

How to Develop the Periphery? : The Regional Integration Case of *Basso-Ferrarese* in Italy

N. Melloni
Oxford University

G. Palmieri
University of Macerata

A. Soci
University of Bologna

Abstract

This paper - a piece of the research output of the EU-funded project TERA - investigates the dynamics of development in the area of Basso Ferrarese, in Italy. The area is a relatively underdeveloped zone located in the otherwise wealthy Emilia Romagna. The first part of the paper identifies some area-specific factors affecting the poor economic performances of Basso-Ferrarese. In the second part, on the base of our findings, we run several CGE simulations focussing mainly on the potential impact of productivity gains. Finally, we discuss the policy implications of our results suggesting that investment in tourism and environmental and cultural heritage may allow for a more comprehensive path of development. Industrial development through productivity increase will have some positive effects which, however, will be mainly concentrated in relatively small areas.

• **JEL Classification:** R10, R11, R12, R23

*Corresponding address: Nicola Melloni: Oxford University, Department of International Development, Tel: +44 07817900163, Fax: +44 020 7320 1157, E-mai: nicola.melloni@qeh.ox.ac.uk. / Giovanni Palmieri: University of Macerata, Department of Studies in Economic Development Tel: +39 0733 1990263, Fax: +39 0733603452, E-mail: joe.vanni@gmail.com. / Anna Soci: University of Bologna, Department of Economics, and Cambridge University, Clare Hall. Tel: +39 051 2092617, Fax: +39 051 2092664, E-mail: anna.soci@unibo.it.

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I. Introduction

This paper is part of a large EU-funded research on the marginality of rural areas in Europe and their opportunities for development.¹ The paper presents and discusses the results obtained by the application of specifically designed CGE simulations to the Italian rural area of the “Basso-Ferrarese”. We use micro-data specifically collected in order to take into full consideration the local factors that play a key role for the development of the region.

In Section I, we briefly describe the Italian study-area and recall the first set of results obtained from previous simulations throughout the whole project. In Section II, we briefly describe the Italian study-area and recall the first set of results obtained from previous simulations throughout the whole project. In Section III we provide a new set of simulations where we take into full consideration the characteristics of the Italian territory so to offer a more precise view over the perspectives for the future development of the area. Results are discussed and evaluated. Section IV concludes by dealing with policy suggestions.

II. The Premises

A. The Italian study-area

The Basso Ferrarese is a rural area, which gathers 18 municipalities situated in the north-east part of the province of Ferrara.² Though located in the Emilia-Romagna region, one of the wealthiest regions of Italy and the one with the most distributed level of wealth, Ferrara represents an outlier in this successful story of development. Notably, Ferrara is the only relevant town not located around the “via Emilia”—a historic roman road going from Rimini to Milan that has been the main line of development of the region. Despite a number of public initiatives undertaken

¹The Project was funded within the 6th FP by the European Commission, and coordinated by Anna Soci. A brief description of the structure of the research project is provided in the Appendix, Section A.

²These 18 municipalities are: Ostellato, Masi Torello, Comacchio, Berra, Argenta, Portomaggiore, Iolanda di Savoia, Formignana, Goro, Codigoro, Lagosanto, Migliaro, Migliarino, Copparo, Massa Fiscaglia, Mesola, Ro Ferrarese and Tresigallo.

during the last decade by various national and European projects - and in particular the EU Objective 2 programme - the province of Ferrara still lags behind the rest of the region.

B. Previous results

During the initial stage of the EU project several sets of simulations (identical for all the case studied considered) were run on three models built on purpose for the research and implemented with real micro data gathered at the study-area level: a consolidated CGE model (Phimister *et al.*, 2007), a basic krugmanian NEG model (Marattin, 2007a), and a more innovative model (Mion, 2007) of the type sometimes called *New-NEG* model.³ The simulations aimed at capturing phenomena like migration (in and out), changes in infrastructural endowment, composition of demand, and policy intervention. The results for the Italian area confirmed that: i) the rural economy is highly dependent on agricultural subsidies; ii) tourism might be an important resource; iii) productivity is a key element; iv) in-migration, even of unskilled labour, is beneficial for the economic activity of the rural part. Noticeably, the labour- and infrastructure-simulations which were run on all the three models pointed to quite similar results. Since the models differ substantially in their theoretical structure, varying from perfect to monopolistic competition and to the endogenous selection of productive heterogeneous firms, we repute this outcome as particularly relevant and this result as quite robust.

III. The New Research

The new phase of the research, presented in this paper, intends to further the results briefly presented above. While previous simulations run on the Basso Ferrarese were part of a comparative work and discounted the necessity of having a common basis for comparisons among the six European areas involved, our aim here is to perform further simulations able to better capture the specific elements of this area such as its physical and social idiosyncratic features. This is the content of the paper.

A. Local factors

A more specific inquire into the territorial characteristics of the area (Melloni,

³See Bernard *et al.*, 2003; Melitz, 2003; Del Gatto *et al.*, 2006.

2008) identified population structure and unemployment, industrial backwardness, underdeveloped tourism and poor infrastructural endowment as the main weaknesses of the area. This paper aims at assessing whether they are also strategic fields of policy intervention to address the problems of underdevelopment. Both local official publications of the province of Ferrara and the considerations expressed by a pool of highly qualified policy-makers and technical experts interviewed on purpose, agreed that these important territorial phenomena should be taken into consideration in any meaningful analysis of this study-area.

First of all, the structure of the population and of the working force is of extreme relevance. As in Melloni (2007), the provincial occupational rate is on average 5 percentage points below the regional level; the unemployment rate albeit declining is still much higher than in the rest of the region, and female participation is the lowest in the region. The unemployment period is getting longer and longer inducing an exit from the labour force: therefore, an increase in the employment rate could be the result of a reduction of the labour force rather than an actual growth of employed people. The area is also interested by the worrying phenomenon of demographic decrease, while immigration of foreigners is still a marginal trend: immigrants represent a mere 3.5% of the population, against 6.5% of the Emilia-Romagna region. In particular, the demographic decrease in the whole province is mostly originated in the Basso Ferrarese. In short, the area is still depressed, albeit progressing in the last years.

Secondly, the relative backwardness of the industrial sector is another major concern. A large agricultural base is accompanied by a manufacturing sector that revolves around a single, large chemical pole and by a prevalently SME-based small industrial belt. Contrary to the experience of the industrial districts and the "Third Italy", however, industry in this area is not technologically modern and suffers of persistent problems of competitiveness.

Tourism, too, is underdeveloped, and only in recent time policy-makers started showing some interests in the sector. Despite a very favourable location - the province of Ferrara in general and the Basso Ferrarese in particular lay on the highly tourist-oriented Adriatic coastline, not far from Venice and the area of the Palladian "ville-venete" - mass-tourism tends to prefer the neighbouring provinces of Rimini and, to a lesser extent, Ravenna. This is due to historical as well as geographic reasons. Rimini is the capital of youth-tourism with a well developed leisure-industry, while Ravenna is well-known for family-vacations and has a sophisticated offer of Byzantine arts. On the contrary, tourism in the Ferrara area

has been more related to the presence of second-houses allotments that require fewer infrastructures and, consequently, fewer turnovers. Moreover, the presence of marshlands has represented a major obstacle for the development of a competitive tourism industry. More recent trends have seen the emergence of a new type of tourism, such as farmhouse holidays, potentially capable to attract new investment.

Finally, the present infrastructural endowment represents another urgent issue. As explained above, the very peculiar (and unfortunate) geographical position in the region Emilia-Romagna has contributed to the marginalisation of the entire province and of the Basso Ferrarese *in primis*. Resolving the issue of isolation has been pointed by local policy-makers as an essential step for the development of the zone. However, previous studies (Mion, 2008) have denied such urgency mainly on the assumption that a backward and non-competitive industrial sector would suffer once integrated with more productive areas.

B. Area-specific simulations

We run some further simulations to take into full consideration the specific factors just presented and we did that by using the CGE model only – less innovative than the others used in the project but whose structure allows for the key changes we are interested in.

The CGE model is the one provided by IFPRI⁴ and the reader is referred to it for a full mathematical statement. As far as the overall methodology is concerned, social accounting matrices (SAMs)⁵ were created for the purposes of the project and the standard IFPRI model was made consistent with those SAMs in the calibration process. The model has a production block based around activities with a structure allowing for multiple outputs, which was considered important given the nature of the agricultural sector and level of disaggregation of the model (and SAMs). Each activity uses composite commodities as intermediate inputs through fixed Input-Output (I-O) coefficients and value added is a CES function defined over factors of production which are spatially specific. Profit maximizing behaviour is assumed. The factor markets can be either neoclassical in style or Keynesian. The aggregate domestic output is the aggregation from the (imperfectly substitutable) output of different (spatially distinct) activities of a given commodity, according to a standard CES function. Activity-specific commodity prices clear the

⁴See Lofgren *et al.*, 2002.

⁵The methodology used and the data collection process for the Italian SAM are illustrated in the Appendix, Section B.

market. The aggregated output is then allocated between domestic sales and exports on the basis of few hypotheses. Domestic demand is usually defined and to the extent that a commodity is imported it is for a composite commodity made up of imports and domestic output with some imperfect substitutability. The institutions are represented by households, the government and the “rest of the world”, all behaving the usual text-book way. Finally, there are three macroeconomic balances: the government balance, the external balance and the savings-investment balance each having alternative closure rules. Moreover, an assumption about the labour market has to be assumed: i) the full-employment case; ii) the possibility of unemployment; iii) fully segmented labour markets.⁶

Since the first set of simulations run in the common stage of the research were under the hypothesis of savings-driven investment and of fixed labour supply and flexible wage, no autonomous investment was possible and there was no underutilization of the labour force. Capital as a factor of production was kept fix too and was activity-specific. Given the labour market situation of the Basso-Ferrarese featured above, we decided to question the appropriateness of these assumptions, especially full-employment. Accordingly, we chose to modify the framework by relaxing the full employment hypothesis⁷ and also by switching to an investment-driven “closure rule” of the CGE model in order to be able to alter the amount of investment in the area.

In this “new” CGE model we run those simulations able to capture some other territorial-specific factors, such as low productivity, which is the major problem affecting the area (Pouliakas *et al.*, 2007, Marattin, 2007b, and Mion, 2007). We modulated our simulations starting with a test on total factor productivity. Then, we moved to the production factors: capital and labour. As for the former, we investigated the role of new investment in the Construction and Transport sectors so to evaluate the responsiveness of the economy to changes in infrastructure, though broadly defined. As for labour, we inquired about the impact of an increase in the skilled-labour demand in the most relevant sector within each macro-sector (Food Processing for the Primary, Manufacturing for the Secondary, and Finance for the Tertiary). Finally, we tested the impact of productivity gains in the Tourism sector.

We comment the results looking at i) the effects on a set of relevant variables at the area-level, and ii) the effects on the economic activity (GDP and Domestic

⁶For the equations describing the labour-market, see Appendix, Section C.

⁷In terms of the model, this meant to select the first alternative to the basic model version closure rule. See again Appendix, Section C.

Activity, henceforth DA⁸) in the Urban and Rural part of the area, which represent, respectively, our core and periphery.⁹

1. Total factor productivity

The first simulation is a uniform 10% increase in the sectoral total factor productivity, implemented through a numerical alteration of the efficiency parameter α_a^{va} in the value added and factor demands equation

$$QVA_a = \alpha_a^{va} \cdot \left(\sum_{f \in F} \delta_{fa}^{va} \cdot QF_{fa}^{-p_a^{va}} \right)^{\frac{1}{p_a^{va}}} \quad \alpha \in A \quad (15)$$

$$\left[\begin{matrix} \text{quantity of aggregate} \\ \text{value added} \end{matrix} \right] = CES \left[\begin{matrix} \text{factor} \\ \text{Linputs} \end{matrix} \right]$$

The columns in Table 1. rank the sectors¹⁰ according to the effects that the

Table 1. Results of the shocks in productivity ranked by magnitude (all % variations). Sectoral and spatial disaggregation

+10% Productivity		Urban Manufact	Urban Finance	Rural Trade	Urban Trade	Rural Finance	Rural Manufact
Employment	Unskilled	39.70	13.24	8.42	6.37	2.56	4.03
	Skilled	35.60	17.32	6.59	6.32	4.99	3.55
Consumption		38.05	16.51	7.26	6.65	4.27	3.94
Exports		40.55	15.18	5.76	5.65	3.70	4.02
Imports		23.84	13.16	6.06	5.82	3.11	2.57
real GDP		34.61	15.24	6.57	5.98	4.05	3.53
<i>Urban</i> real GDP		41.03	18.65	3.89	7.60	1.58	1.90
Sectors	Primary	19.83	8.62	4.63	4.20	2.10	2.35
	Secondary	58.96	9.17	4.87	4.70	1.93	1.55
	Tertiary	20.39	30.23	2.70	11.16	1.15	2.30
<i>Rural</i> real GDP		21.28	8.17	11.14	1.58	9.19	6.95
Sectors	Primary	26.48	14.33	1.63	1.17	3.59	3.00
	Secondary	10.72	7.49	4.12	3.92	1.55	27.67
	Tertiary	22.76	6.72	15.58	1.05	12.76	2.38
real DA		31.06	14.18	6.01	5.81	3.45	3.17

⁸Noteworthy stressing that the variable DA - which measures total production - may be a relevant indicator when performing regional analysis.

⁹Within our study framework, Ferrara - the Urban part - is the core, and the Basso Ferrarese - the Rural part - is the periphery.

¹⁰Only the sectors with the greatest impacts are presented in Table 1: Urban and Rural Manufacturing, Urban and Rural Trade, Urban and Rural Finance.

increase in their productivity has on some selected main variables: employment - both skilled and unskilled - private consumption, exports and imports, real GDP, and real DA. Table 1. shows also the effects of these simulations on the sectoral¹¹ and spatial disaggregation – as our modelling strategy suggests – of the real GDP. We also present the effects on the real DA, that is to say the sum of intermediate goods and of final production, only when any significant discrepancy exists with the GDP.

Looking at the results, we notice that the most relevant effects derive from the sector of Urban Manufacturing. Increased productivity in Urban Finance has a less significant impact on GDP and DA, yet the positive effects are still considerable. Table 1 reveals two unsurprising trends. The spatial disaggregation (urban-rural) suggests that, as expected, the shock in total factor productivity in Urban sectors have larger effects in the Urban part than in the Rural one, and vice versa. We noticed only one exception: in the Rural area the effects on GDP of an increase in productivity of Urban Manufacturing are larger than those originating from Rural Manufacturing. Though this might also be due to the fact that Urban Manufacturing has the largest overall effect, we argue that Rural Manufacturing is a sector with scarce impact-factor on the periphery. This is confirmed by other results: increases in the total factor productivity of Rural Trade and Rural Finance have both a greater effect on *Rural* GDP than an equal increase in Rural Manufacturing. The second trend is that changes in Urban sectors affect the global GDP much more than their Rural counterpart. This is again not surprising given the quantitative prominence of the Urban part. However, the Trade sector contradicts this pattern in so far as increases in the productivity of Rural Trade have larger effects on global GDP than those of Urban Trade, implying its importance for the development of the area. Both trends hold for the wide majority of sectors as our investigation - not reported for convenience in the text - reveals.

2. Capital

As far as capital goods are concerned, our aim is to shed some light on the role of technical progress. In the first counterfactual (the “only new capital” case) we simply modelled a 10% investment in Machinery¹², a broad proxy for “innovation”.

¹¹The sectoral disaggregation refers to the three macro-sectors: primary (agriculture), secondary (industry), and tertiary (services).

¹²Noteworthy, following the rules of the National Accounting, investment in Machinery does not mean investment in the manufacturing sector: it means having more machinery in the economy. In other words, investment is a commodity (machinery) that any sector in any location (Urban and Rural) can acquire.

Table 2. Shock in investment (*all % variations*).
Sectoral and spatial disaggregation

+10% Investment		Machinery	Construction
Employment	Unskilled	-0.20	0.62
	Skilled	-0.22	0.53
Consumption		-0.46	0.20
Exports		-0.16	0.47
Imports		-0.20	0.27
real GDP		0.00	0.46
<i>Urban real GDP</i>		0.00	0.55
Sectors	Primary	- 0.04	- 0.11
	Secondary	0.00	0.86
	Tertiary	0.01	0.21
<i>Rural real GDP</i>		- 0.01	0.25
Sectors	Primary	- 0.09	- 0.01
	Secondary	- 0.01	0.67
	Tertiary	0.02	0.21
real DA		- 0.17	0.45
<i>Urban real DA</i>		- 0.14	0.52
Sectors	Primary	- 0.24	- 0.09
	Secondary	- 0.09	0.94
	Tertiary	- 0.19	0.15
<i>Rural real DA</i>		- 0.23	0.28
Sectors	Primary	- 0.36	0.01
	Secondary	- 0.11	0.83
	Tertiary	- 0.22	0.21

The results are not impressive: investment in Machinery has a negative effect on the main variables, which represents the well known (short-run) substitution to labour effect widely explained in the literature (Kalecki, 1939; Ricottilli, 2008); Sylos Labini, 1984). Moreover, the very structure of the CGE model necessarily underestimates the impact of new capital goods since investment hits the economy through time.¹³

The Table reveals that the negative effect hits only the primary sector of both Rural and Urban GDP. The same effect is present and more relevant in Rural and Urban DA, where all the three sectors are closely affected.

¹³CGE are one-period models and do not allow for long-run effects.

To evaluate the role of technical progress, in the next simulation we coupled investment in Machinery with an increase in the total factor productivity of Urban Manufacturing. This time however, we augmented the shock in investment in Machinery, now 25%, in order to check whether the negligible effect previously obtained might be due also to an insufficient stimulus. Notwithstanding the larger amount of investment, it is nevertheless the increase in productivity and not the presence of more capital goods to be responsible for the positive result. The effects of this new simulation (Table 3) are quite impressive, both in the aggregate and disaggregate versions (overlapping for GDP and DA). Whilst the greatest effect in the Urban part is concentrated in the secondary sector – where Urban Manufacturing is located and the increase in productivity occurs – the main effects in the Rural part take place in the primary and tertiary sectors. It is worth noticing that this is the simulation that affects the periphery the most.

As a general conclusion, new and more innovative capital goods, proxied by investment in Machinery, do not have any short-run effect whether accompanied or not by productivity gains.

Table 3. Shocks in “innovative” investment and in the productivity of the Urban Manufacturing sector (*all % variations*)
Sectoral and spatial disaggregation

		+25% investment in Machinery	+5% total productivity of Urban Manufacturing	Previous coupled
Employment	Unskilled	-0.49	17.09	16.60
	Skilled	-0.54	15.50	14.96
Consumption		-1.14	18.05	16.94
Exports		-0.40	17.47	17.06
Imports		-0.50	10.63	10.15
real GDP		-0.43	15.01	14.58
<i>Urban</i> real GDP		-0.37	17.62	17.25
Sectors	Primary	-0.60	9.39	8.83
	Secondary	-0.21	24.79	24.55
	Tertiary	-0.55	9.36	8.84
<i>Rural</i> real GDP		-0.56	9.59	9.05
Sectors	Primary	-0.85	12.30	11.47
	Secondary	-0.21	4.41	4.21
	Tertiary	-0.57	10.27	9.71
real DA		-0.42	13.63	13.22

We replicated the first simulation only (a plus 10% investment) for the commodity Construction (see again Table 2). We selected it since it also includes (and may be regarded as a proxy of) infrastructure,¹⁴ though the word should be interpreted in a broader sense than simply “construction of roads”, as Gruber and Marattin (2006) already stressed.¹⁵ Other simulations not reported here confirm that investment in Construction always has beneficial effects, but their magnitude is

Table 4. Shocks on Tourism and on “soft” investment (*all % variations*)
Sectoral and spatial disaggregation

		+ 10% Productivity of Rural Tourism	+ 10% Productivity of Urban Tourism	+ 10% Productivity of both Tourism sectors coupled with a + 33% “soft” investment
Employment	Unskilled	3.40	2.25	6.17
	Skilled	3.26	1.35	5.14
Consumption		3.67	0.95	4.41
Export		3.13	2.48	6.02
Import		2.29	0.79	3.32
real GDP		3.27	1.63	5.35
<i>Urban</i> real GDP		1.06	1.84	3.18
Sectors	Primary	0.95	0.98	2.14
	Secondary	1.37	0.37	1.72
	Tertiary	0.71	3.60	4.95
<i>Rural</i> real GDP		7.89	1.21	9.90
Sectors	Primary	2.53	1.02	3.39
	Secondary	1.04	0.38	1.52
	Tertiary	11.17	1.48	13.91
real DA		2.77	2.13	5.32
<i>Urban</i> real Domestic Activity		1.08	2.59	3.99
Sectors	Primary	0.93	1.00	2.13
	Secondary	1.35	0.37	1.70
	Tertiary	0.83	4.66	6.14
<i>Rural</i> real DA		6.54	1.10	8.29
Sectors	Primary	2.70	1.12	3.64
	Secondary	1.10	0.43	1.62
	Tertiary	9.49	1.30	11.89

¹⁴In the SAM we built for the Basso Ferrarese (see Galassi, 2006), the data strictly resembles the structure at the national level where infrastructural endowments (both private and public) account for approximately 1/3 of construction.

¹⁵For example, improvements in ICT and integrated logistic services are paths to explore, since they reduce transaction (and trade) costs with a relative low financial effort (Kilkenny, 1998).

again small. The effect generated by an increase in investment in Construction is greater for Urban GDP and relates almost exclusively to the secondary sector for both Rural and Urban parts. The lack of any effect on the other sectors might indicate a negligible role of infrastructure in the development of the area, or the inadequacy of Construction as a proxy for infrastructure, or, as before, the inability of the model to capture long-term effects. More work on this issue should be done.

3. Tourism

In the last set of counterfactuals we turned our attention to Tourism, and we performed a 10% increase in the total factor productivity of Rural Tourism and of Urban Tourism. Since Tourism is an activity that hinges upon many other sectors, we added a further simulation where a 10% increase in the productivity of both Rural and Urban Tourism is coupled with a 33%¹⁶ increase in investment in Transport, Retail Trade, and Finance sectors, which are supposed to heavily influence consumer prices. We dubbed it “soft” investment in opposition to “hard” investment in Machinery and Construction.

The overall results are impressive. In the first two simulations the level of economic activity and employment reacts positively, consumption increases and the net exports of the area improve. These results are magnified when “soft” investment is added to the two simulations. However, interestingly, the results from the “coupled case” for the Rural part do not represent a substantial improvement when compared with the previous case. Rural GDP moves from a growth of 7.89% in the uncoupled case to +9.90% in the coupled one (a further increase of “only” 23%). Moreover, it greatly differs from what happens in the core, where the presence of “soft” investment almost doubles the effects on Urban GDP of the augmented productivity of Urban Tourism (from 1.84% to 3.18%, a further increase of 73%). This seems to suggest that periphery is affected much less by indirect *stimula*, *i.e.* changes in sectors linked to tourism, and that it is the Rural Tourism productivity alone to play the decisive role.

The disaggregation of the DA tells that the effects are less relevant (though quantitatively important) than in the GDP case, thus revealing the predominance of the final demand over the intermediate one.

¹⁶This figure is the weighted average of a 50% increase in Retail Trade and Transport, and a 20% increase in Finance. We arbitrarily chose such conspicuous amounts since these commodities have a low base-values and represent an “easy” investment with respect to others.

Table 5. “Infrastructure sector” response to an increased skilled labour demand

	+ 10% skilled labour Urban sectors only		+ 10% skilled labour Urban and Rural sectors	
	Skilled	Unskilled	Skilled	Unskilled
Rural Transport	-	+272%	+4%	-73%
Rural Construction	-36%	+81%	-28%	+50%

4. *Skilled labour demand*

In the counterfactuals run in this section, we simulated a simultaneous 10% increase in skilled labour demand by the three sectors which are the most important within each macro-sector: Food Processing¹⁷ for the primary, Manufacturing for the secondary, and Finance for the tertiary sector.¹⁸ We have hypothesized these increases as either happening only in the core or in the core and periphery simultaneously. In our opinion, these simulations represent both a substantial – and feasible – stimulus to the economy of the area, and a reasonable response to the problem of the scarcity of qualified labour force and the consequent issue of low productivity.

However, the increased demand for skilled labour affects only marginally aggregate real variables – as GDP, DA or demand – and distributive ones, such as factor and households income. Therefore we do not present any general result Table. Relevant changes instead take place in the allocation of labour force and in the sectoral wages. Given the large number of interrelations, the amount of changes produced by these simulations is very large and makes difficult the summing up of the outcomes. Since, as recalled above, we are particularly interested in infrastructure-related sectors, we decided to present the results only for the Transport and Construction ones, in order to provide another piece of evidence about their potential relevance for the development of the area.

Table 5. illustrates the response of these sectors in the rural part only, since the periphery seems more in need of infrastructural development, and the results in the core are less interesting, and lack coherence. The rural area seems unable to attract skilled labour force and ends up hiring overall more unskilled labour. However, we

¹⁷Food Processing is considered important for the primary sector because it uses mostly domestic agricultural commodities as its own input.

¹⁸In terms of the model this means being in the fully segmented labour market-case because we are confronted now with an exogenous labour demand for a specific type of labour which can receive a differentiated wage. Hence, we chose the second alternative closure rule. See again Appendix, Section C.

can notice that the results depend on the geographical origin of the shock: when the increase in skilled labour demand happens only in the core (specifically, in the Food Processing, in Manufacturing, and in Finance), the Transport sector in the periphery hires unskilled labour; when the shock happens also in the periphery, it hires also some skilled labour. In other words, the periphery reacts more beneficially when the shocks originate also in its own area. As for the Construction, the outcome for the periphery is always an increase in the unskilled labour at the expense of skilled labour. In conclusion, a trend seems to emerge in which a stimulus, albeit an indirect one, does neither qualitatively develop the infrastructure sector nor leads it to assume any strategic relevance in supporting the boost of the economy.

IV. Policy Implications

A. An interpretation of the results

The results discussed above reveal that the Basso Ferrarese is affected by a structural problem of competitiveness related in particular to low productivity. New capital goods do not play any significant role (at least in the short run) for the development of the region and investment need to be coupled with either more skilled labour or higher productivity to become relevant.

Sectoral productivity changes have positive effects, and Urban Manufacturing has the most relevant impact in both the core and periphery. However, subsequent economic development is unbalanced, since the Urban (and richer) part grows more than the Rural one, thus enhancing a diverging pattern. Productivity gains in Rural Manufacturing have minor effects also in the Rural part where, instead, changes in Finance and Trade have larger impact. Shocks performed in both these sectors favour convergence and, in particular, productivity increase in Rural Trade outperforms those in Urban Trade.

Tourism turns out to be a key activity for the development of the area. Higher productivity in Rural Tourism – both in itself and coupled with the same shock in the Urban Tourism and “soft” investment – enhances economic growth and fosters the convergence of real GDPs.

Last but not least, infrastructure. There is a general consensus in the developmental literature about the positive role of infrastructure. Our result does not seem to confirm it. This may be due to the fact that the model does not have a specific sector reflecting the infrastructure and we had to rely on a proxy.

Nonetheless, this unexpected result is confirmed also by other recent pieces of literature on the area, such as Mion (2008).

B. Policy suggestions

Given the results, a general productivity increase should be the main target for the development of the area.

As far as industry is concerned, this might be achieved through the enhancement of technological innovation in already existing business activities and/or the attraction of technologically advanced new firms. In both cases, we showed that new physical capital is not sufficient by itself and, at the same time, that an increased demand of skilled labour has no significant impact on growth perspectives for the region. Yet, indeed, technological progress implies a series of changes, including more modern capital and skilled labour whose effect will become visible in future years. The model is unable to capture long term effects but these should be taken into consideration, of course, in policy interventions. Policy makers should be aware of the main indication of this study – increase productivity! – and they should intervene to address this problem. Productivity can be increased by a combination of new “innovative” capital and skilled labour supported by important public investment in housing, urban/rural planning and development, as well as close collaboration between local authorities, the private sector and the University of Ferrara. The ability to attract innovative firms, potentially favoured by the huge differentials in land costs between the Basso Ferrarese and the Emilia-road, is strictly related to a far-reaching infrastructural policy . Also in this case, it is to be noted that infrastructural investment alone is not sufficient, as our results reveal. Thus, the key point is, indeed, to undertake a combination of different policy actions able to boost productivity. An ideal solution would be to combine labour market intervention with transport and communication policies.

Though the manufacturing sector plays a prominent role, the area represents an economy in which the tertiary sector might be the key variable for development. This is feasible insofar as productivity shocks are much easier to obtain in service-sectors, since sunk costs and mark-up pricing are less important than in manufacturing activity. More specifically, the area of Basso Ferrarese would greatly benefit from a better functioning financial- and trade-system. Transaction costs seem to represent a major obstacle to development. Financial intermediation costs must be reduced to let the financial- and trade-system act as a catalyst for the economic activity, and not as a brake. Its better performance spreads benefits to

other activities, and particularly the rural ones. Moreover, lower transaction costs seem to be easier to achieve than a manufacturing upsurge, because services are more flexible and do not require a great amount of investment.

Tourism is an activity of particular interest. As recalled above, the area has huge potentialities, being very close to some areas (Ravenna, Venice, the Po river mouth) which already attract mass tourism. In this sector, it seems that selected investments and increased productivity, especially in the area of rural tourism, can greatly benefit the economy of the Basso Ferrarese. Some specific interventions can be made immediately since the area still has a very poor receptive capacity that can be easily and costless improved. Rural tourism is just a great opportunity that needs to be exploited: growth in this sector may prevent the depopulation of the whole area by employing local labour force, which in turn can preserve the fragile environmental ecosystem of the Po-mouth. Moreover, it can help to recover the monumental and architectural endowment of such a natural area (Melloni, 2008) and also to promote investment in food-farming high quality products: that is what Gruber and Soci (2006) called “intelligent agriculture” as a key issue in rural development. Investments in “le vie del sapore” (“taste paths”) are strictly related to the exploitation of territory’s potential, together with the environmentally friendly tourism in the park of the Po *Delta*. The goal is to transform the tourism offer present in the province of Ferrara, and especially in the Basso Ferrarese. These investments may represent a huge resource for the development of the zone. World demand of tourism is changing, being the typical vacation now shorter – often week-end based – and directed toward specific targets (nature, food, wine, biking). A more efficient marketing needs to be provided, especially to win the lack of confidence of the average Italian tourism in relatively unknown zones. Needless to say, a more modern infrastructural endowments – such as the realisation of the motorway “E55” leading to Rome from the Adriatic coastal side – is indispensable to facilitate the accessibility of these zones .

Local institutions are already actively engaged to resolve some of these problems. The developmental strategy envisaged by the regional directives – with the fundamental contribution of EU Structural Programme Objective 2 – is mostly directed toward an enhancement of the productivity in the secondary sector, and only partially in primary and tertiary sectors. Development is considered a quasi-synonymous of industrial growth (Melloni, 2007).

We think differently. We repute that industrial development needs to be concentrated in selected zones, while the rest of the area would benefit more from

different activities, mainly in the tertiary sector, such as Tourism and Trade and Finance. This approach implies a strategic view based more on a top-down decision-making in order to avoid the preponderance of local interests. Industrial concentration favours economies of scale, labour pooling advantages, diffused spill-over, and easier access to the core. In the rest of the periphery, we argue that tourism and environmental and cultural heritage should be preserved and enhanced.

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Appendix

A. Outline of the project TERA

TERA is a project financed by the EU within the 6th FP, in the thematic area of the scientific support to policy.

The project set out to inquire into what provides the main ground for the creation, development and survival of enterprises in rural areas, with the aim of i) identifying the relevant economic factors; ii) measuring their influence; iii) assessing the current policies; iv) proposing new policies.

Each country selected its own study-area on a common basis of indicators. Two models were designed specifically for the project: a CGE model and a NEG model. A third existing model – a New-NEG model – was applied to the areas as well. All the models were implemented with real data and were duly calibrated using all the information available. The data were collected as a result of broad fieldwork in addition to the (scant) official data existing at that level of disaggregation. Six social accounting matrices were built for the six study-areas. Several common simulations, and some area-specific simulations, were run on the models. The results obtained were confronted with the current policies, expressly reviewed at supranational, national and local level. New policy prescriptions were ultimately provided.

The project lasted three years. The institutions participating in it were: the Department of Economics in the University of Bologna, acting as the coordinator, the Business School in the University of Aberdeen, the Department of Economics and Management in the University of Helsinki, the Department of Economics in the University of Patras, the Latvian State Institute of Agrarian Economics in Riga, and the Institute of Agricultural Economics and Information (the former Institute of Agricultural Economics) in Prague.

The project web-site is: <http://www2.dse.unibo.it/tera>

B. Data collection for the local SAM

In the OECD definition a social accounting matrix (SAM) is a means of presenting the SNA accounts in a matrix which elaborates the linkages between a supply-and-use table and the institutional sector accounts. The construction of a SAM is a complex process at both national and local levels¹⁹ and our case was no exception. The data which is not directly available is generally provided through the *regionalisation* process – often adjusted by an *informed* rule of thumb – integrated with a *superiorisation* approach, which is a focussed research for local data. A final *balancing* of the Sam is made in order to cope with the odd totals coming from differences in the information sources, using the RAS method.²⁰

The procedure used to get our local data through regionalisation was of the GRIT (Generation of Regional Input-Output Tables)²¹ type starting from the last available national matrix (2003). The constellation of regional data obtained from

¹⁹See, among others, Stone and Brown (1962), and Pyatt and Round (1985).

²⁰See Stone (1961) and Bacharach (1970).

²¹See Jensen *et al.*, 1979.

direct sources or through this regionalisation process was successively “*superiorized*” through a specifically organized field-work. For the Business sector, a sampling frame of 31,493 firms was built starting from the records of the Ferrara CCIAA (the local Chamber of Commerce Industry, Artisanry and Agriculture), which include details of firms’ sector of activity, location and annual balance sheet. Accordingly, the breaking down of the firms is as follows: 10,411 in the urban area and 21,082 in the rural area; 11,618 in the primary sector, 9,422 in the secondary sector (including construction), and 11,643 in the tertiary one; 27,748 are partnerships and 3,745 are limited liability corporations. Having organised the CCIAA records by location, sector and corporate form, simple random sampling was applied in each category until we obtained a proportion of firms that was as close as possible to the overall population proportion. Once the sample was obtained, it was presented to the personnel of the Provincial statistical office so as to check that no important sectors in the provincial economy had been left out or significantly under-represented. This could potentially happen if a sector happened to consist of a small number of large firms, hence resulting in a low weight in the CCIAA data base and therefore in the sample. With one exception (a large chemical firm, which was added), this was believed not to be the case, confirming that our sampling procedure provides an accurate image of the local economy. We ended up with a sample size of 150 rural firms and 100 urban ones. As for Households, up-to-date demographic records are kept by the provincial Statistical Office which receives in real time population movement information from each municipality. At the end of 2005, 45,676 households were located in urban areas and 74,180 in rural areas for a total of 287,654 people. The population for both rural and urban areas is scattered over a wide district with a large number of “agro-towns”, which implies the availability of large resources to carry out a series of interviews. Therefore, we relied on local mayors’ offices to introduce us to individuals who might be willing to take part in our survey. The mayors were in all cases very helpful and we obtained full co-operation from municipal authorities. However, the same cannot be said of the respondents who, when contacted by telephone to set up an appointment, were unwilling to agree to take part in the survey. Even when personal contact could be made, respondents often refused to answer a large number of questions or cut off the interview short of completion. This led us with only 51 (0,04% of all Households) questionnaires completed on a face-to-face interview basis, of which 19 are from the rural areas and 32 from the urban area.

C. Closure rules in the labour market

Lofgren *et al.* (2002) describe the labour market in the following way.

“The factor demand (is given by):

$$WF_f \cdot \overline{WFDIST}_{fa} = PAV_a \cdot 1 - tva_a \cdot QVA_a \cdot \left(\sum_{f \in F'} \delta_{fa}^{Va} \cdot QF_{fa}^{-\rho_a^{Va}} \right)^{-1} \cdot \delta_{fa}^{Va} \cdot QF_{fa}^{-\rho_a^{Va} - 1} \quad \begin{matrix} a \in A \\ f \in F \end{matrix} \quad (16)$$

$$\left[\begin{matrix} \text{marginal cost of} \\ \text{factor } f \text{ in activity } a \end{matrix} \right] = \left[\begin{matrix} \text{marginal revenue product} \\ \text{of factor } f \text{ in activity } a \end{matrix} \right]$$

where

- $f \in F (= F')$ = a set of factors,
- tva_a = rate of value-added tax for activity a,
- α_a^{Va} = efficiency parameter in CES value-added function,
- δ_{fa}^{Va} = CES value-added function share parameter for factor f in activity a,
- QF_{fa} = quantity demanded of factor f from activity a,
- ρ_a^{Va} = CES value-added function exponent,
- WF_f = average price of factor, and
- \overline{WFDIST}_{fa} = wage distortion factor for factor f in activity a (exogenous variable).

..... According to equation (16), activities demand factors at the point where the marginal cost of each factor (defined on the left-hand side as the activity-specific factor price) is equal to the marginal revenue product (net of intermediate input costs) of the factor”.²²

The labour supply QFS_f is fixed and the equilibrium condition is given by eq. (39):

$$\sum_{a \in A} QF_{fa} = \overline{QFS}_f \quad f \in F \quad (39)$$

$$\left[\begin{matrix} \text{demand for} \\ \text{factor } f \end{matrix} \right] = \left[\begin{matrix} \text{supply of} \\ \text{factor } f \end{matrix} \right]$$

“Equation (39) imposes equality between the total quantity demanded and the total quantity supplied for each factor. In the basic model version, all demand variables are flexible while the supply variable is fixed. The factor wage, WF_f , is the equilibrating variable that assures that this equation is satisfied: an increase in WF_f raises the wage paid by each activity, $WF_f \cdot \overline{WFDIST}_{fa}$, which is inversely related to the quantities of factor demand, QF_{fa} . All factors are mobile between the

²²See Lofgren *et al.* (2002), pp. 25-26

demanding activities.

Two other factor-market closures are programmed in the GAMS version (italics and numbering added).

1) To specify the case with unemployment at a given wage for a factor, the supply variable for the factor (QFS_f) is unfixed while its economy wide wage (\overline{WF}_f) is fixed. The model remains square (one endogenous variable is added but another is removed). Each activity is free to employ the quantity it desires (QF_{fa}) at a fixed wage ($\overline{WF}_f \cdot \overline{WFDIST}_{fa}$). The free supply variable, QFS_f , records the total employment level.

2) Alternatively, to specify the case of a fully segmented factor market with fixed factor demands the variables for factor demand and the economy wide wage are fixed (written \overline{QF}_{fa} and \overline{WF}_f) while the variables for supply and wage distortions are unfixed (written QFS_f and \overline{WFDIST}_{fa}). The model again remains square - that is, the economy wide wage variable and a set of activity-specific factor-demand variables are fixed while the supply variable and a set of activity-specific wage-distortion variables are unfixed. Activity-specific wages, $\overline{WF}_f \cdot \overline{WFDIST}_{fa}$, vary to assure that the fixed activity-specific employment level, \overline{QF}_{fa} , is consistent with profit-maximization (compare with equation 16). Also for this formulation, the endogenous aggregate factor supply variable merely records the total employment level".²³

In terms of implementing the model, the closure rules imply that some variables are fixed and some are flexible. Thus, any change with respect to the basic model version – where the quantity supplied of factor f (QFS_f) and the wage distortion factor for factor f in activity a ($WFDIST_{fa}$) are fixed, while the average price of factor f (WF_f) and the quantity demanded of factor f from activity a (QF_{fa}) are flexible – implies a switch for the variables in order to keep the model square, as reported in the scheme below.

	Fixed variables	Flexible variables
Basic model version closure rule	$QFS_f, WFDIST_{fa}$	WF_f, QF_{fa}
Alternative 1	$WF_f, WFDIST_{fa}$	QF_{fa}, QFS_f
Alternative 2	WF_f, QF_{fa}	$QFS_f, WFDIST_{fa}$

²³See Lofgren *et al.* (2002), pp. 35-36