



# Determinants and Evidence of Export Patterns by Belgian Firms

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## 1. Executive summary

Growing exports are a clear indication of economic success. There are many historical examples of successful nations and cities where welfare was based on international trading activities. Entrepreneurial inhabitants contributed to these success stories by establishing thriving businesses and expanding them through international networks. Local institutions supported these export activities by creating a business-friendly environment that stimulated growth and productivity among international traders. The same old story is relevant today. European welfare is strongly dependent on export successes in global markets. Firms are the key players in this export story. Therefore they offer the best perspective on how export successes can be achieved.

This research aims to obtain a better understanding of firms' export performance. Knowing the driving forces behind export success will support policy makers in the design of export enhancing policies. As increased exports are an important source of economic growth and welfare for the European Union, improving policies and institutions to stimulate exports in all EU member states as well as at the EU level is quintessential. In particular, this research report studies the evidence and determinants of Belgian firms' exports. Belgian exports are an interesting case study given the strong integration of the Belgium in the European economy as well as the country's openness to international trade. Our findings for Belgian manufacturing exporters are, however, relevant to all small open European economies.

In general, the export performance of small open European economies is very much related to the global business cycle. In recent years export values recovered after the financial crisis thanks to the general improvement in the global and European economic environment. However, the analysis of firms' exports indicates that Belgian manufacturing firms have to cope with substantial global competition. Consequently, the number of exporting firms is shrinking, but the remaining firms are very active. On average, firms tend to increase their geographical scope as well as their export product diversification. Hence exporting firms are able to expand in other markets. Moreover a larger variety of products is being exported. Both factors contribute to export growth. But substantial differences among exporting firms exist. Improving individual firms' export performance is important to safeguard European competitiveness. In the analysis of export performance we distinguish between total export values, the intensive margin (intensity of trade) and the extensive margin (product variety in trade) of exports. Our regression analysis points to both destination market features as firm characteristics as determinants of export performance. Policies can help boost export performance by improving market access to foreign markets. In particular, improved market access to large or close-by economies leads to better export performance. This is relevant for EU policy makers as continued openness in EU trade policies is crucial. Targeting larger and close-by economies in bilateral trade policies – for example, through bilateral preferential trade agreements – is likely to enhance the European export potential too. In addition, changing the nature of firms also appears to be a good policy. More precisely, policies designed to improve firms' productivity or to contribute to firms' growth are helpful to improve European competitiveness. Examples include strengthening innovation, creating well-functioning labour markets and fair competition policies. Stimulating young firms to scale up their business and to reach out to foreign markets early on in their existence will improve overall export performance too. Policy initiatives and institutional reforms that contribute to these goals, both at the level of the EU and at the level of EU member states, are very welcome.

## 2. Introduction

International competitiveness is an important feature of the economic performance of a country. Although international competitiveness is a complex and multifaceted phenomenon, it is very well reflected in a country's export performance as exports signal a country's success to sell its products on foreign markets beating both local and international competitors. Knowing how well a country is doing is important for policy makers. A better understanding of the complex process underlying a country's export performance is likely to help design better policies. Many macroeconomic studies provide well-known insights about the export performance of countries. In order to gain new insights into the drivers of export performance a firm-level analysis is, however, more appropriate. Such insights will allow policy makers to stimulate export growth contributing to economic growth, or alternatively, to help reduce particular barriers to exports. To this end, we aim to study how export performance is affected by trading partners' characteristics or by the exporting firms' features. The former will help determine which trading partners should be prioritized, for example in EU trade policies. The latter will help (re)design EU, national and regional policies to better support firms to achieve export successes.

This research paper analyses detailed firm-level data on Belgian manufacturing exports. We study the features and determinants of export performance of Belgian manufacturing exporters. Following the recent international trade literature (see literature review), we analyse export patterns by individual firms. This allows taking into account the heterogeneity among exporting firms in terms of their export performance as well as in terms of various other firm characteristics that may affect export performance. Both firm characteristics and export market features will be studied as potential determinants of Belgian export performance. Belgium is an interesting case study as the Belgian economy is very open to international trade and very much integrated in the European economy. Belgium's export to GDP ratio (84.5%) is among the highest in the world. Therefore, evidence for Belgium is likely to be representative for any European firm actively engaged in international markets while being confronted with an open and competitive environment.

The remainder of this research report is organized as follows. In the third section we briefly summarize the main literature on firm-level export performance. Section 4 provides a number of detailed statistics on Belgian export performance. Section 5 analyzes which destination market features and firm-level characteristics affect the export performance of Belgian manufacturing firms. Section 6 concludes and derives policy implications from this analysis.

## 3. Literature

The literature of export performance determinants is very extensive. In this section, we aim to provide some key insights rather than an exhaustive literature overview (see e.g., Melitz and Redding (2012)). Important to note is the shift in theoretical as well as empirical research from country-level

and sector-level studies to firm-level studies. The latter approach is able to fine-tune the micro-level aspects of exports, in particular how firm features affect export performance, apart from country (and sector) features. Our analysis follows this recent tendency in the literature by considering both export market characteristics and exporting firm features as potential determinants of Belgian manufacturing firms' export performance.

Early empirical work by Bernard and Jensen (1995, 1997, 1999) indicates that exporting firms are larger and more productive than non-exporting firms. These findings triggered influential theoretical work, in particular by Melitz (2003), that inspired many economists to study the determinants of export behaviour and performance for various countries. Although the literature emphasizes the positive impact of exporters' productivity and size, evidence has been obtained that export performance is, in particular cases, also positively related to a company's age, the presence of foreign shareholders, (human) capital and/or knowledge intensity and profitability. For overviews see Bernard and Jensen (2004), Wagner (2007), Bernard et al. (2011), Melitz and Redding (2012). A similar mechanism underpins the impact of these firm features on export performance. A firm that outperforms its domestic competitors in terms of e.g. productivity will self-select into exporting because it is able to pay for the fixed costs of entering export markets. In turn, more productive firms will be better able to cope with competition in foreign markets leading to export growth. Similar arguments apply for other firm characteristics.

Apart from firm characteristics, also destination market characteristics matter for firm-level export performance. Exporters may perform better on particular markets. In particular it appears that export performance is positively affected by the size of the export destination market. Larger markets offer more opportunities for exporters because of larger demand and economies of scale in the distribution process. Moreover, exporters perform worse on distant markets as they incur additional transport and trading costs. Hence the geographical distance to a destination market implies physical barriers to trade and reflects the existence of various trade policy barriers to trade like higher tariffs, limited economic integration etc.. In particular, most countries tend to trade more with neighbouring countries. Finally, sharing a language or a colonial past stimulate export performance to a particular market. For an overview of country-level determinants of export performance in firm-level studies, see Mayer et al. (2014) and Abraham and Van Hove (2010).

Initially the literature focused on the export behaviour (exporting versus non-exporting firms) and the value of total exports. Gradually the focus has shifted to the analysis of export flows' composition. Total exports have been decomposed into various margins of trade, in particular the intensive margin (average intensity of exporting) and the extensive margin (number of products being exported, or alternatively, the number of markets exported to). For a discussion see Hummels and Klenow (2005).

Hence the literature shows that a firm-level perspective on export performance reveals the most interesting insights in the complex exporting process. Both trading partner characteristics and exporting firms' features are important determinants of export performance. In this case study we will study to what extent these findings hold for Belgian manufacturing exporters and what the implications are for policy-makers.

## 4. Features of Belgian Firm-level Exports

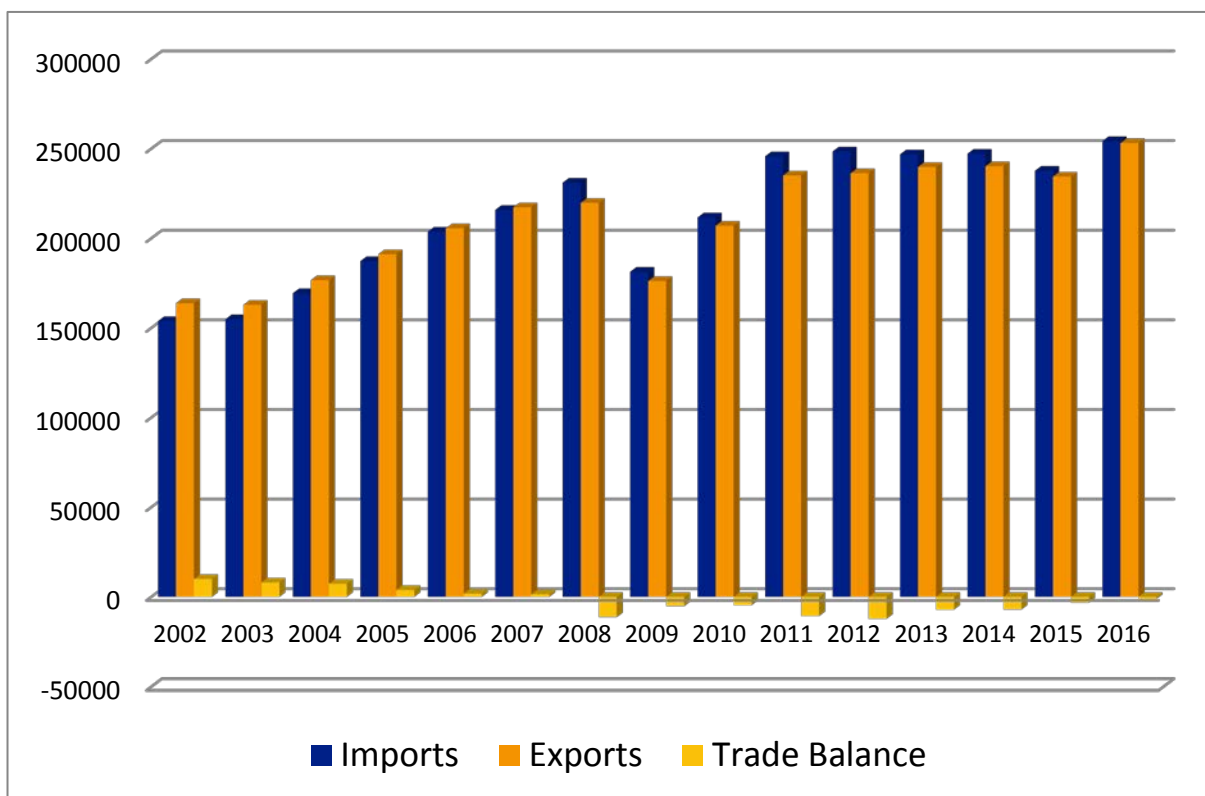
In this section we describe a number of features of Belgian firm-level exports. Data are retrieved from the Foreign Trade Statistics database as well as from firm-level accounting data, both collected by the National Bank of Belgium (NBB). We focus on the period 2002-2012 based on data quality and data availability. This period reflects the trade evolutions before, during and after the global financial crisis of 2008-2009.

Our focus is restricted to manufacturing exports due to data limitations. While services' exports are not fully recorded at the individual firm level, manufacturing exports are. This is a general issue in international firm-level export studies, and so no specific problem for the analysis of Belgian firm-level data. Studying manufacturing trade offers important insights about European competitiveness as European exports mainly consist of manufacturing products. Moreover, international manufacturing trade is recorded at very detailed product levels (within the 8-digit Combined Nomenclature (CN) classification). Using this detailed information allows deriving new microeconomic evidence on export patterns at the combined firm and product level.

Belgium is a small open economy in the core of the European Union. Historically, Belgian firms have always been very active on international markets, partly offsetting the disadvantages of the small domestic market. As Figure 1 shows, Belgian trade openness is reflected in exports as well as imports. According to the latest World Bank indicators, Belgium had an export to GDP ratio of 84.5 % in 2016, making it one of the most open economies in the world. Belgium's trade balance is by and large balanced. As can be seen in the figure, the evolution in Belgian trade is strongly related to the international business cycle. Following international trends, Belgian trade dropped substantially during the global financial crisis, but recovered strongly in recent years thanks to the global and European economic recovery.

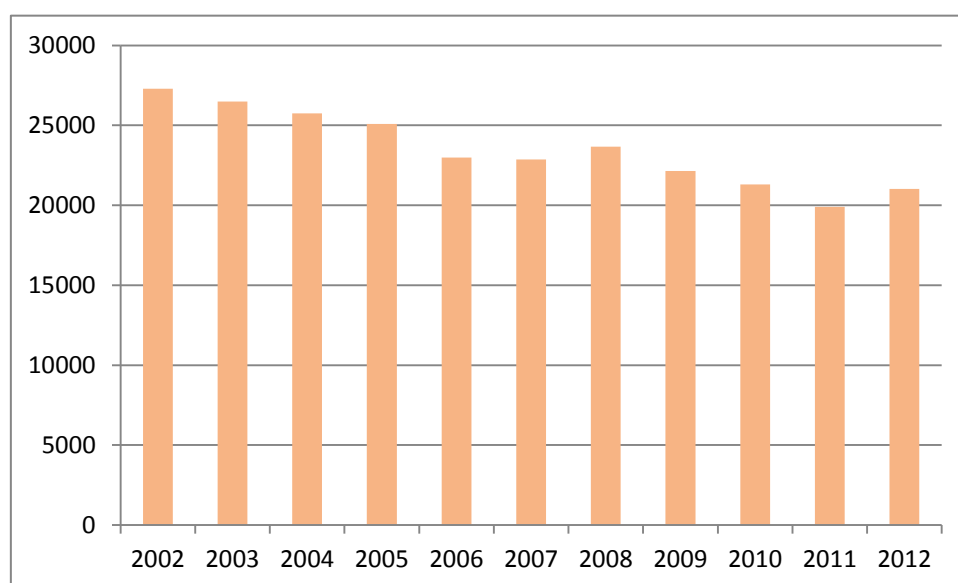
Many Belgian firms are active exporters, notwithstanding the fact that Belgium has only a limited number of large multinational companies and many small and medium sized companies. At the firm level too, it holds that firms have to export to overcome the small size of their domestic market. Consequently a substantial number of firms are exporting firms. Nevertheless, as Figure 2 shows, the number of exporting manufacturing firms has been declining in recent years. Undoubtedly, Belgian firms have had to cope with increasing competition on international markets. In general, European industrial sectors suffer from the rise of emerging markets, triggering a substantial deindustrialisation process in most European economies. This holds for Belgium too. Also, the declining number of Belgian exporting firms is mainly due to gradually increasing reporting thresholds for firms' intra-EU exports. In recent years the intra-EU export reporting threshold increased to the current one million euros level. Consequently some firms dropped out as exporting firms over time. On the contrary, the number of Belgian extra-EU exporters remained relatively constant in the same period. The threshold of extra-EU exports remained constant and low at 1000 euros.

Figure 1: Evolution in total Belgian exports and imports (in mio euros)



Source: NBB (2017)

Figure 2: Evolution in the number of exporting Belgian manufacturing firms



Source: NBB (2017), own calculations



Table 1 shows some general features of Belgian exporting manufacturing firms. The average export value almost doubled between 2002 and 2012. Although this is affected by the change in the intra-EU reporting threshold, it still reflects substantial growth in firm-level exports during this period. Looking at the other indicators, there appears to be substantial heterogeneity among Belgian exporters. Total Belgian exports clearly consist of both small and large exporters. Table 2 and 3 provide additional information about the composition of Belgian exports. Table 2 shows how many destination markets are served by Belgian exporters, while Table 3 indicates the number of manufacturing products exported by firms. Hence these tables respectively reflect geographical diversification and product diversification in Belgian firm-level exports. Both phenomena are of growing importance. On average, Belgian manufacturing exporters have been active in 7.6 markets in 2012, while they were only active in 6 markets in 2002. Still, a large majority of Belgian exporters (around 70 %) is active in less than 6 destination markets. In practice, these exports are concentrated on the neighbouring markets. However, some firms are globally active as some firms are active in more than 170 markets in the world. Belgian firm-level exports have also become more diversified in terms of products. On average, 13.78 products were exported in 2012 against 10.45 products a decade before. Both features, increased geographical diversification and augmented product diversification, indicate that Belgian exporters are growing in various dimensions. Total export growth is not only the result of more intensified trade relationships, but also of new trade relationships. The latter can be new because of the new markets Belgian firms entered into, or because of new or alternative products launched on international markets. These features are typically measured by the distinction between the intensive margin of exports and the extensive margin of exports. On the one hand, the intensive margin of exports is measured by the average value of exports of a particular product to a particular market. An increase in the intensive margin implies an intensification of an existing trade relationship. On the other hand, the extensive margin of exports is measured by the number of products exported to a particular market. An increase in the extensive margin reflects new trade relationships that are established. Although both margins of trade are different concepts of export performance, an increase in either of them points to improved export performance. In the next section we will study to what extent total exports as well as both margins of exports are driven by the same determinants.

Table 1: Features of Belgian exporting manufacturing firms

Year	Average exports by firm	Minimum exports by firm	10-percentile exports by firm	Median exports by firm	90-percentile exports by firm	Maximum exports by firms	Standard deviation exports
2002	5372651	0	1983	5100	391334	1.02E+10	7.91E+07
2003	5526740	0.11	1955.63	5075	386825	9.47E+09	7.81E+07
2004	6240387	1.52	2008.2	5286.15	427790	1.04E+10	8.98E+07
2005	6975481	0.14	2098	5500	459211	1.18E+10	1.06E+08
2006	8157320	1.2	1760	4200	152997.1	1.12E+10	1.17E+08
2007	8679057	0.1	1236.99	3250	178136	1.21E+10	1.20E+08
2008	8480826	0.01	800	2,440,125	165317	9.19E+09	1.11E+08
2009	7316747	0.67	842	2699.86	228696.7	7.00E+09	8.77E+07
2010	9291536	0.1	1000	3150	233750	1.12E+10	1.23E+08

<b>2011</b>	1.14E+07	0.18	1388.58	4300	410839.6	1.34E+10	1.61E+08
<b>2012</b>	1.09E+07	0.5	1626.27	4833.95	361986.1	1.28E+10	1.46E+08

Source: NBB (2017), own calculations

Table 2: Indicators of Geographical Differentiation by Belgian manufacturing firms

Year	Maximum number of export destination by firm	Average number of export destinations by firm	Standard deviation in the number of export destinations	90-percentile export destinations	Percentage of firms with 5 or less export destinations
<b>2002</b>	169	6.01	10.43	15	72%
<b>2003</b>	171	6.21	10.71	15	71%
<b>2004</b>	175	6.49	11.04	16	70%
<b>2005</b>	170	6.71	11.36	17	69%
<b>2006</b>	164	6.62	11.9	18	72%
<b>2007</b>	169	6.81	12.32	18	72%
<b>2008</b>	165	6.89	12.49	18	72%
<b>2009</b>	179	7.18	12.72	19	70%
<b>2010</b>	175	7.47	13.13	20	69%
<b>2011</b>	203	7.68	13.19	21	68%
<b>2012</b>	175	7.58	13.22	21	69%

Source: NBB (2017), own calculations

Table 3: Indicators of Product Differentiation by Belgian manufacturing firms

Year	Maximum number of export products by firm	Average number of export products by firm	Standard deviation in the number of exported products	90-percentile number of export products	Percentage of firms with 5 or less export products
<b>2002</b>	2689	10.45	36.94	22	67%
<b>2003</b>	3054	10.83	39.9	23	66%
<b>2004</b>	3140	11.32	41.67	24	66%
<b>2005</b>	3412	11.54	43.01	25	65%
<b>2006</b>	3551	10.73	44.49	22	70%
<b>2007</b>	3935	11.4	48.07	23	69%
<b>2008</b>	2883	11.84	47.28	24	68%
<b>2009</b>	3124	12.7	48.23	26	66%
<b>2010</b>	4045	13.58	53.21	29	65%
<b>2011</b>	6582	14.19	66.34	29	65%
<b>2012</b>	2285	13.78	49.81	28	65%

Source: NBB (2017), own calculations

To summarize, this evidence points to several interesting features of Belgian exporting firms. Though the number of exporting firms is shrinking, in particular after the global financial crisis, the remaining exporters are active in more markets and are able to export a larger variety of products. These observations signal a strong resilience among Belgian exporters to global competition.

## 5. Determinants of Belgian Firm-level Exports

### 5.1. Empirical Methodology

In order to analyze the determinants of Belgian export performance we use firm-level data provided by the National Bank of Belgium (for more details on the data, see Soete, Studnicka and Van Hove, 2015). In our empirical analysis we test whether various company features and destination market characteristics affect the total value of exports, the intensity of exports (intensive margin) and the number of products exported (extensive margin) by Belgian firms to particular markets. In order to test these hypotheses we estimate the following empirical specifications:

$$X_{ijt} = \alpha_0 + \alpha_1 F_{it} + \alpha_2 C_{jt} + \varepsilon_{ijt} \quad (1)$$

$$IM_{ijt} = \beta_0 + \beta_1 F_{it} + \beta_2 C_{jt} + \mu_{ijt} \quad (2)$$

$$EX_{ijt} = \delta_0 + \delta_1 F_{it} + \delta_2 C_{jt} + \tau_{ijt} \quad (3)$$

In specification (1) we estimate the impact of a vector of firm-level characteristics ( $F_{it}$ ) and of a vector of destination market characteristics ( $C_{jt}$ ) on the total value of bilateral manufacturing exports by Belgian firm  $i$  to market  $j$  in year  $t$  (aggregated across products). In specification (2) and (3) we run a similar regression in order to measure respectively the impact on the intensive margin ( $IM_{ijt}$  – average exports by Belgian firm  $i$  to market  $j$  in year  $t$  – average across products) and on the extensive margin ( $EX_{ijt}$  – number of exported products by Belgian firm  $i$  to market  $j$  in year  $t$ ). These empirical specifications are econometrically estimated controlling for unobserved heterogeneity by adding time fixed effects and firm fixed effects to the error term.

We take into account the following destination market characteristics. First, we test whether Belgian exporters export more to larger markets. Market size is measured by the export destination's gross domestic product (GDP). It is expected that exports to a larger market are higher because of larger demand for all products. Distance to the destination market is expected to reduce Belgian exports as exporters have to cope with higher transport and trade costs. Finally, in line with the literature, we also expect a positive impact on Belgian exports when the destination market shares a common language (Dutch or French) or historical colonial ties. While the expected effects for total bilateral exports are pretty clear in the literature, the impact on the margins of exports is mainly an empirical question.

We follow the main insights from the literature for the firm-level characteristics too. First, we test the main hypotheses discussed in the literature, i.e. whether productivity (proxied by value added per full-time-equivalent employees) and firm size (proxied by the number of full-time-equivalent employees) matter for export performance. Secondly, we test whether more profitable or older firms outperform less profitable (possibly loss-making) or younger firms.

## 5.2. Empirical Results

Table 4 summarizes the results of our regression analysis. In the first column we report the determinants of the total export value. It can be shown that this total effect can be decomposed into an impact on the intensive margin (column (2)) and an impact on the extensive margin (column (3)). In general, both destination market features and exporting company features are important to explain export performance of Belgian firms.

Belgian exporters export more to larger markets. The size of the destination market matters for the growth of existing trade relationships as well as for the creation of new export opportunities. The distance between Belgium and the destination markets have the opposite effect: total export value as well as both margins are negatively affected. Both effects are in line with the literature. Surprisingly, a common language or a common colonial past is negatively affecting Belgian firm-level exports. However, the negative effect is caused by a negative effect on the intensive margin. On the contrary, the extensive margin is positively affected. Hence this implies that sharing a common language or a colonial past with your export partner is helpful to boost new trade relationships. Similarly, an existing trade agreement with the EU helps create new export opportunities for Belgian firms, but existing trade relationships may actually be negatively affected. One should, however, note, that in the period 2002-2012 the existing EU trade agreements were not yet as sophisticated as the more recent trade agreements signed by the EU. Hence this finding is likely to be revised when using more recent data (see e.g., Soete and Van Hove, 2017).

Similar to previous findings in the literature, Belgian firm-level exports are positively affected by firm size and firm productivity. Larger or more productive firms tend to export more, have more intensive trade relationships and create more new trade relationships. Hence productivity and size are both very important determinants of export performance. Note that productivity matters most for the intensification of trade relationships, while size matters most for increasing the product diversification in exports. Firm profitability and firm age matter too, although their impact is smaller. They have a negative impact on total export value and on the intensive margin. The extensive margin of exports is, however, stimulated by the age of the company.

Table 4: Regressions Results

	(1)	(2)	(3)
	Total export value	Intensive Margin	Extensive Margin
<i>Destination Market Features</i>			
<b>GDP</b>	0.10***	0.05***	0.05***

	(0.00)	(0.00)	(0.00)
<b>Distance Belgium-market</b>	-0.10***	-0.05***	-0.05***
	(0.01)	(0.01)	(0.00)
<b>Common language</b>	-0.11***	-0.15***	0.03***
	(0.01)	(0.01)	(0.00)
<b>Former colony</b>	-0.48***	-0.60***	0.11***
	(0.04)	(0.03)	(0.01)
<b>Trade agreement with EU</b>	-0.04***	-0.06***	0.01***
	(0.01)	(0.01)	(0.00)
<i>Exporting Firm Features</i>			
<b>Firm productivity</b>	0.38***	0.35***	0.03***
	(0.00)	(0.00)	(0.00)
<b>Firm size</b>	0.29***	0.20***	0.09***
	(0.00)	(0.00)	(0.00)
<b>Firm profitability</b>	-0.00***	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)
<b>Firm age</b>	-0.08***	-0.12***	0.02***
	(0.01)	(0.01)	(0.00)
<b>Constant</b>	4.04***	4.62***	-0.37***
	(0.09)	(0.08)	(0.03)
<b>Number of Observations</b>	458,586	458,586	458,586

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 6. Conclusion

In this research report we studied the characteristics and determinants of Belgian firm-level manufacturing exports. As Belgium is a representative example of small open European economy, the results in this paper may be generalized to other small European countries. The analysis shows that manufacturing exporters have to cope with substantial competition in global markets. While total export values have recovered after the financial crisis, the number of exporting firms is clearly subdued due to global competition. At the same time, exporting firms tend to become more diversified in their geographical scope and their export product portfolio. Export performance, measured by total export value or by the intensive or extensive margin of exports, is affected by a number of destination market features as well as firm characteristics. These findings encompass a number of interesting policy implications.

Exports are larger to larger or closer markets. Hence trade policy should focus on large and close-by economies to facilitate trade in the future. Or alternatively, companies should be supported to

become active on such markets. Good trade facilitation policies are crucial. These can be set-up by national or regional authorities across the European Union, or through concerted actions at the EU level. Negotiations of trade agreements with such markets are likely to boost trade too, both at the intensive and at the extensive margin. The recent agreement between the EU and Japan is a nice example of a trade deal that is likely to support European export growth as European firms will benefit from improved access to the large Japanese market. In particular for small countries and smaller firms, access to large markets may not be easy. Hence any improved market access is likely to boost export growth.

Policies can also be directed at firms directly. As both firm productivity and firm size lead to better export performance, policies improving productivity or contributing to firms' growth, like innovation policies or schooling and training initiatives, are useful to extend export opportunities in the future. Increasing firms' productivity or size may help intensify existing trade relationships, but will also lead to the creation of new export relations. As productivity and firm size are strongly driven by innovation, offering innovation support and creating an innovation-minded European market are crucial to guarantee export success in the future. Such policies may structurally enhance exporters' opportunities. Innovation programmes are key ingredients in any policy to improve European competitiveness, within and outside the European internal market. In particular for firms in smaller European economies, productivity and growth enhancing policies are crucial for their survival in the global context. Improved export performance will not only benefit firms, but also the European society as a whole. Exports contribute to higher economic growth and welfare. Moreover, increased product diversification also provides European consumers and firms with access to a larger set of varieties which is an additional source of welfare.

Finally, the results indicate that young firms positively contribute to export performance growth at the intensive margin and in total. But it is important to help these young firms to scale up quickly and reach out to many large markets. European entrepreneurs should be fostered to scale up their ventures and reach out to global markets early on in their venture life.

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