

Value Chain Integration and Firm Productivity: Evidence from Turkish Manufacturing^{1,2}

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The aim

- This study aims to examine the impact of the integration of firms to the value chains (global and domestic) on productivity in the Turkish manufacturing industry.
- GVC integration of the firm may bring productivity gains through at least two channels:
 - First is the direct productivity enhancing effect through learning, scale economies etc.
 - Second is through structural change: misguided government policies, especially in developing countries, may bring about structural changes detrimental to the productivity growth. With GVC integration, however, these misguided government policies will be ineffective.
- This study is said to be the first attempt in exploring the impact of the integration of firms to global value chains on productivity generation in Turkish manufacturing industry at the firm level.

The data

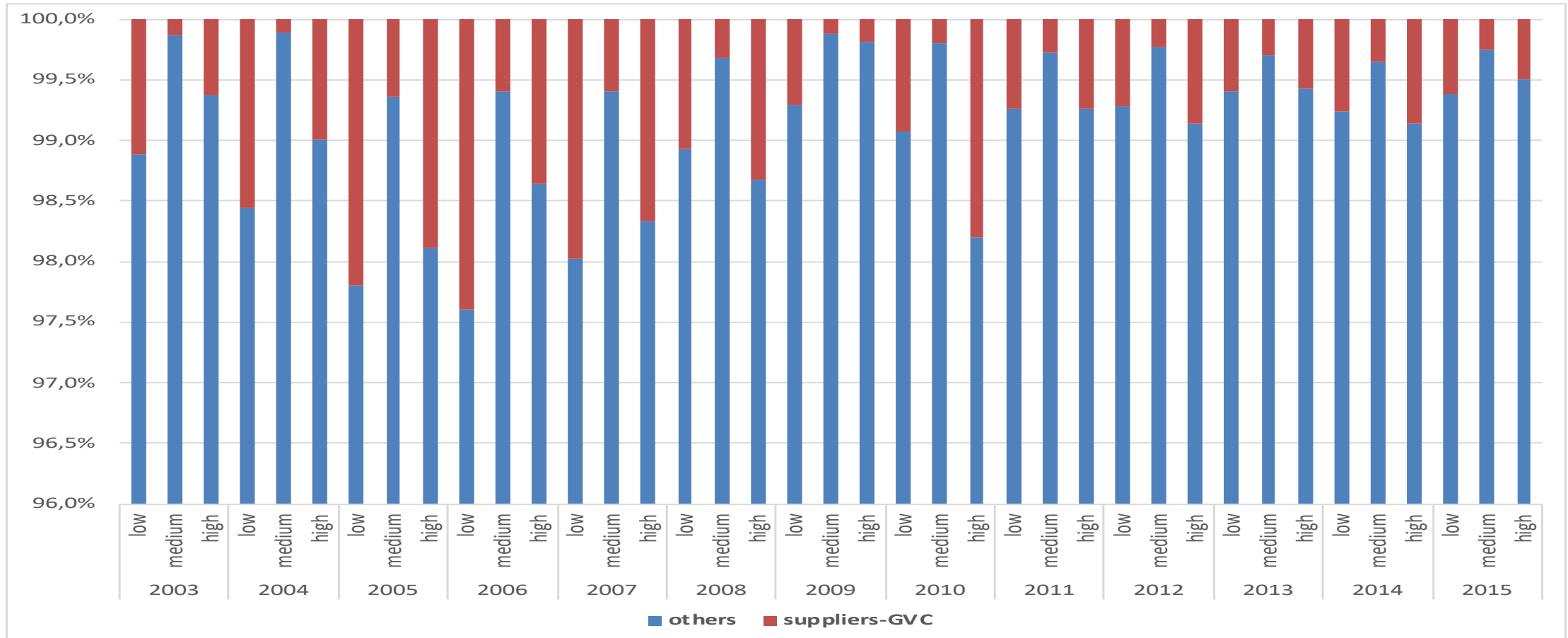
- The data used in this work is a firm level classified data obtained from Turkish Statistical Institute (TurkStat, 2017).
- This is the richest data available on the firm level including all firms employing 19+ workers and 60% of the firms employing less than 20 workers in Turkish manufacturing industry.

Measurement of GVC/DVC-supplier/consumer

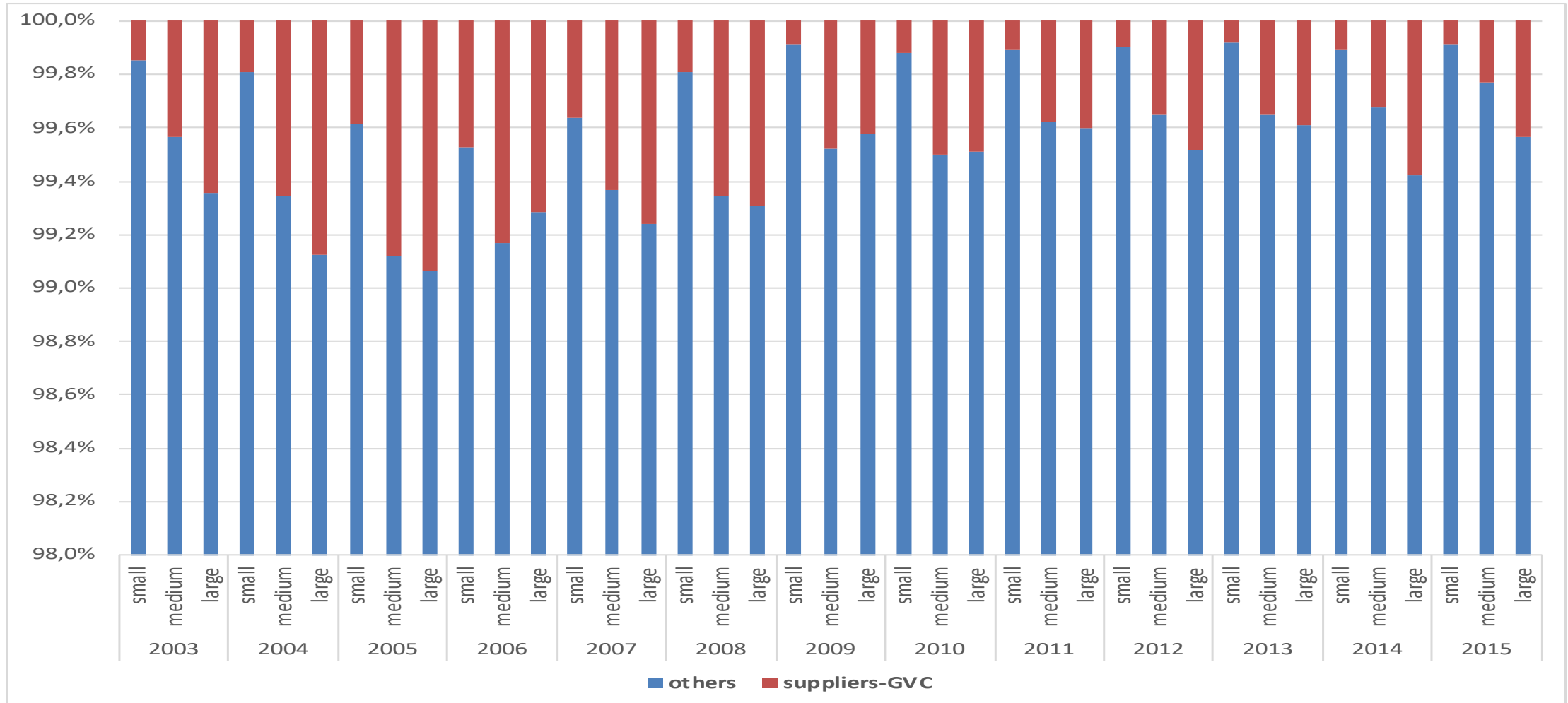
	Global	Domestic
Supplier	=1 if firm is exporter and PTO/Sales>51%	=1 if firm is non-exporter and PTO/Sales>51%
Consumer	=1 if firm is intermediate good importer	=1 if DCI/Expenses>15%

- PTO: Produced-to-order sales
- DCI: Domestic customized intermediaries

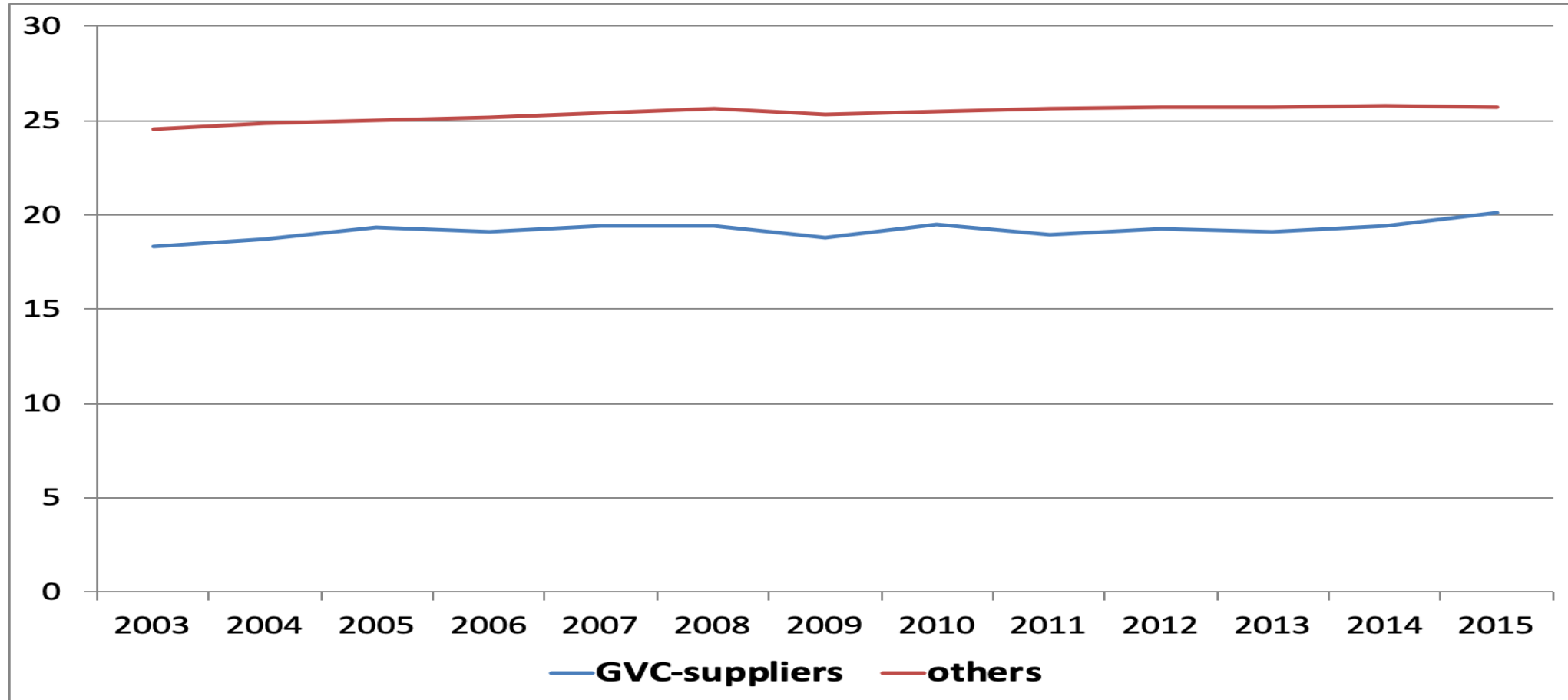
GVC- and non-GVC-suppliers by technological intensity, 2003-2015



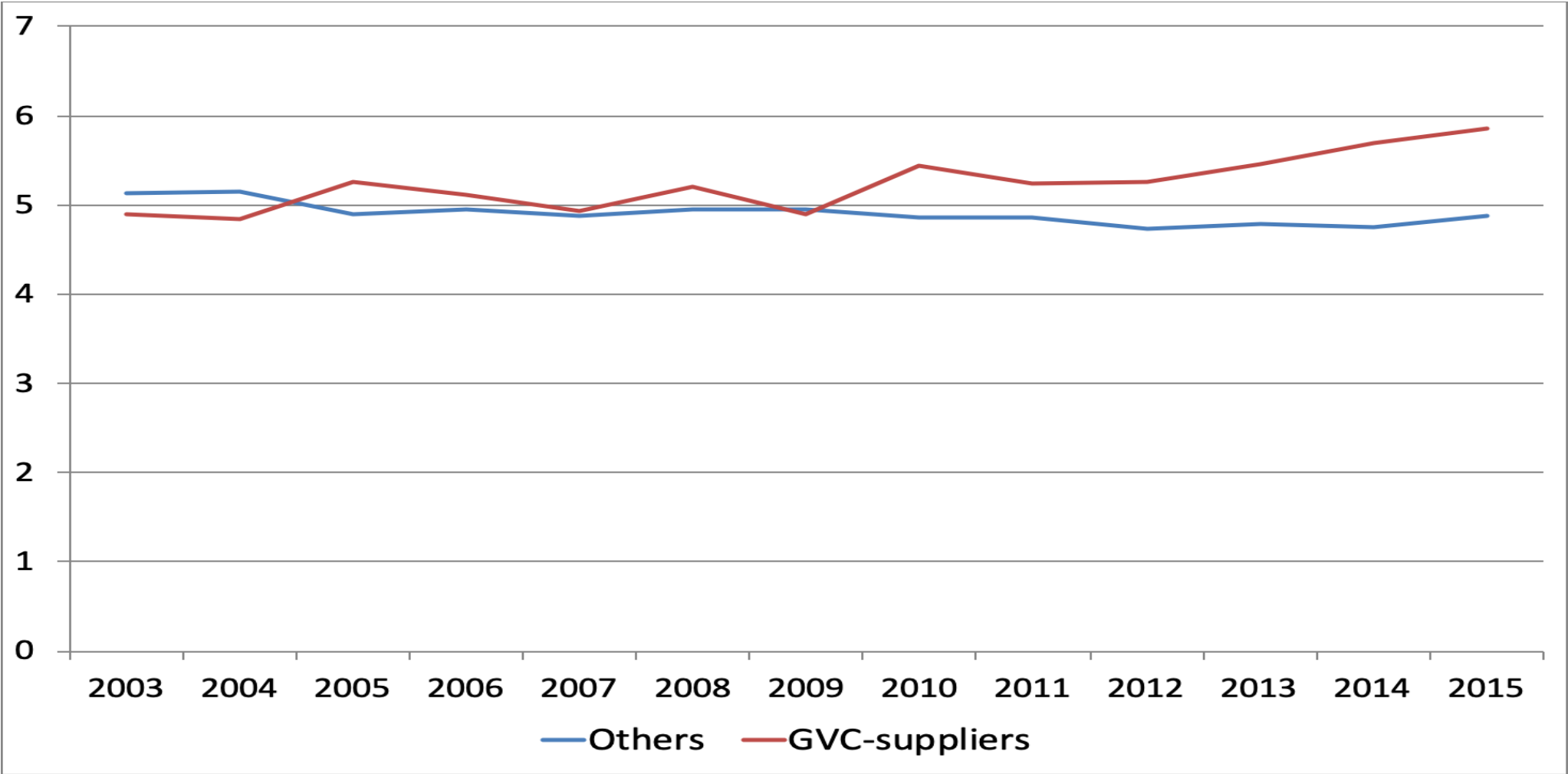
GVC- and non-GVC-suppliers by size, 2003-2015



Exports of GVC-suppliers and other firms, in log USD, 2003-2015



Labor Productivity of GVC-Suppliers and other firms, in log USD, 2003-2015



The Model

- We derived the productivity equation from a typical Cobb-Douglas function.
- Let subscripts i , j and t denote firm, industry and time respectively. Our dynamic model to be estimated to test the impact of GVC and DVC positions on labor productivity is as follows:

$$LP_{ijt} = \beta_0 + \beta_1(LP)_{ij,t-1} + \beta_2 \ln(K/L)_{ijt} + \beta_3(SUP)_{ijt} + \beta_4(CON)_{ijt} \\ + \beta_5(SUP * CON)_{ijt} + D_j + D_t + \varepsilon_{ijt}$$

The Variables

- LP_{ijt} : Value added per employee, constant prices.
- $(K/L)_{ijt}$: Capital labor ratio.
- $(SUP)_{ijt}$: 1 for the firm if the share of sales of produced-to-order to total turnover is greater than the 51% and the firm is exporter.
- $(CON)_{ijt}$: 1 if the firm purchases intermediate goods (“semi-finished goods” and “parts & components”) from abroad.

Productivity estimation results, full sample

VARIABLES	Fixed-effects			Difference GMM		
	All sample-GVC	Exporters	All sample-DVC	All sample-GVC	Exporters	All sample-DVC
$(LP)_{it-1}$	0.083** (0.008)	0.102** (0.008)	0.083** (0.008)	0.110** (0.006)	0.119** (0.007)	0.110** (0.006)
$(K/L)_{it}$	0.079** (0.003)	0.095** (0.004)	0.079** (0.003)	0.091** (0.003)	0.107** (0.004)	0.091** (0.003)
$(SUP)_{it}$	0.013 (0.016)	-0.002 (0.022)	-0.037** (0.010)	0.006 (0.023)	-0.005 (0.027)	-0.029** (0.009)
$(CON)_{it}$	0.053** (0.004)	0.040** (0.005)	0.031+ (0.016)	0.011* (0.005)	0.012* (0.006)	0.030* (0.012)
$(SUP * CON)_{it}$	-0.020 (0.021)	-0.004 (0.029)	-0.015 (0.016)	0.010 (0.029)	0.021 (0.031)	-0.021 (0.019)
Observations	188,656	126266	188660	188,656	126266	188660
Number of ID	39,775	25875	39776	39,775	25875	39776
Industry Dummies	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes
R-square	0.329	0.319	0.312			
Wald (prob)	0	0	0	0	0	0

Productivity estimation results by firm size, GMM

VARIABLES	Small-scale firms-all sample-GVC	Medium-scale firms-all sample-GVC	Large-scale firms-all sample-GVC	Small-scale firms-exporters	Medium-scale firms-exporters	Large-scale firms-exporters	Small-scale firms-DVC	Medium-scale firms-DVC	Large-scale firms-DVC
$(LP)_{it-1}$	0.071** (0.010)	0.118** (0.010)	0.159** (0.023)	0.067** (0.011)	0.129** (0.011)	0.162** (0.024)	0.071** (0.010)	0.117** (0.010)	0.158** (0.023)
$(K/L)_{it}$	0.073** (0.004)	0.108** (0.005)	0.132** (0.017)	0.087** (0.005)	0.118** (0.007)	0.139** (0.018)	0.073** (0.004)	0.108** (0.005)	0.133** (0.017)
$(SUP)_{it}$	0.014 (0.034)	0.003 (0.027)	-0.096 (0.060)	-0.011 (0.039)	0.012 (0.032)	-0.130* (0.054)	-0.034** (0.012)	-0.027* (0.014)	0.053 (0.038)
$(CON)_{it}$	0.017* (0.007)	0.002 (0.008)	-0.018 (0.033)	0.014+ (0.008)	0.004 (0.008)	-0.000 (0.034)	0.019 (0.014)	0.047* (0.021)	0.172* (0.084)
$(SUP * CON)_{it}$	-0.057 (0.043)	0.066+ (0.036)	0.086 (0.070)	-0.038 (0.047)	0.061 (0.039)	0.118+ (0.065)	-0.015 (0.024)	-0.039 (0.029)	-0.127 (0.081)
Observations	72945	57286	13385	43022	45234	12729	72945	57286	13385
Number of firms	21450	13968	2574	13448	11014	2425	21450	13968	2574
Industry Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes

Robust standard errors in parentheses

** p<0.01, * p<0.05, + p<0.1

Productivity estimation results by technology intensity, GMM

VARIABLES	Low-tech firms-all sample-GVC	Medium-tech firms-all sample-GVC	High-tech firms-all sample-GVC	Low-tech firms-exporters	Medium-tech firms-exporters	High-tech firms-exporters	Low-tech firms-DVC	Medium-tech firms-DVC	High-tech firms-DVC
$(LP)_{it-1}$	0.107** (0.008)	0.124** (0.010)	0.107* (0.043)	0.113** (0.010)	0.137** (0.011)	0.085* (0.043)	0.107** (0.008)	0.124** (0.010)	0.109** (0.042)
$(K/L)_{it}$	0.081** (0.004)	0.105** (0.005)	0.101** (0.023)	0.098** (0.006)	0.119** (0.007)	0.105** (0.024)	0.081** (0.004)	0.105** (0.005)	0.100** (0.023)
$(SUP)_{it}$	0.017 (0.026)	-0.048 (0.045)	0.024 (0.086)	0.014 (0.031)	-0.085+ (0.047)	0.014 (0.085)	-0.032** (0.010)	-0.014 (0.020)	-0.161+ (0.092)
$(CON)_{it}$	0.016* (0.007)	0.005 (0.008)	-0.054 (0.052)	0.016* (0.008)	0.009 (0.008)	-0.042 (0.060)	0.032* (0.013)	0.023 (0.026)	0.000 (0.000)
$(SUP * CON)_{it}$	-0.021 (0.033)	0.110+ (0.058)		-0.018 (0.036)	0.148* (0.059)		-0.020 (0.019)	-0.051 (0.079)	
Observations	76682	64960	2030	50708	48418	1912	76682	64960	2030
Number of firms	16907	13326	437	11032	10042	402	16907	13326	437
Industry Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes

Robust standard errors in parentheses

** p<0.01, * p<0.05, + p<0.1

Conclusion

- In this paper, we investigated how the GVC and DVC positions of Turkish manufacturing firms effect productivity compared to their counterparts (domestic firms and exporters).
- While value chain integration of industries, sectors, even countries provides benefits such as learning, efficiency and competitiveness, it is not automatic rapid escalators for the firm. Their positions along the chain and internationalization of the positions do matter.

Conclusion

- Our results show that holding a supplier position in a domestic chain is detrimental to productivity. However, when they moved to global chain in the same position, these losses disappear. This result is more or less valid for all firms, irrespective of their size or technological intensity of the industry the firm operates in. On the other hand, being purchaser in GVCs triggers productivity, specially in small-low-tech firm.
- On the other hand, even though being a purchaser triggers productivity for the both chains, these gains are much more in GVC, especially for SMEs. We should emphasize that while downstream internationalization of firms would enhance firm efficiency, capability building activities can break the vicious cycle of supplier firms.

Thank you for listening ...