New Imported Inputs, Wages and Worker Mobility

Italo Colantone* Alessia Matano+ Paolo Naticchioni**

*Bocconi University

+University of Barcelona

**Roma Tre University and IZA

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Introduction

- The recent globalization wave has been characterized by an increase of trade in intermediate inputs, in line with the emergence of global value chains.
- This has been associated to a sizable increase in the number of **new** imported intermediates worldwide.
- Several studies have shown that imported inputs lead to productivity gains, and foster the introduction of new domestic products and economic growth.
- However, we still lack a comprehensive analysis of the labour market effects of imported inputs $==>$ goal of this paper.

In this paper

- We study the relationship between new imported inputs, wages and workers mobility.
- We employ matched employer-employee data for Italy (INPS), spanning the period 1995-2007, and covering around 416,000 manufacturing workers.
- We complement these data with information on the arrival of new imported inputs at the industry level (identified as in Colantone and Crinò, 2014).

In this paper

- We find new imported inputs to have a positive impact on the average wage at the firm level.
- Such a positive effect is driven by two factors:
  - an increase in the white collar/blue collar ratio;
  - an increase in the average wage of blue collar workers, driven by the displacement of the lowest paid workers.
- We find no impact of new imported inputs on wages of continuously employed individuals, for blue and white collar workers: new imported inputs implies an skill composition upgrade of the in the firm
- Ongoing work. Investigation of the channels behind our findings: Innovation channel; scale vs quality-adjusted price effect; assortative matching.

Related literature

- Studies on input tariffs and wages.

  [Amiti and Davis, 2011; Amiti and Cameron, 2012]

- Literature on the effects of imported inputs on productivity and product innnovation.

  [Amiti and Konings, 2007, and Halpern et al. 2015; Goldberg et al., 2010, and Colantone and Crinò, 2014]

- Literature on the gains from variety.

  [Feenstra, 1998, 2010; Feenstra and Hanson, 2003; Broda et al., 2006; Goldberg et al., 2009]

- The literature on labour market implications of international trade.

  [see Grossman (2013) for a recent review, and Autor et al (2013,2014) for effects of import penetration on labour market outcomes in the US; Dauth et al (2013) for Germany]

Contribution

With respect to the existing literature:

- We provide the first extensive assessment of the effects of new imported inputs on wage dynamics, on the skill composition of the labor force, and on the reallocation of workers.

- In progress:
  - analysis of the impact on assortative matching between firms and workers
  - investigations of the channels behind our results with respect to the issue of quality-adjusted prices of new intermediate goods.

Theoretical motivation

New imported inputs may have an impact on wages, worker mobility, and the skill composition of the labour force mainly through three channels:

1. They have a positive impact on domestic firms' productivity, which in turn may result in higher wages.
   (Amiti and Konings, 2007; Halpern et al. 2015; Amiti and Davis, 2011).

2. They allow domestic firms to produce new upgraded products, which may require higher workers' skills.
   (Goldberg et al., 2010; Colantone and Crinò, 2014).

3. They reflect, at least partly, the offshoring of production activities, which may affect some workers more than others.
   (Grossman and Rossi-Hansberg, 2008; Crinò, 2009)

What about the Italian Case

- Both at the policy debate level and in the literature the focus is on "Bad" shocks for the Italian Economy due to import competition from emerging countries, i.e. China, and offshoring. Bugamelli, Fabiani, Sette (2015), Federico (2012), Altomonte et al (2014), Lo Turco et al (2013).

- Our paper is more on the "positive" side of international trade, related to new opportunities for firms related to new imported inputs.

Outline of the presentation

- Data and descriptive statistics.
- Empirical specification.
- Results.
  - Firm-level estimates.
  - Worker-level estimates.
- Conclusion and ongoing work.

Data and stylized facts

Matched employer-employee data

Data Source: INPS, the Italian Social Security Institute

- Worker-level:
  - random sample of 201,479 manufacturing workers, for whom we can track the employment history between 1995 and 2007;
  - sampling procedure: all workers born either on day 1 or 9 of any month in any year;
  - information on age, gender, wage, occupation, number of weeks worked, full time vs. part time, firm of employment.
- Firm-level:
  - 82,394 firms, with at least one sampled worker employed in any year;
  - industry of affiliation, at the NACE 2-digit level;
  - yearly information on firms average wage (not the average of worker wages in the sample) paid to white collars and blue collars;
  - information on firm age, total number of employees, number of white collar and blue collar workers.

Matched employer-employee data

Worker-level data: descriptives

	Mean	Std. Dev.	Min	Max
Age	39.70	9.53	15	64
Tenure	4.78	3.16	1	13
Real average weekly wage: all	460.43	171.07	13.84	3401.45
Real average weekly wage: blue collars	415.66	112.98	13.84	3382.40
Real average weekly wage: white collars	573.74	223.28	17.46	3401.45
2-years growth of real annual wage: all	0.036	0.118	-0.565	0.616
2-years growth of real annual wage: blue collars	0.030	0.116	-0.565	0.616
2-years growth of real annual wage: white collars	0.053	0.122	-0.565	0.616

Matched employer-employee data

Firm-level data: descriptives

	Mean	Std. Dev.	Min	Max
Age	16.68	10.52	0	89
Size (total number of employees)	54.86	314.19	0	72199
Share of white collars	0.26	0.18	0	1
2-years growth of share of white collars	0.008	0.053	-0.200	0.246
2-years growth of real annual wage: all	0.021	0.072	-0.248	0.275
2-years growth of real annual wage: blue collars	0.016	0.079	-0.363	0.346
2-years growth of real annual wage: white collars	0.029	0.138	-0.546	0.606

International trade data

Data Source: COMEXT (Eurostat)

Official import and export data at the product level.

- Products, countries and time span:
  - more than 10,000 8-digit product codes (Combined Nomenclature classification, *CN*);
  - each product code mapped into a NACE 2-digit industry code within the manufacturing sector;
  - universe of trading partners (about 200 countries);
  - 1988-2007.

New imported inputs (NII)

We focus on imported *varieties*, i.e. product (h) - partner (n) combinations.

We define a variety v as a **new imported input** when product (h) is imported from partner (n) for the first time.

$\rightarrow$ Identification of NII is not trivial due to changes in product classification over time: solved with correspondence tables as in Colantone and Crinò (2014).

New imported inputs

We identify intermediate inputs by mapping the CN classification into the BEC (Broad Economic Categories) classification.

BEC Codes for Intermediate Inputs

Capital goods, parts and accessories	(BEC 42)
Processed industrial supplies	(BEC 22)
Capital goods, except transport equipment	(BEC 41)
Processed food and beverages, mainly for industry	(BEC 121)
Processed fuels and lubricants	(BEC 32)
Industrial transport equipment	(BEC 521)
Parts and accessories of transport equipment	(BEC 53)

New imported inputs

For each NACE 2-digit industry (j), in each year (t), we first compute the entry rate of new imported inputs as follows:

$$NII_{jt} = (new\ imported\ inputs)_{jt}/(total\ imported\ inputs)_{jt} \tag{1}$$

We then construct an overall indicator for the arrival of new imported inputs, which takes into account vertical linkages across industries:

$$NIIov_{jt} = \sum_{k} \phi_{jk} \cdot NII_{kt} \tag{2}$$

where $\phi_{jk} \equiv \frac{Imported\ inputs\ by\ j\ from\ k}{Total\ imported\ inputs\ by\ j}$, based on Import Input Output Matrices.

In our sample Niiov has an average of 10% across industries and a standard deviation of 2.4%

Empirical Specification

Empirical specification: firm-level analysis

$$FirmOutcome_{zjt} = \alpha_z + \alpha_t + \beta_1 NIIov_{jt-2} + \mathbf{F}_{zt-2}\gamma' + \mathbf{S}_{jt-2}\lambda' + \varepsilon_{ijt}, \qquad (3)$$

- where:
  - $FirmOutcome_{zjt}$ is, alternatively, growth of: average wage; share of white collars; average white collars wage; average blue collars wage. All variables are measured at the firm (z) level, between t and t-2.
  - α_z and α_t are firm and year fixed effects, respectively.
  - $NIIov_{jt-2}$ is the arrival rate of new imported inputs in industry j, including info on vertical linkages.
  - $\mathbf{F}_{zt-2}$: controls for firm characteristics [firm age, and log of firm size, i.e. total number of employees].
  - $\mathbf{S}_{jt-2}$: controls for industry characteristics [log of labor productivity, capital intensity, material intensity, export intensity, and import intensity].
- Identification strategy:
  - compare *changes* in firm performance across similar firms, operating in similar industries, except for the entry rate of new imported inputs.

Empirical specification: worker-level analysis

$$WorkerOutcome_{izjt} = \alpha_{iz} + \alpha_t + \beta_1 NIIov_{jt-2} + \mathbf{I}_{it-2}\delta' + \mathbf{F}_{zt-2}\gamma' + \mathbf{S}_{jt-2}\lambda' + \varepsilon_{izjt}, \quad (4)$$

- where:
  - $WorkerOutcome_{izjt}$ is, alternatively, growth of individual wage or a dummy equal to 1 in case of separation of worker *i* from firm *z*. Both variables are measured at the worker-level, between year *t* and *t-2*.
  - α_{iz} and α_t are employment spell and year fixed effects, respectively.
  - $\mathbf{I}_{it-2}$: controls for worker characteristics [age, age squared, tenure, tenure squared, and a dummy for white collars].
  - All other variables are the same as in the firm-level specification.
- Identification strategy:
  - compare *changes* in worker outcomes across similar workers, employed in similar firms, which operate in similar industries, except for the entry rate of new imported inputs.

Endogeneity

- Issue of possible endogeneity for the arrival of new imported inputs, due to different reasons.
- Reverse causality: an increase in domestic wages could push firms to start sourcing more new inputs from abroad, inducing an upward bias in the OLS estimates.
- There could also be omitted variables correlated with both $NIIov_{jt-2}$ and wages, conditional on other controls.
- For instance, negative supply shocks in Italy may have a negative impact on wages and simultaneously lead to more new imported inputs, inducing a downward bias in the OLS estimates.

Endogeneity

- Solution: we instrument $NIIov_{jt-2}$ using the average entry rate of new imported inputs, in each industry and year, across the remaining EU-25 countries (constructed in exactly the same way as for Italy).

- Intuition: this instrument is meant to isolate variation in new imported inputs in Italy which is due to supply shocks in the origin countries.

  (For similar IV strategies see, most notably, Autor et al., 2013, 2014, 2015ab; Dauth et al., 2014; Hummels et al., 2014; Bloom et al., 2016; Colantone et al., 2016).

- Several robustness checks on the IV strategy are provided, e.g. including extensive sets of controls for contemporaneous shocks and underlying trends.

Results

Firm-level estimates: Fixed-effect estimates

Table 1 - Firm level wages

	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
NIIov	0.131***	0.033***	0.048	0.134***
	[0.036]	[0.009]	[0.039]	[0.042]
Estimator	OLS	OLS	OLS	OLS
Firm controls	no	no	no	no
Industry controls	no	no	no	no
Firm effects	yes	yes	yes	yes
Year effects	yes	yes	yes	yes
Obs.	415,519	415,519	415,519	415,519
R2	0.028	0.001	0.008	0.026

Firm-level estimates: IV

Table 1 - Firm level wages

	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
NIIov	0.136***	0.039***	0.083	0.135***	0.126***	0.042***	0.052	0.129***
	[0.033]	[0.008]	[0.053]	[0.039]	[0.031]	[0.007]	[0.032]	[0.038]
Estimator	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Firm controls	no	no	no	no	yes	yes	yes	yes
Industry controls	no	no	no	no	yes	yes	yes	yes
Firm effects	yes	yes	yes	yes	yes	yes	yes	yes
Year effects	yes	yes	yes	yes	yes	yes	yes	yes
Obs.	415,519	415,519	415,519	415,519	415,490	415,490	415,490	415,490
R2	0.028	0.001	0.008	0.026	0.029	0.004	0.008	0.026
First-stage results								
New Imported Inputs EU	0.926***	0.926***	0.926***	0.926***	0.921***	0.921***	0.921***	0.921***
	[0.088]	[0.088]	[0.088]	[0.088]	[0.089]	[0.089]	[0.089]	[0.089]
Kleibergen-Paap F-Statistic	110.85	110.85	110.85	110.85	107.01	107.01	107.01	107.01

Firm-level estimates: alternative instruments

Table 3 - Robustness checks: alternative instruments

	Firm level wages			
	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
1) Excluding France and Germany	0.122***	0.043***	0.051	0.125***
	[0.033]	[0.007]	[0.034]	[0.040]
Obs.	415,490	415,490	415,490	415,490
R2	0.029	0.004	0.008	0.026
First stage coefficient	0.908***	0.908***	0.908***	0.908***
	[0.102]	[0.102]	[0.102]	[0.102]
Kleibergen-Paap F-Statistic	78.92	78.92	78.92	78.92
2) Focusing on UK only	0.144***	0.037***	0.028	0.154***
	[0.033]	[0.010]	[0.024]	[0.036]
Obs.	415,490	415,490	415,490	415,490
R2	0.029	0.004	0.008	0.026
First stage coefficient	0.827***	0.827***	0.827***	0.827***
	[0.043]	[0.043]	[0.043]	[0.043]
Kleibergen-Paap F-Statistic	365.5	365.5	365.5	365.5
3) Focusing on 10 Eastern EU new Members	0.148**	0.016	0.098	0.195**
	[0.068]	[0.022]	[0.078]	[0.082]
Obs.	225,918	225,918	225,918	225,918
R2	0.017	0.007	0.002	0.016
First stage coefficient	0.781***	0.781***	0.781***	0.781***
	[0.268]	[0.268]	[0.268]	[0.268]
Kleibergen-Paap F-Statistic	8.48	8.48	8.48	8.48

Firm-level estimates: alternative instruments

Table 3 - Robustness checks: alternative instruments

	Firm level wages			
	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
4) Excluding most cyclical industries	0.144***	0.048***	0.050*	0.153***
	[0.031]	[0.006]	[0.027]	[0.039]
Obs.	354,811	354,811	354,811	354,811
R2	0.03	0.004	0.009	0.027
First stage coefficient	0.958***	0.958***	0.958***	0.958***
	[0.076]	[0.076]	[0.076]	[0.076]
Kleibergen-Paap F-Statistic	158.67	158.67	158.67	158.67
5) Excluding most volatile industries (Autor et al., 2013)	0.166**	0.018	0.142**	0.200**
	[0.070]	[0.022]	[0.060]	[0.085]
Obs.	315,309	315,309	315,309	315,309
R2	0.031	0.004	0.009	0.028
First stage coefficient	0.845***	0.845***	0.845***	0.845***
	[0.056]	[0.056]	[0.056]	[0.056]
Kleibergen-Paap F-Statistic	223.54	223.54	223.54	223.54
6) Excluding most energy-intensive industries	0.143***	0.048***	0.054*	0.148***
	[0.033]	[0.006]	[0.029]	[0.040]
Obs.	353,453	353,453	353,453	353,453
R2	0.028	0.004	0.008	0.026
First stage coefficient	0.934***	0.934***	0.934***	0.934***
	[0.091]	[0.091]	[0.091]	[0.091]
Kleibergen-Paap F-Statistic	106.07	106.07	106.07	106.07

Firm-level estimates: contemporaneous shocks

Table 4 - Robustness checks: contemporaneous shocks

	Firm level wages			
	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
1) *Sector*-year dummies: Import intensity (1995-2007)	0.092***	0.026**	0.033	0.099***
	[0.018]	[0.013]	[0.036]	[0.022]
Obs.	415,490	415,490	415,490	415,490
R2	0.03	0.005	0.008	0.028
First stage coefficient	0.946***	0.946***	0.946***	0.946***
	[0.077]	[0.077]	[0.077]	[0.077]
Kleibergen-Paap F-Statistic	151.69	151.69	151.69	151.69
2) *Sector*-year dummies: Export intensity (1995-2007)	0.117***	0.044***	0.044	0.122***
	[0.021]	[0.010]	[0.027]	[0.028]
Obs.	415,490	415,490	415,490	415,490
R2	0.03	0.005	0.008	0.028
First stage coefficient	0.942***	0.942***	0.942***	0.942***
	[0.060]	[0.060]	[0.060]	[0.060]
Kleibergen-Paap F-Statistic	248.7	248.7	248.7	248.7
3) *Sector*-year dummies: Output (1995-2007)	0.108***	0.017	0.058***	0.108***
	[0.024]	[0.013]	[0.022]	[0.029]
Obs.	415,490	415,490	415,490	415,490
R2	0.032	0.005	0.009	0.03
First stage coefficient	0.884***	0.884***	0.884***	0.884***
	[0.093]	[0.093]	[0.093]	[0.093]
Kleibergen-Paap F-Statistic	90.01	90.01	90.01	90.01

Firm-level estimates: contemporaneous shocks

Table 4 - Robustness checks: contemporaneous shocks

	Firm level wages			
	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
4) *Sector*-year dummies: Capital intensity (1995-2007)	0.071**	0.033***	0.045	0.073**
	[0.031]	[0.012]	[0.039]	[0.035]
Obs.	415,490	415,490	415,490	415,490
R2	0.03	0.005	0.008	0.028
First stage coefficient	0.947***	0.947***	0.947***	0.947***
	[0.051]	[0.051]	[0.051]	[0.051]
Kleibergen-Paap F-Statistic	339.83	339.83	339.83	339.83
5) *Sector*-year dummies: Material intensity (1995-2007)	0.117***	0.044***	0.036	0.123***
	[0.038]	[0.009]	[0.033]	[0.046]
Obs.	415,490	415,490	415,490	415,490
R2	0.03	0.005	0.008	0.028
First stage coefficient	0.905***	0.905***	0.905***	0.905***
	[0.086]	[0.086]	[0.086]	[0.086]
Kleibergen-Paap F-Statistic	111.55	111.55	111.55	111.55

Firm-level estimates: underlying trends

Table 5 - Robustness checks: underlying trends

	Firm level wages			
	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
1) Pre-sample change in import intensity (1990-1995)	0.121***	0.048***	0.04	0.125***
	[0.036]	[0.015]	[0.040]	[0.041]
Obs.	415,490	415,490	415,490	415,490
R2	0.029	0.004	0.008	0.027
First stage coefficient	0.844***	0.844***	0.844***	0.844***
	[0.071]	[0.071]	[0.071]	[0.071]
Kleibergen-Paap F-Statistic	139.74	139.74	139.74	139.74
2) Pre-sample change in export intensity (1990-1995)	0.138***	0.029***	0.075**	0.149***
	[0.032]	[0.010]	[0.031]	[0.038]
Obs.	415,490	415,490	415,490	415,490
R2	0.03	0.004	0.008	0.027
First stage coefficient	0.947***	0.947***	0.947***	0.947***
	[0.072]	[0.072]	[0.072]	[0.072]
Kleibergen-Paap F-Statistic	174.2	174.2	174.2	174.2
3) Pre-sample output growth (1990-1995)	0.126***	0.042***	0.05	0.127***
	[0.027]	[0.007]	[0.034]	[0.033]
Obs.	415,490	415,490	415,490	415,490
R2	0.029	0.004	0.008	0.027
First stage coefficient	0.915***	0.915***	0.915***	0.915***
	[0.093]	[0.093]	[0.093]	[0.093]
Kleibergen-Paap F-Statistic	97.58	97.58	97.58	97.58

Firm-level estimates: underlying trends

Table 5 - Robustness checks: underlying trends

	Firm level wages			
	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
4) Pre-sample change in capital intensity (1990-1995)	0.140***	0.041***	0.067**	0.144***
	[0.030]	[0.007]	[0.030]	[0.037]
Obs.	415,490	415,490	415,490	415,490
R2	0.03	0.004	0.008	0.027
First stage coefficient	0.922***	0.922***	0.922***	0.922***
	[0.089]	[0.089]	[0.089]	[0.089]
Kleibergen-Paap F-Statistic	106.83	106.83	106.83	106.83
5) Pre-sample change in material intensity (1990-1995)	0.135***	0.042***	0.062**	0.139***
	[0.027]	[0.009]	[0.030]	[0.034]
Obs.	415,490	415,490	415,490	415,490
R2	0.03	0.004	0.008	0.028
First stage coefficient	0.920***	0.920***	0.920***	0.920***
	[0.092]	[0.092]	[0.092]	[0.092]
Kleibergen-Paap F-Statistic	98.96	98.96	98.96	98.96

Worker-level estimations

Two main analyses:

- Focus on the sample of continuing workers, i.e workers that have remained in the same firms in the last two years, to check whether the impact of NIIov affects mainly the existing labour relations in the firm

- The impact of NIIov on separations, to test whether the impact of NIIov takes place through the change in the labour force composition.

  In particular, we want to test whether NIIov affects separations in a different way for low or high skilled workers (low wages: when the wage of the workers leaving the firm is lower than the mean wage of the firm, computed separately for blue and white collars)

Worker-level estimates: continuing workers

Table 2 - Worker level wages: continuing workers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable:	Δ wage	Δ wage	Δ wage	Δ wage	Δ wage	Δ wage	Δ wage	Δ wage	Δ wage
Sample:	All	WC	BC	All	WC	BC	All	WC	BC
NIIov	0.039	0.027	0.035	0.045	0.044	0.031	0.012	0.032	-0.008
	[0.058]	[0.044]	[0.067]	[0.052]	[0.043]	[0.059]	[0.050]	[0.041]	[0.059]
Estimator	OLS	OLS	OLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Individual controls	no	no	no	no	no	no	yes	yes	yes
Firm controls	no	no	no	no	no	no	yes	yes	yes
Industry controls	no	no	no	no	no	no	yes	yes	yes
Employment spell effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Obs.	1,017,871	271,224	745,354	1,017,871	271,224	745,354	1,017,765	271,201	745,272
R2	0.015	0.01	0.018	0.015	0.01	0.018	0.019	0.014	0.021
First-stage results									
New Imported Inputs EU	-	-	-	0.909***	0.873***	0.922***	0.906***	0.883***	0.916***
	-	-	-	[0.092]	[0.093]	[0.090]	[0.092]	[0.088]	[0.093]
Kleibergen-Paap F-Statistic	-	-	-	98.47	87.82	104.12	97.05	101.51	97.4

Worker-level estimates: separations

Table 6 - New imported inputs and firms' separations. Low wage defined with respect to the firm mean wage

	Blue collar				White collar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.
Sample:	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0
NIIov	0.292***	-0.209***	0.387***	-0.053	-0.120	-0.027	-0.072	0.010
	[0.054]	[0.042]	[0.062]	[0.093]	[0.079]	[0.085]	[0.141]	[0.185]
Estimator	OLS	OLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employment spell effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	370,432	494,627	370,432	494,627	192,904	154,343	176,971	138,659
R2	0.129	0.151	0.620	0.566	0.117	0.143	0.580	0.575
First-stage results								
New Imported Inputs EU	-	-	0.924***	0.902***	-	-	0.864***	0.885***
	-	-	[0.088]	[0.099]	-	-	[0.087]	[0.089]
Kleibergen-Paap F-Statistic	-	-	109.86	81.83	-	-	98.49	97.57

Worker-level estimates: separations

Table 7 - New imported inputs and firms' separations. Low wage defined with respect to the firm mean wage minus 5%

	Blue collar				White collar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.
Sample:	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0
NIIov	0.257***	-0.115***	0.349***	0.033	-0.138	-0.036	-0.155	0.055
	[0.069]	[0.038]	[0.069]	[0.081]	[0.088]	[0.076]	[0.120]	[0.192]
Estimator	OLS	OLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employment spell effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	241,085	625,992	241,085	625,992	149,518	166,836	149,518	166,836
R2	0.132	0.147	0.644	0.562	0.117	0.140	0.586	0.571
First-stage results								
New Imported Inputs EU	-	-	0.935***	0.902***	-	-	0.862***	0.883***
	-	-	[0.083]	[0.098]	-	-	[0.087]	[0.088]
Kleibergen-Paap F-Statistic	-	-	125.32	83.28	-	-	98.13	99.34

Worker-level estimates: separations

Table 8 - New imported inputs and firms' separations. Low wage defined with respect to the firm mean wage minus 10%

	Blue collar				White collar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.
Sample:	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0
NIIov	0.191**	-0.069**	0.304**	0.063	-0.071	-0.077	-0.078	0.007
	[0.093]	[0.035]	[0.123]	[0.073]	[0.097]	[0.072]	[0.141]	[0.193]
Estimator	OLS	OLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employment spell effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	141,412	730,288	141,412	730,288	125,271	191,239	125,271	191,239
R2	0.139	0.145	0.668	0.562	0.115	0.140	0.594	0.568
First-stage results								
New Imported Inputs EU	-	-	0.948***	0.904***	-	-	0.862***	0.880***
	-	-	[0.078]	[0.097]	-	-	[0.087]	[0.087]
Kleibergen-Paap F-Statistic	-	-	147.25	85.34	-	-	96.24	100.29

Worker-level estimates: separations

Table 9 - New imported inputs and firms' separations. Low wage defined with respect to the firm mean wage minus 20%

	Blue collar				White collar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.
Sample:	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0
NIIov	0.419**	-0.047	0.664**	0.078	-0.012	-0.097	0.014	-0.011
	[0.189]	[0.033]	[0.253]	[0.068]	[0.126]	[0.065]	[0.210]	[0.178]
Estimator	OLS	OLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employment spell effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	38,766	848,445	38,766	848,445	75,811	241,657	75,811	241,657
R2	0.160	0.144	0.716	0.569	0.111	0.138	0.617	0.565
First-stage results								
New Imported Inputs EU	-	-	0.959***	0.909***	-	-	0.865***	0.876***
	-	-	[0.077]	[0.095]	-	-	[0.091]	[0.087]
Kleibergen-Paap F-Statistic	-	-	153.43	90.37	-	-	90.43	100.87

Worker-level estimates: separations

Table 10 - New imported inputs and firms' separations. Low wage defined with respect to the median industry wage

	Blue collar				White collar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.
Sample:	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0	Low wage=1	Low wage=0
NIIov	0.272***	-0.184	0.363***	0.010	-0.011	-0.181	-0.001	-0.040
	[0.062]	[0.172]	[0.071]	[0.100]	[0.088]	[0.199]	[0.112]	[0.249]
Estimator	OLS	OLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employment spell effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	485,357	492,520	421,780	455,333	172,829	174,418	157,756	160,290
R2	0.120	0.167	0.120	0.167	0.093	0.163	0.093	0.163
First-stage results								
New Imported Inputs EU	-	-	0.911***	0.912***	-	-	0.876***	0.872***
	-	-	[0.095]	[0.094]	-	-	[0.087]	[.089]
Kleibergen-Paap F-Statistic	-	-	91.67	93.32	-	-	100.91	95.26

Worker-level estimates: separations

Table 11 - New imported inputs and firms' separations. Robustness check on blue collar workers

	Blue collar				
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.	Prob. Sep.
Low wage defined as below:	Firm mean	Firm mean -5%	Firm mean -10%	Firm mean -20%	Industry median
NIIov	0.146**	0.104	0.089	0.094	0.112*
	[0.065]	[0.066]	[0.066]	[0.063]	[0.063]
NIIov * Low wage dummy	-0.033	0.080***	0.191***	0.482***	0.036**
	[0.023]	[0.025]	[0.035]	[0.072]	[0.016]
Estimator	2SLS	2SLS	2SLS	2SLS	2SLS
Individual controls	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes
Employment spell effects	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes
Obs.	912,090	912,090	912,090	912,090	912,090
R2	0.58	0.58	0.581	0.582	0.146
Kleibergen-Paap F-Statistic	46.2	46.3	46.2	46.2	46.31

Ongoing work and Conclusion

Ongoing work: Analysis of the Channels - New Product Industries

- Colantone and Crinò (2014) show that new imported inputs is a crucial 'causal' driver of product innovation.
- Underlying intuition: innovation in inputs (higher varieties in intermediate inputs) makes firms more likely to achieve product innovation.
- If this innovation channel applies, we should expect our effects to be stronger in New Product industries.
- To test this channel, we computed the median of the cumulated incidence in New Product at the industry level, over the period 1997-2007. We then apply a sample split approach.

Ongoing work: Analysis of the Channels - New Product Industries

Channels: Hetegeneity of the impact acrcoss High and Low New Product Industries

	High New Product Industries				Low New Product Industries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
NIIov	0.165***	0.045***	0.036	0.174***	0.067	0.043	0.055	0.067
	[0.036]	[0.009]	[0.029]	[0.043]	[0.108]	[0.030]	[0.090]	[0.133]
Estimator	IV	IV	IV	IV	IV	IV	IV	IV
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	183,242	183,242	183,242	183,242	232,248	232,248	232,248	232,248
R2	0.027	0.005	0.008	0.024	0.032	0.004	0.008	0.029
Kleibergen-Paap F-St	527.41	527.41	527.405	527.405	35.34	35.34	35.338	35.338

Ongoing work: Analysis of the Channels - quality-adjusted prices

How NIIov can affect productivity and the labour market: two channels

- 1) They might give raise to a scale effect by expanding the varieties of available intermediates (keeping constant quality-adjusted prices)
- 2) They might allow firms to access varieties with more favorable price-quality ratios.

- Starting from raw prices of intermediate imputs, Colantone and Crinò (2014) computed quality adjusted prices by using a measure of quality (following Kandelwal, 2010). Intuition: higher quality is given to inputs with greater market share, conditional on prices and other controls.
- Aim: testing whether our findings are due to the scale effects (higher number of varieties) or to a change in the composition of NIIov towards varieties with lower price-quality ratios.

Ongoing work: Analysis of the Channels - quality-adjusted prices

- Using quality-adjusted price data it is possible to disentangle the two channels, using the same specification as in Colantone and Crinò (2014), where QAP is the ratio between quality adjusted prices of new intermediate and prices of intermediate inputs.

$$FirmOutcome_{zjt} = \alpha_z + \alpha_t + \beta_1 NIIov_{jt-2} + \beta_2 NIIov_{jt-2} * QAP_{jt-2} + \mathbf{F}_{zt-2}\gamma' + \mathbf{S}_{jt-2}\lambda' + \varepsilon_{ijt} \quad (5)$$

- If QAP=1 (prices of NII equal to the existing intermediates), the scale effect is identified, which is equal to $\beta_1 + \beta_2$.
- $\beta_2 < 0$ suggests instead that the impact of new imported inputs is decreasing in their quality-adjusted prices.

Ongoing work: Analysis of the Channels - quality-adjusted prices

Channels: Scale effects versus quality-adjusted price effect

	(1)	(2)	(3)	(4)
Dependent Variable:	Δ wage All	Δ share WC	Δ wage WC	Δ wage BC
NIIov	0.137*	0.087***	0.224***	0.075
	[0.075]	[0.024]	[0.078]	[0.094]
NIIov*QAP	-0.011	-0.045**	-0.173***	0.055
	[0.066]	[0.019]	[0.049]	[0.087]
Estimator	IV	IV	IV	IV
Firm controls	yes	yes	yes	yes
Industry controls	yes	yes	yes	yes
Firm effects	yes	yes	yes	yes
Year effects	yes	yes	yes	yes
Obs.	415,519	415,519	415,519	415,519
F first stage	13.44	13.44	13.44	13.44

Ongoing work: Assortative Matching

Analysis of the relationship between new imported inputs and allocative efficiency in the labour market.

- We apply the methodology initially developed by Abowd, Kramarz and Margolis (1999) in order to estimate unobserved characteristics of firms and workers, i.e. firm effects and worker effects.
- In a nutshell, this entails regressing individual wages over a number of individual characteristics (i.e. gender, age, age squared, age*female, tenure, tenure squared, tenure*female, occupation, occupation*female), plus the fixed effects.
- We then compute, for each industry and year, the correlation between worker and firm effects, i.e. a proxy for assortative matching.

Ongoing work: Assortative Matching

- We aim at investigating whether NIIov positively affects assortative matching, both for the overall sample and separately for white and blue collar workers.

- On the one hand, NIIov might positively affect production of new products (Colantone and Crinò, 2014) and this might require an upgrade of the labour force.

- On the other hand, NIIov might negatively affect assortative matching since it could foster firms' polarization in terms of skilled and tasks, due to the fact that new imported inputs might replace routine tasks that have over represented in the middle of the skill distribution.

Conclusion

- We have studied the relationship between new imported inputs, wages, and worker mobility.
- Focusing on the Italian manufacturing sector, we have found that new imported inputs have a positive impact on the average wages paid by firms.
- Such a positive effect is driven by two factors: (1) an increase in the white collar/blue collar ratio, and (2) an increase in the average wage of blue collar workers, driven by the displacement of the lowest paid workers.
- We have instead found no impact of new imported inputs on the wages of continuously employed individuals, both for blue collar and for white collar workers.
- Overall, our findings suggest that the arrival of new imported inputs determines an upgrading of the skill composition of the labour force, consistent with earlier evidence on the shift of domestic manufacturing towards new upgraded products.