STUDY OF AVERAGE EFFECTS OF NTM ON TRADE IMPORTS

(Unedited Version)

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A. ABSTRACT

Newly collected data in UNCTAD's TRAINS database on Non-tariff Measures offers the possibility to assess its impact on trade. The approach chosen is using a frequency count, which is the number of NTM on a single product. This method can be relevant if one can assume that NTM do have a cost for exporters, even if that cost is unknown. The key concept is the average cost of any NTM. This analysis checks whether more measures imposed on a single product, will increase difficulty for exporters to comply with all requisites and still being able to export competitively. European imports of agri-food products (at 4 digit level) is analyzed, and data suggests that higher frequency of SPS measures may be significant to influence European imports from all countries, and it impacts LDC in special, particularly those in Africa. Exports could be reduced by around 3% for all countries, and almost 5% for LDC countries for each additional SPS requirement in the importing country. Countries in Asia do not seem to be affected, but this is probably because of trade patters, since European Union is not a major market for agri-food exports coming from those countries. Other middle income countries are affected in a lesser way. This fact gives strength to the idea that the higher income in a country, the more resources are available to the companies operating in their territory to overcome obstacles posed by NTM in partner markets and continue exporting. Even in the evidence that NTM may negatively affect trade, negotiation for reduction, harmonization or elimination is not automatic or even desirable. If importing countries consider the measures in place to be legitimate and required, and, given the nature of measures, it is not possible to negotiate any special and differential treatment; it could be envisaged to compensate the effect by technical assistance or capacity building. Conformity assessment and testing and certification capacity in exporting countries is normally a fertile area for achieving this objective.

B. INTRODUCTION

It is generally assumed that NTMs have negative effect on trade, even if it has been elusive for quantitative assessment. Sometimes, these policy measures are referred to as barriers, when the emphasis is made on the difficulties an exporter may have to comply with them. In fact, NTMs can hinder exports for countries or companies when they are not able to pay the cost of adapting their product or production process to the norm of a trade partner. Then, another less competitive exporter may be able to take on a restrictive market if it complies with that regulation. NTMs would be trade distorting in this case.

However, NTMs may also facilitate trade when they reduce asymmetries in information between consumers and producers, for example about the quality or safety of the product. The effort of complying with NTMS could also help countries to upgrade capacities, (or mitigating institutional deficiencies for monitoring and enforcing regulations, in words of van Tongeren, Begin, Marette, 2009) in which case the ultimate development impact is positive for the exporting country. On the importing country's side, NTMs could reduce negative externalities, for example in the case of environmental threat or food safety.

All these aspects are difficult to measure, especially when assessing multiple NTM on various sectors. The most suitable method for assessing some measures could be different from others. For example, considering quotas and sanitary requirements, the impact analysis of the first has been extensively studied. On the other hand, research is still expanding for the analysis of technical measures and sanitary and phytosanitary measures (TBT and SPS). It is hard to evaluate quantitatively the effect of a hygiene certification, a fumigation requirement or the accessibility of traceability information. This is not only because there is no numeric quantity in the regulations, but also because individual SPS and TBT measures can be very different in nature, and so in the costs they carry.

There could also be a difference among products. Some agri-food products are sensible for many countries for different reasons, and commodity dependence makes the impact wider. Agriculture products are sensible to many countries, and definitely are likely to be highly regulated for different reasons.

This study concentrates on SPS measures for agri-food products. It contributes to the discussion on restrictiveness, necessity and appropriateness of NTM on those products, especially in developed countries. It can help raise awareness on different impacts of NTM to exporters in different regions, and especially on Least Developed Countries (LDC). Though NTM are generally unilateral and applied to imports from all countries alike, exporters in different origins may have differentiated capacity to comply with regulations, and this can be more clearly seen in LDCs. This analysis does not assume the trade measures have protectionist intent or are unjustified. It provides one approach to have a preliminary look into any possible impact on trade. It is worth mentioning that it is not the legitimacy of measures which is at stake, but any (desired, or not desired) economic effects it may bring. Measuring the effect of NTMs is relevant both for adapting policies for exporting countries and for

negotiating purposes with those imposing measures on imports, besides assessing the impact and considering ways to neutralize it, for example through technical assistance and capacity building.

Market access becomes more complex, and goes clearly beyond tariffs. NTM may enhance exports of a country when it complies with the requirements, as it has gained *de facto* market access to the imposing country. This study questions whether less developed countries could face further difficulties because of its conditions compared to other more developed. Agri-food products is a good case, since it is very suitable for analyzing responsiveness of various regions to restrictions in a major market as it is the European Union.

Based on available data, it is possible to use alternative methods to assess the implications of these trade control measures. Tariff effects are more straight-forward for analysis, but for NTM, even complete data could lead to different approaches for its study. This is basically because "measures" are essentially of legal nature with no direct measurement or quantification of impact or effect associated with it.

The frequency on NTM is used as a measure of restrictiveness. This could be assumed as "adding up" the average cost of complying with measures that exporters face across countries and companies.

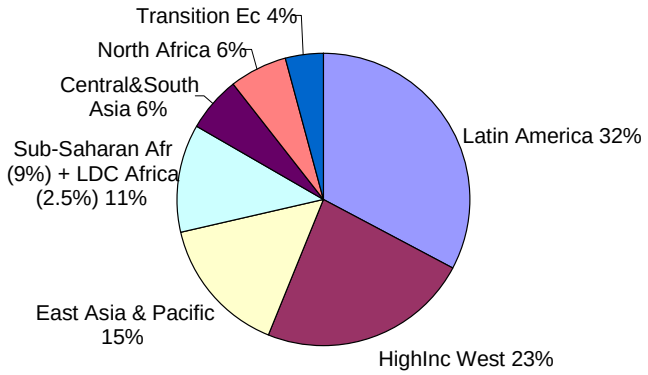
C. AGRI-FOOD IMPORTS IN EUROPEAN UNION AND NTM APPLIED TO THEM

Trade

Figure 1 presents the regional origin of agri-food products imported into the European Union. The largest supplier is Latin America, followed by High Income countries in Europe or America, such as United States, Canada, Norway, Switzerland, New Zealand, or Australia. In East Asia and Pacific there are important suppliers, such as China, Indonesia, Thailand, Vietnam, Malaysia, and others. Sub-Saharan Africa and LDCs in Africa account for 11% of the imports of agri-food products into the European Union. This share is not negligible.

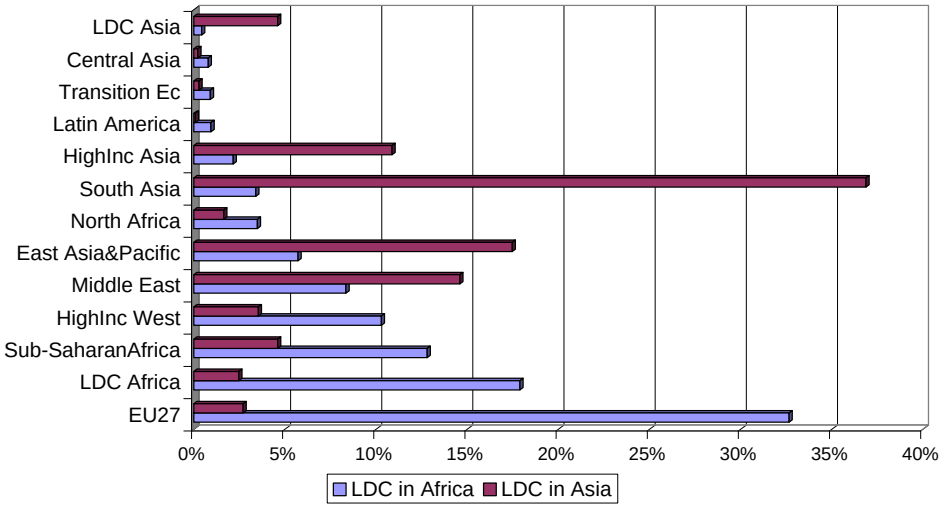
The results point to particular conclusions for African LDCs. It is important to note that European Union represents more than 30% of exports to these countries, as it is shown in Figure 2. On the other hand, it only represents 3% to Asian LDC, since exports are oriented mainly to Asia, especially to South Asia.

Figure 1. Imports of agri-food products into EU. Percentage share by Region



Source: WITS COMTRADE
Note: Average yearly exports for 2008 to 2010

Figure 2. Exports of agri-food from LDC in Africa and Asia. Percentage share by Region



Source: WITS COMTRADE
Note: Average yearly exports for 2008 to 2010

Incidence of SPS Measures

A simple way to grasp the relevance of NTM measures is to calculate tow incidence measures: frequency index and coverage ratio. The frequency index accounts only for the presence or absence of an NTM, and summarizes the percentage of products to which one or more NTMs are applied. The coverage ratio is the percentage of trade subject to NTMs for the importing country and provides a measure of the importance of NTMs on overall imports.[1]

[1] Here, only agri-food products are shown, more information is provided in UNCATD (2012), "NTM to Trade: Economic and Policy Issues for Developing Countries"

The Table and Figures below show that these products are highly regulated. Most of agri-food products and trade is covered by at least one SPS measure. Both incidence measures reach almost 100% coverage. This information is in line with expectations, but it is not useful *per se* to infer the restrictiveness of the regulations.

The figure 3 shows how many SPS measures apply to each product. The ones with highest frequency have almost 60 distinct measures applying to it. On average, there are 17 measures on each product.

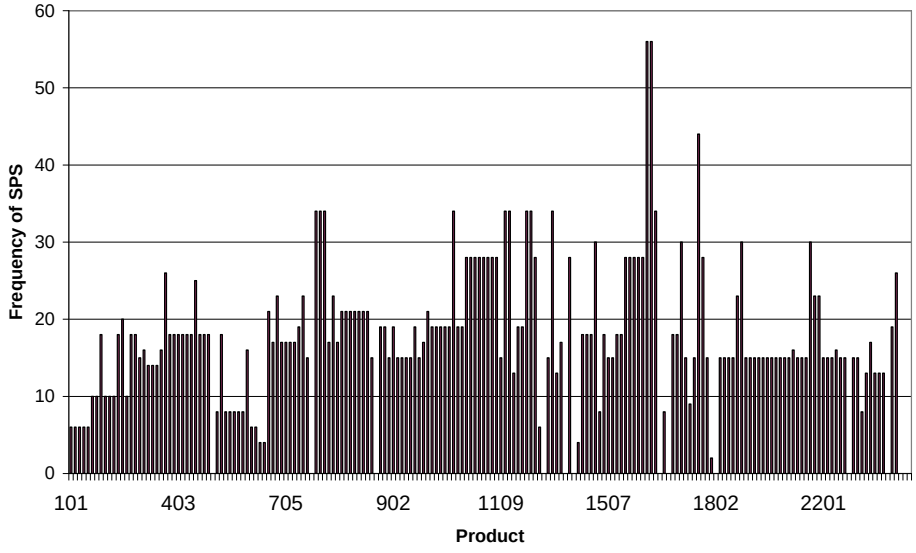
Figure 4 relates import value in the European Union with the frequency count of SPS. It shows that some of the highly regulated products have also high import value

Table 1. Incidence measures of SPS on agri-food products in European Union

	Incidence of SPS
Frequency Index	92.8%
Coverage Ratio	96.9%

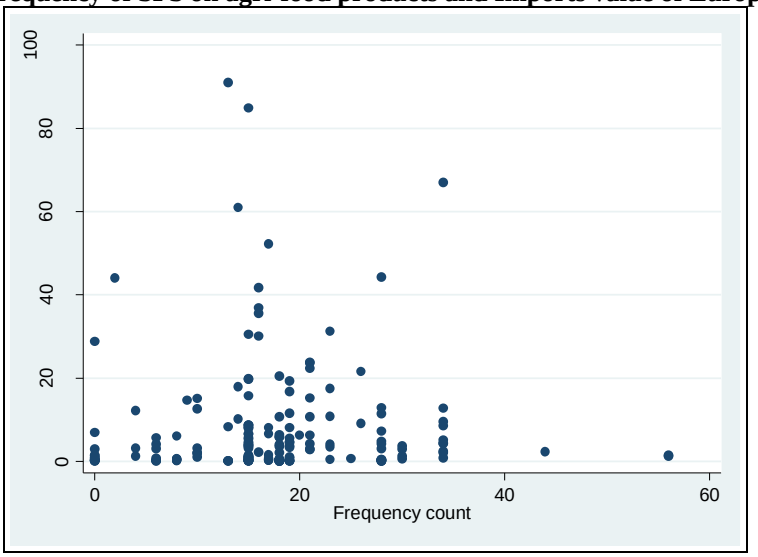
Source: TRAINS/WITS Unctad NTM database

Figure 3. Frequency of SPS on agri-food products at 4 digits HS imposed by European Union



Source: TRAINS/WITS Unctad NTM database

Figure 4. Frequency of SPS on agri-food products and Imports value of European Union



Source: TRAINS/WITS Unctad NTM database and COMTRADE

D. DATA AND METHODOLOGY

The source of data is the UNCTAD's TRAINS database, which as from 2009, collects measures directly from official legal sources in each country. It records measures which have been published as official legal requirements according to the new classification (developed from 2007 to 2009). For the case of the European Union, it consists of processed and classified data which originally is collected by European Export Help Desk[2] . All the measures are mandatory regulations published in the Official Journal of the EU.

The data does not indicate how important any restrictions or limitations are. It just lists measures that control trade, associated with the corresponding affected products. Measuring the restrictiveness of the NTM is a complex task, involving assigning a value to the impact they may cause on trade. Normally, either prices or quantities traded are altered when NTM are in place. There alternative ways of calculating this, to then drawing conclusions on the restrictiveness of NTM applied.

One way of studying the effect of NTM is using the frequency count. This is the number of NTM on a single product. The more measures imposed on a single product, the more difficulty for exporters to comply with all requisites and still being able to export competitively. This method can be relevant if one can assume that NTM do have a cost for exporters, even if that cost is unknown. This is because the key concept is the average cost of any NTM, and not the cost of any single measure. While the average cost is also unknown, it can be assessed. As any average, the average calculated cost in terms of impact on trade is representative of all measures, but not of any one in particular.

[2] http://exporthelp.europa.eu/thdapp/index_en.html

In reality, the cost to the exporter may be different not only for each NTM, but also for each exporting country or region. A country has a level of development that provides an average level of service to all companies located in it. The average cost (or availability) of certification and verification bodies as well as export services can be higher in developing countries, especially in LDCs. Institutional capacity can, then, affect negatively less developed countries, and all companies located in it. Furthermore, the cost can be different for two distinct companies within the same country when they have or have not enough resources to invest (or have already invested) to comply with requirements and adapt its product or production process. This can be associated with the competitiveness of the company. While theoretically NTM could have a differing cost to different companies located in any country or region depending on their competitiveness, what is relevant for this study is that the average cost across companies can be assessed.

Using this approach, any NTM picked randomly would "yield" the average cost impact. When a large number of measures of a country are analysed, then the assessment will be more accurate. The "frequency" measure is simply "adding up" the unknown average cost of individual measures to analyze the cost in the margin.

The equation studied is the following:

$$\ln m_{EU\,k,j} = c + \beta_1 \, frequencySPS_{k} + \beta_2 \, dumLDC + \beta_3 \, dumLDC*frequencySPS_{k,j} + \beta i \text{ Other control variables} + u_{k,j}$$

where the dependent variable, $m_{EU,}$ is the European import value. It is the average annual imports considering data from COMTRADE from 2008 to 2010.[3] The average across three years is used to avoid any short term volatility in trade. It is bilateral and by product, at HS 4 digits. It is used in log.

The frequency variable is *frequencySPS,* and is the count of SPS measures as described above. The frequency count is calculated taking into account how many different regulations are applied to a 4-digit product, as stated in any single regulation, i.e. a single legal document issued officially by the government. Each regulation or legal document must be read to distinguish all measures within its text, and then all are to be registered separately.[4] Thus, it does not matter, how many 8-digit products[5] are in any 4-digit group, but only how many differentiated regulations are applied to it. The result is a maximum of around 60 measures applied to a single product.[6] Measures on Organic products are dropped because they are not affecting but organic-labelled products, and this is a condition on products that is considered voluntary.

A dummy variable for identifying effects on LDC is introduced through *dumLDC.* There is also an interaction term of the LDC dummy variable and frequency of SPS measures, which is *dumLDC*frequencySPS*. This term would capture any specific

[3] Data is not yet complete for all countries for 2011, so this year is not used

[4] In the case of the EU, the regulations are consolidated documents grouping a few laws, decrees, or directives, etc. that relate to the same subject and group of products. This is determined by availability of data from the Help Desk.

[5] Original NTM data for EU is at 8-digit level

[6] It could happen that there are two regulations applying two measures that fall in the same NTM code, e.g. two regulations for labelling. Since they are originated in two different sources of official legislation, and having different content, they are both counted.

effect that additional SPS measures would have in the value of exports for LDC countries, apart from the general effect on all countries.

The control variables are the following: (a) World market size, which is the value of world imports for product i, in log. It accounts for differences in value of imports related to the fact that some products normally have higher traded value (due to price or volume) than others, irrespective of the importer. The variable (b) is the Lead Time to export, as appears in the World Bank survey Doing Business. It is the average number of days of delay to export from each of the countries. When there is no data available for a country, the regional average (available from the same source) is assigned to this country. It reflects whether exports could be lower/higher due to internal conditions of the exporting country, normally related to export facilitation. Some countries have lengthier processes to export, and this could affect the export value. The tariffs data is used in variable (c). It is calculated using trade weighted tariff data from WITS, and using the AVE calculations from the same source.[7] The (d) Distance variable accounts for the fact that some countries may trade less with Europe just because they are geographically distant. Some other countries may export more to Europe because they are either big countries, accounted for in (e) GDP, used in log, or because the are big exporters, as reflected in (f) Exports to other markets, also in log. This last variable describes exports from country j of product i to the World, except for European Union. It accounts also for any particular condition in a country (e.g. endowments, traditional production) that makes it an important exporter of a particular product, regardless of importing conditions in Europe.

The exercise is set to show if the imports of the agri-food products affected with more SPS measures are imported less, compared to others, in which case SPS would have a restrictive effect on trade. When proved statistically significant, the interaction term (of frequency of SPS measures and LDC dummy) would show if the condition of being an LDC affects in a special way the level of exports of these products when confronted to SPS measures. In other words, that their effects are not independent.

Only agri-food products are used. More specifically, only those in chapters 1 to 24 are considered in this group.

E. RESULTS

The results suggest the SPS measures are relevant for exports of agri-food products to Europe. The dummy variable for presence/absence of those measures is significant, and quite large. Moreover, results also suggest the higher frequency of measures decreases exports, especially for LCD countries in Africa. Most of the control variables are significant, and they have the expected signs.

The higher frequency of measures seems to decrease exports around 3% worldwide, on average. The coefficient is highly significant in all specifications where it was included, i.e. in equations from 7 to 15, and with a similar value in all of them. This

[7] It used Ad Valorem Equivalent (AVE) Method 1. Variable is calculated as ln(1+tariff in decimal). Bilateral data is used. The AVE values are preferred, when available. Preferential rates are the second information used, when available, then effectively applied rates, and MFN when the others are missing.

suggests all countries are affected in their exports when there are a large number of Non-Tariff Measures, in particular for SPS measures on agri-food products. Each additional measures imposed on a single product would make its imports decrease in about 3%, for any country. These conclusions are driven for Europe because it is the only market analyzed.

Equation 12 tests whether there is a special effect for LCD, and the result is that the coefficient is not significant, and so there should be no additional effect for those countries for facing SPS measures, apart from the average effect across countries. Still, if the LDC group is split in regions, a specific effect emerges for African countries. Equation 13 shows that an additional 2% decrease in exports could be added to the 2.9% average effect across countries, so that LDC countries in Africa could see their exports of agri-food products to Europe decreased in almost 5% for each additional SPS measure on a single product. The coefficient for the interaction for these two variables is significant (LDC in Africa dummy and frequency count) and suggests that they are not independent when considering their effect on EU imports of these products.

Equation 14 tests the same for the LDC in Asia, but results are different. The condition of being in that country group negatively affects exports to Europe, and in a stronger way that for those in Africa. Table 3 shows the estimated impact in percentage change of Europe imports, using calculations suggested by Kennedy (1981)[8]. Exports for those countries falling in the category of Asian LDCs are decreased by 80%, but for reasons that do not relate to NTM. In fact, the interaction term (variable (q) in the Table 2), is not significantly different from zero. LDCs in Asia suffer from the worldwide average effect of 3%, but there is no additional or special effect for them as it was found for African LDC. Finally, the Equation 15 combines both regions, and the same results are confirmed.

The control variables, for their part, are successful in isolating the effects of market size, facilitation difficulties in the exporting countries, tariffs, distance, and exporting tradition of countries. All these are significant. The Lead time to Exports suggests more than 2% of exports can be reduced because of lengthy processes in the exporting country. This problem could be almost as tough as SPS requirements for exports of developing countries. Tariffs and distance also seem to restrict trade strongly. On the other hand, results suggest the size of an economy does not influence its exports of these products to Europe, but is more related to the tradition of exportation in that country. This variable is country and product specific and so takes into account any condition favouring exports of a particular product from a particular country, e.g. traditional exports of commodities.

In Equation 1, imports of the EU is explained from various sources as a function of a number of variables. Using a very simple regression, it appears that the level of imports is negatively affected by tariffs and distance, and also that delayed exporting procedures and obstacles in the exporting countries do affect their level of exports. On

[8] The calculations are done using the program proposed by Scott Merryman, version 1.0.0 October 9, 2005. The value "p = exp(b}-1" is not known. Kennedy (1981) pointed out that this transformation results in a biased estimator for p, and suggested "p = 100*(exp{b_hat - .5*V(b_hat)} - 1)"

the other hand, the size of the exporting sector and tradition will increase exports of a country.

The second equation adds the SPS dummy variable, which appears to be significant. As it states, it would suggest that having one or more SPS regulations on any product makes a big difference for imports. The estimated percentage impact calculated for this coefficient in all equations (shown in Table 3) is around 46-50% decrease in EU imports when there are SPS measures. This is a very broad an imprecise assessment; probably the estimations are more accurate if considering the frequency, rather than the presence/absence of one or more measures. This is done in equations from 7 to 15.

A third calculation, shown in Equation 3, includes what could be considered the most vulnerable group: the LDC. Again, the presence of SPS measures appears to be very important, but the condition of being an LDC does not seem to be relevant for exporting to Europe. In fact, even when considering separately the African and Asian LCD, the negative effect found for LDC in Africa for the interaction of both conditions (being and LDC in Africa and facing SPS measures) offsets the positive effect of being in that country group. Once again, the usefulness of analyzing the trade effect through categorical "dummy" variables is limited because it would assume not only that all measures are the same in terms of effect, but also that facing one or many should have the same impact on trade.

This information leads to test if the number of measures can make any difference. Equation 7 uses the frequency variable. This case suggests that the more SPS regulations on a product, the less imports for that product; and this effect is of around 3% of imports per each extra SPS regulation.

The drawback is that it is only an average worldwide. Considering the diversity of countries and regions, this information may not be very useful for determining any conclusions that could lead to policy implications. One way of overcoming this difficulty is analyzing what is considered the most vulnerable group: the Least Developed Countries (LDC). The rest of the Equations use again the same frequency variable as before but adds another one/s to test the condition of being an LDC. Equation 12 shows these results. Apparently, there is no affect for LDC countries, but this result changes when considering African and Asian LDC separately. Equations 13 and 15 suggest there is an extra 2% decrease in exports for African LDC countries apart from the general 3%, while there is no effect for Asian LDC. These results suggest that LDC in Africa, in particular, find extra difficulty in exporting; they are relatively more affected than the rest whenever the number of SPS measures are increasing. The total effect rises to almost 5% of decreased exports for any product for each extra SPS measure imposed by the European Union (which is the only importing market analyzed). On average, other countries would face a reduction of about 3%.

Table 1. Regression results. Equations 1 to 6

	Eq.1	Eq.2	Eq.3	Eq.4	Eq.5	Eq.6
(a) World market size	0.053	0.0743*	0.0846**	0.0734*	0.0842**	0.0848**
(b) DayDelay	-.0196***	-0.0198***	-0.0126	-0.0217***	-0.0235***	-0.0237***
(c) Tariffs	-1.11***	-1.12***	-1.27***	-1.1***	-1.31***	-1.31***
(d) Distance	-.578***	-0.578***	-0.567***	-0.577***	-0.556***	-0.555***
(e) GDP	5.7E-14	5.5E-14	-5.4E-14	6E-14	-1.5E-14	-2.7E-14
(f) Exports to other markets	0 .593***	0.593***	0.584***	0.593***	0.587***	0.586***
(g) SPS dummy		-0.648**	-0.599**	-0.586**	-0.668**	-0.602**
(h) SPS dummy*LDC			-0.497			
(i) SPS dum*LDC Africa				-0.881*		-0.889**
(j) SPS dum*LDC Asia					0.263	0.175
(k) LDC dummy			0.0864			
(l) LDC Africa				0.884**		0.813*
(m) LDC Asia					-1.62**	-1.54**
(n) Frequency of SPS						
(o) FreqSPS*LDC						
(p) Freq SPS*LDC Africa						
(q) Freq SPS*LDC Asia						
constant	5.14***	5.45***	5.25***	5.4***	5.23***	5.16***

legend: * p<.1; ** p<.05; *** p<.01

Table 2. Regression results. Equations 7 to 15

	Eq.7	Eq.8	Eq.9	Eq.10	Eq.11	Eq.12	Eq.13	Eq.14	Eq.15
(a) World market size	0.0899**	0.1**	0.0892**	0.0992**	0.1**	0.0997**	0.0887**	0.0993**	0.0997**
(b) DayDelay	-0.0198***	-0.0121	-0.0207***	-0.0235***	-0.0226***	-0.0122	-0.0209***	-0.0235***	-0.0228***
(c) Tariffs	-1.13***	-1.28***	-1.12***	-1.31***	-1.32***	-1.29***	-1.12***	-1.31***	-1.32***
(d) Distance	-0.577***	-0.567***	-0.578***	-0.555***	-0.555***	-0.567***	-0.577***	-0.555***	-0.555***
(e) GDP	5E-14	-5.7E-14	5.7E-14	-2.1E-14	-3E-14	-5.6E-14	5.8E-14	-2.1E-14	-2.9E-14
(f) Exports to other markets	0.592***	0.584***	0.593***	0.587***	0.587***	0.584***	0.593***	0.587***	0.586***
(g) SPS dummy									
(h) SPS dummy*LDC									
(i) SPS dum*LDC Africa									
(j) SPS dum*LDC Asia									
(k) LDC dummy		-0.388***				-0.168			
(l) LDC Africa			0.037		-0.0415		0.411**		0.33
(m) LDC Asia				-1.37***	-1.37***			-1.58***	-1.55***
(n) Frequency of SPS	-0.0305***	-0.0304***	-0.0305***	-0.0305***	-0.0305***	-0.0289***	-0.0287***	-0.0308***	-0.0289***
(o) FreqSPS*LDC						-0.012			
(p) Freq SPS*LDC Africa							-0.0204**		-.0203**
(q) Freq SPS*LDC Asia								0.0118	0.00952
constant	5.16***	5.01***	5.17***	4.93***	4.92***	4.98***	5.14***	4.93***	4.9***

legend: * p<.1; ** p<.05; *** p<.01

Table 3. Unbiased Estimated Percentage Change in Dependent Variable

	Eq.3	Eq.4	Eq.5	Eq.6	Eq.8	Eq.10	Eq.11	Eq.13	Eq.14	Eq.15
(g) SPS dum	-47.27%	-46.55%	-50.72%	-47.44%						
(k) LDC dum					-32.43%					
(l) LDC Africa		119.00%		104.05%				47.61%		
(m) LDC Asia			-84.33%	-83.12%		-74.86%	-75.02%		-80.68%	-80.01%

Kennedy's (1981) approximation method for semilogarithmic equations
Note: only those that are significantly different from zero are shown here

It is also possible to add other regions to the analysis to check whether LDCs in Africa are particularly affected as the single group. Table 4 shows the results for an equation including the above mentioned control variables, plus Region categorical variables and their interaction with SPS frequency count. Results suggest that LDC in Africa and countries in Sub-Saharan Africa are the ones who suffer most when SPS measures summate. Their exports are reduced above 4% for each additional NTM in agri-food products, while other regions, such as Transition Economies, Latin America, Middle East and North Africa would see their exports reduced in about 2.5%. There is no significant effect for countries with High Income or those in Asia.

Table 4. Regression results. Equations for regions

Variables	Eq.Regions
(a) World market size	0.121***
(b) DayDelay	-.0238***
(c) Tariffs	-1.34***
(d) Distance(sq)	-.831***
(e) GDP	3.3E-13
(f) Exports to other markets	0.583***
(n) Frequency of SPS	-0.00802
Region 2 dum. HighIncome Asia	-1.42***
Region 3 dum. Transition Ec	-1.26***
Region 4 dum. Central Asia	1.18**
Region 5 dum. Latim Am	-0.11
Region 6 dum.East Asia&Pacific	-0.532**
Region 7 dum. South Asia	-0.238
Region 8 dum. Middle east	-2.38***
Region 9 dum. North Africa	0.206
Region 10 dum. Sub-Saharan Africa	0.501**
Region 11 dum. LDC Americas	-1.58
Region 12 dum. LDC Asia	-1.91***
Region 13 dum. LDC Africa	-0.0679
(r2) Freq SPS*Region2. High Income Asia	0.00498
(r3) Freq SPS*Region3. Transition Ec	-0.0257**
(r4) Freq SPS*Region4. Central Asia	-0.0316
(r5) Freq SPS*Region5. Latin America	-0.0239**
(r6) Freq SPS*Region6. East Asia & pacific	-0.00925
(r7) Freq SPS*Region7. South Asia	-0.0102
(r8) Freq SPS*Region8. Middle East	-0.0248*
(r9) Freq SPS*Region9. North Africa	-0.0284**
(r10) Freq SPS*Region10. Sub-Saharan Africa	-0.0453***
(r11) Freq SPS*Region11. LDC Americas	-0.00067
(r12) Freq SPS*Region12. LDC Asia	-0.0118
(r13) Freq SPS*Region13.LDC Africa	-0.0416***
constant	7.35***

legend: * p<.1; ** p<.05; *** p<.01

F. CONCLUSIONS

This study shows one approach to use recently available data on NTM to assess the impact on trade. Though it is generally assumed that NTM restrict trade, the existence of a measure should not be taken as protectionist policy in all cases. First, because according to WTO agreement on SPS, a country is free to set measure to control sanitary risks when it can show regulation is based on scientific arguments to protect itself from sanitary risks. Second, because this measure could also be comparable in restrictiveness to similar measures applied by other countries; and third, because there is nothing in the NTM database that can give an estimation of the cost to the exporter. The database simply lists trade control measures used by that country and determined by the law. This analysis does not assume the trade measures have protectionist intent or are unjustified; it tries to assess broadly intended or unintended trade effects.

This analysis provides a preliminary look into any possible impact on trade. It compares one measurement of restrictiveness which is the number of NTM applied to a product, to import trade flows for that product, coming from different countries. This method assumes that measures have different costs, and adding up the number of measures to compare across products would give a preliminary estimation of the average cost of each measure. As any average, it is representative of the whole group, but can not be taken as an estimate for any of the individual measures. The cost carried by an NTM is not known, because it is different for each type of measures, but also for each exporting country, and probably for each exporting company also. Nevertheless, the average cost can be assessed and it becomes a key concept to rely on this method.

The data studied concentrates on one type of measures, SPS, and only on certain products, agriculture and food products. These products are sensible to many countries, and definitely are likely to be highly regulated for different reasons. The only importing market analyzed is European Union

The results suggest the SPS measures are be relevant for exports of agri-food products to Europe. The dummy variable for presence/absence of those measures is significant, and quite large. Still, this categorical analysis does not offer much insight and its usefulness is limited. Nevertheless, the results using the frequency count suggest that when a product is highly regulated (more distinct measures are imposed on it), imports of this product would be decreased, especially for LCD countries in Africa. The higher frequency of measures seems to decrease exports around 3% worldwide, on average. The impact for African LDC is stronger, and their exports could be reduced by almost 5% for each additional SPS measure on agri-food products imposed by the European Union. The interaction of both conditions (being an African LCD and facing more SPS measures) suggests the impact is disproportionate for them, affecting them more in their ability to export.

The analysis including other regions supports the idea that the effect is not even across countries or regions. High income countries and those in Asia, including LDC in Asia, do not seem to be affected. Probably, this relates to the fact that exports from Asia to Europe do not concentrate on agri-food, or because their importing partners for these products are not in the European Union. It also gives strength to the idea that High Income countries, or at least many of the exporting companies in these countries,

may have the resources to overcome obstacles posed by NTM in partner markets and continue exporting.

This idea suggests that NTM affect poorer countries disproportionally. LDCs in Africa, but also those in Sub-Saharan Africa are relatively more affected than others, such as Transition Economies, Latin America, Middle East or North Africa, who would see their exports reduced in about 2.5% for each additional SPS measure on agri-food products.

Even in the evidence that NTM may negatively affect trade, negotiation for reduction, harmonization or elimination of these measures is not automatic. They cannot simply be washed away. If importing countries consider the measures in place to be legitimate and required, and, given the nature of measures, it is not possible to negotiate any special and differential treatment; it could be envisaged to compensate the effect by technical assistance or capacity building. Conformity assessment and testing and certification capacity in exporting countries is normally a fertile area for achieving this objective.

Lastly, the assessed percentage of decrease is not likely to affect all companies in a region (country) alike. It is reasonable to think that it could come from a few companies not being able to continue exporting, and probably being excluded from business. This feature could be more damaging for the economy and labour market of a country than an even decrease in all companies active in the export sector. This is also an area that national policies could address, so as to provide resources and facilities to assist vulnerable companies to be competitive.

This analysis provides a preliminary look on average impact of NTM measures, but it fails to distinguish between costs associated to the country of origin, i.e. availability (or not) of infrastructure, export services, testing and certification capacity in exporting countries, etc. and those costs associated to the companies operating in them. These are directly related to their competitiveness. Still, there are reasons to believe these two are not independent, and a joint assessment is useful for empirical analysis oriented to negotiation and policy needs.

ANNEX

Table A1. Average days of delay to export, by region

Region	Lead Time to export
High Income	2
East Asia & Pacific	3.583333
Europe & Central Asia	2.75
Latin America & Caribbean	3.93
Middle East & North Africa	2.749
South Asia	1.884286
Sub-Saharan Africa	8.132728
LDC Americas	8.5435
LDC Africa	8.5435
LDC Asia	8.5435

Source: World bank, Doing Business survey

Table A2. LDC countries

LDC countries	
in Africa	**in Asia**
Angola	Afghanistan
Benin	Bangladesh
Burkina Faso	Bhutan
Burundi	Cambodia
Central African Republic	Lao People's Democratic Rep
Chad	Myanmar
Democratic Republic of the Congo	Nepal
Djibouti	Yemen
Equatorial Guinea	
Eritrea	
Ethiopia	
Gambia	
Guinea	
Guinea-Bissau	
Haiti	
Lesotho	
Liberia	
Madagascar	
Malawi	
Mali	
Mauritania	
Mozambique	
Niger	
Rwanda	
Senegal	
Sierra Leone	
Somalia	
Sudan	
Togo	
Uganda	
United Republic of Tanzania	
Zambia	

Source: The Least Developed Countries Report 2011, UNCTAD