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Local effects of manufacturing employment growth in Italy

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Abstract
For Italy's case, we estimate the local labor variation – both in tradable and nontradable sectors – due to an exogenous shift in local employment in tradable sectors. The results show that the local impact of employment growth in the tradable sectors is zero. We highlight some possible explanations for these findings. We also discuss the role of our results for the assessment of location-based policies.
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1. Introduction

The creation of new industrial employment in less prosperous local economies has been for decades at the forefront of regional policies. While this is true all over the world, it is particularly accurate in the case of Italy (see Braunerhjelm et al, 2000). Apart from the direct benefit of industrialization by itself, those policies have been widely motivated by the expectation of local multiplicative effects on the remaining parts of the local economy.

Is the expectation of local multiplicative effects grounded in economic theory? The answer is yes, with some caveats. A rise in the number of jobs in the tradable sector – either because a new firm comes in or an existing firm increases its operations – might affect local employment of both nontradable and tradable industries. First, more local jobs imply an increase in the local demand for nontradables (such as restaurants, real estate, cleaning services, legal services, retail, personal services, construction, etc.). The extent to which this increase in demand results in more jobs in the nontradable sector and/or higher nontradable prices (which are set on the local market) depends on the elasticity of supply of local services. Note that a lower elasticity of supply (i.e., higher prices for local services) might also impact on the competitiveness of the tradables, as local services are also purchased by firms in the tradable sector. Second, more local jobs in one industry might also affect employment in the remaining part of the local tradable sector. Local demand for intermediate inputs grows and this might foster employment in some other industries, if input providers are located in the same area (moreover, higher economic activity in one sector might enhance agglomeration economies). However, if local labor supply is less than infinitely elastic, there is an upward pressure on local wages that lowers the competitiveness of the overall local tradable sector, as prices for tradables is set on the national market and cannot adjust to local economic conditions.[1] All in all, economic theory suggests that local multiplicative effects are likely to materialize in the local nontradable sector; as for the local tradable, the effects are going to be more uncertain.

Unfortunately, for Italy there is little empirical evidence on the impact of new jobs in the tradable sectors on the remaining parts of the local economy. This paper tries to fill this gap. By using the methodology recently proposed by Moretti (2010) for the US case, we estimate the local employment increase – both in nontradable and tradable sectors – due to an exogenous shift in local employment in tradable sectors (EEST), which is identified by

[1] As we discuss later, upward pressures for the local price of labor are not going to be an issue for the case of Italy, where a centralized wage setting system prevails (see, also, Casadio, 2010).

exploiting the lagged industry mix at the local level, interacted with the contemporaneous nationwide variation.[2]

Our results are striking. We find no effect whatsoever that a creation of new jobs raises employment in other parts of the local labor market (LLM). In particular, we show that the effect of EEST is zero on local nontradables. This finding contrasts sharply with estimates for the US and applies invariantly for both the centre-northern and the southern LLMs. We also show that the impact of EEST on other tradables is zero or even negative; again, no discernable impact is found for the South of Italy.

What does hamper the local multiplicative effects? Although the analysis presented here cannot offer a final word on that, we highlight a number of tentative explanations that refer to the excess of regulation in the market for nontradables, the centralized wage setting, and the role of further obstacles to labor mobility. Whatever the reason behind our results, a clear policy implication emerges: to the extent that location-based policies rely on the expectation of local multiplicative effects, they are going to be ineffective.

The paper is structured as follows. Sect. 2 sketches the methodology and illustrates the data. Sect. 3 describes the empirical results. Sect. 4 discusses the tentative interpretations and the policy consequences.

3. Methodology and Data

To estimate the local labor increase due to EEST we use the following simple model (cf. Moretti, 2010):

$$(1) \qquad \Delta N^{a}_{i,t} = \alpha + \beta \, \Delta N^{c}_{i,t} + \varepsilon_{i,t}$$

where $\Delta N^{a}_{i,t}$ is the change over time in the log number of jobs in LLM *i* in the *a* (affected) sector and $\Delta N^{c}_{i,t}$ denotes the corresponding change in the *c* (causing) sector. In what follows, affected sectors are assumed to be either the nontradable sector or (a randomly selected part

[2] For the policy implications we discuss later, note that this methodology has the appealing feature that the exogenous variation comes from the tradable (industry) sector, which represents the sector towards which goes the bulk of the public money for regional policies (see: DPS, various years).

of) the tradable sector; the causing sector is assumed to be the tradable sector (or a randomly selected part of it) for which an exogenous variation for labor demand is identified by the instrument ($INST_{i,t}$):

$$(2) \qquad INST_{i,t} = \Sigma_j \, \omega_{j,i} \, \Delta N^c_{j,t}$$

where j refers to an industry in the tradable sector, $\Delta N^c_{j,t}$ is the nationwide change over time in employment in that industry, and $\omega_{j,i}$ denotes the LLM industrial shares (at the beginning of the period) of the tradable sector employment.

The instrumental variable is a derivation of the well-established shift-share approach introduced by Bartik (1991) and Blanchard and Kats (1992), and used in a number of leading papers afterwards, including Moretti (2010). The validity of the instrument relies on the fact that national shocks in individual industries of the tradable sector affect the local economies proportionally to the employment shares of those industries in the total employment. On the other side, both the national shocks and the lagged industry shares can be considered to be exogenous to LLM changes in employment over time. An example may be useful to clarify the intuition behind the identification stratgey: in the 2000s' the Italian textile industry has massively suffered from the Chinese competition. The employment in the sector has been drastically reduced and those LLMs which where highly specialized in textile have been of course affected most. Thus, those LLMs experienced an adverse shock in the tradable sector for reasons which can be considered independent from any other time-varying factor affecting the local economy.[3]

We use municipality-level Census data on employment – appropriately aggregated at the LLM-level following the definition based on year 2001 census (see Istat, 2005)[4]. As the aim of the paper is to inform policy, we try to extend as far as possible the time span of the data by using the ASIA (*Archivio statistico delle imprese attive*),dataset, which goes up to 2007. Note

[3] As we explain later, overtime changes are taken to be those referring to 1991-2001 and 1991-2007 while the beginning-of-period industrial structure is taken to be that at the 1991. As suggested by a referee, we could obtain a more exogenous instrument by using as initial industrial structure that at an even earlier period (e.g., 1981). As we checked, this possibility is precluded with the data at hand. As the sector classification is not fully comparable across Census releases, using 1981 data drastically reduces the strength of the instrument, as measured by the *F-statistic* of the 1st stage.

[4] We adopt the 2001 definition, rather than the 1991 one, as data for year 2007 are available only with the former definition. However, using the 1991 definition for the Census only sample delivers results similar to those presented.

that contrary to Census data – which are released at the ATECO[5] 5-digit – the ASIA dataset contains a much coarser industry classification, i.e., the ATECO 2-letters (this means, for example, that the tradable sector is divided in 14 industries only, as opposed to the 354 of the ATECO 5-digits). As a coarser industry classification might jeopardize the identification of the impact of EEST, we always supplement the results we obtain by using the Census-ASIA data (which extend over two time intervals: 1991-2001 and 2001-2007) with those obtained by using Census only (1991-2001). In both cases, we exclude education and the public administration from the service sector. The specifications based on the Census-Asia sample always include a dummy for the first time period.

Our unit of analysis is the Local Labour Market (LLM – *Sistema locale del lavoro* in Italian), which is a functional area (see OECD, 2002) based on the self-containment of commuting flows. The LLMs are defined by the Italian statistical office (Istat) on Census commuting data at the municipality level, following roughly the same criteria used to define the *Metropolitan Statistical Areas* in the US or the *Travel to Work Areas* in the UK. As highlighted in Menon (2011), commuting-defined areas present a number of advantages over administrative spatial units (say, municipalities or provinces). In particular, when labor market dynamics are at stake the adoption of administrative spatial units may lead to inefficiency (through spatial correlation in the error term) or even inconsistency of the estimates.[6]

According to the 2001 Census of Population, in Italy there are 686 LLMs, with an average population of 83,084, a standard deviation of 222,418 and a median of 33,966. The large number of very small LLMs (102 have less than 10,000 inhabitants) leads to high heterogeneity along several dimensions (density, total employment, share in tradables, etc.). This implies that our estimates might be biased by the presence of several outliers, which we struggle to identify ex ante. We cope with the problem by fitting the data with a two-stage robust regression (Lawrence and Arthur, 1990), which identifies the outliers in the first stage, and then down-weight them in the second stage.

4. Results

In Table 1, we start by showing the effect of EEST on nontradables for the nationwide sample of 686 LLMs. As for the Census-Asia sample, we find a positive and significant effect (point

[5] ATECO is the sectoral classification adepted by the Italian statistical office (Istat). Precisely, our data are aggregated according to the ATECO 1991 definition, which is comparable to the NACE rev. 1.1 classification up to the fourth digit.

[6] For further discussion on the choice of the appropriate spatial units, see Arbia (1989).

estimate =.08, s.e. = .02) for the overtime change in tradables on that of nontradables when model (1) is estimated by LS. Since this result might be biased due to the usual drawbacks related to omitted variables, reverse causality, and measurement error, we proceed with the IV estimation explained in Sect. 2. We find a strong first-stage relationship between the instrument and the overtime change in tradables (with a F-statistic value over 20). The second-stage results show that the IV coefficient is considerably smaller than its LS counterpart, with a point estimate even negative though not statistically significant. Although a coarser industry classification might imply a weaker first-stage relationship and (second-stage) inflated standard errors and weak instrument bias (Murray, 2006), when we move to the Census-only sample, for the which a more detailed classification is exploited, our findings are confirmed (while no gain in the first-stage estimate materializes). Note also that the estimated effect for the Italian case is remarkably lower than that estimated by Moretti (2010) for the US metropolitan areas, which is equal to 0.34 and it is highly significant.[7]

Due to the uneven development process, however, Italian nationwide estimates might mask substantial heterogeneity. For instance, the lack of nationwide effect could be due to a positive impact of EEST in the South – where, due to the high unemployment, the elasticity of labor supply is supposed to be higher – counterbalanced by a negative one in the developed Centre-North. We therefore provide the estimation results separately for the two areas. We find that the effect of EEST is basically zero in both of them (and irrespectively of the sample used).

[Table 1]

It could also be the case that the expansion of the manufacturing sector only affects those non-tradable activities that are more business related. We therefore replicate the analysis restricting our definition of the non-tradable sector only to transport, finance, real estate, informatics, telecommunications, and business services. With LS, we find indeed a stronger effect, as coefficients almost double. When we apply IV, however, the coefficient is still not significantly different from zero, which lead us to conclude that the effect is very weak. We do not report the results for brevity, but those are available from the authors upon request.

Then, we turn to the estimation of the effect of EEST on the tradable sector. Again, we follow closely Moretti (2010) and we randomly pick half of the tradable branches and we allocate them to the *causing* sector, while the other half is allocated to the *affected* sector. In such a

[7] Moretti's estimates imply that for each additional job in manufacturing in a city, roughly 1.6 jobs are created in the nontradable sector in the same city.

setting, however, the level of detail of the industry classification may lead to substantial differences. For instance, if one industry purchases inputs mostly from sectors close in the industrial-space (see: Rosenthal and Strange, 2004), than a coarser classification might bias downward our results, as these input linkages are not captured by the wider industries. Therefore, with the Census-Asia sample we might expect, beyond a reduced first-stage correlation, the estimated coefficients to be biased toward zero.

The results are depicted in Table 2. We find that LS estimates are positively biased. The effect of EEST is basically zero in the Census-Asia sample and negative and highly significant (except in the South) when we use the Census-only sample. Note also that, as documented by the F-statistic of the first-stage, the instrument works much better with a finer industry partition.[8]

We also estimate the impact of EEST by considering among the 686 LLMs only those - 156 of them - that are identified as industrial districts by the National Statistical Institute (see: Istat, 1991). As these clusters are in principle featured by a higher fraction of input purchased locally and greater agglomeration economies, theory suggests that we should find greater effects. Our results (not shown for brevity, but available from the authors), however, suggest that they are not different from those estimated for the totality of LLMs (although they are more imprecisely measured, also due to the smaller sample size).

All in all, our empirical results suggest that LS estimates are upwardly biased. That is, among the possible source of bias, that related to measurement error is not going to be not predominant, since it would have induced an attenuation bias. Therefore, the differences between LS and IV coefficients can be predominantly attributed to the role of endogeneity (i.e, an increase in employment in nontradables that affects the number of tradables jobs) and that of omitted variables correlated with the expansion (or contraction) of both the tradable and non-tradable sectors (for instance, changes in the effectiveness of local government, exogenous shocks on the labor supply, changes in endowments of local infrastructures).

[Table 2]

[8] Following a referee's hint, we did an additional robustness test by making the randomization *LLM-specific*. I.e., we created a full list of all the possible LLM-sector pairs, and we randomly assigned half of those to the "causing" group. By so doing, each sector is assigned to the causing (or affected) group only half of the time. This is equivalent to run 686 (the number of the LLMs in our sample) iterations of the sector randomization. The results we obtained are very similar to those currently reported in the paper.

5. Conclusions

We offer one policy implication and a number of possible explanations of the results.

The implication is related to regional policy. The payoffs of local industrialization policies depend on (i) the extent to which the intervention is effective in creating new jobs and (ii) the impact of the additional employment on other parts of the local economy; that is, the multiplicative effects. As for the Italian case, recent research has shown that the benefits under (i) are quite limited (see: de Blasio and Lotti, 2009), therefore suggesting that the benefits of regional policies could be scarce.[9] This conclusion, however, could be unwarranted in the case of positive effects under (ii), that is, if the new jobs will trigger additional employment in other sectors at the local level. As the evidence presented here suggests that multiplicative effects under (ii) are basically irrelevant, the consensus view – emerged in recent years – on the overall ineffectiveness of location-based policies remain undisputed (see: Accetturo and de Blasio, forthcoming), at least until the obstacles to multiplicative effects are effectively tackled by policy.

We therefore attempt to develop some plausible arguments explaining why the estimated effect of EEST is so low, and what policy makers should do to foster them. Comparing with the US, the difference relies in the impact for nontradables, as that for tradables is estimated to be null in both cases. It is interesting to note, however, that there is no impact on tradables also for the subset of LLMs that are identified as industrial districts; that is, the LLMs for the which theory suggests effects of greater magnitude. While this piece of evidence is consistent with other papers that have cast a shadow on the productivity gains of the Italian industrial clusters (see: de Blasio and Di Addario, 2005), it may also suggest that local multiplicative effects are hampered by nationwide factors.

We propose three candidates: excess regulation for the nontradables, lack of variability for wages, and additional obstacles to labor mobility.

Regulation of nontradebles. Compared to other OECD countries, Italy's economy is featured by a higher degree of anti-competitive regulation in the service sector (see: OECD, 2010). As highlighted by Barone e Cingano (forthcoming), the excess of regulation in nontradables impacts negatively on the performance of manufacturing (see, also, Viviano and Schivardi,

[9] According to Cannari et al (2007), the additionality measured by investment can be as high as 30% and 12% of the subsidies, respectively for the South and the Centre-North.

forthcoming). The lack of competition in the local markets for nontradables can be a reason behind our findings, as the increase in demand for local goods and services will be reflected in higher prices, rather than in greater quantities. An increase in the price of the local nontradables might also impact on the competitiveness of the tradables, as local services are also purchased by firms in the tradable sector.

Nationwide wage bargaining. As recently mentioned by the IMF (2011), Italy's wage setting system is an obstacle for job creation. Indeed, the current system implies that wages are hampered to react to local labor market conditions. This feature might have a role for our results in two respects. First, even where unemployment is high and persistent (i.e., the southern regions), the effect of EEST on the employment of the other parts of the local system might be constrained by wages well above their equilibrium level (see: Accetturo et. al., forthcoming). Second, the lack of adjustment of wages could impair labor mobility also across the LLMs located in developed areas, as local wages may not grow enough to attract workers from other areas. In turn, lower mobility decreases the elasticity of local labor supply, depressing the magnitude of local multiplicative effects.

Other obstacles to labor mobility. Beyond the role of wages, incentives to mobility are offset by other additional factors. As highlighted by Saraceno (1994) and Alesina and Ichino (2009), one reason is the "familism" of the system for the provision of welfare-related services. The family network in Italy offers most of the support for higher education, unemployment, and child- and elderly-care. Therefore, the spatial proximity to the family discriminates the access to a wide range of basic social services. Thus, migration opportunity costs are going to be very high as compared to the US (where the family network is much weaker) or other European countries (with a stronger welfare state not based on family ties). There is also evidence that labor mobility have been discouraged by the generous provision of public funds (government social transfers, which include unemployment benefits, social assistance, regular and invalidity pensions and health payments; see Brunello et al, 2001) and public sector jobs (Alesina et al, 1999) deployed in lagging (Southern) regions in the last decades. Finally, the real estate market might have also played a role, as the the housing price differential between richer and poorer areas has constantly increased from the mid-80's onwards (Cannari et al, 2000), due to the rigidity of housing supply.

Table 1. The effect of EEST on Nontradables

	Census-Asia: 1991-2001-2007			Census-only: 1991-2001		
	LS	IV		LS	IV	
		1st stage	2nd stage		1st stage	2nd stage
			Nationwide Estimates			
Δ jobs in tradables	0.079***		-0.085	0.049**		-0.249*
	(0.016)		(0.095)	(0.025)		(0.199)
Instrument		0.744***			0.378***	
		(0.116)			(0.080)	
Constant	0.182***	0.0221**	0.178***	0.047***	0.046***	0.045***
	(0.005)	(0.010)	(0.005)	(0.006)	(0.014)	(0.006)
Year f.e.	YES	YES	YES			
N. obs	1372	1372	1372	686	686	686
R square	0.211	0.030	0.199	0.006	0.032	0.005
F	182.6	21.50	169.7	3.868	22.45	3.115
			Estimates for Centre-Northern LLMs			
Δ jobs in tradables	0.123***		-0.132	0.0499		-0.270
	(0.023)		(0.274)	(0.034)		(0.530)
Instrument		0.433***			0.338***	
		(0.124)			(0.086)	
Constant	0.174***	-0.0185	0.162***	0.102***	0.032**	0.097***
	(0.005)	(0.011)	(0.010)	(0.006)	(0.014)	(0.007)
Year f.e.	YES	YES	YES			
N. obs	724	724	724	362	362	362
R square	0.123	0.028	0.088	0.006	0.041	0.007
F	50.51	10.45	34.94	2.160	15.56	2.532
			Estimates for Southern LLMs			
Δ jobs in tradables	0.054**		-0.154	0.056*		-0.213
	(0.022)		(0.134)	(0.034)		(0.603)
Instrument		1.048***			0.434***	
		(0.201)			(0.138)	
Constant	0.193***	0.062***	0.195***	-0.025***	0.064**	-0.024**
	(0.008)	(0.017)	(0.008)	(0.010)	(0.025)	(0.010)
Year f.e.	YES	YES	YES			
N. obs	648	648	648	324	324	324
R square	0.360	0.040	0.354	0.009	0.030	0.004
F	181.4	13.60	176.6	2.814	9.890	1.186

Notes: The dependent variable is the log change in the number of jobs in the non tradable sector. Census and Asia archive data. Robust regressions (Lawrence and Arthur, 1990). Standard errors (estimated by bootstrapping in the second-stage regressions) in parenthesis. * = p<0.10; ** = p<0.05; *** = p<0.01.

Table 2. The effect of EEST on Tradables

	Census-Asia: 1991-2001-2007			Census-only: 1991-2001		
	LS	IV		LS	IV	
		1st stage	2nd stage		1st stage	2nd stage
			Nationwide Estimates			
Δ jobs in tradables	0.107***		-0.468	-0.0119		-0.632***
	(0.032)		(-0.614)	(0.030)		(0.158)
Instrument		0.744***			0.515***	
		(0.237)			(0.077)	
Constant	-0.0926***	0.0428***	-0.0680***	0.00810	0.073***	0.007
	(0.011)	(0.009)	(0.019)	(0.011)	(0.017)	(0.010)
Year f.e.	YES	YES	YES			
N. obs	1370	1372	1370	686	686	686
R square	0.012	0.009	0.005	0.000	0.061	0.040
F	8.260	6.147	3.414	0.159	44.41	28.68
			Estimates for Centre-Northern LLMs			
Δ jobs in tradables	0.0752*		-0.583	-0.115***		-0.527***
	(0.044)		(-1.733)	(0.042)		(0.123)
Instrument		0.563**			0.473***	
		(0.236)			(0.080)	
Constant	-0.0894***	0.00354	-0.0866***	0.0218*	0.031*	0.0065
	(0.011)	(0.009)	(0.011)	(0.012)	(0.018)	(0.013)
Year f.e.	YES	YES	YES			
N. obs	724	724	724	362	362	362
R square	0.006	0.014	0.004	0.020	0.089	0.039
F	2.221	5.102	1.339	7.449	35.01	14.62
			Estimates for Southern LLMs			
Δ jobs in tradables	0.141***		-0.168	0.0565		-0.790
	(0.052)		(-9.405)	(0.045)		(1.898)
Instrument		0.994**			0.562***	
		(0.455)			(0.140)	
Constant	-0.0947***	0.0868***	-0.0681	-0.0117	0.119***	0.0179
	(0.020)	(0.015)	(0.057)	(0.019)	(0.030)	(0.020)
Year f.e.	YES	YES	YES			
N. obs	646	648	646	324	324	324
R square	0.016	0.025	0.005	0.005	0.048	0.046
F	5.346	8.113	1.699	1.558	16.06	15.42

Notes: The dependent variable is the log change in the number of jobs in a random selection of the tradable sector. Census and Asia archive data. Robust regressions (Lawrence and Arthur, 1990). Standard errors (estimated by bootstrapping in the second-stage regressions) in parenthesis. * = p<0.10; ** = p<0.05; *** = p<0.01.

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