | 40% |
| 12 | 0504.00.13 | OAP | Guts of swine | 8% | 28% |
| 13 | 0402.10.10 | MIL | Milk and cream | 28% | 48% |
| 14 | 0404.10.00 | MIL | Whey and modified whey | 28% | 48% |
| 15 | 1502.00.11 | CMT | Fats of bovine | 6% | 26% |
| 16 | 1507.90.90 | VOL | Other soya-bean | 10% | 30% |
| 17 | 1514.11.00 | VOL | Low erucic acid | 10% | 30% |
| 18 | 1514.19.10 | VOL | Low erucic acid | 10% | 30% |
| 19 | 4011.10.00 | CRP | New pneumatic tyers | 16% | 32% |
| 20 | 4011.20.90 | CRP | Other new pneumatic tyers | 16% | 32% |
| 21 | 0303.51.00 | OFD | Frozen Herrings | 10% | 30% |
| 22 | 2005.20.00 | OFD | Potatoes, prepared | 14% | 34% |
| 23 | 2009.90.00 | OFD | Mixtures of juices | 14% | 34% |
| 24 | 2103.20.10 | OFD | Tomato ketchup | 18% | 38% |
| 25 | 2103.90.91 | OFD | Preparations for | 18% | 38% |
| 26 | 2106.10.00 | OFD | Protein concentrates | 14% | 34% |
| 27 | 2106.90.30 | OFD | Food supplements | 16% | 36% |
| 28 | 2106.90.50 | OFD | Sugar-free chewing gum | 16% | 36% |
| 29 | 2106.90.90 | OFD | Other food preparations | 16% | 36% |
| 30 | 2303.20.00 | OFD | Beet-pulp | 6% | 26% |
| 31 | 7113.19.00 | OFD | Articles of jewellery | 18% | 36% |
| 32 | 9021.10.20 | OFD | Splints | 4% | 14% |
| 33 | 9021.39.80 | OFD | Other artificial parts of body | 14% | 28% |

| Nr. | HS8 Code | GTAP | HS8 Code Description | Current | Retaliatory |
|------------|-----------------|-------------|-------------------------------|----------------|--------------------|
| 34 | 2202.90.00 | B_T | Other non-alcoholic beverages | 20% | 40% |
| 35 | 5203.00.00 | TEX | Cotton, carded or combed | 8% | 100% |
| 36 | 5208.21.00 | TEX | Plain woven fabrics | 26% | 100% |
| 37 | 5209.32.00 | TEX | Woven fabrics of cotton | 26% | 100% |
| 38 | 5703.20.00 | TEX | Carpets | 35% | 60% |
| 39 | 5903.90.00 | TEX | Textile fabrics | 26% | 48% |
| 40 | 6303.92.00 | TEX | Curtains, incl. drapes | 35% | 60% |
| 41 | 6307.90.10 | TEX | Other made-up textiles | 35% | 60% |
| 42 | 6307.90.90 | TEX | Other made-up textiles | 35% | 60% |
| 43 | 6116.10.00 | WAP | Gloves | 35% | 60% |
| 44 | 6203.42.00 | WAP | Men's or boys' trousers | 35% | 100% |
| 45 | 6204.62.00 | WAP | Women's or girls trousers | 35% | 100% |
| 46 | 4908.90.00 | PPP | Other transfers decalcomanias | 16% | 32% |
| 47 | 2905.11.00 | CRP | Methanol | 12% | 22% |
| 48 | 2929.10.21 | CRP | Isomer mixtures | 14% | 28% |
| 49 | 3003.90.55 | CRP | Medicaments | 14% | 28% |
| 50 | 3004.20.19 | CRP | Medicaments | 8% | 14% |
| 51 | 3004.20.79 | CRP | Other medicaments | 8% | 14% |
| 52 | 3004.39.39 | CRP | Medicaments | 8% | 14% |
| 53 | 3004.40.90 | CRP | Other medicaments | 8% | 14% |
| 54 | 3004.90.49 | CRP | Other medicaments | 8% | 14% |
| 55 | 3005.10.90 | CRP | Other adhesive dressings | 0% | 12% |
| 56 | 3006.10.90 | CRP | Other sterile surgical catgut | 12% | 22% |
| 57 | 3303.00.20 | CRP | Toilet waters | 18% | 36% |
| 58 | 3304.10.00 | CRP | Lip make-up | 18% | 36% |
| 59 | 3304.99.10 | CRP | Beauty creams | 18% | 36% |
| 60 | 3304.99.90 | CRP | Other beauty preparations | 18% | 36% |
| 61 | 3305.10.00 | CRP | Shampoos | 18% | 36% |
| 62 | 3305.90.00 | CRP | Other preparations | 18% | 36% |
| 63 | 3306.10.00 | CRP | Dentifrices | 18% | 36% |
| 64 | 3306.90.00 | CRP | Other preparations | 18% | 36% |
| 65 | 3307.10.00 | CRP | Pre-shave, shaving | 18% | 36% |
| 66 | 3307.20.90 | CRP | Other personal deodorants | 18% | 36% |
| 67 | 3307.90.00 | CRP | Other depilatories | 18% | 36% |
| 68 | 3401.19.00 | CRP | Other soap | 18% | 36% |

| Nr. | HS8 Code | GTAP | HS8 Code Description | Current | Retaliatory |
|------------|-----------------|-------------|--------------------------------|----------------|--------------------|
| 69 | 3402.90.39 | CRP | Other surface-active prep. | 18% | 36% |
| 70 | 3923.30.00 | CRP | Carboys, bottles | 18% | 36% |
| 71 | 8212.10.20 | FMP | Non-electric razors | 18% | 36% |
| 72 | 8212.20.10 | FMP | Safety razor blades | 18% | 36% |
| 73 | 8703.21.00 | MVH | Motor cars | 35% | 50% |
| 74 | 8703.23.10 | MVH | Motor cars | 35% | 50% |
| 75 | 8703.24.10 | MVH | Motor cars | 35% | 50% |
| 76 | 8703.24.90 | MVH | Motor cars | 35% | 50% |
| 77 | 8703.33.10 | MVH | Motor cars | 35% | 50% |
| 78 | 8711.50.00 | OTN | Motorcycles | 20% | 40% |
| 79 | 8903.92.00 | OTN | Motorboats | 20% | 40% |
| 80 | 8903.99.00 | OTN | Other vessels | 20% | 40% |
| 81 | 8471.90.12 | ELE | Bar-code readers | 12% | 22% |
| 82 | 8517.12.31 | ELE | Portable telephones | 16% | 32% |
| 83 | 8518.10.90 | ELE | Other microphones | 20% | 40% |
| 84 | 8518.21.00 | ELE | Single loudspeakers | 20% | 40% |
| 85 | 8518.22.00 | ELE | Multiple loudspers | 20% | 40% |
| 86 | 8518.30.00 | ELE | Headphones and earphones | 20% | 40% |
| 87 | 8518.50.00 | ELE | Electric sound amplifiers | 20% | 40% |
| 88 | 8521.90.90 | ELE | Other video recording | 20% | 40% |
| 89 | 8525.80.19 | ELE | Other television cameras | 20% | 40% |
| 90 | 8525.80.29 | ELE | Other digital cameras | 20% | 40% |
| 91 | 8527.21.90 | ELE | Other radio-broadcast receiver | 20% | 40% |
| 92 | 8528.49.29 | ELE | Other colour monitors | 20% | 40% |
| 93 | 8418.40.00 | OME | Freezers, upright | 20% | 40% |
| 94 | 8433.11.00 | OME | Mowers for lawns | 18% | 36% |
| 95 | 8506.80.90 | OME | Other primary cells, batteries | 16% | 32% |
| 96 | 8516.60.00 | OME | Other ovens | 20% | 40% |
| 97 | 9004.10.00 | OME | Sunglasses | 20% | 40% |
| 98 | 9008.30.00 | OME | Other image projectors | 18% | 36% |
| 99 | 9018.32.19 | OME | Other tubular needles | 16% | 32% |
| 100 | 9018.39.10 | OME | Other needles | 16% | 32% |
| 101 | 9403.70.00 | OMF | Furniture of plastic | 18% | 36% |
| 102 | 9603.21.00 | OMF | Tooth brushes | 18% | 36% |

Source: Resolution Nr. 15, March 15, 2010 of the Chamber of Foreign Trade of Brazil

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Table 8: Sectoral and regional aggregation

| Sectors | Description |
|---------|------------------------------------|
| AGR | Agriculture |
| V_F | Vegetables, fruit and nuts |
| PFB | Plant-based fibers |
| MIN | Mining |
| FOOD | Food products |
| VOL | Vegetable, oils and fats |
| MIL | Dairy products |
| OFD | Other agricultural products |
| B_T | Beverages and tobacco products |
| TEX | Textiles |
| WAP | Wearing apparel |
| MANUF | Manufactures |
| CRP | Chemical, rubber, plastic products |
| FMP | Metal products |
| MVH | Motor vehicles and parts |
| OTN | Transport equipment nec |
| ELE | Electronic equipment |
| OME | Machinery and equipment nec |
| OMF | Manufactures nec |
| ROY | Royalty services |
| OBO | Other business services |
| SERV | Services |
| Regions | Description |
| USA | United States |
| BRA | Brazil |
| SAM | Rest of South America |
| EU27 | EU27 countries |
| CHN | China |
| IND | India |
| ASIA | Rest of Asia |
| AFR | Africa |
| AUN | Australia and New Zealand |
| ROW | Rest of the World |