



Pharmaceutical tariffs, trade flows and emerging economies

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Key findings

- The value of trade in medicines (category HS3004) in countries outside the scope of the WTO “Pharmaceutical Zero-for-Zero Initiative” has increased between 2006 and 2013 at a CAGR of 20.7 per cent.
- A number of countries maintain tariffs on medicaments of over 8 per cent. These include Russian Federation (10.2%), India (10%), Uruguay (9.9%), Argentina (9.8%), Brazil (9.8%) and Thailand (9.3%).
- The vast majority of high-income countries do not levy tariffs on pharmaceuticals.
- Uruguay, Paraguay, Argentina, Brazil, India, Mexico, and Morocco have the highest number of tariff lines in the HS 3004 category. All other countries have less than 50 tariff lines.
- Tariff coverage amongst HS 3004 has remained constant between 2006 and 2011.
- Product categories falling under HS-300450 (other medicaments containing vitamins) and 300490 (other medicaments, packaged for retail sale) have the highest incidence of tariffs, globally. This latter category includes, among others, anaesthetics, anti-retrovirals, anti-malarials, and a number of antiseptic and anti-infective medicines.
- The global average applied ad-valorem tariff level on category HS 3004 (medicaments) has fallen from 3.25 per cent in 2006 to 2.74 per cent in 2011.
- Fewer countries apply tariffs on vaccines than on medicaments. However, India, Ghana and DR Congo have the highest levels, applying them at an average level 10 per cent.

1. Introduction

Health is an important component of development, with the positive impact of improved health on labour productivity and economic growth well documented over the years (see for example Bloom & Canning, 2000; Barghava et al 2001; Mayer, 2001; Bloom, Canning & Sevilla, 2004). As a result, improving population health has been for some time a major development priority, both at the national level and via international frameworks such as the Millennium Development Goals and latterly the Sustainable Development Goals.

Improving access to medicines is an essential component of these initiatives, with Millennium Development Goal 8.E calling on pharmaceutical companies to cooperate in providing access to affordable essential drugs in developing countries.

Ensuring access to essential medicines is dependent on a number of factors, including reliable health and supply systems, sustainable financing, and rational selection, according to the World

Health Organization (WHO)¹. The final component identified by WHO is affordable prices, because up to 90 per cent of populations in developing countries have to buy medicines through out-of-pocket payments.

The end price of a medicine is also determined by a number of factors. As an imported pharmaceutical product moves along the distribution chain, it undergoes many mark-ups: port charges, warehouse costs, local government levies, distribution costs and retailers mark-ups, to name a few. Import duties (tariffs) can also be major determinant of final price, as they can significantly increase the price of imported goods before they embark on the journey down the distribution chain. Tariffs are essentially regressive taxes as they take a higher proportion of income from the poor than they do for those higher up the income scale.

Many countries have long recognised the regressive nature of pharmaceutical tariffs and the obstacle they pose to improving access to medicines and fulfilling the right to health. The US and 21 of its trading partners, for instance, agreed in 1995 to the reciprocal elimination of import duties on approximately 7,000 pharmaceutical products under the WTO Pharmaceutical Agreement. Although many countries outside this agreement do not impose tariffs on pharmaceuticals, previous research in this area has shown that a large number continue to impose duties, even if overall global average tariff levels have been falling in recent years (Laing & Olcay, 2005; Stevens & Linfield, 2009).

This short paper is an attempt to quantify recent progress made towards reducing tariffs, with a particular focus on the period 2006-2013. Specifically, it aims to answer the following questions:

- Has there been a reduction in applied average ad-valorem tariffs globally between 2006 and 2011?
- Has tariff-cover on vaccine products and pharmaceuticals increased or

decreased between 2006 and 2011?

- Which countries have the highest levels of applied duty on pharmaceuticals?
- Has the total value of trade that takes place in countries outside the WTO Pharmaceutical Agreement increased or decreased since 2006?

The rest of this paper is organized as follows. Section 2 discusses the literature. In Section 3, we introduce the data and give the rationale behind choosing it. Section 4 outlines our results and analysis of those results. Section 5 concludes.

2. Literature Review

Olcay and Liang (2005) carried out a comprehensive study involving data points from 150 countries to understand the impact of tariffs on prices of pharmaceutical products, the protection of local industry and revenue generation. Their analysis found that in 2005, 61 per cent of countries levied tariffs on finished pharmaceutical products, and a total of 35 per cent of countries levied import duties on vaccines. What is however important to note from this study is that tariffs on pharmaceutical products generate less than 0.1 per cent of Gross Domestic Product (GDP) in 92 per cent of the countries analysed, and in 90 per cent of cases applied tariffs on pharmaceutical products are less than 10 per cent.

Stevens and Linfield (2010) analysed the prevalence of weighted average tariffs and domestic taxes on finished pharmaceutical products in the context of low and middle-income countries. The study concludes although tariff on medicines had declined between 2005 and 2009, a handful of mainly middle-income countries continued to apply high levels of duties.

A recent study by Helble (2012) examined the relationship between tariffs and trade flows between 167 countries between 1996 and 2009. The importance of this paper is that it included a wider data base

“This short paper is an attempt to quantify recent progress made towards reducing tariffs”

¹ <http://www.who.int/medicines/areas/access/en/>



“Many countries have long recognised the regressive nature of pharmaceutical tariffs and the obstacle they pose to improving access to medicines”

- involving large sets of health-related products in addition to pharmaceuticals, namely, dosified medicines, bulk medicines, chemical inputs of general purpose, hospital and laboratory inputs, inputs specific to the pharmaceutical industry and medical technology equipment. This study found that tariffs for health-related products are overall low, but far from being zero, especially for developing countries.

3. Data

For the tariffs analysis, we source applied level ad-valorem data from the WTO Tariff database and trade flow data from the United Nations Comtrade database. We consider eight related products falling under six digit sub-categories of HS-3004. These products are:

- 300410 [containing penicillins or derivatives thereof, with a penicillanic acid structure, or streptomycins or their derivatives]
- 300420 [containing other antibiotics]
- 300431 [containing insulin], 300432 [containing corticosteroid hormones, their derivatives or structural analogues]
- 300439 [other]
- 300440 [containing alkaloids or derivatives thereof but not containing hormones, other products of heading 29.37 or antibiotics]
- 300450 [other medicaments containing vitamins or other products of heading 29.36]
- 300490 [other].

For data analysis we look at the period between 2006 and 2012. We chose this period as Olcay and Liang [2005] have already carried out a comprehensive study covering tariff data until 2005. However, for our statistical analysis on tariff levels and coverage we restrict ourselves to data points between 2006 and 2011, which is the latest year for which sufficient data is available across all the variables. For the trade flow analysis we cover data until 2012, and to examine the

WTO Pharmaceutical Agreement analysis we use data up until 2013.

In order to maintain uniformity for our statistical analysis on tariffs, we cover tariff data for the aforementioned eight product categories under the HS 3004 code across 98 different countries. Therefore, for each one of these two years - 2011 and 2006 - we have 784 data points.

4. Results and Analysis

WTO Pharmaceutical Agreement

Following the creation of the World Trade Organization [WTO] in 1995, the United States and 21 of its trading partners agreed to the reciprocal elimination of import duties on approximately 7,000 pharmaceutical products, chemical intermediates and certain derivatives used in the production of medicines.

This WTO Pharmaceutical Agreement, also known as the “Pharmaceutical Zero-for-Zero Initiative”, came into force on January 1, 1995 and eliminated tariffs in signatory countries for all WTO members on a Most Favoured Nation [MFN] basis. The Zero-for-Zero Initiative has been expanded in subsequent rounds of WTO negotiation to include additional international non-proprietary names and chemical intermediates.

The original list of 7,000 items has been updated periodically. The first update in 1996 saw duties eliminated on a further 496 pharmaceutical items; 642 items in the second update in 1998, and 823 items in the third update in 2006. In the fourth update of 2010 the US International Trade Commission proposed an additional 735 products to receive duty-free treatment. There are now 34 signatories to the Pharmaceutical Agreement [see Table 1].

Given that WTO Pharmaceutical Agreement members such as the US, EU, Switzerland, and Japan are amongst the biggest players in the global pharmaceutical market, this implies that a large

proportion of global trade in pharmaceuticals is tariff-free. However, three major emerging pharmaceutical manufacturing nations, namely, China, India and Brazil, are notably absent from this agreement, as are major importing nations such as Russia, Mexico and Turkey.

Using data extracted from the UN Comtrade database, we calculate that total trade in pharmaceuticals (HS 3004)² that took place in all the countries outside the scope of the WTO Pharmaceutical Agreement stood at US\$39.73bn in 2006. By 2013, this had increased to \$48.53bn, representing a Compound Annual Growth Rate of 20.7 per cent³.

Which countries have the highest tariffs on medicines?

A number of countries outside the WTO Pharmaceutical Agreement continue to impose tariffs on products in category HS 3004. The countries with the ten highest average duties are listed in Table 2, with full details of the global picture provided in the appendix. Countries which have an average applied tariff on vaccines of over 5 per cent are listed in Table 3.

Trade flows between the major pharmaceutical markets

Trade in pharmaceuticals is increasing globally. For three major countries outside the WTO Pharmaceutical Agreement (Brazil, China and India), the data shows that imports from the four big exporters (US, EU, Switzerland and Japan) have increased. Interestingly, imports from the EU to these three countries have increased more rapidly than those from the US and Japan.

As India is increasing its overall trade with China, for India we consider China instead of Japan. However, the pattern for India remains the same – imports from EU and Switzerland have outpaced those from China. China has been predominantly

[continued on page 7]

Table 1 - Signatories to WTO Pharmaceutical Agreement

Australia	Lithuania [EU-27]
Canada	Luxembourg [EU-27]
Austria [EU-27]	Malta [EU-27]
Belgium [EU-27]	Netherlands [EU-27]
Bulgaria [EU-27]	Poland [EU-27]
Cyprus [EU-27]	Portugal [EU-27]
Czech Republic [EU-27]	Romania [EU-27]
Denmark [EU-27]	Slovakia [EU-27]
Estonia [EU-27]	Slovenia [EU-27]
Finland [EU-27]	Spain [EU-27]
France [EU-27]	Sweden [EU-27]
Germany [EU-27]	United Kingdom [EU-27]
Greece [EU-27]	Japan
Hungary [EU-27]	Norway
Ireland [EU-27]	Switzerland
Italy [EU-27]	United States
Latvia [EU-27]	Macau

Table 2 - Countries with the ten highest average duties on products within the HS 3004 category

Country	Applied Tariffs					
	Year	Number of tariff lines	Average of <i>ad valorem</i> duties	Minimum <i>ad valorem</i> duty	Maximum <i>ad valorem</i> duty	Duty Free TL[%]
Nepal	2013	10	14.6	10	15	0.0
Pakistan	2013	20	11.1	5	25	0.0
Democratic Republic of the Congo	2010	15	11	5	20	0.0
Russian Federation	2012	17	10.2	0	15	12.5
India	2014	137	10	10	10	0.0
Lao People's Democratic Republic	2008	78	10	10	10	0.0
Uruguay	2014	158	9.9	0	14	16.5
Argentina	2012	146	9.8	0	14	16.7
Brazil	2014	146	9.8	0	14	16.6
Paraguay	2014	151	9.3	0	14	16.7
Thailand	2013	60	9.3	0	10	7.3

Source: WTO Tariff Database

² HS 3004 covers medicaments - or medicinal preparations - that can be made up of either mixed or unmixed products.

³ Our calculations include data points from 139 countries. Data is unavailable for 40 countries (mainly small island nations and LDCs), so our calculation therefore covers >95% global trade.



Table 3:

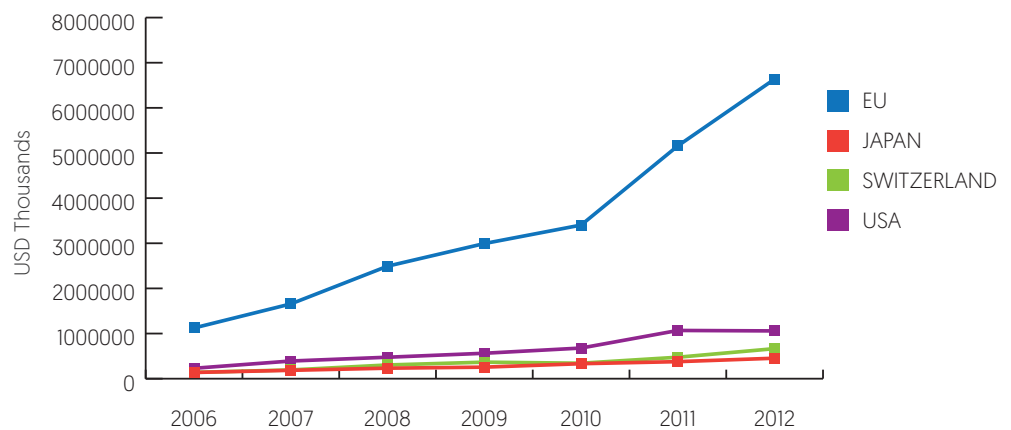
Countries with average applied tariffs on vaccines of over 5 per cent (HS 300220)

Country	Year	Average ad valorem duty
Democratic Republic of the Congo	2010	10
Ghana	2013	10
India	2014	10
Djibouti	2014	8
Pakistan	2013	6.7
Russian Federation	2012	6.7
Chile	2014	6
Peru	2014	6
Bolivia	2013	5
Cameroon	2013	5
Central African Republic	2013	5
Chad	2013	5
Congo	2013	5
Lao People's Democratic Republic	2008	5
Maldives	2011	5
Mongolia	2013	5
Sierra Leone	2012	5
Solomon Islands	2011	5
Tajikistan	2012	5
Venezuela, Bolivarian Republic of	2012	5
Yemen	2009	5

Source: WTO Tariff Database

Figure 1:

Imports by China from the four big exporters (Product: 3004)





Addendum Figure 1a:

Growth rate in
China's imports

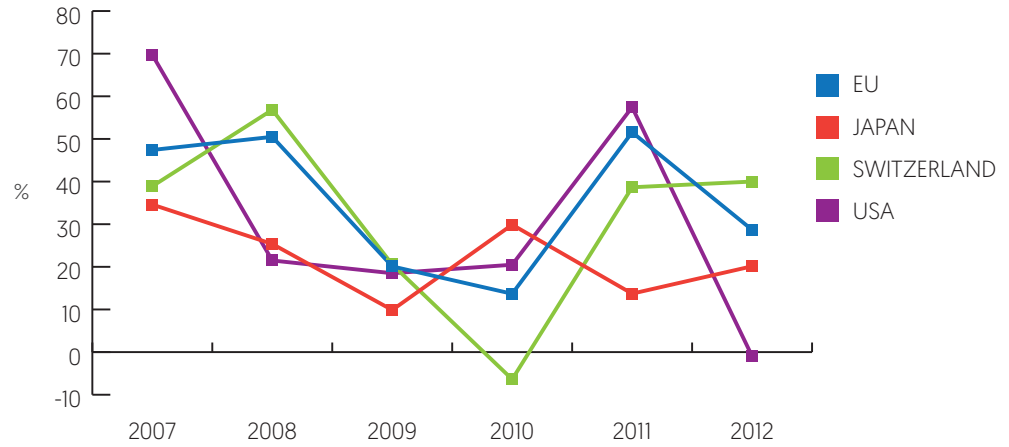
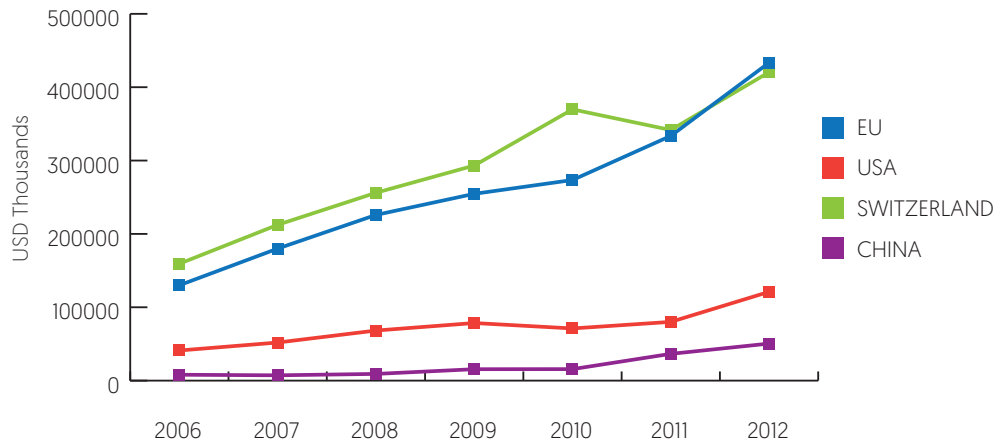


Figure 2:

Imports by India from
the four big exporters
(Product: 3004)



Addendum Figure 2a:

Growth rate in
India's Imports

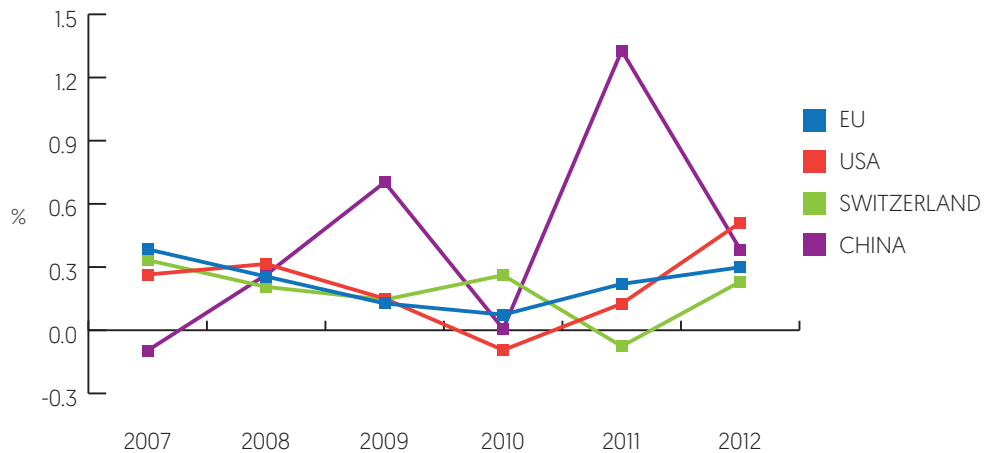
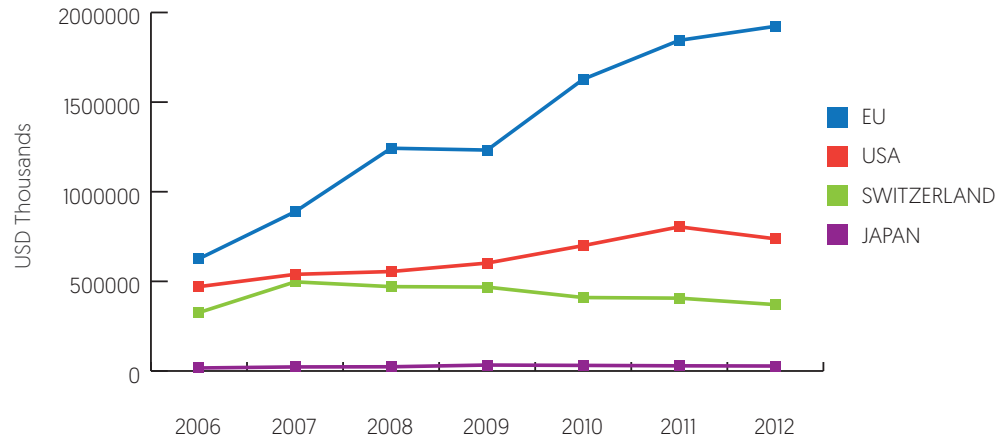




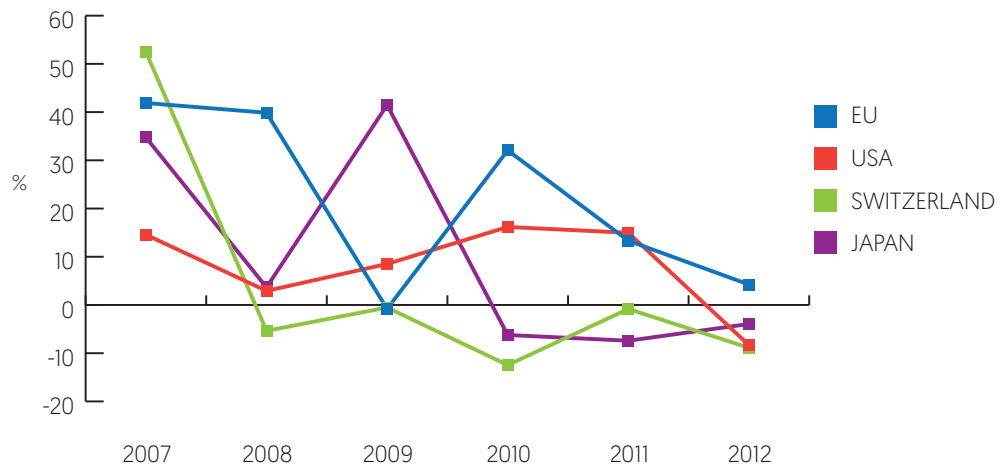
Figure 3:

Imports by Brazil from the four big exporters (Product: 3004)



Addendum Figure 3a:

Growth rate in Brazil's imports



[continued from page 4]

importing from the EU, and Brazil primarily from EU and Japan (see Figures 1, 2, and 3).

A closer examination of the growth rate reveals although in absolute terms imports by China, Brazil and India from the big four have increased [particularly from the EU], the growth rate of imports dipped following the 2007-08 financial crisis. Although the EU remained the largest supplier of pharmaceuticals to India during the period following the financial crisis, the import growth rate from the EU, Switzerland, and US fell while it increased from China. For China, the import growth rate from the US has fallen while increasing from the EU and Switzerland.

For Brazil, import growth from the EU and Japan are inversely related. However, the overall trend suggests for Brazil, India and China as a whole there has been an increase in imports. As these four countries all apply tariffs on imported pharmaceuticals and vaccines, this indicates that the overall value of medicines available on the domestic market in these countries subject to tariffs has increased.

Statistical analysis of global tariffs

Table 4 shows that the average applied ad-valorem tariff level on category HS 3004 has fallen between 2006 and 2011. We find t-statistics is significant at 2 per cent, indicating that for our sample the

tariff has fallen from 3.25 per cent in 2006 to 2.74 per cent in 2011. Also, variance as reflected through standard deviation has come down from 4.53 to 4.01, implying that the range between the highest and lowest applied tariffs has come down. We find that product categories HS-300450 [other medicaments containing vitamins] and 300490 [other medicaments, packaged for retail sale] have the highest incidence of tariffs amongst its sub-categories.

Table 5 shows that there has not been a statistically significant decrease in the number of products falling under HS 3004 that are subject to tariff coverage. Figure 5 shows that with the exception of Uruguay



Table 4:

Test for equality of means between series for tariffs-level

Method	df	Value	P-value
t-test	1564	-2.35	0.018
Anova F-test	(1,1564)	5.56	

Summary Statistics

Variable	Count	Mean	Standard deviation	Maximum	Minimum
Average Duty 2011	783	2.74	4.01	20.00	0.00
Average Duty 2012	783	3.25	4.53	20.00	0.00

Table 5:

Test for equality of means between series for tariffs coverage

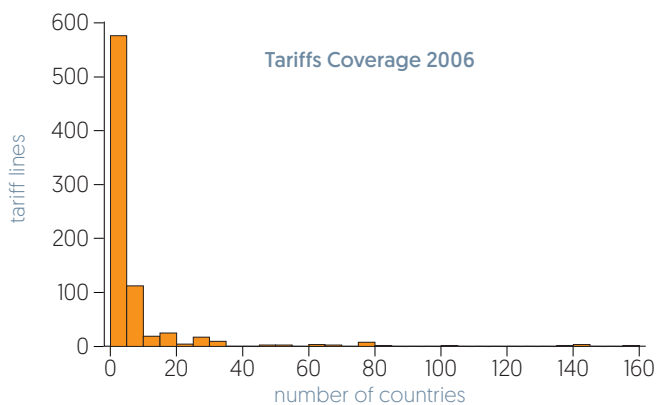
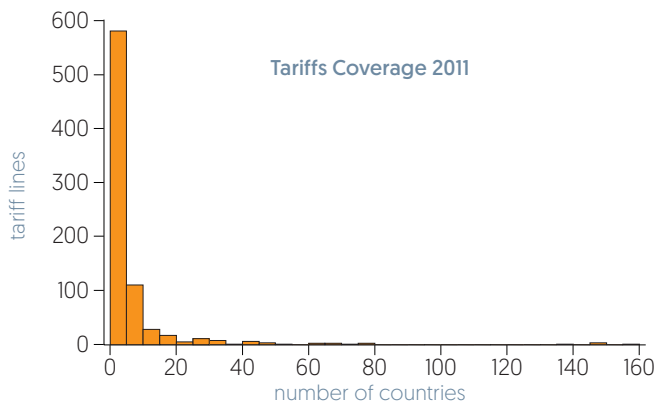
Method	df	Value	P-value
t-test	1564	-0.84	0.39
Anova F-test	(1,1564)	0.71	

Summary Statistics

Variable	Count	Mean	Standard deviation	Maximum	Minimum
Average Tariff Coverage 2011	783	5.90	14.78	158	1
Average Tariff Coverage 2006	783	6.55	16.12	158	1

Figure 4:

Distribution function of the Tariffs Coverage 2006 and 2011





[158 tariff lines], Paraguay [147], Argentina [146], Brazil [146], India [137], Mexico [79], and Morocco [76], all other countries have less than 50 product categories subject to tariffs [this is also shown in table 6].

For all countries we find that the product category with the highest number of tariff

lines is HS-300490 [other medicaments, in packaging for retail sale]. HS category 300490 contains, among others, anaesthetics, anti-retrovirals, antimalarials, and a number of antiseptic product categories. The 23 countries with the highest number of tariffs lines in this category are listed in Table 7.

Table 6:

Countries with more than 50 tariff lines on HS 3004

Country	Number of tariff lines
Uruguay	158
Paraguay	147
Argentina	146
Brazil	146
India	137
Mexico	79
Morocco	76
All other countries	<50

Table 7:

Countries with the highest number of tariff lines in HS 300490

Numbers of tariff lines on HS 300490	
India	70
Uruguay	69
Paraguay	65
Argentina	63
Brazil	63
Mexico	50
Hong Kong, China	25
Jamaica	22
Indonesia	15
Malaysia	15
Thailand	15
Brunei Darussalam	14
Cambodia	14
Costa Rica	14
Morocco	14
Myanmar	14
Philippines	14
Singapore	14
Chinese Taipei	13
Turkey	12
Pakistan	11
China	10
Macao, China	9

5. Conclusion

A major finding of this short study is that the value of pharmaceutical trade for countries outside the WTO “Zero-for-zero initiative” has increased significantly between 2006 and 2013, at a CAGR of 20.7 per cent. This implies that globally a larger proportion of marketed pharmaceuticals are potentially subject to tariffs, which has implications for access to medicines.

However, we also find that the global average of tariffs on pharmaceuticals and vaccines has declined between 2006 and 2011, although this is somewhat countered by fact that the average number of tariff lines per country has remained constant during this period. Some countries continue to apply tariffs on all sub-categories within HS 3004, the most prominent of which is India (which has an average applied tariff rate of 10 per cent for this category).

No high-income countries apply tariffs on HS 3004 with the exception of the Republic of Korea. The countries with

the highest applied average tariffs on this category are Nepal, Pakistan, DR Congo, Russian Federation, India and Lao People’s Democratic Republic.

We find that HS category 300490 (containing, among others, anaesthetics, anti-retrovirals, antimalarials, and a number of antiseptic product categories) has the highest incidence of tariffs, meaning that these products are the most likely to have import duties imposed on them.

Fewer countries apply tariffs on vaccines than on medicaments. However, India, Ghana and DR Congo have the highest levels, applying them at an average level 10 per cent.

An interesting avenue for further study would be a more detailed analysis of tariffs imposed by three biggest pharmaceutical markets outside the Zero-for-Zero Initiative: China, India and Brazil, in particular to examine the impact of tariffs in these markets on access to medicines.

“Globally, a larger proportion of marketed pharmaceuticals are now potentially subject to tariffs than was the case in 2006.”



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Appendix

Average *ad valorem* duties on HS 3004. Countries not included in this table have no tariffs on this category

Country	Applied Tariffs					
	Year	Number of tariff lines	Average of <i>ad valorem</i> duties	Minimum <i>ad valorem</i> duty	Maximum <i>ad valorem</i> duty	Duty Free TL[%]
Nepal	2013	10	14.6	10	15	0.0
Pakistan	2013	20	11.1	5	25	0.0
Democratic Republic of the Congo	2010	15	11.0	5	20	0.0
Russian Federation	2012	17	10.2	0	15	12.5
India	2014	137	10.0	10	10	0.0
Lao People's Democratic Republic	2008	78	10.0	10	10	0.0
Uruguay	2014	158	9.9	0	14	16.5
Argentina	2012	146	9.8	0	14	16.7
Brazil	2014	146	9.8	0	14	16.6
Paraguay	2014	151	9.3	0	14	16.7
Thailand	2013	60	9.3	0	10	7.3
Ghana	2013	10	9.2	0	10	8.3
Belarus	2001	27	8.8	0	15	12.5
Nigeria	2013	8	8.8	0	20	50.0
Venezuela, Bolivarian Republic of	2012	40	8.4	0	10	12.5
Djibouti	2014	8	8.0	8	8	0.0
Korea, Republic of	2014	49	8.0	8	8	0.0
Colombia	2014	25	7.7	0	10	12.5
Tunisia	2012	16	7.5	0	15	50.0
Slovenia	2003	18	7.1	0	15	37.5
Algeria	2010	9	6.6	5	30	0.0
Bolivia, Plurinational State of	2013	25	6.5	0	10	23.7
Chile	2014	16	6.0	6	6	0.0
Peru	2014	25	6.0	6	6	0.0
Zimbabwe	2012	12	5.8	0	10	29.2
Mexico	2014	78	5.7	0	15	43.1
Morocco	2012	76	5.3	2.5	25	0.0
China	2013	32	5.2	3	6	0.0
Cameroon	2013	8	5.0	5	5	0.0
Central African Republic	2013	8	5.0	5	5	0.0
Chad	2013	8	5.0	5	5	0.0
Congo	2013	8	5.0	5	5	0.0
El Salvador	2013	19	5.0	5	5	0.0
Guatemala	2012	19	5.0	5	5	0.0
Maldives	2011	37	5.0	5	5	0.0

Country	Applied Tariffs					
	Year	Number of tariff lines	Average of <i>ad valorem</i> duties	Minimum <i>ad valorem</i> duty	Maximum <i>ad valorem</i> duty	Duty Free TL(%)
Mongolia	2013	16	5.0	5	5	0.0
Solomon Islands	2011	8	5.0	5	5	0.0
Tajikistan	2012	31	5.0	5	5	0.0
The Gambia	2013	8	5.0	5	5	0.0
Grenada	2014	22	4.8	0	15	58.5
Sierra Leone	2012	14	4.7	0	5	5.4
Yemen	2009	9	4.7	0	5	6.3
Egypt	2012	10	4.4	0	5	4.2
Indonesia	2014	62	4.3	0	5	13.8
Antigua and Barbuda	2013	23	4.2	0	10	58.2
Barbados	2013	23	4.2	0	10	58.2
Guyana	2013	23	4.2	0	10	58.2
Jamaica	2013	23	4.2	0	10	58.2
Saint Lucia	2013	23	4.2	0	10	58.2
Saint Vincent and the Grenadines	2013	23	4.2	0	10	58.2
Suriname	2013	23	4.2	0	10	58.2
Trinidad and Tobago	2013	23	4.2	0	10	58.2
Bangladesh	2013	17	4.1	0	25	30.6
Angola	2013	16	3.5	2	5	0.0
Belize	2013	23	3.4	0	15	76.6
Poland	2003	18	3.0	0	6	50.0
Ecuador	2012	25	3.0	0	10	42.4
Philippines	2014	61	2.9	0	5	1.7
Liberia, Republic of	2013	9	2.5	2.5	2.5	0.0
The former Yugoslav Republic of Macedonia	2013	20	2.5	0	5	50.0
Serbia	2005	18	2.3	1	5	0.0
Costa Rica	2014	40	2.2	0	5	55.9
Saint Kitts and Nevis	2013	23	2.2	0	10	78.1
Myanmar	2013	60	1.5	1.5	1.5	0.0
Viet Nam	2013	60	1.4	0	8	73.4
Cuba	2014	32	1.0	1	1	0.0
Iceland	2014	34	1.0	0	20	95.0
Chinese Taipei	2014	26	0.2	0	20	99.0
Dominican Republic	2014	13	0.1	0	3	97.9

Source: WTO tariff database