Do export transitions differently affect firm productivity? Evidence across Vietnamese manufacturing sectors

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ABSTRACT

This paper, by exploring the enriched information in annual Vietnamese enterprise surveys from 2010 to 2015, tries to shed light on the causal effect of the various statuses of export transitions on total factor productivity occurring across 20 manufacturing sec- tors and during various phases of export transition. The empirical results derived from the system GMM estimation provide evidence of causal direction from export transitions to total factor productivity, after controlling for endogenous variables and taking firm hetero- geneity into account. Our results indicate that export effects on productivity are highly dependent on specific manufacturing sectors, and on type of export transition. From the perspective of trade and industrial policies, while supporting the creation of new exporters, some issues related to a high level of subsidy and tax incentives by the government to every exporting firm and export-oriented unit in every manufacturing sector seem to be questionable.

KEYWORDS

Learning-by-exporting; total factor productivity; export persistence; export fluctuation; export striving; manufacturing sectors

1. Introduction

Since the pioneering works of Abramovitz (1956), Solow (1957) and Tinbergen (1942), Total Factor Productivity (TFP) has been regarded as playing a pivotal role in generating and predicting overall economic growth. While Tinbergen (1942) calculated efficiency by generalising the Cobb-Douglas production function, Solow (1957) constructed the 'Solow residual index', which explains the residual growth rate of output which is not accounted for by the growth rate of inputs; this Solow residual was also termed the 'measure of ignorance' by Abramovitz (1956). Subsequent theoretical studies (e.g. Romer (1990) and subsequently Jones (1995) and Young (1998)), provide alternative rationales for how TFP can endogenously explain economic growth. Over 60 years later, Caselli (2005), in his chapter in the *Handbook of Economic Growth,* still argues that most of the variation in income at the country level is explained by TFP. TFP is calculated as the share of output not explained by the amount of factor inputs. Numerous studies support the importance of productivity growth as a crucial source of output growth for a large set of countries and a significant time horizon (see Hall & Jones, 1999; Klenow & Rodriguez-Clare, 1997; Krugman, 1997; Prescott, 1998, among many others in the literature).

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The economic linkage between trade and productivity growth has long been a highly debated topic in the international economics and growth literature. From the theoretical perspective, there is a consensus that international trade in general, and export in particular, improves the productivity of firms, which finally leads to economic growth (see Balassa, 1989; Beckerman, 1962; Bhagwati, 1988). Similarly, proponents ofendogen- ous growth also affirm that exporting plays a crucial role in improving productivity through acceleration of innovation (Grossman & Helpman, 1991; Rivera-Batiz & Romer, 1991) and technology transfer (Barro & Sala-i-Martin, 1995; Parente & Prescott, 1994). In terms of economic policies, trade liberalisation and export-led growth strategies have been strongly based on the argument that integration into international markets through exporting helps to increase the productivity and efficiency of exporters (see Grossman & Helpman, 1991; Krugman, 1987; Rodrik, 1988).

A huge number of studies have investigated the causal relationship between exporting and productivity at firm level and one important issue has been the hypotheses of learning-by-exporting (export newcomers have higher productivity than non-exporters in the post-entry period). Despite a great treasure of empirical literature on these issues, the overall results are rather mixed and inconclusive (for a positive conclusion, see, Maggioni (2012), Martins and Yang (2009), Tse, Yu, and Zhu (2017) and Wagner (2007); and for the opinion that exporting confers little or no benefit in productivity growth, see, Bernard and Jensen (1999, 2004), Clerides, Lach, and Tybout (1998), Delgado, Farinas, and Ruano (2002) and Sharma and Mishra (2011)).

The relationship of exports and TFP in the context of Vietnamese manufacturing firms is relevant for various reasons. Since 'Doi Moi' (renovation) in 1986, due to several policies, such as the abolition of import and export licences, reduction in tariff rates through various regional trade agreements, and the liberalisation of restrictions on foreign capital, the manufacturing sector has grown manifold and emerged as a significant sector in the country. The contribution of manufacturing was around 15.0% of total GDP, with an average growth rate of 14.4% in 2017. This sector is considered to be an engine of growth for the Vietnamese economy due to its pivotal role in industrialisation.

With the increasing development of theoretical literature on productivity, various statistical techniques have been employed to estimate TFP, namely: the frontier para- metric technique, the frontier non-parametric technique, the non-frontier parametric technique and the non-frontier non-parametric technique, and among them, the semi- parametric approach, such as the Levinsohn-Petrin (L-P) approach, has become popular over the years to estimate TFP (Blalock & Gertler, 2004; Satpathy, Chatterjee, & Mahakud, 2017). There has been a recent debate in the literature on the estimation of production functions, and thus total factor productivity. An excellent review may be found in the work of Ackerberg, Caves, and Frazer (2006) (ACF). A long-lasting problem in estimating production functions is the endogeneity that occurs from the correlations between inputs and unobserved productivity. Two popular solutions to the problem are instrumental variables (IV) and fixed-effects estimation (Mundlak, 1961). However, for a variety of reasons, these methodologies have not been particularly successful at solving these endogeneity problems (Abeberese, 2017). To solve the bias issue of ordinary least square estimation for the production function, Olley and Pakes (1992) (OP) first decomposed production function residuals into the firm's productivity and the random and zero-mean measurement errors, and then used the inverse function of investment as the proxy for the unobserved productivity (Nguyen, Osypuk, Schmidt, Glymour, &Tchetgen Tchetgen, 2015). Levinsohn and Petrin (2003) proposed to exploit intermediate inputs as the alter- native proxy in the case of lumpy investment. As claimed by Ackerberg et al. (2006), multicollinearity could happen when labour is correlated with the proxy, then the labour coefficient cannot be identified. To overcome this issue, Wooldridge (2009), and later Petrin and Levinsohn (2012) (LP), suggested applying an IV estimator using the own lags of labour for its instruments. Ackerberg et al. (2006) suggest a method that builds upon the ideas in OP and LP, e.g. using investment or intermediate inputs to 'proxy' for productivity shocks, but does not suffer from the above collinearity problems. The AFC procedure, however, unlike the OP and LP procedures, which estimate the labour coeffi- cient in the first stage (where the collinearity issue arises), involves estimating the labour coefficient in the second stage.

The choice of the appropriate estimation algorithm crucially depends on the applica- tion and data availability. Our productivity estimates are obtained from Ackerberg et al. (2006) who suggest a method that avoids the collinearity problems discussed above. The AFC procedure draws on aspects of both the OP and LP procedures and is able to use either the 'intermediate input as proxy' idea of LP, or the 'investment as proxy' idea of OP. The main difference between the AFC approach and OP and LP is that, in the former approach, no coefficients will be estimated in the first stage of the estimation. Instead, the input coefficients are all estimated in the second stage. However, as Ackerberg et al. (2006) indicate, the first stage is still important since it nets out the non-transmitted error from the production function. The AFC method thus deals with both the simultaneity bias and the selection bias in estimating production functions. While the former is common in any dataset related to firm production and business, the latter is important for an emerging economy such as Vietnam where the least productive firms exit the market and are replaced by new more productive firms.

Exploring a six-wave unique panel dataset of Vietnamese manufacturing firms and applying the GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998), which controls for both endogeneity and unobserved, time-invariant factors, our study tries to answer to what extent exports during various phases of transition in the export market foster productivity measured by TFP at the disaggregate level of 20 Vietnamese manufacturing sectors. Our results indicate that export effects on productivity are highly dependent on specific manufacturing sectors, and on type of export transitions; not every manufacturing sector can be associated with significantly positive effects of export transitions nor can every type of export transition.

Our paper moves the empirical literature forward along the following six dimensions. First, for the first time, we look at the linkages between export and productivity in the Vietnamese manufacturing industry, which hasachieved rapid exportgrowth overthe last three decades but has observed low productivity in recent years. Second, a large amount of previous studies has focused on the effect of export on firm productivity measure by TFP. To this end, they have included variables proxying for export, such as export status, in their productivity regressions. We go further and look more deeply at the export transi- tions over time and examine various statuses of export such as export decision at a point in time, export exit at a point in time, export persistence, export fluctuation and export striving over a period of time. Third, most of the surveyed studies try to discover a link between export variables and firm productivity, but few take firm heterogeneity into account. Our research fills this gap in the literature by contributing to an exploration of the extent to which firms characterised by different numbers of labour exhibit different sensitivities of productivity to the existence of export statuses. Fourth, while most of the previous firm-level studies examine the issues of concern at the aggregate level of manufacturing, we, by exploring the enriched dataset, try to uncover the effects at the disaggregate level of 20 manufacturing sub-sectors. Fifth, several of the firm-level studies surveyed above suffer from methodological problems. Most of the variables included in the productivity equations estimated in the literature are in fact likely to be endogenous. Although some authors take into account the endogeneity of the export variables included in their models (e.g. Kim, Gopinath, & Kim, 2009; Maggioni, 2012; Sharma & Mishra, 2011), most of the studies in this literature use simple fixed or random effects estimators, which do not take endogeneity into account. Their results have therefore to be interpreted with caution. Improving on the existing literature, our equation will be estimated using a Generalised Method of Moments (GMM) system estimator, which takes into account the endogeneity of all regressors. Sixth, in this paper, we are the first to use the methodology of Ackerberg et al. (2006) on the Vietnamese enterprise censuses to separately estimate TFP in 20 different manufacturing sectors.

The remainder of this article is organised as follows: In Section 2, 'Literature background', we present the relationship between export and TFP, and the conceptual and the empirical framework. The data sources and variables, definitions of export transitions and TFP estimation in the manufacturing sector are discussed in Section 3, 'Export transitions and TFP estimation'. Section 4, 'Empirical results', presents the econometrics results of the effects of export transitions on TFP. Finally, Section 5, 'Conclusions and implications' concludes.

2. Literature background

2.7. Export and TFP: where do we stand?

The literature proposes that the positive correlation between exporting and productivity may reflect productivity improvements that result from knowledge and expertise that the firm gains as a direct result of its experience in the export market. This phenomenon is the hypothesis of the learning-by-exporting effect (LBE effect or post-entry effect: new export market entrants have higher productivity growth than non-exporters in the post-entry period). This knowledge and expertise comes from their buyers, including both new product designs and production methods (Baldwin & Gu, 2003; Crespi, Criscuolo, & Haskel, 2008; Greenaway & Kneller, 2008; Hallward-Driemeier, Iarossi, & Sokoloff, 2002; Isgut, 2001; Mengistae & Pattillo, 2004; Van Biesebroeck, 2005; Yasar, Nelson, & Rejesus, 2006). In addition, exporting could be an important source of competitive pressures and information (Bernard & Jensen, 2004; Clerides et al., 1998; Fernandes & Isgut, 2005), leading to significant performance improvements.

Regarding the effect of exports on TFP, several studies have been conducted about the learning-by-export hypothesis. To name a few, we can include: Aw, Chung, and Roberts (1998) on Taiwan; Bernard and Wagner (1997) on Germany; Kraay (1999) on China; Greenaway, Girma, and Kneller (2002) on the UK; Bigsten et al. (2004) on Africa; Castellani (2002) on Italy; Delgado et al. (2002) on Spain; Kim et al. (2009) on Korea; Yang and Mallick (2010) on China; Sharma and Mishra (2011) on India; and Maggioni (2012) on Turkey. The empirical literature finds a robust positive correlation between exporting and productivity at the firm level. However, many opinions exist in the sense that exporting confers little or no benefit for productivity growth, such as: Bernard and Jensen (1999, 2004), Clerides et al. (1998), Delgado et al. (2002) and Sharma and Mishra (2011). Another problem is the level of analysis. The manufacturing industry is said to be heterogeneous across manufacturing sub-sectors. The aggregated analysis may hide the actual effect of export over productivity. As proven in disaggregate-level analysis, the overall results are also mixed and inconclusive. Take as an example, Sharma and Mishra (2011), who find, in the case of four Italian manufacturing sectors, that exporting as measured by export intensity has a significantly positive effect on productivity in the cotton sector, whereas no significant results are found in the transport equipment, pharmaceutical and electrical sectors. Taking all of these into account, we, by exploring the enriched dataset, try to uncover the effects at the disaggregate level of 20 manufac- turing sub-sectors.

2.2. *Conceptual and empirical framework*

2.2.1. Learning-by-exporting hypothesis

In the present study, our empirical model to test the learning-by-exporting hypothesis follows Bernard and Jensen (1999) and Clerides et al. (1998) and has the following form:

$$TFP\underset{\cdot}{i}_{\ t} = a + \underset{\cdot}{o}_1 start_{it} + \underset{\cdot}{e}_2 continuity_{it} + \underset{\cdot}{e}_3 stop_{it} + \underset{\cdot}{e}_4 fiucdown_{it} + \underset{\cdot}{o}_5 flucup_{it} + \underset{\cdot}{e}_6 striving_{it}$$
$$+ \tilde{\tilde{o}} Xit—1 + \hat{\underset{\cdot}{O}} TFPit—1 \mid \underset{í}{\underline{\hat{}\ '}}\ \tilde{\tilde{o}}\hat{\underset{\cdot}{o}}\underset{\cdot}{i} TimS\underset{\cdot}{i} + £it \qquad (1)$$

where *X* is a vector of firm characteristics, export status is measured by export transitions, including six choices, namely: stop, start, continuity, fluctuation down, fluctuation up and striving.The coefficients $^{\wedge}_1$, $^{\wedge}_2$, $^{\wedge}_3$, $^{\wedge}_4$, $\underset{\cdot}{e}_5$, $\underset{\cdot}{e}_6$, $\tilde{\tilde{o}}$ and $\hat{\underset{\cdot}{e}}$ are parameters to be estimated. *t* and *i* denote year and firm, respectively, in the model. We include firm-specific characteristics, including capital stock (capital stock), size of employment (labour), human capital (wage) and firm age (years of operation). Equation (1) is estimated for 20 manufacturing sectors.

2.2.2. Export transitions and TFP: econometric issue

While estimating model 1, we face one major challenge: endogeneity. This could lead to a biased estimation of the impact. To overcome this problem, we therefore utilise the GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). The Blundell and Bond estimator, also called the system GMM estimator, combines the regression expressed in first differences (lagged values of the variables in levels are used as instruments) with the original equation expressed in levels (this equation is instrumented with lagged differences of the variables) and allows us to include some additional instrument variables (Sharma, 2014). All other variables in the equations serve as candidates of standard instruments in the estimation. Specifically, we assume control variables of capital stock and number of employees as predetermined and use their lagged values as exogenous instruments in implementing our GMM estimation. Other control variables of firm age and dummies for years are treated as strict exogenous variables. The GMM estimator, in this case, outperforms the fixed-effects estimator for three reasons. First, it allows us to take into account the unobserved time-invariant specific effects. Second, it can deal with the potential endogeneity arising from the inclusion of the lagged dependent variable and other potentially endogenous variables. Finally, this method is highly suitable for our data, which have large N (number of panel firms) and small T (time-year).

3. Export transitions and TFP estimation

3.7. Data source and variables

3.1.1. Dataset and data handling

The main data source for production function estimation is the Vietnam Annual Enterprise Survey (VAES) which is conducted annually by the General Statistical Office (GSO) of Vietnam. It is designed to provide annual data on financial performance and financial position by broad industry groups. Because the concepts and measures used in the survey are designed for the purposes of production measurement, the data are most appropriate for use in production function estimation. The term 'VAES' refers to two different things: first, to a postal sample survey of firms; and second, to a compiled dataset of business information that includes data from the sample survey, but also includes data from administrative sources.

The surveys collected information on firms' activities, including numerous indicators such as firm characteristics, location, industry, labour and wages, assets and liabilities, export and import of goods, and business results (including: turnover, cost of goods, administration costs, net profit) at the firm level. All types of manufacturing sectors were covered in the sample.

3.1.1.1. Firm identification. Enterprises in the Vietnam Annual Enterprise Survey are assigned a unique identifier *(madn)* that is intended to identify each enterprise long- itudinally. We improve the longitudinal tracking of enterprises using administration information on the geographical locations of enterprises such as province *(tinh),* district *(huyen)* and commune (xa) to create 'permanent enterprise codes' (e.g. Newman, Rand, Talbot, & Tarp, 2015). Each enterprise is now associated with a unique enterprise code.

3.1.1.2. Sector classification. Each enterprise code is assigned to a unique industry, based on the industry of the enterprise that accounts for the greatest share of revenues. The sector classification system used here is based on VSIC 2007, which corresponds closely to the fourth revision of the International Standard Industrial Classification of All Economic Activities (ISIC4 Revision) (United Nations, 2008). The final list of manufacturing sectors and the number of firms covered by our data in each year are presented in Table 1. Four sectors - the manufacture of tobacco products (sector 12), the manufacture of coke and refined petroleum products (sector 19), repair and installation of machinery and equipment (sector 33), and other manufacturing (sector 34) - are excluded due to the small number of firms operating in these sectors.

Our final sample covers firms from 20 manufacturing industries: (1) food products (code 10, 10,090 firms); (2) beverages (code 11, 1096 firms); (3) textiles (code 13, 3666 firms); (4) wearing apparel (code 14, 7597 firms); (5) leatherand related products (code 15,

Table 1. Number of firms by manufacturing sectors, 2010-2015.

Industry	2010	2011	2012	2013	2014	2015	Total
10: Food products	1788	1806	1783	1775	1760	1178	10,090
11: Beverages	211	202	205	181	172	125	1096
12: Tobacco products	19	19	19	19	19	18	113
13: Textiles	644	647	641	628	630	476	3666
14: Wearing apparel	1318	1343	1336	1330	1295	975	7597
15: Leather and related products	412	421	421	425	413	339	2431
16: Wood and products of wood/cork	739	741	729	716	695	454	4074
17: Paper and paper products	670	668	658	659	650	400	3705
18: Printing and reproduction of recorded media	478	510	499	510	469	234	2700
19: Coke and refined petroleum products	10	12	11	12	11	9	65
20: Chemicals and chemical products	568	573	562	563	546	430	3242
21: Pharmaceuticals, medicinal chemicals	141	139	138	142	140	114	814
22: Rubber and plastics products	1055	1058	1041	1025	1004	642	5825
23: Other non-metallic mineral products	1278	1289	1256	1254	1226	893	7196
24: Basic metals	284	275	257	253	251	160	1480
25: Fabricated metal products	1444	1454	1429	1384	1400	853	7964
26: Computer, electronic and optical products	181	204	204	201	205	189	1184
27: Electrical equipment	307	316	303	306	305	243	1780
28: Machinery and equipment n.e.c.	255	261	260	262	254	198	1490
29: Motor vehicles, trailers and semi-trailers	111	113	112	116	114	111	677
30: Other transport equipment	187	185	168	168	166	155	1029
31: Furniture	753	745	718	712	711	550	4189
All manufacturing sectors	13,194	13,341	13,095	12,980	12,770	9006	74,386

Source: Authors' calculation from VAES 2010-2015.

2431 firms); (6) wood and products of wood/cork (code 16, 4074 firms); (7) paper and paper products (code 17, 3705 firms); (8) printing and reproduction of recorded media (code 18, 2700 firms); (9) chemicals and chemical products (code 20, 3242 firms); (10) pharmaceuticals, medicinal chemicals (code 21, 814 firms); (11) rubber and plastics products (code 22, 5825 firms); (12) other non-metallic mineral products (code 23, 7196 firms); (13) basic metals (code 24, 1480 firms); (14) fabricated metal products (code 25, 7960 firms); (15) computer, electronic and optical products (code 26, 1184 firms); (16) electrical equipment (code 27,1780 firms); (17) machinery and equipment not elsewhere classified (n.e.c.) (code 28,1490 firms); (18) motor vehicles, trailers and semi-trailers (code 29, 677 firms); (19) other transport equipment (code 30, 1029 firms); and (20) furniture (code 31, 4189 firms). We have selected these industries for analysis basically on two grounds: first, the significance of the industry in the domestic economy in terms of employment generation, technology improvement and export earnings; and, second, the relative size of the industry in the database. Specifically, preference is given to those industries that have many firms in the database. Further, we pick up firms from the selected industries for analysis based on the availability of data. Firms with missing data of more than a year in the database are excluded from the study. The primary data series extracted from company accounts are sale, wage and salary expenses, gross value added, and expenses incurred on raw materials. Since our focus in this study is on exports of firms, we also take these data along with export data from the same database.

Also in Table 1, food products (code 10), fabricated metal products (code 25), wearing apparel (code 14), other non-metallic mineral products (code 23), rubber and plastics products (code 22), furniture (code 31), wood and products of wood/cork (code 16), and paper and paper products (code 17) are the largest manufacturing industries in terms of number of firms.

TFP is measured only for manufacturing firms. The sector classification system used here is based on VSIC 2007, which corresponds closely to ISIC Revision 4 (Table 1). The food industry has the largest coverage in the dataset, covering over 13.6% of the sample. The fabricated metal products sector is the second largest industry and wearing apparel is the third largest industry.

The classification in our sample is similar to Newman et al. (2015), although we have more sub-sectors since we use the whole-dataset information.

3.1.2. *Variable creation*

Firstly, we want to derive a capital input measure that provides a consistent indication of capital use for firms that lease capital inputs as well as for those that own their capital inputs. Our general approach to measuring capital inputs is to estimate the flow of capital services used by the firm in a year. We estimate three components of capital services flows:

$$\textit{Value of Capital services} = \textit{depreciation} + \textit{rental and leasing costs} \\ + \text{cosf } \textit{of construction in progress}$$

VAES collects book value information for various classes of fixed assets, including tangible fixed assets, financial lease fixed assets and cost of construction in progress. We measure assets at the beginning and the number of employees at the end of the year given the timing of the input choices assumed in the model outlined in Section 2.2.

Secondly, total labour input is measured at the end of the year.

Thirdly, with respect to depreciation, VAES collects balance sheet information, includ- ing opening and closing book values and depreciation, for the various classes of fixed asset. In VAES, there is information on original value and accumulated depreciation of tangible fixed assets, financial lease fixed assets, and intangible fixed assets. We obtain a measure of depreciation of all assets by subtracting accumulated depreciation from the original value of each group of assets.

Fourthly, in the VAES data, we use the measure of gross output or total revenue contained in the variable *kqkd1* in the dataset.

Fifthly, value added includes wages, salaries, interest, depreciation, rent, taxes and profit. Specifically: (1) wages, salaries are directly reported in VAES; (2) interest payments, in VAES, are recorded as components of financial expenses; (3) depreciation; (4) rent and taxes; and (5) profit.

Sixthly, we deflate costs of production and intermediate materials at the sectoral level using the Index of Inputs in Industry Production (IIIP). We deflate revenues, value added and profits at the sectoral level using the Index of Industry Production (IIP). Using the IIIP and IIP does control for cross-industry variation in the price of inputs and values of outputs used in different industries. The price deflators are obtained from GSO. Deflation is to control for the fact that output and factor prices might be different and/ or evolve differently over time for exporting firms.

Seventhly, regarding investment, the capital stock (C) is measured by the perpetual inventory method based on the flow of annual business investment. The perpetual inventory method (PIM) is an indirect method of calculation through the sum of the accumulated investments which, appropriately depreciated, converge over time to the fixed capital stock of the companies. Thus, the existing capital stock over the previousyear is depreciated, and added to this are the current year investments (Griliches, 1998; Parisi, Schiantarelli, & Sembenelli, 2006). Thus, investment is measured as the change in the value of fixed and long-term assets over the year plus any accumulated depreciation.

Finally, the firm export status is computed using the following question in the VAES: 'Was your enterprise involved in export and/or import activities in [year]?'.

3.2. *Export transitions*

In this section, we attempt to provide evidence on export and productivity linkage that occurs during various phases of transition in the export market. This will probably provide a better insight into this linkage by analysing the adjustment process within the firm during the period of transition. To covervarious phases of transition in the export market, we divide a change in export status into a set of indicator variables for firms entering, staying and leaving the export market. We attempt to investigate the impact of these decisions on firms' productivity performance.

We have four scenarios in total. The first scenario is two-year transition or short-term transition (starting from the year 2010) and the four possible situations within the sample are: *stay out* (firms that do not export in period *t-1* and period t), *start* (firms that do not export in period t-1 but do export in the period t), *stop* (firms that export in the period t-1 but stop exporting in period t) and *continuity* (firms that export in both periods) (Table 2). Hence, we use three dummies for export status which are defined as follows:

$startit = 1$ if ($exportjt_{-1} = 0$) and ($export_{it} = 1$)

$continuity_{it} = 1$ if ($export_{it^{-}1} = 1$) and ($export_{it} = 1$) $stop_{it}$

$= 1$ if ($export_{it\_1} = 1$) and ($export_{it} = 0$)

The second, third and fourth scenarios in Table 2 are respectively three-year, four-year (or medium-term) and five-year (or long-term) transitions (starting from the year 2010). In general, *start* is defined as exporting in the current year and not exporting in the last years; *stop:* exit in the current year and export for at least two consecutive years up to the last year; *fluctuation down:* exit in the current year and export in the last years; *fluctuation up:* export in the current year and exit in the last years); *striving:* exporting in at least two consecutive years up to the current year; *continuity:* exporting in all of the survey years; *stay out:* never exporting in the survey years.

3.3. *TFP estimation in manufacturing sectors*

To accomplish the objectives of this study, our empirical analysis starts with the estima- tion of TFP. This is done separately for all 19 sample industries. It is noteworthy that the use of ordinary least squares (OLS) in the estimation of the production function may lead to some serious problems. As pointed out by Griliches and Mareisse (1995), profit-max- imising firms immediately adjust their inputs (in particular capital) each time they observe a productivity shock, which ensures input levels are correlated with the same shocks. Since productivity shocks are unobserved, they enter in the error term of the regression. Hence, inputs may turn out to be correlated with the error term of the regression, and thus OLS estimates of production functions are biased. Olley and Pakes (1996) (OP,

Table 2. Export transitions, 2011-2015.

hereafter) and Levinsohn and Petrin (2003) (LP, hereafter) have developed two similar semi-parametric estimation procedures to overcome this problem. As claimed by Ackerberg et al. (2006), multicollinearity could happen when labour is correlated with the proxy, then the labour coefficient cannot be identified. To overcome this issue, Wooldridge (2009) and later Petrin and Levinsohn (2012) (LP) suggested applying an IV estimator using the own lags of labour for its instruments. Ackerberg et al. (2006) suggest a method that builds upon the ideas in OP and LP, e.g. using investment or intermediate inputs to 'proxy' for productivity shocks, but this does not suffer from the above colli- nearity problems. The AFC procedure, however, unlike the OP

	2011		2012		2013		2014		2015		Total	
Two-year transition	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Stay out	2894	21.54	2697	20.08	2647	19.71	2616	19.47	2579	19.2	13,433	100.0
Start	1386	41.82	476	14.36	522	15.75	417	12.58	513	15.48	3314	100.0
Stop	279	14.55	472	24.62	386	20.14	476	24.83	304	15.86	1917	100.0
Continuity	3016	15.7	3930	20.46	4020	20.93	4066	21.16	4179	21.75	19,211	100.0
Total	7575	20	*7575*	*20*	*7575*	*20*	*7575*	*20*	*7575*	*20*	*37,875*	*100.0*
Three-year transition												
Stay out			2602	26.29	2457	24.82	2455	24.8	2384	24.09	9898	100.0
Start			292	30.54	240	25.1	192	20.08	232	24.27	956	100.0
Stop			187	19.2	260	26.69	312	32.03	215	22.07	974	100.0
Continuity			2829	20.12	3670	26.11	3708	26.38	3851	27.39	14,052	100.0
Fluctuation down			285	42.92	126	18.98	164	24.7	89	13.4	664	100.0
Fluctuation up			184	18.93	282	29.01	225	23.15	281	28.91	972	100.0
Striving			1101	51.52	350	16.38	358	16.75	328	15.35	2137	100.0
Other			95	14.82	190	29.64	161	25.12	195	30.42	641	100.0
Total			*7575*	*25*	*7575*	*25*	*7575*	*25*	*7575*	*25*	*30,300*	*100.0*
Four-year transition												
Stay out					2404	34.3	2319	33.09	2286	32.62	7009	100.0
Start					198	39.21	138	27.33	169	33.47	505	100.0
Stop					146	26.94	236	43.54	160	29.52	542	100.0
Continuity					2683	27.76	3434	35.53	3548	36.71	9665	100.0
Fluctuation down					240	38.46	240	38.46	144	23.08	624	100.0
Fluctuation up					324	34.21	279	29.46	344	36.33	947	100.0
Striving					1337	51.42	632	24.31	631	24.27	2600	100.0
Other					243	29.17	297	35.65	293	35.17	833	100.0
Total					7575	33.33	7575	33.33	7575	33.33	22,725	100.0
Five-year transition												
Stay out							2283	51.1	2185	48.9	4468	100.0
Start							121	47.45	134	52.55	255	100.0
Stop							117	48.55	124	51.45	241	100.0
Continuity							2566	43.67	3310	56.33	5876	100.0
Fluctuation down							240	62.5	144	37.5	384	100.0
Fluctuation up							217	42.14	298	57.86	515	100.0
Striving							1500	63.32	869	36.68	2369	100.0
Other							531	50.96	511	49.04	1042	100.0
Total							7575	50	7575	50	15,150	100.0

Source: Authors' estimation from VAES 2010-2015.

and LP procedures, which estimate the labour coefficient in the first stage (where the collinearity issue arises), involves estimating the labour coefficient in the second stage.

In this study, we prefer the AFC methodology, which is an extension of the LP technique for computation of TFP. This methodology explicitly recognises and overcomes the endo- geneity, which occurs because at least a part of theTFP is observed by the profit maximising firms early enough to allow the factor input decisions to be changed, and possible colli- nearity between labour and proxy variable. Specifically, we follow the value-added method of the AFC procedure and deflated gross value added (LY) of firms is used as a measure of output. Further, in this process, intermediate inputs (raw material) are used as proxy, to avoid the bias problem.

TFP is estimated with the Ackerberg et al. (2015) method of using value-added production. To accomplish the objectives of this study, our empirical analysis starts with the estimation of TFP. This is done separately for all 20 sample industries. Our value-added specifications include two primary inputs as regressors: labourers and capital. We posit a Cobb-Douglas production function and estimate production functions separately for each two-digit industry code. Value added and other input factors are defined in Section Section 3.1.2.

The estimated production function is reported in Table 3 for each sub-industry, which suggests that workers (logarithm of labour) and capital (logarithm of capital) are signifi- cant in all industries at the 1% level of significance. In each case, tests for under identification, weak identification and first-stage F-tests confirm the validity of the instru- ments. Based on this estimated result, the TFP of firms is calculated for the purpose of further analysis.

We observe capital elasticities ranging from 0.03 to 0.81. Firms in food products, beverages, chemicals and chemical products, electrical equipment, motor vehicles, trailers and semi-trailers, and repair and installation of machinery and equipment have the highest capital coefficients, above 0.5. Firms in wearing apparel have the lowest capital coefficient, below 0.1. Labour elasticities range from 0.36 to 1.4. Firms in all sectors, except for fabricated metal products, and repair and installation of machinery and equipment, have labour elasticities above 0.5. We do not find evidence of constant returns to scale in all sectors, whereas all of them are characterised by increasing returns to scale.

The descriptive statistics of TFP in manufacturing industry is presented in Table 4. The best performing sectors in terms of average productivity in 2010-2015 are wearing apparel (code 14), leather and related products (code 15), group of other manufacturing sectors (code 34), furniture (code 31), computer, electronicand optical products (code 26), and fabricated metal products sectors (code 25). The worst-performing sectors were firms in the production of motor vehicles, trailers and semi-trailers (code 29), beverages (code 11), chemicals and chemical products (code 20), electrical equipment (code 27), and food products (code 10).

4. Empirical results

Table 5 presents the estimation results for: (1) food products; (2) beverages; (3) textiles; and (4) wearing apparel. Relevant tests are conducted and presented in Table 5 which indicate that the problem of higher levels of autocorrelation is solved (AR (2) test statistics are not statistical at the common level in most manufacturing industries) and that the validity of instrument variables is obtained (Hansen J statistics are not statistical at the common level in most manufacturing industries).

The results in Table 5 for food products suggest that the estimated coefficients for 'start', 'continuity', 'fluctuation down' and 'striving' are not statistically significant. That is, entering the export market does not improve firms' productivity performance. Hence, the learning-by-exporting hypothesis is not supported, i.e. productivity appears unaffected by exporting, in the food products industry. The result regarding the 'stop' dummy is found

Table 3. Cobb-Douglas production íunction estimation using Ackerberg-Caves-Frazer estimator (dependent variable: value added (logarithm)), **2010-2015.**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLE	10	11	13	14	15	16	17	18	20	21	22
Capital (log)	0.517***	0.800***	0.473***	0.0341	0.139***	0.389***	0.326***	0.260***	0.621***	0.162	0.426***
	(0.0513)	(0.145)	(0.0192)	(0.0227)	(0.0362)	(0.0349)	(0.0493)	(0.0596)	(0.0328)	(0.209)	(0.0448)
Labour (log)	0.712***	0.605*	0.755***	1.105***	0.931***	0.901***	1.041***	1.117***	0.597***	1.372***	0.789***
	(0.0724)	(0.314)	(0.0332)	(0.0378)	(0.0385)	(0.0862)	(0.109)	(0.179)	(0.0577)	(0.368)	(0.0562)
Observations	4865	485	2010	4445	1525	1820	1770	970	1825	525	2765
Wald test statistic of constant returns to scale	85.48	5.162	152.7	50.19	24.73	23.71	30.35	8.442	51.99	7.319	107.8
Sargan-Hansen test statistic	4.19e-09	3.87e-08	6.84e-09	3.03e-08	2.89e-08	1.45e-09	1.78e-07	4.93e-08	9.18e-09	0.0160	6.12e-09

Continued

	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	23	24	25	26	27	28	29	30	31
Capital (log)	0.363***	0.476***	0.482***	0.383***	0.576***	0.472***	0.808***	0.326	0.223***
	(0.0659)	(0.0138)	(0.0429)	(0.0528)	(0.0478)	(0.0662)	(0.279)	(0.203)	(0.0680)
Labour (log)	0.986***	0.792***	0.490***	0.731***	0.620***	0.707***	0.649	1.078**	0.947***
	(0.111)	(0.0215)	(0.108)	(0.0963)	(0.0660)	(0.206)	(0.468)	(0.432)	(0.106)
Observations	3770	620	3360	740	1040	810	440	570	2445
Wald test statistic of constant returns to scale	52.50	219.6	0.0583	3.370	57.84	1.351	4.571	3.010	5.093
Sargan-Hansen test statistic	1.82e-08	7.00e-09	6.456	3.50e-08	1,59e-08	2.28e-08	0.0780	1,65e-08	8.96e-08

Notes: Z-test statistics are in parenthesis; Wald test of constant returns to scale; Proxy variables: raw material expenses, and the test for the overidentiíying restrictions is based on Sargan- Hansen's J-test.

Manuíacturing industry codes are as follows: 10:food Products; 11: beverages; 13: textiles; 14: vvearing apparel; 15: leather and related Products; 16: wood and Products of wood/cork; 17: paper and paper Products; 18: printing and reproduction of recorded media; 20: chemicals and chemical Products; 21: pharmaceuticals, medicinal chemicals; 22: rubber and plastics Products; 23: other non-metallic mineral Products; 24: basic metals; 25: íabricated metal Products; 26: Computer, electronic and optical Products; 27: electrical equipment; 28: machinery and equipment n.e. c.; 29: motor vehicles, trailers and semi-trailers; 30: other transport equipment; 31: íurniture.

Source: Authors' estimation from VAES 2010-2015.

Table 4. Statistic description of TFP by manufacturing sectors, 2010-2015.

Industry	Mean	Min	Max
10: Food products	4.994	-1.771	9.278
11: Beverages	2.935	-2.689	5.864
13: Textiles	5.329	0.721	9.323
14: Wearing apparel	7.890	2.236	11.760
15: Leather and related products	7.853	4.165	9.941
16: Wood and products of wood/cork	5.438	1.599	7.535
17: Paper and paper products	5.651	-1.692	8.535
18: Printing and reproduction of recorded media	6.262	2.889	8.702
20: Chemicals and chemical products	4.758	0.321	8.051
21: Pharmaceuticals, medicinal chemicals	6.050	2.486	10.166
22: Rubber and plastics products	5.800	0.150	8.765
23: Other non-metallic mineral products	5.304	-6.892	8.463
24: Basic metals	5.045	1.590	8.549
25: Fabricated metal products	6.397	1.120	9.419
26: Computer, electronic and optical products	6.407	2.670	9.921
27: Electrical equipment	4.827	0.981	6.734
28: Machinery and equipment n.e.c.	5.501	1.196	7.876
29: Motor vehicles, trailers and semi-trailers	2.017	-1.302	3.702
30: Other transport equipment	5.309	-0.262	8.138
31: Furniture	6.901	1.572	9.853
Mean, manufacturing sectors	5.921	-6.892	11.760

Source: Authors' estimation from TFP regressions on VAES 2010-2015.

to be significant and positive. This implies that while entering the export market does not affect firms' performance in the food products industry, the exit decision from the export market does not have an adverse effect on the productivity of firms. However, this effect holds only in the short-run (two-year) export transition. Note also that the estimated coefficient on lagged TFP in the medium-run (four-year) export transition is small (0.101) indicating quickadjustment of firm productivity over time (cf. Kim et al. (2009) finds a slow adjustment of firm productivity in the food sector over time in the case of Korea).

Regression results for beverages reported in Table 5 indicate that the estimated coefficient for 'start' in the short- and long-run export transitions, and 'fluctuation up' in the medium- and long-run export transitions, are positive and statistically significant. That is, entering the export market does improve firms' productivity performance. Hence, the learning-by-exporting hypothesis is supported, i.e. exporting proves to affect productivity in the beverages industry. This strengthens earlier findings that the learning-by-exporting hypothesis holds true (see, for example: Aw et al. (1998) on Taiwan; Bernard and Wagner (1997) on Germany; Kraay (1999) on China; Greenaway et al. (2002) on the UK; Bigsten et al. (2004) on Africa; Castellani (2002) on Italy; Delgado et al. (2002) on Spain; Kim et al. (2009) on Korea; Yang and Mallick (2010) on China; Sharma and Mishra (2011) on India; and Maggioni (2012) on Turkey). The result regarding the 'stop' dummy is found to be significant and positive in the medium-run export transition. This implies a similar thing to that which occurred in the food products industry, that while entering the export market does affect firms' performance in the beverages industry, the exit decision from the export market does not have an adverse effect on the productivity of firms in the medium-run export transition. Note also that, unlike the case of the food products sector, the esti- mated coefficients on lagged TFP in the short-, medium- and long-run export transitions are small (0.161-0.195) indicating relative quickadjustment of firm productivity over time.

The estimation results for textiles in Table 5 prove that the estimated coefficients for 'start', 'continuity', 'fluctuation down', 'fluctuation up' and 'striving' are not statistically

Table 5. Export transitions and TFP by manuíacturing sectors (part **1). 2010-2015.**

Var.	10: Food Products				11: Beverages				13: Textiles				14: VVearing apparel			
	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year
L.tfp	0.0629	0.0922	0.101*	0.0877	0.176**	0.142	0.195*	0.161*	0.0480	0.0800	0.0449	0.0371	0.0754	0.0507	0.0427	0.0799
	(0.0435)	(0.0800)	(0.0554)	(0.0770)	(0.0890)	(0.163)	(0.115)	(0.0850)	(0.0591)	(0.0528)	(0.0609)	(0.0955	(0.0509)	(0.0506)	(0.0544)	(0.0627)
Start	0.469	0.0667	6.873	-1.658	0.355**	-1.239	0.519	0.692**	-0.0662	0.195	-0.570	0.859	0.817*	0.263	1.161	-0.735
	(0.854)	(3.510)	(8.007)	(5.653)	(0.153)	(1.021)	(0.459)	(0.304)	(0.614)	(0.465)	(2.811)	(4.979)	(0.424)	(0.584)	(1.009)	(1.608)
Stop	1.503**	0.470	1.085	0.739	0.122	2.756**	0.296	0.232	-1.023	-0.561	-4.971**	-0.0825	0.267	0.263	0.948	0.402
	(0.724)	(4.232)	(3.597)	(9.977)	(0.168)	(1.247)	(0.235)	(0.144)	(0.754)	(0.653)	(2.533)	(7.169)	(0.407)	(0.656)	(0.702)	(2.794)
CONT	-0.108	-0.322	0.147	-0.0528	-0.120	-0.369	-0.0646	-0.193	0.210	0.138	0.309	0.217	0.326***	0.322**	0.499***	0.154
	(0.100)	(0.339)	(0.644)	(0.555)	(0.192)	(0.325)	(0.171)	(0.132)	(0.130)	(0.122)	(0.373)	(0.874)	(0.101)	(0.122)	(0.172)	(0.176)
FLUCDOWN		-6.538	-1.645	-0.555		-0.530	0.248	-0.0580		-0.213	0.366	1.016		1.309**	2.086	-2.798
		(6.205)	(2.318)	(1.055)		(1.121)	(0.319)	(0.178)		(0.365)	(1.581)	(4.274)		(0.635)	(1.528)	(2.454)
FLUCUP		1.751	3.496*	-0.324		0.829	0.648**	0.618*		0.0708	0.179	0.391		0.387	-0.282	0.105
		(2.207)	(2.000)	(0.498)		(1.382)	(0.197)	(0.335)		(0.185)	(1.136)	(3.054)		(0.739)	(0.660)	(0.269)
Striving		-1.845	0.122	-0.000969		0.797	0.180	-0.123		-0.0802	0.228	-0.0414		0.111	0.525**	0.328
		(1.644)	(1.019)	(0.382)		(0.785)	(0.259)	(0.178)		(0.161)	(0.431)	(0.834)		(0.205)	(0.248)	(0.301)
Obs.	4835	4835	4835	4835	480	480	480	480	2005	2005	2005	2005	4425	4425	4425	4425
Nb. of íirms	967	967	967	967	96	96	96	96	401	401	401	401	885	885	885	885
Hansen J test	15.23*	1.264	0.947	8.729	30.05	10.13	28.48	11.77	14.62	30.87	3.533	4.911	11	10.83	2.744	21.68***
Wald test	91.67***	46.24***	53.52***	21.02***	51.38***	32.27**	186.5**	74.86***	57.13***	61.89***	65.69***	18.97	927.3***	1112***	1188***	1111***
AR (2) test	0.997	2.402**	1.681*	0.992	0.294	0.530	0.534	0.501	0.660	1.272	0.636	0.453	0.349	-0.344	0.883	-1.077
Nb. of INST	21	18	20	22	45	32	48	34	29	46	20	22	29	32	20	22

Notes: Main variables related to TFP and export transitions are presented. Other variables such as log of value added per labour, logarithm of Capital stocks per labour, logarithm of labour, logarithm of wage, logarithm of age, dummies for years are available on request.

Robust Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: Var.:variables; Obs.: Observations; Nb.: number;CONT: continuity; FLUCDOWN:fluctuation down; FLUCUP:fluctuation up; INST: instruments; AR (2) denotes Arellano-Bond testíor autocorrelation of order 2.

Method of estimation: GMM (Arellano & Bond, 1991).

Source: Authors' estimation from VAES 2010-2015.

significant. That is, entering the export market does not improve firms' productivity performance. Hence, the learning-by-exporting hypothesis is not supported in the textiles industry. The result regarding the 'stop' dummy is found to be significant and negative in the medium-run export transition. This implies that while entering the export market does not affect firms' performance in the textiles industry, the exit decision from the export market does have a negative effect on the productivity of firms in the medium-run export transition.

The parameter estimates of productivity in the wearing apparel industry in Table 5 show that the estimated coefficient on 'start' in the short-run export transition, 'continu- ity' in both short- and medium-run export transitions, 'fluctuation down' in the medium- run export transition, and 'striving' in the medium-run export transition are positive and statistically significant. That is, entering the export market does improve firms' productiv- ity performance. Hence, the learning-by-exporting hypothesis is again supported, i.e. productivity appears affected by exporting, in the wearing apparel industry in the men- tioned export transitions.

Relevant tests related to higher levels of autocorrelation and the validity of instrument variables are presented in Table 6. Arellano-Bond second order test statistics are not statistical at the common level in most manufacturing industries and thus indicate that the problem of higher levels of autocorrelation is solved; Hansen J statistics are not statistical at the common level in most manufacturing industries, implying that the validity of instrument variables is sufficient.

The results of estimation for leather and related products are presented in the first block of Table 6. Dummy variables such as 'continuity' in the short-, medium- and long-run export transitions, 'fluctuation down' in the medium-term export transition, 'fluctuation up' in the medium-term export transition, and 'striving' in the medium- and long-term export transitions are statistically significant in most scenarios, pointing out that the learning-by-exporting hypothesis holds true in the mentioned export transitions (as supported by, for example: Aw et al. (1998) on Taiwan; Bernard and Wagner (1997) on Germany; Kraay (1999) on China; Greenaway et al. (2002) on the UK; Bigsten et al. (2004) on Africa; Castellani (2002) on Italy; Delgado et al. (2002) on Spain; Kim et al. (2009) on Korea; Yang and Mallick (2010) on China; Sharma and Mishra (2011) on India; and Maggioni
(2012) on Turkey). Especially, export persistence as measured by the dummy variable 'continuity' does have an influence on the productivity performance throughout every stage of export transitions. The 'stop' dummy is found to be significant and positive in the medium-term export transition, implying that the exit decision from the export market does not have an adverse effect on the productivity of firms in the medium term. Note that the estimated coefficients on lagged TFP are positive and statistically significant at the 1% level in all scenarios of export transitions. Their magnitudes are from 0.18 to 0.21, relatively small, and these indicate a relatively quickadjustment of firm productivity over time in the leather and related products manufacturing industry.

The results for wood and products of wood/cork are given in the second block of Table 6. The estimated coefficient on lagged TFP is positive and statistically significant at the 1% level only in the scenario of two-year export transition with a magnitude of 0.15, and this indicates a relatively quick adjustment of firm TFP over time in the wood and products ofwood/cork manufacturing industry. With respecttothe learning-by-exporting hypothesis, export persistence as measured by the dummy variable 'continuity' does have

Table 6. Export transitions and TFP by manuíacturing sectors (part 2), 2010-2015.

Var.	15: Leather and related Products				16: Wood and Products of wood/cork				17: Paper and paper Products				18: Printing and reproduction of recorded media			
	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year
L.tfp	0.183***	0.182***	0.210***	0.177***	0.152**			0.122	0.194***	0.196***	0.178***		0.181**	0.140*	0.145**	0.0888
	(0.0628)	(0.0628)	(0.0601)	(0.0599)	(0.0591)			(0.0976	(0.0483)	(0.0528)	(0.0528)		(0.0756)	(0.0720)	(0.0712)	(0.0708)
Start	0.146**	0.00956	-0.0503	-0.203	0.0232	0.0442	-0.107	5.708	0.103*	0.0395	0.134	-0.0618	0.0991	0.145*	0.105	0.210**
	(0.0604)	(0.178)	(0.199)	(0.219)	(0.0559)	(0.0777)	(2.175)	(9.382)	(0.0542)	(0.0753)	(0.101)	(0.101)	(0.0774)	(0.0868)	(0.138)	(0.0866)
Stop	0.0792	0.221**	0.231***	0.123	0.00417	-0.0378	-1.236	3.987	0.113*	0.199*	0.125	0.476	0.131*	-0.00100	0.106	-0.198
	(0.0735)	(0.0942)	(0.0884)	(0.0855)	(0.0560)	(0.0921)	(1.341)	(6.080)	(0.0636)	(0.104)	(0.117)	(0.545)	(0.0687)	(0.0989)	(0.181)	(0.247)
CONT	0.170***	0.244***	0.274***	0.201***	0.116**	0.105*	0.305*	0.0486	0.158***	0.210***	0.158**	0.154**	0.158	0.0858	0.132	0.105
	(0.0536)	(0.0559)	(0.0570)	(0.0607)	(0.0537)	(0.0609)	(0.161)	(0.411)	(0.0515)	(0.0574)	(0.0617)	(0.0643)	(0.0975)	(0.104)	(0.0928)	(0.0841)
FLUCDOWN		0.153	0.293***	0.0386		0.0589	0.124	0.110		-0.0260	0.190	0.153		0.0728	0.0859	0.00544
		(0.127)	(0.0873)	(0.182)		(0.0906)	(0.374)	(0.534)		(0.127)	(0.117)	(0.123)		(0.0809)	(0.0580)	(0.148)
FLUCUP		0.251***	0.273***	0.133		0.118	-0.0294	0.543		0.133	0.230***	0.185**		-0.0129	0.0430	0.130
		(0.0818)	(0.0737)	(0.0834)		(0.119)	(0.330)	(1.333)		(0.0881)	(0.0853)	(0.0834)		(0.138)	(0.155)	(0.110)
Striving		0.191***	0.223***	0.164**		0.0284	-0.0777	0.449		0.154**	0.203***	0.161***		0.161	0.0689	0.0751
		(0.0723)	(0.0861)	(0.0728)		(0.0780)	(0.219)	(0.473)		(0.0700)	(0.0652)	(0.0604)		(0.120)	(0.114)	(0.118)
Obs.	1520	1520	1520	1520	1820	1820	1820	1820	1765	1765	1765	1765	965	965	965	965
Nb. of íirms	304	304	304	304	364	364	364	364	353	353	353	353	193	193	193	193
Hansen J test	32.30	37	19.60	15.53	39.94	73.17*	9.007	2.612	26.65	38.08	40.68	21.90	31.56	32.71	29.04	18.72
Wald test	428.3***	411.5***	559.5***	463.9***	82.07***	77.61***	67.41***	15.85	180***	214.8***	181.5***	200.9***	234.5***	233.5***	209.4**	236.4***
AR (2) test	-0.136	-0.276	-0.383	-0.453	-0.848	-0.655	-1.562	-1.141	1.189	1.238	1.182	0.914	0.788	0.616	0.682	0.521
Nb. of INST	45	60	48	36	45	71	34	22	45	60	48	36	45	60	46	36

Notes: Main variables related to TFP and export transitions are presented. Other variables such as log of value added per labour, logarithm of Capital stocks per labour, logarithm of labour, logarithm of wage, logarithm of age, dummies for years are available on request.

Robust Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: Var.: variables; Obs.: Observations; Nb.: number; CONT: continuity; FLUCDOWN:íluctuation down; FLUCUP:íluctuation up; INST: instruments; AR (2) denotes Arellano-Bond test for autocorrelation of order 2.

Method of estimation: GMM (Arellano & Bond, 1991).

Source: Authors' estimation from VAES 2010-2015.

an influence on the productivity performance over three scenarios of export transitions, namely: two-year, three-year and four-year ones.

The results for the paper and paper products manufacturing industry in the third block of Table 6 are quite similar to those of the leather and related products manufacturing industry. The estimated coefficients on lagged TFP are positive and statistically significant at the 1% level in all scenarios of export transitions (except for the five-year transition). Their magnitudes are from 0.18 to 0.20, which are relatively small, and these demonstrate a relatively quick adjustment of firm TFP over time in the paper and paper products manufacturing industry. Dummy variables such as 'start' in the short-term export transi- tion, 'continuity' throughout every stage of export transitions, 'fluctuation up' in the medium- and long-term export transitions, and 'striving' in the medium- and long-term export transitions are statistically significant, suggesting that the learning-by-exporting hypothesis holds true in the mentioned periods. The 'stop' dummy is found to be significant and positive in the cases of two scenarios of export transitions such as the two- and three-year periods, implying that the exit decision from the export market does not have an adverse effect on the productivity of firms in the paper and paper products manufacturing industry.

The results for printing and reproduction of recorded media are displayed in the last block of Table 6. The estimated coefficients on lagged TFP again are positive and statistically significant at the 1% level in all scenarios of export transitions (except for the five-year transition). Their magnitudes are from 0.14 to 0.18, which are relatively small, and these demonstrate a relatively quick adjustment of firm TFP over time in the printing and reproduction of recorded media manufacturing industry. While the dummy variable 'start' is statistically significant and positive in the cases of two-year and five-year export transitions, export persistence as measured by the 'continuity' variable and export fluc- tuation as measured by three separate dummies, namely 'fluctuation down', 'fluctuation up' and export striving as proxied by the dummy variable 'striving', are all not significant. The 'stop' dummy is found to be significant and positive in the case of two-year export transition, implying that the exit decision from the export market does not have an adverse effect on the productivity of firms in the printing and reproduction of recorded media manufacturing industry.

In Table 7, Arellano-Bond second order test statistics are not statistical at the common level in most manufacturing industries and thus indicate that the problem of higher levels of autocorrelation is solved; Hansen J statistics are not statistical at the common level in most manufacturing industries, implying that the validity of instrument variables is sufficient.

Table 7 presents the estimation results of: (1) chemicals and chemical products;
(2) pharmaceuticals, medicinal chemicals; (3) rubber and plastics products; and (4) other non-metallic mineral products. We find a significantly positive effect of lagged TFP in most scenarios of export transitions for the case of (1) chemicals and chemical products and
(2) rubber and plastics products. For other non-metallic mineral products, a significantly positive effect of lagged TFP is only found in the short-run export transition. The 'start' dummy variable dedicated to export status is found to be significantly positive in the short- and long-run cases of rubber and of plastics products (code 22) and throughout all stages of export transitions of other non-metallic mineral products (code 23), whereas export persistence persists in all export transitions of the four mentioned manufacturing

Table 7. Export transitions and TFP by manuíacturing sectors (part 3), 2010-2015.

Var.	20: Chemicals and chemical Products				21: Pharmaceuticals, medicinal chemicals				22: Rubber and plastics Products				23: Other non-metallic mineral Products			
	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year
L.tfp	0.206***	0.213***		0.244***		0.130		0.136	0.137***	0.133***		0.137***	0.0842*	0.0769	0.0860	0.0761
	(0.0589)	(0.0626)		(0.0538)		(0.0916)		(0.149)	(0.0354)	(0.0317)		(0.0346)	(0.0479)	(0.0513)	(0.0526)	(0.0508)
Start	0.125	0.0617	-0.0693	-0.122	-0.1000	0.00450	0.0462	-0.134	0.115**	0.0829	0.110	0.199*	0.143***	0.105*	0.171**	0.205
	(0.0786)	(0.137)	(0.157)	(0.149)	(0.108)	(0.200)	(0.192)	(0.134)	(0.0513)	(0.0685)	(0.0911)	(0.110)	(0.0404)	(0.0560)	(0.0833)	(0.125)
Stop	0.0560	0.00523	0.0309	-0.0390	-0.151	-0.0616	-0.0368	-0.192	0.0109	0.0489	0.0753	-0.0325	0.137**	0.221***	0.159	0.0310
	(0.0627)	(0.0824)	(0.0926)	(0.255)	(0.131)	(0.163)	(0.110)	(0.149)	(0.0564)	(0.0623)	(0.0758)	(0.113)	(0.0553)	(0.0744)	(0.102)	(0.118)
CONT	0.143**	0.109*	0.175***	0.129**	0.0209	0.204*	0.0985	-0.0592	0.148***	0.192***	0.251***	0.199***	0.151***	0.172***	0.185***	0.174***
	(0.0613)	(0.0651)	(0.0608)	(0.0583)	(0.119)	(0.121)	(0.102)	(0.107)	(0.0492)	(0.0505)	(0.0504)	(0.0533)	(0.0393)	(0.0415)	(0.0442)	(0.0489)
FLUCDOWN		-0.0689	-0.0835	-0.159		0.398***	-0.345*	-0.285		-0.126	-0.113	0.0568		0.0588	0.117	0.113
		(0.0611)	(0.0830)	(0.102)		(0.114)	(0.203)	(0.257)		(0.141)	(0.101)	(0.154)		(0.0705)	(0.0725)	(0.0938)
FLUCUP		-0.0120	0.000305	-0.0857		0.0642	-0.108	-0.555*		0.166**	0.232***	0.139*		0.236***	0.208***	0.187**
		(0.0995)	(0.0994)	(0.124)		(0.171)	(0.129)	(0.300)		(0.0675)	(0.0631)	(0.0791)		(0.0618)	(0.0672)	(0.0743)
Striving		0.0801	0.121*	0.111*		0.160	0.131	-0.0487		0.183***	0.165***	0.152**		0.140***	0.179***	0.163***
		(0.0678)	(0.0621)	(0.0618)		(0.141)	(0.108)	(0.0990)		(0.0608)	(0.0549)	(0.0595)		(0.0517)	(0.0513)	(0.0583)
	1825	1825	1825	1825	520	520	520	520	2755	2755	2755	2755	3760	3760	3760	3760
Nb. of íirms	365	365	365	365	104	104	104	104	551	551	551	551	752	752	752	752
Hansen J test	34.75	46.83	39.39	27.61	22.41	30.31	21.80	18.19	37.88	38.58	31.82	18.59	28.16	36.57	31.94	21.47
Wald test	115.7***	115.8***	121.5***	141***	95.80**	121.6***	95.37**	92.62***	190.3***	236.5***	253.4***	207.2***	304.1***	331.4***	309.9***	328.7***
AR (2) test	0.180	0.259	0.149	0.174	1.410	1.369	1.274	1.511	1.490	1.418	1.436	1.588	1.361	1.360	1.504	1.502
Nb. of INST	45	59	46	36	45	59	46	36	45	60	48	36	45	60	48	36

Notes: Main variables related to TFP and export transitions are presented. Other variables such as log of value added per labour, logarithm of Capital stocks per labour, logarithm of labour, logarithm of wage, logarithm of age, dummies for years are available on request.

Robust Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: Var.: variables; Obs.: Observations; Nb.: number; CONT: continuity; FLUCDOWN:íluctuation down; FLUCUP:íluctuation up; INST: instruments; AR (2) denotes Arellano-Bond test for autocorrelation of order 2.

Method of estimation: GMM (Arellano & Bond, 1991).

Source: Authors' estimation from VAES 2010-2015.

industries (except for the long-run case of pharmaceuticals, medicinal chemicals, code 21) . Export fluctuation is evidenced with positive effects in medium-term export transition of pharmaceuticals, medicinal chemicals (code 21), in medium-term export transition of rubber and plastics products (code 22), and throughout every stage of export transition of other non-metallic mineral products (code 23). Export striving is documented with a positive effect in medium- and long-term cases of chemicals and chemical products, throughout every stage of export transition of both rubber and plastics products (code 22) and other non-metallic mineral products (code 23). Exit decision from the export market proves to have no adverse effect on the productivity of firms in the short- and medium-run cases of other non-metallic mineral products (code 23).

Table 8 presents the estimation results of (1) basic metals; (2) fabricated metal pro- ducts; (3) computer, electronic and optical products; and (4) electrical equipment. We conduct the Arellano-Bond test for autocorrelation of second order and the Hansen J test for the validity of instrument variables. Results in Table 8 show that the problem of higher levels of autocorrelation is solved, and the validity of instrument variables is sufficient.

Regarding export status, we find a significant and positive effect in the short-, medium- and long-term export transitions of basic metals (code 24) and in the short- and medium- term export transitions of fabricated metal products (code 25), whereas export persistence persists in all export transitions of basic metals, in the short- and medium-term export transitions of fabricated metal products, in the short-run export transition of computer, electronic and optical products (code 26), and in the medium- and long-term export transitions of electrical equipment. Export fluctuation is evidenced with positive effects in the short- and medium-term export transitions of basic metals (code 24), in the short- and medium-term export transitions of fabricated metal products (code 25), and in the long- term export transition of electrical equipment (code 27). Export striving is documented with a positive effect in all export transitions of basic metals (code 24), in the medium- and long- term export transitions of fabricated metal products (code 25), and throughout all stages of export transitions of electrical equipment (code 27). Exit decision from the export market proves to have no adverse effect on the productivity of firms throughout every stage of export transitions of basic metals (code 24), in the short- and medium-term export transi- tions of fabricated metal products (code 25), and only in the medium-term export transition of electrical equipment. Finally, we find the significantly positive effect of laggedTFP in most scenariosof exporttransitionsforthe case offabricated metal products (code 25), computer, electronic and optical products (code 26), and electrical equipment (code 27), and in the short-term export transition of basic metals (code 24).

Table 9 presents the estimation results of (1) machinery and equipment n.e.c.; (2) motor vehicles, trailers and semi-trailers; (3) other transport equipment; and (4) furniture. We conduct an Arellano-Bond test for autocorrelation of second order and a Hansen J test for the validity of instrument variables. Results in the second and fourth last rows of Table 9 show that the problem of higher levels of autocorrelation is solved, and the validity of instrument variables is sufficient.

With respect to export status, we find a significant and positive effect in the medium- and long-term export transitions of machinery and equipment n.e.c. (code 28), in the short-term export transitions of other transport equipment (code 30), and in the short- term export transitions of furniture (code 31), whereas export persistence persists throughout all stages of export transitions of machinery and equipment n.e.c. (code 28)

Table 8. Export transitions and TFP by manuíacturing sectors (part 4), 2010-2015.

Var.	24: Basic metals				25: Fabricated metal Products				26: Computer, electronic and optical Products				27: Electrical equipment			
	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year
L.tfp	0.105*	0.105	0.0877	0.102	0.122***	0.146***	0.141***	0.198***	0.179***	0.172***	0.173***	0.179***	0.181***	0.186***	0.180***	0.201***
	(0.0550)	(0.0667)	(0.0602)	(0.0648)	(0.0406)	(0.0415)	(0.0391)	(0.0472	(0.0513)	(0.0448)	(0.0470)	(0.0516)	(0.0535)	(0.0502)	(0.0576)	(0.0529)
Start	0.444***	-0.0378	0.540**	0.489*	0.162***	0.147**	0.0974	-1.289	0.0321	0.0895	0.104	-0.560	0.0426	0.0438	-0.00662	0.0868
	(0.111)	(0.260)	(0.237)	(0.294)	(0.0465)	(0.0669)	(0.0841)	(3.334)	(0.127)	(0.136)	(0.144)	(2.532)	(0.0801)	(0.118)	(0.137)	(0.130)
Stop	0.293**	0.533***	0.615*	1.023***	0.116*	0.271***	0.218*	3.933	-0.143	0.104	-0.0370	-0.135	0.0415	0.308*	0.132	0.00559
	(0.145)	(0.126)	(0.349)	(0.119)	(0.0672)	(0.0973)	(0.112)	(3.387)	(0.196)	(0.186)	(0.216)	(0.291)	(0.0850)	(0.171)	(0.120)	(0.170)
CONT	0.451***	0.309**	0.412***	0.384***	0.352***	0.375***	0.351***	0.161	0.00941	0.198*	0.0781	0.0503	0.121	0.189**	0.274***	0.309***
	(0.114)	(0.129)	(0.124)	(0.119)	(0.0476)	(0.0440)	(0.0415)	(0.162)	(0.126)	(0.114)	(0.140)	(0.180)	(0.0763)	(0.0877)	(0.0817)	(0.0914)
FLUCDOWN		0.0302	0.467***	0.0747		0.0186	-0.152*	0.311		0.134	-0.168	-0.508		-0.145	0.155	0.383***
		(0.133)	(0.140)	(0.175)		(0.0603)	(0.0795)	(0.527)		(0.112)	(0.559)	(1.920)		(0.145)	(0.250)	(0.112)
FLUCUP		0.645***	0.634***	0.222		0.232***	0.165**	0.287		0.173	0.120	-0.342		0.152	0.0720	0.156
		(0.193)	(0.154)	(0.568)		(0.0754)	(0.0670)	(0.353)		(0.258)	(0.411)	(0.802)		(0.128)	(0.150)	(0.206)
Striving		0.420***	0.325***	0.175*		0.294***	0.223***	-0.171		0.107	0.125	0.0875		0.180**	0.201**	0.266***
		(0.131)	(0.107)	(0.0920)		(0.0603)	(0.0509)	(0.197)		(0.149)	(0.180)	(0.204)		(0.0848)	(0.0895)	(0.0995)
Ob.	615	615	615	615	3350	3350	3350	3350	740	740	740	740	1035	1035	1035	1035
Nb. of íirms	123	123	123	123	670	670	670	670	148	148	148	148	207	207	207	207
Hansen J test	24.45	32.04	28.47	20.65	52.74**	51.68	37.99	11.64	25.80	18.72	20.64	18.34	32.50	49.20	33.57	22.48
Wald test	36.26***	143.4***	60.60***	510***	827.2***	882.8***	897.3***	557.1**	130.2***	200.4***	127***	132.8***	62.67***	63.43***	84.39***	103.7***
AR (2) test	-0.702	-0.317	-1.001	—(1289	0.684	1.103	0.942	0.688	0.482	(1498	0.448	0.421	0.571	0.639	0.336	0.242
Nb. of INST	45	58	46	34	45	60	48	24	45	59	46	36	45	60	48	36

Notes: Main variables related to TFP and export transitions are presented. Other variables such as log of value added per labour, logarithm of Capital stocks per labour, logarithm of labour, logarithm of wage, logarithm of age, dummies for years are available on request.

Robust Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: Var.:variables; Obs.: Observations; Nb.: number; CONT: continuity; FLUCDOWN:fluctuation down; FLUCUP:fluctuation up; INST: Instruments; AR (2) denotes Arellano-Bond testíor autocorrelation of order 2.

Method of estimation: GMM (Arellano & Bond, 1991).

Source: Authors' estimation from VAES 2010-2015.

Table 9. Export transitions and TFP by manuíacturing sectors (part **5), 2010-2015.**

Var.	28: Machinery and equipment n.e.c.				29: Motor vehicles, trailers and semi-trailers				30: Other transport equipment				31: Furniture			
	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year	2-year	3-year	4-year	5-year
L.tfp	0.151**	0.131**	0.141**	0.150**	0.252***	0.323***	0.314***	0		0.270***		0.286***	0.0700*	0.0615	0.0742*	0.0674*
	(0.0615)	(0.0627)	(0.0594)	(0.0601)	(0.0691)	(0.0731)	(0.0735)	(0)		(0.0850)		(0.0819)	(0.0394)	(0.0414)	(0.0413)	(0.0409)
Start	0.136	0.373***	0.296***	0.375***	0.137	0.0222	-0.735	0	0.327*	0.327	0.0345	0.111	0.0886*	0.0605	-0.00529	0.130
	(0.0895)	(0.107)	(0.106)	(0.122)	(0.174)	(0.180)	(1.153)	(0)	(0.194)	(0.329)	(0.252)	(0.907)	(0.0497)	(0.0672)	(0.0677)	(0.275)
Stop	-0.127	-0.293 ■	-0.641***	-0.0929	-0.217	-0.0122	0.156	0.332	0.0053	0.380*	0.352*	0.258	0.0501	0.0836	0.0963	0.0881
	(0.109)	(0.245)	(0.236)	(0.112)	(0.186)	(0.160)	(0.186)	(0.241)	(0.283)	(0.209)	(0.192)	(0.233)	(0.0498)	(0.0571)	(0.0711)	(0.0954)
CONT	0.334***	0.316***	0.283***	0.314***	0.00443	0.0881	0.0766	0.149	0.380*	0.416***	0.506***	0.354***	0.0810*	0.0649	0.0537	0.0630
	(0.0813)	(0.0888)	(0.0867)	(0.0717)	(0.125)	(0.106)	(0.128)	(0.132)	(0.155)	(0.111)	(0.102)	(0.102)	(0.0423)	(0.0423)	(0.0453)	(0.0512)
FLUCDOWN		-0.115	0.135	-0.0123		-0.361	-0.322	-0.371**		-0.0320	0.509	0.860		0.148*	-0.0336	0.116
		(0.176)	(0.179)	(0.139)		(0.336)	(0.228)	(0.175)		(0.508)	(0.364)	(0.759)		(0.0783)	(0.0978)	(0.0871)
FLUCUP		0.0989	0.0891	0.483***		0.367**	0.222	0.915*		0.667***	0.571***	0.483		0.117*	0.0572	0.0453
		(0.136)	(0.173)	(0.128)		(0.171)	(0.230)	(0.481)		(0.209)	(0.194)	(0.349)		(0.0673)	(0.0645)	(0.0716)
Striving		0.265***	0.197*	0.223**		0.119	-0.0127	0.268**		0.584***	0.507***	0.501***		0.104*	0.0519	0.0795
		(0.0945)	(0.104)	(0.0902)		(0.139)	(0.172)	(0.131)		(0.144)	(0.119)	(0.138)		(0.0551)	(0.0573)	(0.0589)
Obs.	805	805	805	805	440	440	440	440	565	565	565	565	2445	2445	2445	2445
Nb. of íirms	161	161	161	161	88	88	88	88	113	113	113	113	489	489	489	489
Hansen J test	34.67	40.07	31.15	19.20	20.32	15.37	17.87	17.25	30.13	29.40	25.41	22.46	37.09	40.79	35.74	27.70
Wald test	188.1***	231.5***	193.7***	290.2***	208.4***	302.6***	235.6***	288.4***	154.2*	223.9***	205.9***	207.4***	890.9***	874.2***	926.9***	925.2***
AR (2) test	0.566	0.679	0.458	0.00361	0.972	0.968	1.048	1.115	0.881	0.964	0.743	0.869	-1.532	-1.631	-1.557	-1.503
Nb. of INST	45	60	48	36	44	51	43	33	45	59	46	36	45	60	48	36

Notes: Main variables related to TFP and export transitions are presented. Other variables such as log of value added per labour, logarithm of Capital stocks per labour, logarithm of labour, logarithm of wage, logarithm of age, dummies for years are available on request.

Robust Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: Var.: variables; Obs.: Observations; Nb.: number; CONT: continuity; FLUCDOWN:íluctuation down; FLUCUP:íluctuation up; INST: instruments; AR (2) denotes Arellano-Bond test for autocorrelation of order 2.

Method of estimation: GMM (Arellano & Bond, 1991).

Source: Authors' estimation from VAES 2010-2015.

and other transport equipment (code 30), and in the short-term export transitions of furniture (code 31). Export fluctuation is evidenced with positive effects in the long-run export transition of machinery and equipment n.e.c. (code 28), in the short- and long-term export transitions of motor vehicles, trailers and semi-trailers (code 29), and in the short- and long-term export transitions of other transport equipment (code 30) and in the short- term export transition of furniture (code 31). Export striving is documented with a positive effect throughout every stage of export transitions of machinery and equipment n.e.c. (code 28) and other transport equipment (code 30), in the long-run export transition of motor vehicles, trailers and semi-trailers (code 29), and in the short-term export transition of furniture (code 31).

Exit decision from the export market proves to have no adverse effect on the produc- tivity of firms in the medium-term export transition of machinery and equipment n.e.c. (code 28), and in the medium- and long-term export transitions of other transport equipment (code 30). Finally, we find the significantly positive effect of lagged TFP in most scenarios of export transitions for the four cases of mentioned manufacturing sectors (except for the medium-term case of furniture (code 31)).

5. Conclusions and implications

While TFP has been regarded as playing a pivotal role in generating and predicting overall economic growth, the economic linkage between trade and productivity growth has long been a highly debated topic in the international economics, trade and growth literature. In recent years, the relationship between exports and TFP has emerged as a reconsidered core development issue in developing countries, given the mixture of globalisation, regional trade agreement and even trade wars in the world. From the perspective of a developing country, Vietnam, the concerns of this study can contribute to knowledge about the relationship between export and productivity. In Vietnam, since 'Doi Moi' in 1986, due to several policy measures, such as the abolition of import licensing except for a few products, reduction in tariff rates, abolition of industrial licensing and liberalisation of restrictions on foreign capital, the manufacturing sector has grown manifold and emerged as a significant sector in the country. The contribution of manufacturing was around 15.0% of total GDP, with an average growth rate of 14.4% in 2017. This sector is considered as an engine of growth for the Vietnamese economy due to its pivotal role in industrialisation. However, despite rapid export growth rates over the last three decades, recently low productivity has been observed. In this paper, we examine the effect of export transitions on total factor productivity at the firm level, using a representative sample of Vietnamese firms in 20 manufacturing sectors. Firm productivities are estimated using the Ackerberg et al. method (2015), using value-added production. We distinguish different types of export statuses, namely: start to export, stop to export, export persis- tence, export fluctuation and export striving, and various phases of export transition, namely: two-year, three-year, four-year and five-year ones.

The empirical results derived from the system GMM estimation provide evidence of causal direction from export transitions to total factor productivity, after controlling for endogenous variables and taking firm heterogeneity into account. Our results indicate that export effects on productivity are highly dependent on specific manufacturing sectors, and on type of export transitions; not every manufacturing sector can be associated with significantly positive effects of export transitions nor can every type of export transition.

Specifically, we find that exporting does lead to productivity in sectors such as: (1) beverages (in the short- and long-run export transitions); (2) wearing apparel (in the short- run export transition); (3) paper and paper products (in the short-term export transition); (4) printing and reproduction of recorded media (in the cases of two-year and five-year export transitions); (5) rubber and plastics products (in the short- and long-run cases); (6) other non-metallic mineral products (throughout every stage of export transition); (7) basic metals (in the short-, medium- and long-term export transitions); (8) fabricated metal products (in the short- and medium-term export transitions); (9) machinery and equipment n.e.c. (in the medium- and long-term export transitions); (10) other transport equipment (in the short-term export transitions); and (11) furniture (in the short-term export transitions).

With respect to export persistence, we find that export persistence increases productivity in manufacturing sectors, namely: (1) wearing apparel (in both short- and medium-run export transitions); (2) leather and related products (in the short-, medium- and long-run export transitions); (3) wood and products of wood/cork (over three scenarios of export transitions, namely: two-year, three-year and four-year ones); (4) paper and paper products (throughout all stages of export transitions); (5) chemicals and chemical products (in all export transitions); (6) pharmaceuticals, medicinal chemicals (except for the long-run case); (7) rubber and plastics products (in all export transitions); (8) other non-metallic mineral products (in all export transitions); (9) basic metals (in all export transitions); (10) fabricated metal products (in the short- and medium-term export transitions); (11) computer, electro- nic and optical products (in the short-run export transition); (12) electrical equipment (in the medium- and long-term export transitions); (13) machinery and equipment n.e.c. (through- out all stages of export transitions); (14) other transport equipment (throughout every stage of export transitions); and (15) furniture (in the short-term export transition). However, export persistence does not lead to productivity in manufacturing sectors such as: (1) food products; (2) beverages; (3) textiles; (4) printing and reproduction of recorded media; and (5) motor vehicles, trailers and semi-trailers.

With regard to export fluctuations, our results indicate that export fluctuations increase productivity in manufacturing sectors, namely: (1) beverages (in the medium- and long- run export transitions); (2) wearing apparel (in the medium-run export transition); (3) leather and related products (in the medium-term export transition); (4) paper and paper products (in the medium- and long-term export transitions); (5) pharmaceuticals, medic- inal chemicals (in medium-term export transition); (6) rubber and plastics products (in medium-term export transition); (7) other non-metallic mineral products (throughout every stage of export transitions); (8) basic metals (in the short- and medium-term export transitions); (9) fabricated metal products (in the short- and medium-term export transi- tions); (10) electrical equipment (in the long-term export transition); (11) machinery and equipment n.e.c. (in the long-run export transition; (12) motor vehicles, trailers and semi- trailers (in the short- and long-term export transitions); (13) other transport equipment (in the short- and long-term export transitions); and (14) furniture (in the short-term export transition). However, export fluctuations do not lead to productivity in manufacturing sectors such as: (1) textiles; (2) wood and products of wood/cork; (3) printing and reproduction of recorded media; (4) chemicals and chemical products; and (5) computer, electronic and optical products.

In relation to export striving, our results show increases in productivity in manufacturing sectors, namely: (1) wearing apparel (in the medium-run export transition); (2) leather and related products (in the medium- and long-term export transitions); (3) paper and paper products (in the medium- and long-term export transitions); (4) chemicals and chemical products (in medium- and long-term cases); (5) rubber and plastics products (throughout every stage of export transitions); (6) other non-metallic mineral products (throughout all stages of export transitions); (7) basic metals (in all export transitions); (8) fabricated metal products (in the medium- and long-term export transitions); (9) electrical equipment (throughout every stage of export transitions); (10) machinery and equipment n.e.c. (throughout all stages of export transitions); (11) motor vehicles, trailers and semi-trailers (in the long-run export transition); (12) other transport equipment (throughout every stage of export transitions); and (13) furniture (in the short-term export transition). However, export striving does not lead to productivity in manufacturing sectors such as: (1) food products; (2) beverages; (3) textiles; (4) wood and products of wood/cork; (5) printing and reproduction of recorded media; (6) pharmaceuticals, medicinal chemicals; and (7) compu- ter, electronic and optical products.

With reference to export exit, this leads to increases in productivity in manufacturing sectors, namely: (1) food products; (2) beverages (in the medium-run export transition); (3) textiles (in the medium-run export transition); (4) leather and related products (in the medium-term export transition); (5) paper and paper products (in the cases of two scenarios of export transitions such as two- and three-year periods); (6) printing and reproduction of recorded media (in the case of two-year export transition); (7) other non- metallic mineral products (in the short- and medium-run cases); (8) basic metals (through- out every stage of export transitions); (9) fabricated metal products (in the short- and medium-term export transitions); (10) electrical equipment (in the medium-term export transition); (11) machinery and equipment n.e.c. (in the medium-term export transition); and (12) other transport equipment (in the medium- and long-term export transitions). However, export exit does not lead to productivity in manufacturing sectors such as: (1) wearing apparel; (2) wood and products of wood/cork; (3) chemicals and chemical products; (4) pharmaceuticals, medicinal chemicals; (5) rubber and plastics products; (6) computer, electronic and optical products; (7) motor vehicles, trailers and semi-trailers; and (8) furniture.

From an industrial policy perspective, there is hence productivity-related reasons why Vietnamese policy makers should prefer foreign sales over domestic sales. Our results show support for creating new exporters. In addition, since there is strong evidence to suggest that export participation does not lead to productivity improvement in some manufactur- ing sectors, the rationale behind the government giving a high level of subsidy and tax incentives to every exporting firm and export-oriented unit in every manufacturing sector seems to be questionable. It appears more convincing that trade and economic policies should focus on productivity enhancement that will help firms to enter the export market after gaining a real competitive edge. This will in turn increase the likelihood of survival of domestic firms in the highly competitive international export markets.

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