EU Trade Preferences and Export Diversification

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Abstract

Since at least the 1960s, the European Union (EU) has offered various kinds of non-reciprocal trade preferences for developing countries. Originally, these trade preferences had at least two policy goals: (i) to increase export volumes for developing countries and thereby boost their export earnings, and (ii) to facilitate export diversification. While extensive research has confirmed that the first of these goals is typically met, the second goal seems to have been largely forgotten by researchers as well as in policy circles. The aim of this paper is therefore to analyse the impact of the EU's non-reciprocal trade preferences for developing countries on export diversification. Our estimation results suggest that some trade preference programs, such as the Generalised Scheme of Preferences (GSP), are associated with increasing ranges of export products. By contrast, preferences offered to Mediterranean countries typically have no significant effects, and African, Caribbean and Pacific (ACP) preferences actually have negative effects toward the end of our time period, suggesting that ACP countries may respond to preferences by specializing into fewer goods.

Keywords: Export diversification; non-reciprocal trade preferences; GSP; ACP; EU
JEL codes: F13; F15; O24

1 Introduction

Developed countries' trade preferences for developing countries have been one of the most important issues in North-South trade relations for the last half century. Unilaterally lowering trade barriers for developing countries, these non-reciprocal trade preferences were first used in the 1960s, and since 1979 there has been a permanent legal basis in GATT for offering these preferences which otherwise technically speaking violate the MFN obligation.[3]

The main direct goal of non-reciprocal trade preferences is to increase export earnings for the developing countries offered preferences. Export earnings are expected to increase both because exporters can charge a higher price than they would if they paid full MFN tariff, and because the quantity of exports increases. There has been quite a lot of policy debate about whether trade preferences actually lead to larger export flows, but fairly extensive research suggests that the goal is typically met. For an overview of the literature, see Persson (2012).

However, increased export earnings may not be the only beneficial effect from trade preferences. In fact, already in the 1960s when the policy was starting to be discussed in a more systematic fashion, trade preferences were explicitly linked to a *diversification* of developing countries' economies. For instance, in the second UNCTAD conference in 1968, when the parties agreed upon the need to create what would later become known as the *Generalized System of Preferences*, a second explicit goal of trade preferences was said to be to promote industrialization.[4] While it is not entirely clear how the industrialization goal should be interpreted, as discussed in Persson (forthcoming), it seems reasonable to read this as a diversification of the economy, where countries move from a dependence on a limited number of (in particular) primary products to producing and exporting a widening range of goods. Another example of an explicit link between trade preference programs and export diversification can be found in the first Lomé Convention which offered trade preferences to African, Caribbean and Pacific (ACP) states. In this convention, the program is said to aim to "promote the development and diversification of industry in the ACP states", and further to promote the "establishment of new industrial and trade links between the industries of the member states and those of the ACP states".[5]

From a theoretical point of view, is it reasonable to expect trade preferences to lead to export diversification? Early theoretical discussions used infant industry arguments to explain why unilateral trade preferences might help potentially profitable industries start production and over time take advantage of positive learning externalities and become competitive (for a short discussion, see Persson (forthcoming)). However, given the current lack of a strong consensus in favour of infant industry arguments, a more

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[3] For a thorough overview of the historical and legal background to non-reciprocal trade preferences, see Persson (forthcoming).

[4] See Persson (forthcoming) for an outline of the discussion at the second UNCTAD conference.

[5] Excerpts from Article 26 (A-B), ACP-EEC Convention of Lomé, *Offical Journal*, L 025, 30/01/1976. Technically speaking, these goals are mentioned under the heading "Industrial co-operation" and there is no explicit discussion about the mechanism through which trade preferences would play a role.

promising argument could perhaps be made using heterogeneous firm trade theory. In that type of theoretical framework (see e.g. Melitz (2003) and Chaney (2008)), a reduction of trade barriers – for example due to unilateral trade preferences – is expected to have a positive effect on both the intensive and the extensive margins of trade. Specifically, more firms will be productive enough to cover the costs of trading when trade barriers are reduced, which suggests that trade preferences could help more firms to become exporters. Without going into details, this line of reasoning suggests a reasonable argument for linking unilateral trade preferences and export diversification.[6]

However, one could, interestingly enough, also make a plausible argument for a negative relationship between trade preferences and export diversification. Preference programs rarely cover all products, and even the ones that do can have differences in preference margins across products. Unilateral trade preferences could therefore result in limited resources being channelled into the production of a few products with particularly high preference margins.

Thus, it is possible to construct theoretical arguments for trade preferences having both positive and negative effects on export diversification and ultimately, empirical research is needed to shed further light on the relationship.[7] However, despite this uncertainty about whether export diversification should really be seen as an expected policy outcome – and despite the obvious policy relevance in determining this question – the research literature addressing the issue is very limited, and no general conclusions have been drawn.

The goal of this paper is to investigate empirically whether there is a positive relationship between unilateral trade preferences and export diversification.[8] More specifically, we ask whether the various non-reciprocal trade preference schemes offered by the European Union (EU) to groups of developing countries are associated with increases in the range of products exported from these countries. Using the bilateral number of exported products as our baseline measure of export diversification, we study a very long time period, 1962-2007, and cover all preference schemes that the EU has implemented during that time.

We aim to make a contribution to the literature on unilateral trade preferences by focusing on export diversification that has been all but forgotten in the trade preference research. By using an intuitive and robust methodology, covering a very long time period and many examples of preference programs that have varying characteristics, and specifically investigating earlier time periods when preference erosion had not had the chance to affect the value of trade preferences as much, we believe to be in a position to draw fairly general conclusions.

We start by giving a thorough overview of the various schemes of non-reciprocal trade preferences that the EU has offered over time. Thereafter, in Section 3, we summarize the conclusions to be drawn from the previous studies on export diversification, and discuss the existing empirical research on trade effects of

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[6] For a elaborate discussion of applicable predictions of the model in Melitz (2003), see Gamberoni (2007).
[7] Note the difference between the expected effects on export earnings and export diversification. When it comes to the former, one can expect either a positive effect or no effect at all, since it is hard to envision why traders would request preferential treatment rather than exporting under MFN tariffs if preferences were to have a negative effect. For the latter, the expected effect is ambiguous.
[8] Note that we specifically investigate the effects of unilateral – i.e. non-reciprocal – trade preferences, and do not focus on reciprocal forms of preferential trade arrangements (free trade areas and customs unions).

unilateral preferences. In Section 4 the data and empirical strategy are described, and Section 5 presents the empirical results. Section 6 summarizes and concludes.

2   EU trade preferences for developing countries

The EU has historically offered trade preferences within three broad regimes: preferences to African, Caribbean and Pacific (ACP) countries, preferences to Mediterranean countries and preferences offered to all developing countries under the Generalized System of Preferences (GSP).

2.1   ACP preferences[9]

In the discussion surrounding the EU's trade policy towards developing countries, the Lomé Conventions, offering ACP countries the arguably best market access among developing countries, have always had a centre position. The first Lomé Convention in 1975 was, however, by no means the start of the special relationship between the EU and ACP countries. Already the Treaty of Rome, signed in 1957, created an "association" between the community and the present or former colonies of France, Belgium and Italy, which involved a gradual reciprocal abolishment of import duties and quantitative restrictions between EU members and associates. When many of these colonies became independent states, the same basic principles where retained in the Yaoundé Conventions, the first of which was signed in 1963.[10] [11] Table 1 offers details on the historical evolution of EU-ACP relations.

In 1973, the United Kingdom, Denmark and Ireland, joined the European Community (EC). In terms of the EC's trade relations with developing countries, this created a problem, since the Community had to find a way to handle the former British colonies. Rather than just adding new countries to the existing Yaoundé framework, a new type of agreement was negotiated, and in February 1975, the first Lomé Convention was signed. This Convention gave 46 ACP countries non-reciprocal trade preferences. Tropical products and manufactures, which together represented the largest part of exports, could be exported to the EC free of duties or quantitative restrictions. For agricultural products competing with goods covered by the Common Agricultural Policy (CAP), the ACP countries were given a better market access than non-ACP exporters. The ACP countries did not have any obligation to reciprocate this market access, apart from not offering less favourable access than what was offered to other developed countries. Trade in certain important products – bananas, sugar, rum and (from the fourth Lomé Convention) beef and veal – was governed by special so-called commodity protocols. With minor changes, the following Lomé Conventions kept the model for EU-ACP economic relations that had been created by Lomé I.

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[9] This section draws heavily on Bartels (2007) and Grilli (1993).

[10] One main difference between trade provisions in the Treaty of Rome and the Yaoundé Convention is that the former unlike the latter also stipulated the abolishment of trade barriers between the "associates".

[11] Through the Arusha Agreement, Tanzania, Kenya and Uganda had trade relationships with the EU that were comparable to that of the Yaoundé signatories.

Table 1 Evolution of EU-ACP Relations

Agreement	Signed	Into force	African, Caribbean and Pacific Countries
Treaty of Rome	1957	1958	Belgian, French and Italian colonies.
Yaoundé I	1963	1964	Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo (Dem. Rep.), Congo (Rep.), Côte d'Ivoire, Gabon, Madagascar, Mali, Mauritania, Niger, Rwanda, Senegal, Somalia, Togo
Yaoundé II	1969	1971	As Yaoundé I, plus Mauritius from 1973
Arusha	1969	1971	Kenya, Tanzania, Uganda
Lomé I	1975	1976[a]	*Original parties*: As Yaoundé II and Arusha, plus Bahamas, Barbados, Botswana, Equatorial Guinea, Ethiopia, Fiji, Gambia, Ghana, Grenada, Guinea, Guinea Bissau, Guyana, Jamaica, Lesotho, Liberia, Malawi, Nigeria, Samoa, Sierra Leone, Sudan, Swaziland, Tonga, Trinidad and Tobago, Zambia *Acceding parties*: Cape Verde (1977)[b], Comoros (1976), Djibouti (1978), Dominica (1979), Kiribati (1979), Papua New Guinea (1977)[b], São Tomé and Principe (1977)[b], Seychelles (1976), Solomon Islands (1978), St. Lucia (1979), St. Vincent and the Grenadines (1980), Surinam (1976), Tuvalu (1979)
Lomé II	1979	1981	As Lomé I plus Antigua and Barbuda (1982), Belize (1982), St. Kitts and Nevis (1984), Vanuatu (1981), Zimbabwe (1981)[c]
Lomé III	1984	1986	As Lomé II plus Angola (1986), Mozambique (1986)
Lomé IV[d]	1989	1991	As Lomé III plus Dominican Republic (1991), Eritrea (1993), Haiti (1991), Namibia (1990), but minus Somalia
Cotonou	2000	2000[e]	As Lomé IV plus Cook Islands (2000), Micronesia (2000), Marshall Islands (2000), Nauru (2000), Niue (2000), Palau (2000), Timor Leste (2005)

Source: This table is based on information collected by the authors for Persson and Wilhelmsson (2007).
a: The full Lomé Agreement came into force April 1, 1976, but the trade preferences applied from July 1, 1975.
b: The formal accession to Lomé I in 1978 was preceded by the entry into force of trade-related provisions 1977.
c: Formal accession to Lomé II in 1982, trade preferences under interim agreement from 1981.
d: Lomé IV was amended by a new regulation signed 1995, and entering into force 1998. No new ACP countries.
e: Full entry into force for Cotonou in 2003, but trade related provisions apply from 2000.

The next important change in EU-ACP relations came in 2000, when the Cotonou Agreement was signed. In this it was agreed that ACP countries would continue to receive, for a transitional period, non-reciprocal trade preferences under a WTO waiver. By 2008, these preferences were to have been renegotiated into WTO-compatible free trade agreements.[12]

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[12] In reality, these negotiations to create so-called Economic Partnership Agreements (EPAs) proved to be quite complicated, and at the time of writing negotiations are still underway between the EU and some groups of ACP countries. Since we focus on non-reciprocal trade preferences, we have chosen to end the time period under study at the time when EPAs should have been implemented.

2.2 *Mediterranean Preferences*[13]

For an overview of the evolution of the EU's relation with Mediterranean countries, see Table 2. Grilli (1993) divides the EU's Mediterranean Policy into two phases. In the first of these, lasting until the mid-1970s, some countries around the Mediterranean Sea signed bilateral trade agreements with the EU.[14] These agreements contained reciprocal trade preferences with a focus on industrial products, but also covering a limited number of agricultural goods.

Table 2 Evolution of EU-Mediterranean Relations

	Type of Agreement	*Signed*	*Info Force*	*Mediterranean Country*
First Phase[a]	Association Agreements	1969	1969	Morocco
		1969	1969	Tunisia
		1963	1964	Turkey[b]
	Preferential Trade Agreements	1972	1973	Egypt
		1970	1970	Israel
Second Phase[c]	Cooperation Agreements	1976	1976[d]	Algeria[e]
		1977	1978	Egypt
		1975	1975	Israel
		1977	1977[d]	Jordan
		1977	1977[d]	Lebanon
		1976	1976[d]	Morocco
		1977	1977[d]	Syria
		1976	1976[d]	Tunisia
Third Phase	Euro-Mediterranean Association Agreements	2002	2005	Algeria
		2001	2003[d]	Egypt
		1995	1996[d]	Israel
		1997	2002	Jordan
		2002	2003[d]	Lebanon
		1996	2000	Morocco
		1997	1997	Palestinian Authority[f]
		1995	1998	Tunisia

Source: This table is based on information collected by the authors for Persson and Wilhelmsson (2007).
a: Besides these agreements with what we will refer to as Mediterranean countries, there were also agreements with countries that later have become EU members: Association Agreements with Greece (1961), Malta (1970) and Cyprus (1972) and preferential trade agreements with Spain (1970) and Portugal (1972). There were also non-preferential trade agreements with Israel (1964), Lebanon (1965) and Yugoslavia (1970).
b: Following this agreement, the EU and Turkey created a customs union (covering industrial products) which came into force December 31, 1995 – see European Commission (2008b).
c: In addition, there was also an agreement with Yugoslavia in 1980.
d: Trade provisions entered into force through an interim agreement.
e: Since its independence in 1962, Algeria was *de facto* enjoying associated status, but without any clear legal basis – for a discussion see e.g. Shlaim and Yannopoulos (1976) or Mishalani et al. (1981).
f: Euro-Mediterranean Interim Association Agreement on Trade and Cooperation.

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[13] This sections draws on Stevens (1981), Shlaim and Yannopoulos (1976) and Grilli (1993).
[14] For a discussion on the difference between the *Association Agreements* and the *Preferential Trade Agreements*, see e.g. Shlaim and Yannopoulos (1976).

In the second phase of EU-Mediterranean relations, a series of Cooperation Agreements were signed. Unlike in the ACP framework, where EU negotiations with all ACP countries resulted in one single agreement, these agreements were strictly bilateral, even though they were very much alike. Mediterranean exporters obtained free access for most industrial products as well as agricultural products not covered by the EU's CAP. For products covered by the CAP, there were tariff reductions. In return, the Mediterranean countries only had to grant EU exports MFN treatment, so in reality it is fair to say that these where non-reciprocal trade preferences. An interesting aspect of the Cooperation Agreements was that the duration was unlimited. This can be contrasted with the ACP and GSP frameworks where trade preferences were offered for limited durations of time.

One can also identify a third phase in EU-Mediterranean relations. Since 1995, the Cooperation Agreements have been in the process of being replaced with a new generation of Euro-Mediterranean Association Agreements as part of the Barcelona process' attempts to create a Euro-Mediterranean Free Trade Area by 2010. All Mediterranean countries, except Syria, and with the addition of the Palestinian Authority, now have such Association Agreements, which offer duty-free access to the EU market for industrial products, and preferential treatment for agricultural goods. In return, Mediterranean countries offer a gradual dismantling of trade barriers to EU exports (European Commission 2008a).

2.3   Generalized System of Preferences

Unlike ACP and Mediterranean preferences that were only open to a select group of countries, all developing countries have also been able to request preferential access under the EU version of the Generalized System of Preferences. The first European Union GSP scheme came into effect in 1971. Table 3 describes some of the evolution that has followed since.

Table 3 Evolution of the EU Generalized System of Preferences

Year	Event
1971	First EU 10-year GSP Scheme enters into force. Scheme reviewed every year with changes.
1977	Special rules for LDCs introduced (non-sensitive industrial goods). Special rules for all goods from 1979.
1981	Second EU 10-year GSP Scheme enters into force. Scheme reviewed every year with changes. Extended until 1994 pending Uruguay Round of multilateral negotiations.
1991	Bolivia, Colombia, Ecuador and Peru granted duty-free access without quantitative restrictions for a range of industrial and agricultural products to help these countries combat the production and trafficking of illegal drugs. Similar preferences extended 1992 to Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama, and later to Venezuela (1995) and Pakistan (2002).
1995	All quantitative restrictions removed. New system with four different product categories.
2001	Under *Everything But Arms*, LDC are granted the right to export almost all goods to the EU free of duty or quantitative restrictions. The exceptions are arms and ammunition, and three other goods for which there are transition periods: Bananas (free entry from 2006), rice and sugar (free entry from 2009).

Source: This table is based on information collected by the authors for Persson and Wilhelmsson (2007).

The most recent EU GSP in the time period under study, valid 2006-2008, had three separate types of arrangements: the *general arrangement* which was open to all developing countries, the *special incentive arrangement for sustainable development and good governance*, known as GSP+ and open only to a subset of developing countries, and the *special arrangement for least developed countries*, available to countries classified by the United Nations as least developed. [15] Products included in the general arrangements were divided into non-sensitive and sensitive. The former could enter the EU duty-free, while there were tariff reductions available for the latter (*ad valorem* duties were reduced by 3.5 percentage points – 20 per cent for textiles and clothing – while specific duties were reduced by 30 per cent).[16]

Eligibility for preferences under the special incentive arrangements for sustainable development and good governance was linked to ratification and implementation of several conventions regarding human and labour rights, environmental protection and good governance. Beneficiary countries could export the goods that were covered by the general arrangement duty-free to the EU. Under the special arrangement for least developed countries, all LDCs could export all goods except arms and ammunition free of duty to the EU.

2.4   Comparing the Systems

When comparing the potential usefulness of various preference schemes, factors relating to the program design that are worth considering include the width of preference margins, product coverage, how secure the market access is and how the rules of origin are defined.

ACP and Mediterranean countries have typically been able to export under a lot wider preference margins than countries only having access to GSP preferences. For some important products, such as agricultural goods covered by CAP, ACP preferences have further given wider margins than Mediterranean preferences. In terms of product coverage, ACP preferences have been more generous than Mediterranean preferences, which in turn was better than the general arrangements in the GSP. On the other hand, from 2001, LDCs had the best product coverage through *Everything But Arms*.

Since they were offered on a contractual basis, i.e. as part of negotiated agreements, ACP preferences and Mediterranean preferences both provided a more certain market access than preferences under the GSP which were unilaterally granted by the EU, and therefore could be changed or withdrawn. However, this difference arguably became less important in the 1990s, when the EU moved towards fixing the GSP market access for more than one year at a time. Preferences for LDCs are also given for an unlimited period of time (as long the recipient remains an LDC), which provides more certain market access. Concerning security of access, it should also be noted that the agreements on Mediterranean preferences had an unlimited duration, while preferences for ACP countries were renegotiated regularly. In this respect, ACP countries have faced a disadvantage compared with Mediterranean countries.

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[15] Operating under Council Regulation (EC) No 980/2005.
[16] This program design with three sets of preference arrangements has been kept in subsequent revisions to the GSP.

A fourth way to compare the preference systems is to look at the rules of origin applied. Complicated and strict rules of origin are often emphasized as one of the main culprits behind low utilization of preferences. Therefore, it is important to note that ACP and Mediterranean preferences operate under less strict rules of origin than GSP preferences – see e.g. Cadot et al. (2006).

Altogether, it is fair to say that preferences for ACP or Mediterranean countries have been more generous than preferences under the GSP. In fact, the literature sometimes uses the analogy of a "pyramid of privilege", with ACP countries at the apex, Mediterranean countries in the middle and countries only having access to GSP preferences at the base (see Figure 1). From this follows that firms in countries eligible for either ACP *and* GSP or Mediterranean *and* GSP preferences could be expected to request preferential treatment under the ACP or Mediterranean schemes.[17]

Figure 1 EU Trade Preferences: The "Pyramid of Privilege"
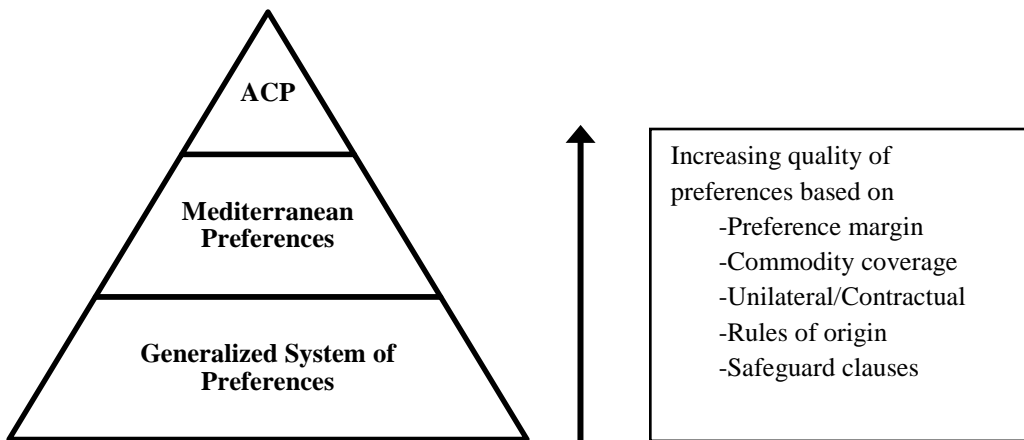
Source: Persson and Wilhelmsson (2007)

3 Previous Research

The research literature has paid substantially less attention to the issue of what drives export diversification than what causes trade volumes to grow. A lot of work therefore remains in order to fully understand the underlying roots of export diversification. Still, a growing empirical literature has started to lay the foundations of a broader understanding. For example, in a widely cited article, Cadot et al. (2011a) identify a hump-shaped relationship between export diversification and the level of income. In other words, the authors find that countries tend to diversify at lower income levels, but once they have reached a certain threshold level of income, export concentration begins to increase. Examples of papers exploring similar relationships and identifying various determinants of export diversification include De Benedictis et al. (2009), Minondo (2011) (focusing on the role played by comparative advantage) and Agosin et al. (2012) (including a large number of explanatory variables, and for instance identifying openness to trade and financial development as factors that promote export diversification). Other papers in the literature have

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[17] Note that there is no overlap between ACP and Mediterranean countries.

focused more specifically on the effects of various forms of trade policy and/or trade costs. Examples include Amurgo Pacheco (2006), Felbermayr and Kohler (2006, 2010), Feenstra and Kee (2007), Dutt et al. (2011) and Dennis and Shepherd (2011). Cadot et al. (2012) offer an excellent overview of the literature. For our purposes, it is particularly important to note that the vast majority of the empirical studies in the literature include some sort of gravity variables (specifically GDP and distance) as core elements in their empirical specifications.

The existing literature on how trade preferences affect trade has focused almost exclusively on the effects on export earnings, or put differently, on changes in the value of exports when countries are granted trade preferences. Typically, researchers have used the gravity model to assess the effect on trade volumes, and most studies tend to find rather sizable effects. Among the papers that have studied EU preference programs are Sapir (1981), Oguledo and Macphee (1994), Nilsson (2002), Péridy (2005) and Persson and Wilhelmsson (2007). Persson (2012) offers a review of the literature.

While a limited literature has emerged on general determinants of export diversification, when it comes to the specific effects of unilateral trade preferences, as far as we are aware, very little research has been done. In an early contribution, Yannopoulos (1986) raises the question of how trade preferences affect not only export earnings but also export diversification and foreign direct investment. Focusing specifically on the preferences offered by the EU to Mediterranean countries, Yannopoulos (1986) hypothesizes that the preferences ought to have a positive effect on diversification. Noting that the trade flows were more similar when comparing 1963 to 1970 than when comparing 1970 to 1979, Yannopoulos (1986) draws the conclusion that the preferences being introduced around 1970 led to increased export diversification. However, we have some reservations about the methodology used in Yannopoulos (1986) due to the interpretation of the changes in the trade similarity index used. 18 The index was constructed by Finger and Kreinin (1979) to compare the similarity of export patterns for countries. As noted by Finger and Kreinin (1979), if the commodity distribution of a's and b's exports are identical, the index will take the value of 100, and if the countries' export patterns are completely dissimilar, the index will take the value 0. Yannopoulos (1986) uses this index to compare different exports over time, and interprets the fact that the similarity index decreases over time as saying that exports have become more diversified. However, that is not the only way that the index could have decreased: if exports were diversified in the beginning of the period, and then became more specialized as a result of preferences, this would also lead to the decrease in trade similarity. We therefore argue that his empirical findings cannot be interpreted as saying much about whether the effect is negative or positive.

In addition to the early contribution by Yannopoulos (1986), as far as we are aware, only one other paper has addressed the issue of unilateral trade preferences and export diversification. Gamberoni (2007) investigates whether trade preferences offered by the EU over the time period 1994-2005 have an effect on

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[18] The index is defined as $S(ab,c) = \left\{ \sum_i Min\left[X_i(ac), X_i(bc) \right] \right\} * 100$, where $X_i(ac)$ is the share of commodity i in country a's exports to country c.

the extensive margin of trade. Focusing on total product-level (HS 6-digit) imports to ten EU countries (EU12 minus Belgium and Luxembourg) from 118 developing countries, Gamberoni (2007) uses two estimation techniques – tobit and probit – where the probit methodology more closely resembles our setup. To identify whether there is indeed an effect on the extensive margin, Gamberoni (2007) estimates whether dummies for GSP, GSP_LDC, the Drug regime within GSP[19] and lastly ACP has an effect on the probability of switching from zero to positive EU imports in a given product. Interestingly, Gamberoni (2007) draws the conclusion that while GSP and the Drug regime have had positive effects, ACP preferences have led to an anti-diversification effect. The effects for LDC preferences differ somewhat across specifications.

4   Data and Methodology

4.1   Data and Sample

The trade data used for this study is extracted from the Comtrade database which provides coverage of the time period 1962-2007 (United Nations 2008, 2011). To accommodate the aim of the paper to analyse a wide range of trade preferences granted by the EU to developing countries it has been vital to use a long time-series of trade data. The most detailed trade statistics available for this period is 4-digits classified according to the Standard International Trade Classification (SITC), rev. 1, which is used in this paper.

Our sample of importing countries consists of all EU15 countries (i.e. the 15 members of the EU, as of 1995). The sample of exporting countries consists of all middle and low income countries (Gross national income (GNI) < $11,115 in 2006) according to the definition of the World Bank.[20] In addition, countries that have had access to any of the trade preference systems studied are included irrespectively of their GNI. Current members of the EU, countries in the Former Soviet Union and Former Yugoslav republics are excluded from the sample of exporting countries.[21] A list of countries with available trade statistics included in our sample is presented in the Appendix. Even though we analyse the exports of developing countries, import statistics from EU15 countries have been used as the data quality on imports is generally considered to be higher.[22] Main economic indicators (GDP and population) of the EU15 and developing countries have been extracted from World Development Indicators (World Bank 2011). For a summary of the variables used see the Appendix. The data on trade preferences is constructed by the authors and is an updated version of the data used in Persson and Wilhelmsson (2007). Table 4 shows the individual

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[19] This subset of GSP preferences, formally known as the *special arrangements to combat drug production and trafficking*, later became part of what is today known as GSP+.

[20] Gross national income (GNI) is calculated according to the Atlas method by the World Bank.

[21] Current EU countries are excluded since they differ regarding their trade relations with the EU and also, in some cases, since they have gone from being on the receiving end of preferences to granting preferences. Former Soviet and Yugoslav republics have been excluded due to lack of consistent data for the time period studied.

[22] The number of reporting EU-countries is in fact only 14 since Belgium and Luxembourg is treated as one unit in the trade statistics.

preference groups included in the regressions. The preference groups in the baseline regressions are identified as exclusive groups where each country only can belong to one preference group at a time. This implies that we have assumed that countries only utilize the most beneficial preference scheme at every time. This assumption is made to facilitate the interpretation of the estimation results but is relaxed somewhat in the robustness checks. To capture changes within preference systems, the impact of preferences is estimated for the each phase of the preference systems.

Table 4 Overview of Preferential Dummies

Dummy	Preferential Agreements
ACP1	Yaoundé 1964-1974
ACP2	Lomé I - Lomé III 1975-1988
ACP3	Lomé IV - Cotonou 1989-2007
GSP+	GSP Special arrangements to combat drug production and trafficking from 1991, and later GSP+
GSP1	GSP General Arrangements 1971-1980
GSP2	GSP General Arrangements 1981-1995
GSP3	GSP General Arrangements 1996-2007
LDC1	GSP Special arrangements for least developed countries 1977-2000
LDC2	GSP Special arrangements for least developed countries 2001-2007 ("Everything But Arms")
MED1[a]	First phase of Mediterranean Association Agreements 1960 and onwards
MED2[a]	Second phase of Mediterranean Cooperation Agreements 1976 and onwards
MED3[a]	Third phase Euro-Mediterranean Association Agreements 1990s onwards
Other	Any other free trade area etc.

a: The time period of individual Mediterranean countries in each phase varies; see Table 2.

4.2 Measuring Export Diversification

In the empirical literature on export diversification, various approaches have been used to measure export diversification. Common approaches are to use the number of goods exported or using various export specialisation indices.[23] The former corresponds to a definition of export diversification as a wider range of goods being exported while the latter is associated with a notion of export diversification as a more even distribution of exported goods.

From an empirical point of view, key benefits of using the number of exported goods as a measure of export diversification include that it is not affected by price changes on the world market and that it is straightforward to calculate and interpret. Moreover, the number of goods exported is a direct measure of a widening of the export basis. A potential drawback of the measure could be that all exported goods are counted as equally important while new export flows are often small and short-lived, and hence do not

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[23] See for example Cadot et al. (2011a) and Dennis and Shepherd (2011).

contribute much to export growth. Even so Cadot et al. (2011b) find that a lot of the action from a reduction of trade costs can be observed in terms of new exports. This suggests that estimation of the impact of preferences on the number of exported goods should provide a good indication of the impact of preferences on trade. Using a specialisation index approach, the issue of export diversification is interpreted as a more even distribution of exports across sectors by taking into account the relative importance of goods in the total exports. A drawback with these measures is that they can yield counter-intuitive results. For instance, if physical exports are exactly the same for two periods but prices change, the various diversification indices will capture this as a change in diversification. Most researchers and policymakers would not consider this a real diversification of exports. Another drawback is that the interpretation of the values of the indices is not always straightforward.

In our baseline specification, export diversification is measured as the number of product lines (*Lines*) with positive export by country-pair and year (eq. 1). As argued above, this is a very intuitive measure which is also not affected by price changes, so we will focus primarily on this. In addition, in order to cover alternative ways to define export diversification, we also use the inverse of the Hirschman-Herfindahl index (eq. 2), which measures export diversification and Theil's index of export concentration (eq. 3). Note that due to their different interpretations, we expect opposite signs of the estimated coefficients when using the inverse Hirschman-Herfindahl index (IHHI) and the Theil index. The measures are presented below.

(1) $\qquad G_{kt} = \begin{cases} 1 & x_{kt} > 0 \\ 0 & otherwise, \end{cases}$ where x_{kt} is the export of good k at time t.

$\qquad Lines_t = \sum_{k=1}^{N} G_{kt}$

(2) $\qquad IHHI_t = \dfrac{1}{\sum_{k=1}^{N}\left(\frac{x_{kt}}{\sum_{k=1}^{N} x_{kt}}\right)^2}$, where x_{kt} is the export of good k at time t.

(3) $\qquad T_t = \dfrac{1}{N}\sum_{k=1}^{N}\dfrac{x_{kt}}{\mu} ln\left(\dfrac{x_{kt}}{\mu}\right)$, $\mu = \dfrac{1}{N}\sum_{k=1}^{N} x_{kt}$ where x_{kt} is the export of good k at time t and N is the

total number of goods that could be exported (N = 625).

Both indices (eq. 2) and (eq. 3) measure the inequality of export shares of goods. The IHHI is undefined if a country-pair does not trade a given year but if trade exists it varies between 1 for maximum concentration, with only one product exported, and the number of goods (625 in our case) for full diversification, that is an equal amount of each good is exported. A higher number of the index would thus indicate a more diversified export. Export of new goods would, everything else equal, increase the value of IHHT and so would an increase of the export value of a good with a low share of the total exports. An increase of the export of a good with a high share of export, on the other hand, would reduce the index and hence be interpreted as increased concentration. The Theil index varies between zero when all products are exported at the same values and ln(N) when the export consists of a single exported product, thus the lower the index, the more diversified the export. A reduction of the index could be a result of an increase in the number of goods exported or a more even distribution of export values across the goods and it can be

decomposed to capture changes along the intensive and extensive margin individually.[24] All measures vary across country-pairs and time, but for notational convenience, equations are presented for a given country-pair; hence the indices for exporting and importing country are left out in the equations.[25] The level of aggregation of the trade statistics will clearly affect the measured export diversification. Highly disaggregated data would result in a greater number of products being exported and more variation over time since the export of each good would be smaller than at a more aggregated level and minor product changes might be recorded as new exports. In our baseline, export diversification is measured as the number of 4-digit goods exported to each of the 14 importing EU-countries. An advantage of using 4-digit rather than more disaggregated trade statistics is that the differences between the categories in the trade statistics are substantial. This means that identified newly exported products would indicate a substantial differentiation of the export. With highly disaggregated data, such as for example 8-digits, a re-classification of the same good or a minor change in existing products, such as adding sugar to pineapple juice would be interpreted as export diversification without representing a substantial diversification of the export. In other words, we argue that using this relatively aggregated data greatly increases the chance that any change in the measured diversification represents economically meaningful diversification.

Besides the advantages involved in using relatively aggregated data to measure export diversification, another important benefit with the data we use is that precisely the same classification has been used for the entire time period under study. This is important, because if the classification itself were to change, this could artificially introduce diversification over time, even if the underlying trade patterns did not change .[26]

Export diversification is measured on a bilateral basis. This enables us to control for differences across destination markets that might affect the diversity of exports. In addition, factors that do not vary over time, such as for example common language or historical ties, but might affect trade and thus export diversification can be controlled for by the introduction of country-pair fixed effects. An alternative to using bilateral data would have been to measure export diversification for export to the EU as one trading partner rather than to the individual EU-countries. This approach would imply that information provided by the variation in bilateral trade flows is disregarded. It would also reduce our ability to control for country specific factors as well as the enlargement process of the EU during the studied period.

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[24] See for example Cadot et al. (2011a).

[25] From the exporting country's perspective, diversification could occur not only by exporting new varieties, but also by exporting to new markets. Most existing studies use aggregate as opposed to bilateral trade data and can therefore not capture this geographical diversification. By using bilateral trade data, we do, however, indirectly capture this additional dimension of diversification.

[26] A detail worth pointing out is that since the SITC-system has gone through several revisions during the studied period, all observations are mapped into SITC rev. 1 by the United Nations (2008, 2011). Changes in SITC may induce changes in measured export diversification if the mapping of goods onto to the old system is imperfect. However, this is much less of an issue with 4-digit data compared to more disaggregated data since the concordance across systems at the 4-digit level is more precise. We therefore do not consider this to be a major cause for concern.

4.3 Evolution of Export Diversification over Time

Figure 2 illustrates the evolution of export diversification – measured as the bilateral number of exported 4-digit product categories – over time for groups of preference-receiving countries. There has been a massive increase in the number of goods exported over the studied period but the ACP countries have not expanded the range of products exported by nearly as much as other groups. It is also evident that the preference groups differ in terms of the absolute number of goods exported. Countries with Other preferences, GSP or Mediterranean preferences export a broader range of products compared to ACP and LDC countries. Given that countries in the latter groups in general have lower GDP per capita and are smaller economies than the former the differences in levels across the preference groups is expected and should not be used to draw conclusions about the impact of preferences. Nevertheless, the striking differences in the country groups' evolution over time indicate that it will be appropriate to allow the effects of trade preferences to vary across preference systems and over time in the regressions.

Figure 2 Evolution of the number of goods exported by preference group
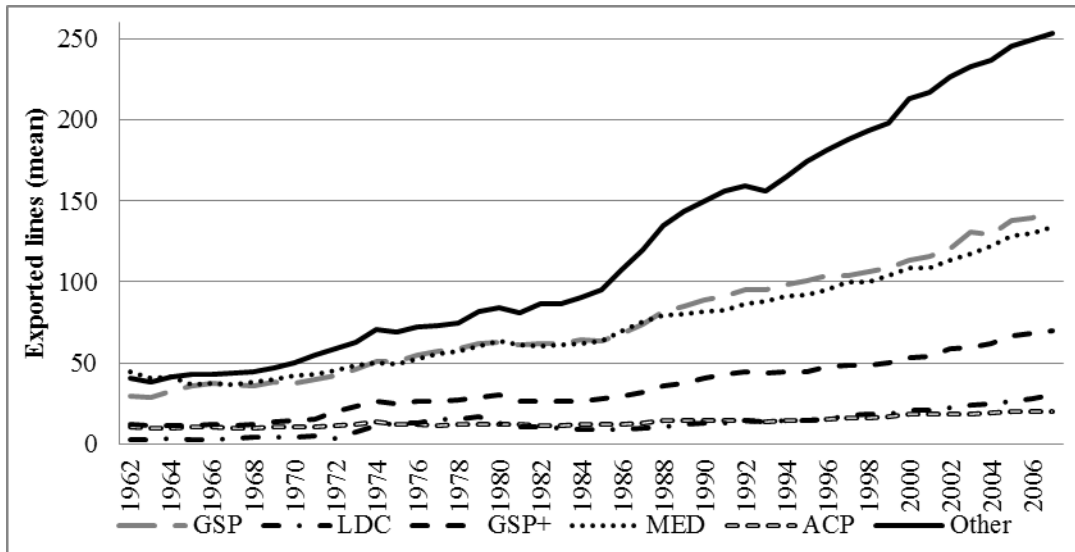
Notes: Average number of goods exported (4-digit level of SITC rev. 1) to each of the 14 importing EU countries. The preference groups are defined based on the best available preferences 2007.

4.4 Estimation Strategy

To analyse the effects of preferences on the export diversification of preference receiving countries our baseline estimation is:

$$(4) \qquad \text{lines}_{ijt} = \exp(\alpha_{ij} + \lambda_t + D_{EU} + \sum_p \gamma_p D_{p,EU}) Y_{it}^{\beta_1} Y_{jt}^{\beta_2} N_{it}^{\beta_3} N_{jt}^{\beta_4} v_{ijt},$$

where lines is the number of products exported from developing country j to EU15 country i in year t. α and λ are country-pair and time fixed effects, respectively. D_{EU} is a dummy variable equal to one if the importer is a member of the EU in year t. This variable is included to capture the enlargements of the EU

taking place during our time period of study. $D_{p,EU}$ are the preference group dummy variables (listed in Table 4) defined as exclusive groups of preferences and interacted with the EU dummy variable to make sure that we only capture effects where the importing country has already joined the EU and is therefore implementing the preferences in question. Y and N are log of nominal GDP in US dollars and log of population respectively and v is an error term.

In order to correctly identify the effect of trade preferences on the diversity of exports other factors affecting trade flows should be controlled for. While there is no clear theoretical basis to build on, we largely follow the previous empirical literature in our choice of independent variables. The size of the exporting country affects the export supply potential and is controlled for by GDP. A larger market will result in more firms finding it profitable to export to that market; hence the size of the export market (measured by GDP of the importing country) should increase the number of goods exported to that market. According to Imbs and Wacziarg (2003) income per capita tends to have a u-shaped relationship with diversification; hence in the case of developing countries we would expect a positive relationship between GDP per capita and diversification. In addition to GDP we have therefore also included the size of the population in the regressions. [27] Distance will tend to be correlated with transportation costs and should therefore have a negative impact on trade. As distance between country-pairs is constant over time, the effect of distance is captured by the country-pair fixed effects included in the regressions. The same is true for all other factors that are constant over time but vary across bilateral pairs, such as for instance various trade costs relating to sharing a joint language or not, or sharing a colonial history. The period studied is characterized by a large expansion of world trade. This will partially be control for by the inclusion of time period fixed effects in the regressions. Additional controls such as for example level of education, infrastructure and general trade policy of the exporting country that might affect the ability of the exporting country to diversify its export is disregarded in the baseline due to lack of data for a large part of the studied period and countries but additional variables are included as robustness tests later on.

The equation is estimated with the fixed effect Poisson Pseudo Maximum Likelihood (PPML) estimator. In the case of panel data estimations of the gravity model, this estimator has been shown to have robust properties even when a high proportion of zeros is observed (in our case, *lines* is zero for 6305 observations). More importantly, given the nature of our primary dependent variable, the estimator is widely used for count models.[28] In order for the inference to be valid in the Poisson model a restrictive assumption on the variance has to be imposed. If the assumption does not hold the variance will be incorrect but the estimated coefficients will still be consistent (Wooldridge 1999). To circumvent the drawback with inference the standard errors presented are based on Stata's bootstrap procedure with 50 replications. This will allow correct inference of the results based on the presented standard errors even if the Poisson variance assumption is violated.

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[27] To include GDP/Capita and either of GDP or population to control for income differences instead of including GDP and population individually in the estimation equation does not affect the estimated impact of preferences.

[28] See Westerlund and Wilhelmsson (2011).

5   Estimation Results

5.1   Baseline Results

Table 5 contains the results from estimations where the baseline measure of export diversification – the bilateral number of exported 4-digit product lines – has been used. Our main results are presented in the first column where the fixed effects Poisson model has been estimated. The estimated coefficients for GDP and population can be interpreted as elasticities since the variables are in their log-form. The results suggest that economically larger and more populous countries export and import a larger number of goods. There is a positive effect from the importer joining the European Union, but it should be noted that a significance level of 10 per cent is not very reassuring given the very large number of observations.

The estimated coefficients of the dummy variables will provide a reasonable approximation of the impact of preferences on export diversification for coefficient near zero. For inference on the impact of preferences with larger coefficients, the coefficient should be transformed before used for inference.[29] Further, given the definition of the preference dummy variables as exclusive groups the coefficient is interpreted as the impact of a given preference system compared to not having preferences at all. To correctly estimate the impact of preferences the set of bilateral and time fixed effects included play an important role to control for heterogeneity across countries and changes over time common to all countries that are substantial given the long time period under study. Failing to control for heterogeneity and the general evolution of trade over time would bias the results. To capture the changes within preference systems over time the impact of preferences is allowed to vary (see Table 4 for details).

Focusing at first on the standard GSP regime, its effects are divided into three parts to capture how the regime changed over time. Interestingly, all three coefficients are positive and significant. This implies that the countries that have only been able to use the GSP regime, which, as argued above, is the least generous set of preferences, have nevertheless experienced export diversification as a result of the preferences over this time period. The impact is quite evenly distributed over time with rather minor changes even though the GSP-system has been modified.

Turning now to the LDC dummies, note that the first captures the additional preferences granted to least developed countries within the GSP regime from 1977, while the second refers to the much more well-known, and much more generous, *Everything But Arms* regime which started in 2001. Interestingly, both regimes had a positive and significant diversifying effect on least developed countries' exports, and the effect was somewhat larger for the latter regime. The preferences have been relatively more important for the LDC:s in terms of exporting diversification compared to the general GSP preferences with the EBA regime contributing to an increase of export diversification of 125 per cent compared to 17 per cent for the last period of the GSP. Further, another special regime within the broader framework of the GSP, namely the GSP+ also had a significantly positive effect on the number of exported products from the eligible

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[29] The transformation necessary is exp(b)-1 where b is the estimated coefficient for a given dummy variable, see for example Winkelmann (2008).

countries. The effect was larger than that of the ordinary GSP regime, but not as sizable as the effect of the LDC preferences.

Table 5 Effect of preferences on the number of products exported

VARIABLES	(1) Poisson FE	(2) Poisson FE	(3) Neg. Bin.
ln(gdp_imp)	0.297***	0.296***	0.440***
	[0.051]	[0.058]	[0.042]
ln(gdp_exp)	0.122***	0.120***	0.182***
	[0.021]	[0.020]	[0.014]
ln(pop_imp)	1.777***	1.780***	-0.187***
	[0.331]	[0.357]	[0.057]
ln(pop_exp)	0.451***	0.466***	0.179***
	[0.084]	[0.089]	[0.023]
EU-dummy	0.067*	0.064*	0.120***
	[0.036]	[0.038]	[0.037]
gsp1	0.211***	0.214***	0.208***
	[0.029]	[0.032]	[0.034]
gsp2	0.145***	0.151***	0.093***
	[0.036]	[0.028]	[0.033]
gsp3	0.157***	0.154***	0.081**
	[0.040]	[0.034]	[0.034]
ldc1	0.563***	0.563***	0.446***
	[0.091]	[0.079]	[0.079]
ldc2	0.813***	0.801***	0.704***
	[0.101]	[0.090]	[0.078]
gsp+	0.199***	0.194***	0.134***
	[0.049]	[0.045]	[0.039]
med1	0.144***	0.145**	0.247***
	[0.051]	[0.058]	[0.052]
med2	-0.026	-0.026	0.027
	[0.062]	[0.065]	[0.067]
med3	-0.044	-0.053	0.056
	[0.063]	[0.070]	[0.064]
acp1	0.260***	0.258***	0.317***
	[0.053]	[0.060]	[0.045]
acp2	0.037	0.038	0.140***
	[0.051]	[0.059]	[0.042]
acp3	-0.126**	-0.115*	-0.073
	[0.056]	[0.062]	[0.047]
Other	0.201***	0.194***	0.116**
	[0.052]	[0.039]	[0.048]
ldc2*acp3		-0.097***	
		[0.037]	
Constant			-13.684***
			[0.840]
Observations	67,980	67,980	67,980
Number of id	1,816	1,816	1,816

Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrapped standard errors in brackets. Time and country-pair fixed effects, not reported, are included in all regressions.

As noted above, Mediterranean countries have been offered better-than-GSP preferences from the EU since the 1960s. The positive and significant coefficient for MED1 suggests that these early preferences had an export diversifying effect. However, the second and third wave of Mediterranean preferences do not seem to have had any positive effect. This is perhaps surprising, but given that these preferences were in some sense supposed to be modelled after the ACP preferences, it is worth noting the similar pattern over time for the Mediterranean and ACP preferences.

Turning the attention to the ACP countries, the three ACP coefficients exhibit a very interesting pattern. While ACP1 is positive and significant – suggesting that countries eligible for the Yaoundé Conventions did receive a boost to the number of export products – ACP2 which captures the initial Lomé Conventions is insignificant. ACP3 – covering the fourth Lomé Convention and stretching into the Cotonou Agreement – actually has a negative and significant coefficient, implying that ACP countries responded to preferences with export *concentration* rather than diversification at that late stage in the period.

The effect for countries falling into the "other" category, i.e. countries having some FTA or similar with the EU, is captured in the "other" coefficient which is positive and significant. Given our focus on non-reciprocal trade preferences, we consider this to be mostly a control variable.

There is no self-evident explanation for why Mediterranean and ACP preferences go from having positive effects early in the period to insignificant or even negative effects later on, but one possible reason could be that preference erosion over time decreased the de facto preference margins enjoyed by the beneficiary countries. Such preference erosion could for instance be the result of multilateral trade agreements lowering MFN tariffs rates, the EU entering into free trade areas or improvements in the preferential access offered to other developing countries, such as LDCs. It is interesting to note, however, that our results are entirely consistent with the findings in Gamberoni (2007). Using a rather different empirical set-up and only looking at the period 1994-2005, she did indeed find positive effects of the GSP and GSP+, while ACP preferences were found to be associated with negative export diversification. This corroborates our empirical findings.

While the main results are found in column 1 of Table 5, we briefly note that we have also included results from two additional estimations. In column 2, the model is augmented with an extra interaction variable between LDC2 and ACP3 to capture the fact that it is not à priori self-evident which system that is chosen by exporters in LDCs if they are eligible for both EBA (LDC2) and ACP preferences. This interaction term has a negative and significant coefficient, indicating that ACP countries that are also LDCs experienced an even greater export concentration than other ACP countries at this point in time. The other coefficients are not significantly affected by the inclusion of this extra variable. Lastly, in column 3 we use the baseline model, but estimate it with a negative binomial model rather than a Poisson model. The estimates from the negative binomial model are potentially more efficient than those from the Poisson model in case of over dispersion but they lack the robustness of the Poisson estimates, explaining why we consider the Poisson to be our preferred model. One difference between the two results is that the coefficient for the size of the importer's population unexpectedly changes signs. A difference of potentially

larger importance is further that ACP2 now has a significantly positive coefficient while the coefficient was insignificant in the Poisson specification, and that the coefficient for ACP3 which was previously significantly negative is now insignificant. In other words, while the estimators seem to pick up on the same trend of a decreasing ACP effect, one should be cautious in drawing overly strong conclusions about the exact magnitude of that effect.

5.2   Extension: Alternative Diversification Measures

To investigate the impact on export diversification defined as a more even distribution of exported goods and to gain insight into the importance of empirical measures used when estimating the effect of preferences we have also rerun the model using alternative ways to define the outcome variable, i.e. export diversification. Similarly to the baseline these regressions will be estimated using the PPML estimator which as noted above is very robust and is applicable both when the dependent variable is a count and when it is a non-negative continuous variable. The results can be found in Table 6. Before discussing the results, we want to stress that because the interpretation of what constitutes export diversification differs strongly between our baseline measure and the alternative indices outlined in Section 4.2, this exercise should not be seen as a robustness test, but rather as an extension. Put differently, since the measures are not designed to capture precisely the same underlying economic process, these regressions will offer additional insights into how the beneficiary countries' exports evolve as a result of preferences. Therefore, it is also possible and even plausible that we will not get the same results as we did with the baseline measure.

To facilitate comparisons, the first column contains results from our baseline equation, which constitute our main results. Note that to be able to compare the impact of changing the export diversification measure the same sample is used for all estimations in Table 6. This sample is smaller than the sample used in Table 5 since both the inverse Hirschman-Herfindahl index (IHHI) and the Theil index is undefined when the export to a destination is zero. Therefore, the results in the first columns of Table 6 and Table 5, respectively, are not exactly the same. Column 2 shows the results using the IHHI rather than the number of exported 4-digit product lines to measure export diversification. A higher index number implies a higher degree of export diversification, so to the extent that this measure captures a similar export change as the baseline measure, we may expect the same signs for the coefficients in columns 1 and 2. The results based on Theil´s export concentration index in column 3 is expected to be similar to the results in column 2 but, importantly, with the opposite sign since the Theil index measures export concentration rather than export diversification. Therefore, a negative sign of the coefficients in column 3 would indicate export diversification.

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Table 6 Alternative measures of export diversification

VARIABLES	(1) Lines	(2) IHHI	(3) Theil
ln(gdp_imp)	0.285***	0.202***	-0.032***
	[0.056]	[0.064]	[0.010]
ln(gdp_exp)	0.106***	0.045**	-0.015***
	[0.017]	[0.019]	[0.003]
ln(pop_imp)	1.709***	-0.417	-0.000
	[0.348]	[0.339]	[0.051]
ln(pop_exp)	0.459***	0.306***	-0.058***
	[0.090]	[0.067]	[0.011]
EU-dummy	0.070*	0.108**	-0.021***
	[0.039]	[0.043]	[0.008]
gsp1	0.194***	0.039	0.004
	[0.029]	[0.033]	[0.006]
gsp2	0.144***	0.051	-0.018**
	[0.034]	[0.039]	[0.007]
gsp3	0.163***	0.142***	-0.043***
	[0.035]	[0.048]	[0.011]
ldc1	0.459***	-0.073	-0.005
	[0.074]	[0.068]	[0.013]
ldc2	0.696***	-0.073	-0.006
	[0.081]	[0.077]	[0.015]
gsp+	0.204***	-0.124**	0.016*
	[0.045]	[0.049]	[0.009]
med1	0.146***	0.248***	-0.042
	[0.052]	[0.076]	[0.028]
med2	-0.017	-0.022	0.012
	[0.069]	[0.067]	[0.015]
med3	-0.030	0.192***	-0.064***
	[0.066]	[0.072]	[0.020]
acp1	0.183***	0.123**	-0.016**
	[0.051]	[0.049]	[0.008]
acp2	-0.036	-0.171***	0.026***
	[0.055]	[0.050]	[0.008]
acp3	-0.207***	-0.334***	0.063***
	[0.059]	[0.049]	[0.009]
Other	0.215***	0.213***	-0.118***
	[0.046]	[0.078]	[0.029]
Observations	61,741	61,741	61,741
Number of id	1,813	1,813	1,813

Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrapped standard errors in brackets. Time and country-pair fixed effects, not reported, included in all regressions.

It seems as if the definition of export diversification does have a certain impact on the conclusions that can be drawn regarding the impact of preferences. For instance, the effects of GSP and LDC preferences are in several instances no longer significant. The suggests that while countries eligible for these preferences have indeed exported a wider range of products as a result of the preferences – as evidenced by the baseline regressions – this has not resulted in a more even distribution of export across goods. That is, export incomes have not become more diversified and hence the vulnerability to changes in relative prices on the world market has not been reduced. Further, the results concerning the GSP+ regime

(a positive effect on export diversification in the baseline regressions and a concentration effect in the alternative regressions) together indicate that the number of exported goods has increased but at the same time the importance of a few goods for export income has increased. In other words, the preferences have not made these countries less vulnerable to shifts in world market prices of key goods but have potentially opened up new export opportunities. For the ACP countries the dependence on a few exported goods has also increased over time as a result of preferences (as evidenced by the initially (ACP1) positive and later (ACP2 and ACP3) negative coefficients in column 2 and vice versa in column 3). To make things worse the number of exported goods has also been reduced after an initial boost (as evidenced by the positive coefficient of ACP1 and the subsequent negative coefficient of ACP3 in the baseline regressions). Altogether, the results are consistent with a situation where preference erosion seems to have pushed ACP-countries into specialization of their exports to goods with relatively higher or preserved preference margins. In contrast the preferences for Mediterranean countries have contributed to a more even distribution of export incomes in the final period even though the number of goods exported has not increased significantly (MED3).

To conclude, the results underline the usefulness of approaching the issue of export diversification from several perspectives. Even though we consider our baseline measure to be the most appropriate way to empirically measure export diversification, extending the analysis with additional measures allows us to paint a fuller picture of how beneficiary countries' exports diversify as a result of trade preferences.

5.3 Robustness Analysis

In Table A3, we test whether the results are robust to changes in the sample. We first exclude observations for 1962, since a few EU countries (Austria, Finland and Ireland) are missing data for 1962. We then reduce the sample by excluding small economies and high income exporters. Generally, the results are robust. The only substantial impact is that excluding high-income exporting countries alters the positive effect of GSP preferences in the later stages. This indicates that the high income countries are those who have benefited the most among the countries only having access to GSP preferences. It is also worth noting that most of the excluded high income countries had access to only GSP so the exclusion of them would affect the composition of the group of GSP countries in the sample quite substantially. In addition, the estimates for MED1, GSP+ and Other preferences is affected as they turns insignificant without the high income exporters. Again, since the sample is rather substantially reduced, this is not entirely surprising.

If the impact of preferences varies across countries due to time-varying local conditions not controlled for in the estimation the result would suffer from an omitted variable bias. The infrastructure of an exporting country could, for example, affect the country's ability to diversify its export and thus benefit from the preferences. In Table A4, the number of telephone lines is used as a proxy for infrastructure since this is the measure available for the longest period for a wide range of countries. Still, including this variable will reduce the available sample quite significantly. To be able to analyse the importance of controlling for infrastructure the baseline is re-estimated using the same sample as with the additional

control for infrastructure. The infrastructure variable is significant and not negligible in size but it does not significantly affect the estimated impact of preferences; hence we have chosen to use a larger sample over a longer time-period and not controlling for infrastructure.[30]

In the Appendix Table A4 we also present results from robustness regressions where we have allowed the manufacture and agricultural sectors to experience different effects – justified by the fact that preference margins can be quite different for these sectors. This is due both to the fact that the MFN tariffs often are lower on manufactures and that agricultural goods are not included in all of the preference schemes discussed. For those preferences where agricultural goods are included, however, the preference margins vary across agricultural products and are higher than the preference margins for manufactured goods. A cautious conclusion is that when there are differences, it is usually the case that the effects on export diversification are more positive for manufactures than for agricultural goods. If we accept the common view that there are special gains to be had from expanding industrial rather than agricultural production, this may be an encouraging finding. A slightly less positive view would be that the generally lower estimates of the impact of preferences for the agricultural sector may imply that the preferences are less suited to contribute to export diversification when the preference margins are relatively high for individual goods. This would explain why there are some indications of an increased concentration of exports (MED2, MED3 and ACP3) in the agricultural sector where preference margins tend to be higher.

In a last line of robustness analysis, we start by noting that the previous literature on trade preferences has illustrated that they have positive effects on the value of exports from beneficiary countries (see e.g. Persson and Wilhelmsson (2007) and references therein). An additional test of our empirical set-up could therefore be to see whether we can replicate those results if we replace our dependent variable – i.e. the bilateral number of exported products – with bilateral export volumes. How does this test the robustness of our results? If the interesting negative and insignificant effects that we in some cases find were the results of an inappropriate estimator or, perhaps most importantly, poorly defined preference dummies, then we ought to find *strange* results also when we analyse export volumes. If, on the other hand, we can replicate the positive volume results found by other authors in this empirical setup, this would be an encouraging sign that our results merit serious consideration. In Table 7, results are reported from estimating the same PPML that was used above on the same sample and set of independent variables (as in Table 5), but replacing the dependent variable with bilateral export volumes. Interestingly, in accordance with theory and entirely consistent with the previous literature, the effect of preferences is now significantly positive in all cases except one (GSP+ which is insignificant). This lack of unexpected volume results suggests that the negative and insignificant effects that we in some cases find when we analyse export diversification do not seem to be the results of an inappropriate estimator or poorly defined preference dummies. Instead, the results work as an illustration of the fact that while theory does suggest that preferences have a positive (or

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[30] Again, we want to stress that the sample is substantially reduced, so it is not appropriate to compare these results directly with the baseline results in Table 5. However, when using the same reduced sample, the baseline specification does yield the same results whether or not we include this infrastructure variable, indicating that this variable in itself is not crucial for the estimated effect of preferences.

insignificant) effect on trade volumes, the theoretical predictions could go in either way when it comes to the effect on export diversification. In fact, interpreting these volume results in combination with our baseline results is interesting in its own right. Whereas GSP countries increase the value of trade at the same time as they export more products, ACP countries also see increased export volumes, but over time increasingly concentrate on fewer export products. Altogether, this reinforces the notion that although preferences generally live up to the goal of increasing export earnings for beneficiary countries, countries may respond in various ways when it comes to the diversity of exports.

Table 7 Impact of preference on export volumes

VARIABLES	Poisson FE
ln(gdp_imp)	0.591***
	[0.168]
ln(gdp_exp)	0.937***
	[0.061]
ln(pop_imp)	2.055**
	[0.968]
ln(pop_exp)	-2.397***
	[0.231]
EU-dummy	-0.512***
	[0.140]
gsp1	0.821***
	[0.160]
gsp2	0.365***
	[0.138]
gsp3	0.506***
	[0.137]
ldc1	1.767***
	[0.227]
ldc2	2.489***
	[0.296]
gsp+	0.205
	[0.179]
med1	0.537**
	[0.214]
med2	0.685***
	[0.211]
med3	0.579***
	[0.210]
acp1	0.583***
	[0.225]
acp2	0.894***
	[0.219]
acp3	0.581**
	[0.232]
Other	0.390***
	[0.147]
Observations	67,980
Number of id	1,816

*** p<0.01, ** p<0.05, * p<0.1, bootstrapped standard errors in brackets. The dependent variable is the export volume. Time and country-pair fixed effects, not reported, are included in the regression.

6   Summary and Conclusions

Noting that – despite its very relevant policy implications – the relationship between unilateral trade preferences and export diversification has been largely ignored by researchers and policymakers alike, we hope to make a contribution by carefully assessing whether there is indeed a positive association between trade preferences and the range of exported products. Studying the period 1962-2007 and incorporating all trade preference programs that have at some point been offered by the EU to groups of developing countries, we formally test whether countries that are offered trade preferences respond by increasing the number of products that are exported. Compared to the very limited previous literature, we cover a much longer time period (including stages when preference erosion had had less of a chance to influence the underlying value of preferences) and a broader range of preference programs with varying characteristics. We also use a robust and intuitive methodology that closely mirrors how export diversification is thought of in a policy context. Altogether, we therefore hope to be in a position to draw reasonably general conclusions about the effects of unilateral trade preferences on export diversification.

What we find is that some trade preference programs are indeed associated with increasing ranges of export products. For instance, for both the general GSP and the additional preferences offered within that framework – i.e. preferences for LDCs and the so-called GSP+ – we find positive effects on export diversification. By contrast, preferences offered to Mediterranean countries typically have no significant effects on the range of products exported (with the exception of some very early versions of these programs). Interestingly, there are further indications that ACP preferences actually have negative effects toward the end of our time period, suggesting that ACP countries over time respond to preferences by specializing into fewer goods. This conclusion is also supported by our finding that export earnings become more concentrated in the ACP countries. At the same time, consistent with the previous literature, our robustness regressions with export volumes show that all preference groups barring one (GSP+) experience increased export volumes. In other words, our results altogether indicate that while preferences generally do lead to increased export earnings, this increase in export volumes can be accompanied either by an expansion of the range of exported products or by a specialization into fewer products.

What conclusions should policy makers and others draw from our study? Before commenting on that, it is important to emphasize that more research is needed in this area and that our results should be seen as a starting point for further analysis rather than as the definitive description of the relationship between trade preferences and export diversification. In particular, it would be valuable to be able to use more precisely defined preference margins than we have been able to use in this study that covers such a long time period. Studying shorter time periods could also allow researchers to include many more independent variables that we suspect may be important to explain variation in export diversification, but that are simply not available for much of the time period that we cover. Still, given the present lack of empirical evidence in the literature regarding this issue of considerable policy relevance, we nevertheless think that some cautious conclusions are in order. Most importantly, our results suggest that policymakers should not automatically expect developing countries' exports to diversify as a result of being offered trade preferences. Instead, the

varying results indicate that the effects could go in either direction, suggesting that the effects may indeed depend on the precise design of the preference program and the supply-side conditions in the preference-receiving country. Describing what the most conducive conditions are should also be a promising area for further research. In the meantime, policy makers should be aware that while the first goal of trade preferences – to increase export earnings – is often met, the second goal, i.e. export diversification, is a much less certain outcome.

7   References

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8 Appendix

Table A1 Exporting countries in the trade statistics database[1]

Algeria	Dominica	Lebanon	Saudi Arabia
Angola	Dominican Republic	Lesotho	Senegal
Antigua and Barbuda	Ecuador	Liberia	Seychelles
Argentina	Egypt, Arab Rep.	Libya	Sierra Leone
Bahamas, The	El Salvador	Madagascar	Singapore
Bahrain	Equatorial Guinea	Malawi	Somalia
Bangladesh	Eritrea	Malaysia	South Africa
Barbados	Ethiopia	Maldives	Sri Lanka
Belize	Fiji	Mali	St. Kitts and Nevis
Benin	French Polynesia	Mauritania	St. Lucia
Bermuda	Gabon	Mauritius	St. Vincent and the Grenadines
Bhutan	Gambia, The	Mexico	Sudan
Bolivia	Ghana	Mongolia	Suriname
Botswana	Greenland	Morocco	Swaziland
Brazil	Grenada	Mozambique	Syrian Arab Republic
Brunei Darussalam	Guatemala	Myanmar	Sao Tome and Principe
Burkina Faso	Guinea	Namibia	Tanzania
Burundi	Guinea-Bissau	Nepal	Thailand
Cambodia	Guyana	New Caledonia	Timor-Leste
Cameroon	Haiti	Nicaragua	Togo
Cape Verde	Honduras	Niger	Tonga
Central African Republic	Hong Kong, China	Nigeria	Trinidad and Tobago
Chad	India	Oman	Tunisia
Chile	Indonesia	Pakistan	Turkey
China	Iran, Islamic Rep.	Palau	Uganda
Colombia	Iraq	Panama	United Arab Emirates
Comoros	Israel	Papua New Guinea	Uruguay
Congo, Dem. Rep.	Jamaica	Paraguay	Vanuatu
Congo, Rep.	Jordan	Peru	Venezuela, RB
Costa Rica	Kenya	Philippines	Vietnam
Cuba	Kiribati	Qatar	Yemen, Rep.
Cote d'Ivoire	Kuwait	Rwanda	Zambia
Djibouti	Lao PDR	Samoa	Zimbabwe

[1] Some observations and countries are in practice lost in the regressions as a result of lack of data on GDP and/or population.

Table A2 Data sources

Variable	*Data source*	*Notes*
Trade statistics 1962- 2006	United Nations (2008)	SITC rev 1, 4-digits
Trade statistics 2007	United Nations (2011)	SITC rev 1, 4-digits
Population	World Bank (2011)	
GDP	World Bank (2011)	(West) Germany before 1970 calculated based on data from Statistics Germany
Preferences	Official Journal of the European Communities (OJ)	Database created by the authors based on various issues of OJ.

Table A3 Robustness tests with respect to the sample

VARIABLES	(1) All	(2) excl. 1962	(3) excl. small export countries	(4) excl. high income countries
ln(gdp_imp)	0.297***	0.287***	0.313***	0.338***
	[0.047]	[0.053]	[0.050]	[0.058]
ln(gdp_exp)	0.122***	0.121***	0.114***	0.176***
	[0.023]	[0.021]	[0.021]	[0.022]
ln(pop_imp)	1.777***	1.782***	1.699***	1.729***
	[0.352]	[0.341]	[0.273]	[0.312]
ln(pop_exp)	0.451***	0.457***	0.466***	0.058
	[0.079]	[0.080]	[0.083]	[0.118]
EU-dummy	0.067*	0.068*	0.068**	0.155***
	[0.035]	[0.035]	[0.035]	[0.042]
gsp1	0.211***	0.210***	0.212***	0.138***
	[0.031]	[0.031]	[0.032]	[0.034]
gsp2	0.145***	0.143***	0.143***	0.009
	[0.033]	[0.032]	[0.031]	[0.033]
gsp3	0.157***	0.156***	0.164***	-0.088**
	[0.034]	[0.032]	[0.033]	[0.037]
ldc1	0.563***	0.556***	0.553***	0.427***
	[0.067]	[0.066]	[0.071]	[0.065]
ldc2	0.813***	0.806***	0.817***	0.656***
	[0.088]	[0.085]	[0.085]	[0.083]
Gspplus	0.199***	0.197***	0.199***	0.002
	[0.044]	[0.036]	[0.041]	[0.046]
med1	0.144**	0.151**	0.140**	0.057
	[0.060]	[0.059]	[0.058]	[0.072]
med2	-0.026	-0.014	-0.030	-0.082
	[0.067]	[0.078]	[0.065]	[0.071]
med3	-0.044	-0.036	-0.043	-0.056
	[0.071]	[0.074]	[0.076]	[0.080]
acp1	0.260***	0.272***	0.239***	0.163***
	[0.058]	[0.055]	[0.047]	[0.056]
acp2	0.037	0.048	0.018	-0.032
	[0.057]	[0.053]	[0.050]	[0.051]
acp3	-0.126*	-0.117**	-0.164***	-0.265***
	[0.066]	[0.057]	[0.058]	[0.056]
Other	0.201***	0.199***	0.207***	0.000
	[0.050]	[0.049]	[0.048]	[0.048]
Observations	67,980	67,243	58,810	58,036
Number of id	1,816	1,816	1,525	1,564

Notes: *** p<0.01, ** p<0.05, * p<0.1. Bootstrapped standard errors in brackets. The dependent variable is the number of product lines exported. Time and country-pair fixed effects, not reported, included in all regressions. Small countries are countries with a population of less than 500,000 inhabitants in 2007. High income exporters are defined as countries with a Gross national income > $11,115 in 2006.

Table A4 Robustness tests: Additional explanatory variables and separate sectors.

VARIABLES	(1) FE Poisson	(2) FE Poisson	(3) Manufacture	(4) Agriculture
ln(gdp_imp)	0.237***	0.175***	2.478***	0.788***
	[0.049]	[0.050]	[0.471]	[0.298]
ln(gdp_exp)	0.091***	0.091***	0.515***	0.426***
	[0.015]	[0.017]	[0.121]	[0.059]
ln(pop_imp)	1.871***	1.736***	0.268***	0.271***
	[0.310]	[0.244]	[0.066]	[0.051]
ln(pop_exp)	0.444***	0.445***	0.075***	0.104***
	[0.086]	[0.067]	[0.026]	[0.018]
ln(tele)		0.134***		
		[0.040]		
EU-dummy	0.034	0.055*	0.009	0.090***
	[0.029]	[0.031]	[0.038]	[0.035]
gsp1	0.249***	0.245***	0.302***	0.073***
	[0.025]	[0.030]	[0.038]	[0.027]
gsp2	0.177***	0.171***	0.230***	0.043
	[0.025]	[0.031]	[0.029]	[0.034]
gsp3	0.184***	0.179***	0.212***	0.072
	[0.026]	[0.034]	[0.033]	[0.045]
ldc1	0.467***	0.467***	0.705***	-0.175
	[0.070]	[0.058]	[0.094]	[0.111]
ldc2	0.697***	0.697***	0.903***	0.308***
	[0.092]	[0.072]	[0.112]	[0.111]
gsp+	0.230***	0.224***	0.308***	0.150***
	[0.035]	[0.033]	[0.046]	[0.052]
med1	0.298***	0.292***	0.216***	0.017
	[0.077]	[0.074]	[0.067]	[0.047]
med2	0.121*	0.112*	0.084	-0.266***
	[0.065]	[0.063]	[0.069]	[0.075]
med3	0.099	0.091	0.013	-0.225***
	[0.073]	[0.076]	[0.077]	[0.077]
acp1	0.367***	0.379***	0.312***	0.276***
	[0.048]	[0.057]	[0.102]	[0.053]
acp2	0.204***	0.197***	0.254***	-0.061
	[0.048]	[0.048]	[0.078]	[0.051]
acp3	0.003	-0.004	0.112	-0.249***
	[0.051]	[0.051]	[0.089]	[0.056]
Other	0.199***	0.196***	0.258***	0.127***
	[0.034]	[0.044]	[0.062]	[0.042]
Observations	51,182	51,182	67,882	67,151
Number of id	1,813	1,813	1,812	1,771

Notes: *** p<0.01, ** p<0.05, * p<0.1, bootstraped standard errors in brackets. The dependent variable is the number of product lines exported. Time and country-pair fixed effects, not reported, included in all regressions. For columns 1 and 2, the regressions are based on a sample covering 1965, 1970 and 1975-2007 due to limitations in data availability.