

**Innovation types, export propensity and firm productivity growth:
Evidence from Vietnamese non-state manufacturing SMEs**

By
Nguyen Quoc Cong
PhD candidate

Principal supervisor: A/PR Charles Harvie
Co-supervisor: Dr Amir Arjomandi

Motivation for the Study

Importance of SMEs

- Business numbers
- Employment creation
- Output
- Exports
- Poverty alleviation, economic empowerment
- Incubator of entrepreneurship and innovation

SMEs in economic integration

- Access to wider markets
- Available of greater variety of inputs
- High skilled labour
- Transfer high technology, and productivity spillover
- Joining regional supply chain

- High competition
- Increasing of labour cost, and “brain drain”

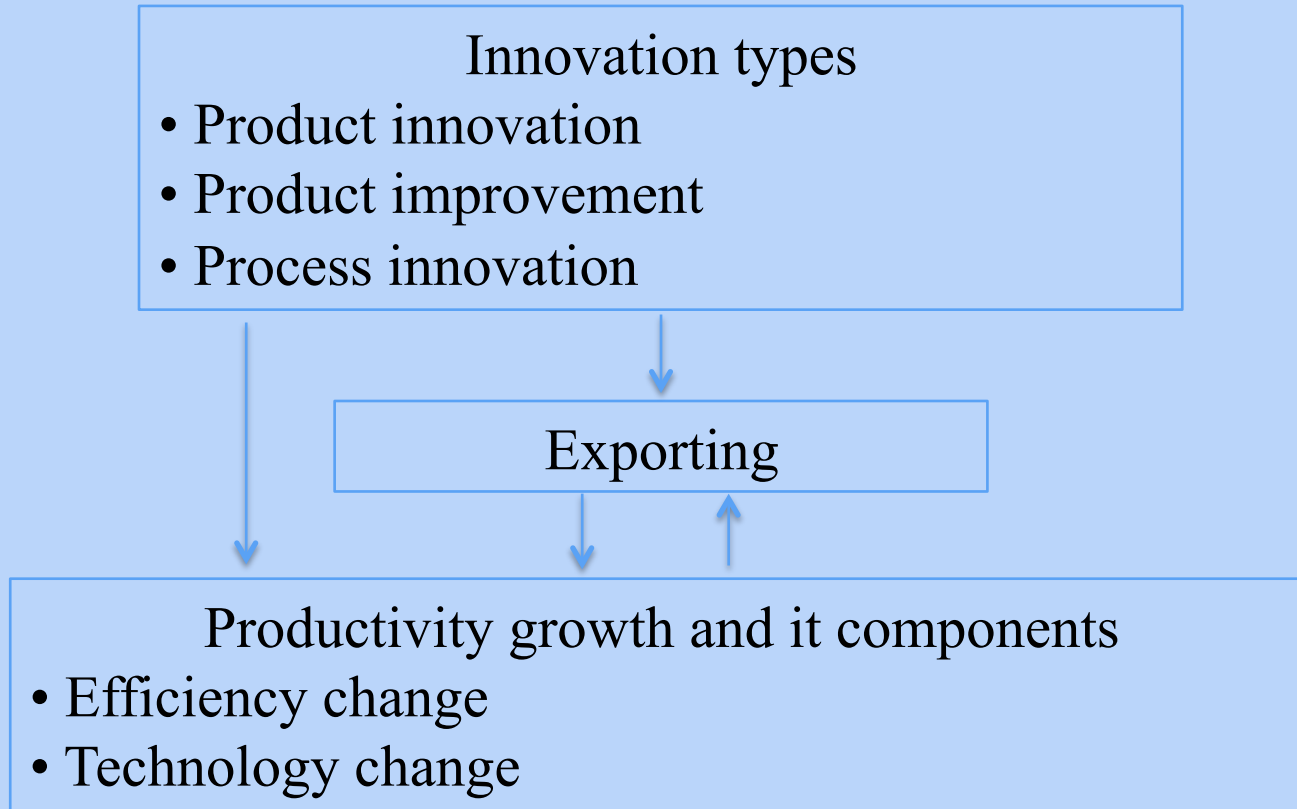
Obstacles of SMEs

- lack of resources (information, finance, technology, low skilled labour, management)
- a lack of economies of scale and scope
- higher transaction costs relative to large enterprises
- lack of networks, and experience of international markets
- an inability to compete against larger firms in terms of innovation
- significant gap in efficiency/productivity.

Innovation, exporting, and productivity in the literature

- Innovation and exporting
- Innovation and productivity
- Productivity and exporting
 - self-section
 - learning by exporting

Theory and hypothesis



Productivity growth measurement method

- Meta-frontiers for efficiency comparisons across groups of industries, regions, countries.
- Metafrontier Malmquist Productivity Index (MMPI)
 - Decompositions of MMPI
 - + Efficiency change & technology change
 - + Technology catch-up
 - Cross country productivity growth of across group of industries, regions, countries.

Metafrontier Malmquist Productivity Index

- Malmquist productivity change index

$$MLO\hat{\Gamma}(x_{t1}, y_{t1}, x_{t2}, y_{t2}) = [(D_{t1}^{\hat{\Gamma}}(x_{t2}, y_{t2}) / D_{t1}^{\hat{\Gamma}}(x_{t1}, y_{t1})) \times (D_{t2}^{\hat{\Gamma}}(x_{t2}, y_{t2}) / D_{t2}^{\hat{\Gamma}}(x_{t1}, y_{t1}))]^{\hat{\Gamma}/2}$$

$$= D_{t2}^{\hat{\Gamma}}(x_{t2}, y_{t2}) / D_{t1}^{\hat{\Gamma}}(x_{t1}, y_{t1}) \times [D_{t1}^{\hat{\Gamma}}(x_{t1}, y_{t1}) / D_{t2}^{\hat{\Gamma}}(x_{t1}, y_{t1}) \times D_{t1}^{\hat{\Gamma}}(x_{t2}, y_{t2}) / D_{t2}^{\hat{\Gamma}}(x_{t2}, y_{t2})]^{\hat{\Gamma}/2}$$

$$= \text{Efficiency change (EC)} \times \text{Technology change (TC)}$$

Econometric models and hypotheses tests

- The empirical model for the determinants of productivity

$$Y_{i,t} = \gamma_t + \beta_0 + INN_{i,t} \beta_1 + X_{i,t} \beta_2 + e_{i,t}$$

$Y_{i,t}$ is the MPIs, and its components in the period t and $t+1$; $INN_{i,t}$ are innovation activities variables, and $X_{i,t}$ is a vector of control variables, including firm age, firm size, location, and export status

- Probit model for the probability of exporting

$$\mathbb{P}[Y_{it} = 1 | X_{1it}, \dots, X_{Kit}; \beta_0, \dots, \beta_K] = \Phi(\beta_0 + \sum_{k=1}^K \beta_k X_{kit})$$

$\Phi(\cdot)$ is the cumulative distribution function of the standard normal

Data

- Data source
 - The SME survey from Vietnam
 - 2011, 2013 and 2015
 - 2500 sample of SMEs in manufacturing industry (mostly in private sector)
 - 10 provinces

- A balanced panel data of 1405 non-state manufacturing SMEs

Variables for measurement of Malmquist indices

Variable	Definitions/ Description	Mean	Std. dev
Output	Real revenue from sales (million VND)	1,786.7	40,601.5
C a p i t a l input	Total value of productive physical assets (million VND)	1,430.9	3,480.6
L a b o u r input	The total wages bill (million VND)	127.2	251.2
Intermediate Input	The costs of raw materials and energy (million VND)	1,396.8	39,004.1

Variables for econometric model

Variables	Mean	Std. dev.
Product innovation	0.09	0.28
Product improvement	0.23	0.42
Process innovations	0.09	0.28
Export	0.03	0.16
Size	12.76	38.19
Age	16.42	10.16
Urban	0.34	0.47

Productivity index results

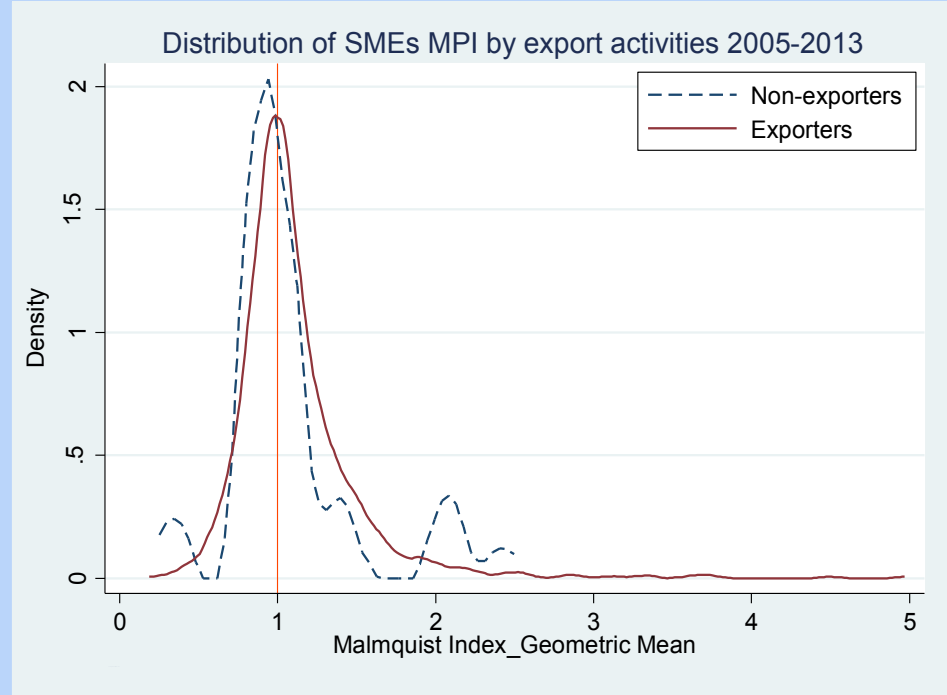
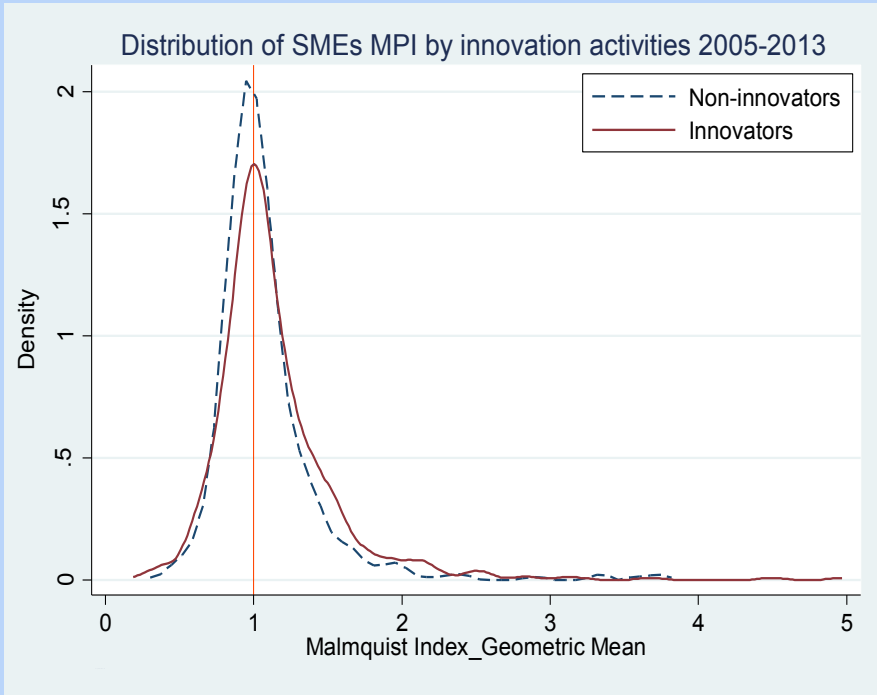
Sub-manufacturing sectors	Geometric mean 2011-2015			
	MMPI	EC	TC	TGC
Electrical machinery (ISIC-29/32)	1.048	1.142	0.851	1.077
Chemical products (ISIC-24)	1.038	1.115	0.838	1.111
Motor vehicles (ISIC-34)	1.042	1.216	0.830	1.033
Refined petroleum (ISIC-23)	0.914	0.883	1.036	1.001
Rubber and plastic products (ISIC-25)	1.062	0.978	1.086	1.000
Non-metallic mineral products (ISIC-26)	1.141	1.059	1.078	1.000
Basic metals (ISIC-27)	1.142	0.862	1.325	1.000
Fabricated metal products (ISIC-28)	1.034	0.867	1.193	1.000
Furniture, jewellery, music equipment (ISIC-36)	1.013	0.860	1.178	1.000

Productivity index results

Sub-manufacturing sectors	Geometric mean 2011-2015			
	MMPI	EC	TC	TGC
Food products and beverages (ISIC-15)	1.060	0.830	1.276	1.000
Textiles (ISIC-17)	1.058	1.105	0.957	1.001
Wearing apparel (ISIC-18)	1.011	0.977	1.035	1.000
Tanning and dressing leather (ISIC-19)	1.043	0.967	1.079	1.000
Wood and wood products (ISIC-20)	1.111	1.028	1.081	1.000
Paper and paper products (ISIC-21)	0.994	0.936	1.062	1.000
Publishing (ISIC-22)	0.956	0.886	1.078	1.000
Recycling (ISIC-37)	0.952	1.092	0.871	1.001
Geometric mean of total	1.053	0.905	1.160	1.003

Productivity index results

Innovators and non-innovators; Exporters and non-exporters



Determinants of productivity growth and its components

Variable	MPI	EC	TC
Constant	1.175	4.291	1.776
Product innovation	0.047**	0.749	0.078***
Product improvement	0.031*	0.531**	0.309***
Process innovation	0.085	- 0.188	0.081*
Export	0.278***	0.946*	0.075
Size	-0.001**	-0.003	-0.002***
Age	0.003	0.186**	0.008***
Urban	0.127***	0.534***	-0.151**
Observation	2750	2750	2750
Prob > F	0.001	0.000	0.000

Determinants of export propensity

Variable	Probit regression	Average marginal effects
Product innovation	-0.135	-0.006
Product improvement	0.251*	0.012*
Process innovation	0.406**	0.019**
Productivity growth	-0.003	-0.000
Age	0.001	0.000
Size	0.012***	0.001***
Urban	-0.098	-0.005
Number of obs	2750	2750
Prob > chi2	0.000	

Conclusions

- Innovators, exporters have higher productivity growth than non-innovators, non-exporters
- Product innovation, product improvement significant impact on productivity growth
- Product improvement and process innovation significant impact on export propensity
- Exporting contribute to productivity growth. However, productivity growth does not impact on export propensity
- Further study: Long-term impact of innovation need to be considered

Thanks for your attendance!