dECON
Departamento de Economía
Facultad de Ciencias Sociales
Universidad de la República

Documentos de Trabajo

Vertical Fiscal Transfers and the Location of Economic Activity across a Country Regions. Theory and Evidence for Argentina.

P. Moncarz, S. Freille, A. Figueras y M. Capello

Documento No. 24/10
Noviembre 2010

ISSN 1688-5031

Vertical fiscal transfers and the location of economic activity across a country regions
Theory and evidence for Argentina[(*)]

P. Moncarz[†], S. Freille[† ¥], A. Figueras[†], and M. Capello[† ¥]

[†] *Universidad Nacional de Córdoba*

[¥] *IERAL de Fundación Mediterránea*

[¥] *CONICET*

Argentina has an important system of vertical transfers with a compensatory aim including the convergence across sub-national regions. However, there still exist high levels of asymmetries among the country provinces. Extending Martin and Rogers' FCM including non-tradable goods and public employment we analyse the effect on economic activity location that follows to changes on the regional distribution of transfers. An increase in the share of transfers a region receives positively effect the production of manufactures the higher are: transaction costs of goods produced under increasing returns to scale; the share of transfers that goes directly to consumers instead of local governments; the elasticity of substitution between differentiated goods; the share of consumers' expenditure on manufactures *via-as-vis* on non-traded goods.

JEL: R12 H71 H72

Keywords: federalism, vertical fiscal transfers, economic location.

(*) Corresponding author: Pedro E. Moncarz, Facultad de Ciencias Económicas, Universidad Nacional de Córdoba. Av. Valparaíso s/n. Ciudad Universitaria. Córdoba. 5016. Argentina. E-mail: pedro.moncarz@gmail.com.

Introduction

A non trivial amount of empirical evidence has shown that in Argentina there have been a lack of convergence between less and more developed regions (Figueras, *et al*., 2003, 2004; Russo and Ceña Delgado, 2000; Marina, 1998; Utrera and Koroch, 1998; Willington, 1998; Porto, 1994, 1996). This outcome is present even despite of the existence of a voluminous system of redistributive fiscal transfers.

The evidence we present below try to provide a plausible and much stylised explanation to an observed phenomenon where provinces that receive the highest per capita transfers show the worst behaviour in terms of footloose activities, i.e. manufactures. This result could be, to some extent, due to a Dutch disease like phenomenon that is negatively affecting the growth opportunities of provinces that are most benefited by fiscal transfers. Our hypothesis is that fiscal transfers, through an increasing purchasing power, may be producing a negative effect on the incentive of manufacturing producers to locate on those provinces which receive the largest transfers. Additionally, a non-benevolent behaviour by State governments may be also contributing to this negative effect.

The rest of the paper is organised as follow. In section 1 we discuss briefly the literature on the effects of capital flows, foreign aid and the Dutch disease. Section 2 presents a stylised description of the recent evolution of Argentina's system of transfers from the Federal to State governments, looking at the correlation between these transfers and State governments current expenditures; some econometric evidence is also presented. In section 3 we develop a theoretical model inspired on the New Economic Geography to try to explain the stylised facts presented in the previous section. Section 4 concludes.

I. Capital flows, foreign aid, and the Dutch disease

The neoclassical theory, under its usual set of assumptions, predicts that in response to a difference in the rates of return there should be a net flow of capital from richer to poorer countries, such that the later would growth faster producing a convergence in per capita income between these two groups of countries. However there is plenty of evidence where observed outcomes are not in line with the theoretical predictions. Almost twenty years ago an influential neoclassical author like Robert Lucas[1] pointed out that the direction of capital flows were quite different from those suggested by the theory. A *paradox* that appears to have become stronger as time (and globalisation) moves forward. Even more striking is the fact that capital appears to flow in the direction from poor countries to rich ones.

These findings have led some authors to suggest for the need of government intervention. The question that then arises is what could be the effects of capital inflows on less developed regions? The answers are not homogeneous and often contradictory. On the one hand, we have works such as Clemens *et al.* (2004) pointing out that capital flows are beneficial for poorer regions; on the other hand works such that of Rajan and Subramanian (2008) point out to a potentially negative effect derived from capital inflows. All these contributions deal with the issue of international capital mobility. To the best of our knowledge there has been no attempt to study the phenomenon at thesub-national level[2]. Because of this, most of the literature we rely on refers to the problem in an international perspective.

To some extent, but with the required qualifications, the debate resembles the controversy between J. M. Keynes and Bertil Ohlin regarding the transfers required to fulfil the payments imposed on Germany after its defeat in the First World War. This controversy centred around the effects that such transfers would produce both on the recipient countries but mostly on Germany, the "donor". However, the debate then was kept under a static framework. Currently, the debate incorporates a dynamic dimension to this problem by looking at the effects that such transfers could have on the structure of production of countries that benefit from a positive net capital flow, and how this could affect the achievement of what we may call as the new "*El Dorado*" or, in more technical terms, sustainable growth.

There exists evidence that supports the idea that, under some circumstances, the aid received by less developed regions may end up becoming an *iron life vest*. In the early fifties, Samuelson (1952) analysed the problem under a macro framework assuming a two-

[1] Lucas (1990).
[2] There are some references in the literature that recognize this point without going into a detailed study of this phenomenon. See for example Torvik (2002).

country Walrasian model, concluding that the *transfer paradox* was not logically viable. Later, other studies relaxed some of Samuelson's assumptions and suggested that the *transfer paradox* was indeed a possible outcome under a Walrasian model if: a) there were more than two countries (Gale, 1974, Chichilnisky, 1980); b) a general equilibrium trade model is used (Bhagwati *et al*., 1993; Yano, 1983); and c) free trade was absent (Brecher and Bhagwati, 1982). Hirschman (1958) also suggested the *transfer paradox* could work through changes in relative prices, with foreign aid increasing the relative price of non-tradable goods because of the expansion of domestic demand.

The empirical evidence is scarce and limited to the case of international transfers. Yano and Nugent (1999) address the problem using a small economy model which receives exogenous foreign aid and is unable to affect its terms of trade. The model also assumes capital and labour are domestically mobile across sectors but not internationally. There are three goods, one non-tradable and two goods that are internationally traded. The authors distinguish between two potential effects: a) an import substitution effect; and b) a domestic good effect. While the authors find that the import substitution effect is absent in most of the 44 countries included into their sample, the domestic good effect shows a negative contribution to growth, offsetting, at least partially, the direct positive effects from foreign aid.

Rajan and Subramanian (2008) provide more conclusive evidence in their examination of the effects of international capital flows on the process of development. More specifically, they look at if less developed countries that experienced a faster growth were also the most dependants on foreign savings. The outcome the authors arrive to suggests countries that have resorted to less foreign financing have grown faster. They conclude that the dependency on foreign capital may produce a perverse outcome through the appreciation of the local currency, that if large enough may produce a Dutch disease like phenomenon, affecting negatively the competitiveness of sectors that are crucial if a sustainable growth is to be achieved, such as is the case of manufacturing production. Similarly, in a recent survey paper, Doucouliagos and Paldam (2009) conclude that foreign aid has been largely ineffective in fostering economic growth and that one plausible explanation for this result is the Dutch disease effect on the exchange rates of the countries on the recipient end.

Up to now, we have limited our discussion to the Dutch disease problem in its standard context, that of international transfers. Within our framework, the Dutch disease is the phenomenon with negative consequences that may follow after an (important) increase in foreign capital inflows. The increase in foreign capital flows produces an increase in the demand of both tradable and non-tradable goods. The higher demand for tradable goods could be met by an increase in imports and a reduction of exports, which would also help to counteract the appreciation of the local currency that follows after the initial flow of foreign capital. However, if the possibility of satisfying the increasing demand for the non-tradable goods is restricted by rigidities on the supply side, this would provoke a further appreciation of the local currency, and therefore hurting in the short-run the international competitiveness of domestic producers; even the long-run competitiveness may also be affected if the economy is less attractive to local and foreign investors.

If the nominal exchange rate is fixed, the increase in foreign capital inflows would lead to an increase in the supply of the domestic currency, resulting in an increase in domestic prices, which is equivalent to an appreciation of the local currency through a reduction in the nominal exchange rate.

In the case of a country, it is possible to counterbalance the negative effects of an increase in foreign capital inflows through restrictive fiscal and/or monetary policies. This alternative is of course absent in the case of regions which belong to a single economy, since they share the same currency. Thus, the recommendation to compensate for the negative effects of an increase in transfers is to achieve a higher productivity and to increase the capacity to produce non-tradable goods, which would help to reduce the pressure on the relative price of these goods.

II. Fiscal transfers, public sector expenditure and manufacturing production. Some stylised facts for Argentina's provinces

In this section we present a brief and much stylised description of the correlations between vertical fiscal transfers from the Federal government to Argentine State governments, public sector expenditure on labour, and production of manufactures. We also provide some econometric evidence. We use data for 1990 to 2001.

The main share of transfers State governments receive from the Federal government is that corresponding to the *Co-participation Regime*.[3] If we separate Argentina's provinces into four mutually exclusive groups according to their income per-capita and population density, the results show that in general provinces with low population density (LD), either with high (HI) or low (LI) income per capita, receive the highest transfers in per capita terms[4] (see Table 1). Despite the fact that the legal provisions regulating the distribution of transfers across provinces are not very clear about the criteria for redistribution[5], it can be seen clearly that provinces with LD are the ones most benefited. To some extent, this behaviour could be explained by the existence of important diseconomies of scale in the provision of public goods in provinces with low population density.

Including Current Transfers, those outside the Co-participation Regime and over which the Federal government can adopt a more arbitrary behaviour, the results are barely changed. However, against what it could a priori be expected, provinces that belong to the LI-HD group are less benefited than provinces falling into the group with HI-LD indices. For instance, while for the latter, Current Transfers represented a 28% of transfers received under the Co-participation Regime, for the group of provinces with LI-HD indices the percentage was just 8%. For LI-LD provinces, there are not many changes when we consider different definitions of transfers. The same behaviour as the one just described is observed if we look at total transfers.

[3] The Co-participation regime is the system by which Argentina's provinces transferred to the Federal government the legal power to collect some taxes. The collection from these taxes is then, partially, redistributed to the provinces.

[4] Following Capello and Roca (1999) we use the median values of per capita GDP and population density to distinguish between provinces with low and high values.

[5] For instance, in the Law 23548 that regulates the Co-participation regime there is no explicit reference to how the share each province receive is calculated. Porto and Sanguinetti (1998) argue that the distribution is positively correlated with the number of per capita representatives each province has in the Federal Congress.

Table 1
Transfers from Federal Government: 1990-2001 average

Group (*)	Province	Co-participation per capita		Co-participation + Current transfers per capita		Tax + Current transfers per capita	
		1993 $	Ranking	1993 $	Ranking	1933 $	Ranking
HI – HD	Santa Fe	269.7	20	283.9	20	399.9	20
	Córdoba	269.1	21	279.8	21	385.1	21
	Buenos Aires	145.7	23	152.9	23	249.2	23
	Capital Federal	46.2	24	53.6	24	70.4	24
HI – LD	Tierra del Fuego	816.8	1	1,295.6	2	2232.2	1
	Santa Cruz	783.4	3	1,014.5	3	1612.1	3
	La Rioja	719.8	5	1,394.5	1	1767.6	2
	San Luís	618.1	6	641.3	7	964.0	7
	La Pampa	590.4	7	662.5	6	989.8	6
	Río Negro	417.6	12	458.7	12	686.4	14
	Chubut	361.2	15	430.1	13	723.3	11
	Neuquén	355.5	16	425.7	14	690.9	12
LI – LD	Catamarca	814.1	2	847.1	4	1201.3	4
	Formosa	726.4	4	779.5	5	1079.0	5
	San Juan	517.7	8	564.4	8	793.9	8
	Santiago del Estero	492.9	9	521.0	9	725.9	10
	Salta	348.4	17	385.5	17	555.2	18
LI – HD	Chaco	481.3	10	506.7	11	687.0	13
	Jujuy	445.4	11	509.4	10	734.3	9
	Entre Ríos	393.5	13	414.4	15	592.7	16
	Corrientes	378.8	14	412.0	16	603.5	15
	Tucumán	337.5	18	362.5	19	517.2	19
	Misiones	332.5	19	382.0	18	559.4	17
	Mendoza	244.5	22	254.5	22	374.9	22

HI: high income; LI: low income; HD: high population density; LD: low population density.

In Figures 1 to 3 we present the correlation relationship that there exist between different pairs of variables. Table 2 reports the correlation coefficients as well as their statistical significance. As it is very clear form the Figures, it is possible to observe a positive and significant correlation between the amounts of per capita transfers received from the Federal government and the expenditure in personnel and public employment by the State governments. These relationships give us support for our presumption that in the case of Argentina, State-level governments follow a non-benevolent behaviour when using public resources[6]

Another empirical evidence of how State governments react to Federal transfers is shown in Figure 4. State governments that receive higher transfers from the Federal government impose a lower *effective* tax pressure on their economies, even when the *legal* tax pressure does not vary greatly across regions.

Finally, it is possible to observe that there exists a negative correlation between the per capita transfers received by provincial governments and the growth of manufacturing production (see Table 3)[7].

Table 2
Federal transfers and State governments expenditures
Correlation Matrix: 1990-2001, constant 1993 prices

	Expenditure in personnel (*)	Average public wage	Public Employment (**)	State governments tax pressure (***)
Co-participation (*)	0.662	0.267	0.758	-0.274
Other tax transfers (*)	0.912	0.713	0.667	-0.120
Current transfers (*)	0.680	0.473	0.559	-0.252
Co-participation + Current Transfers (*)	0.788	0.424	0.785	-0.311
Tax and Current Transfers (*)	0.876	0.557	0.779	-0.252

(*) Per capita, (**) Per 1000 inhabitants, (***) % GDP.
All correlations are statistically significant at 5%.

[6] If instead of using expenditure in personnel and public employment, we use the average monthly wage paid by local governments, the relationship with per capita transfers is still positive but less significant.
[7] It is important to note that we are not implying the existence of a causal relationship between the two variables at this stage of our work.

Figure 1
Co-participation Transfers and State Governments Expenditures
1990-2001 (1993 constant $)

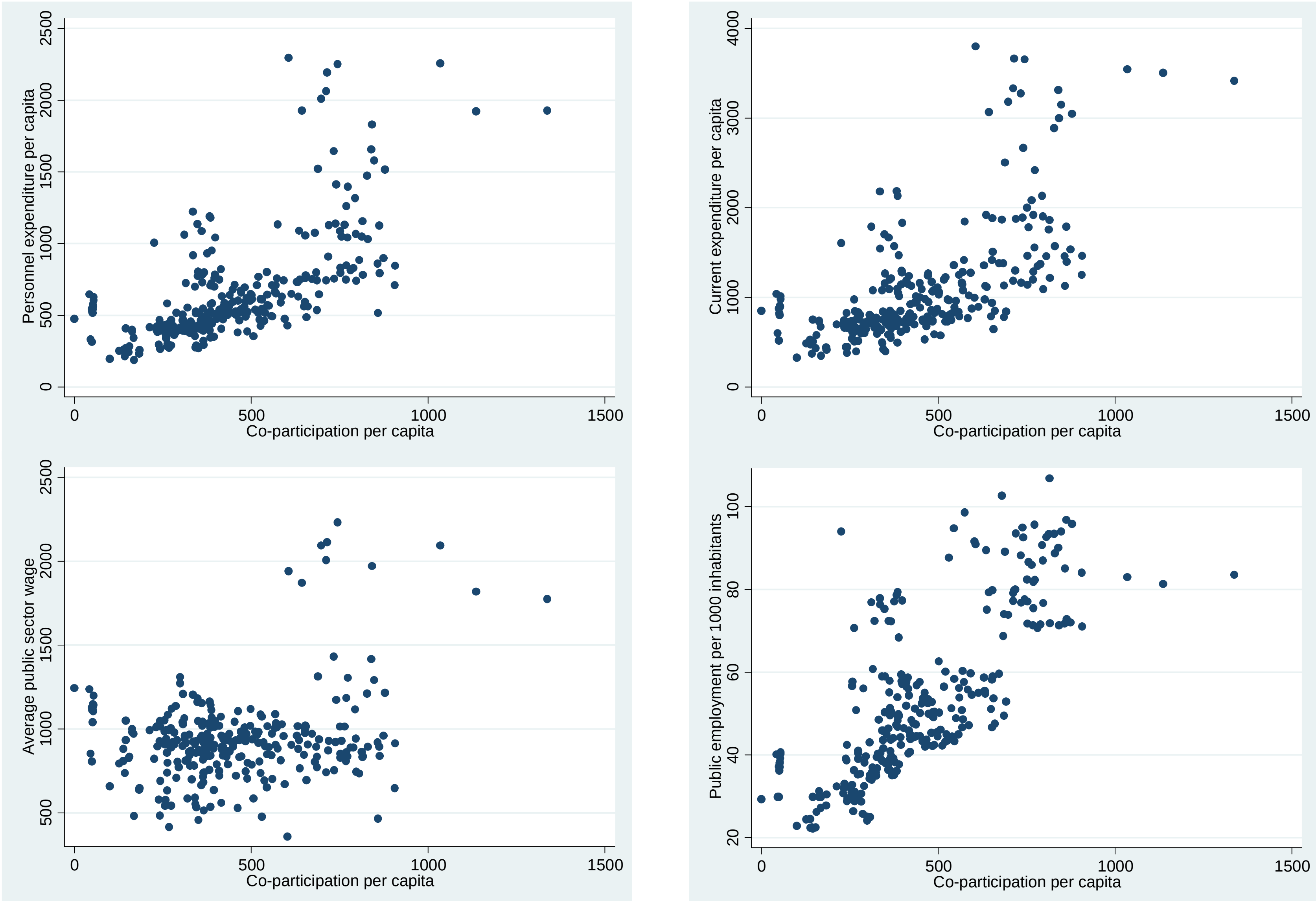


Figure 2
Co-participation + Current Transfers and State Governments Expenditures
1990-2001 (1993 constant $)

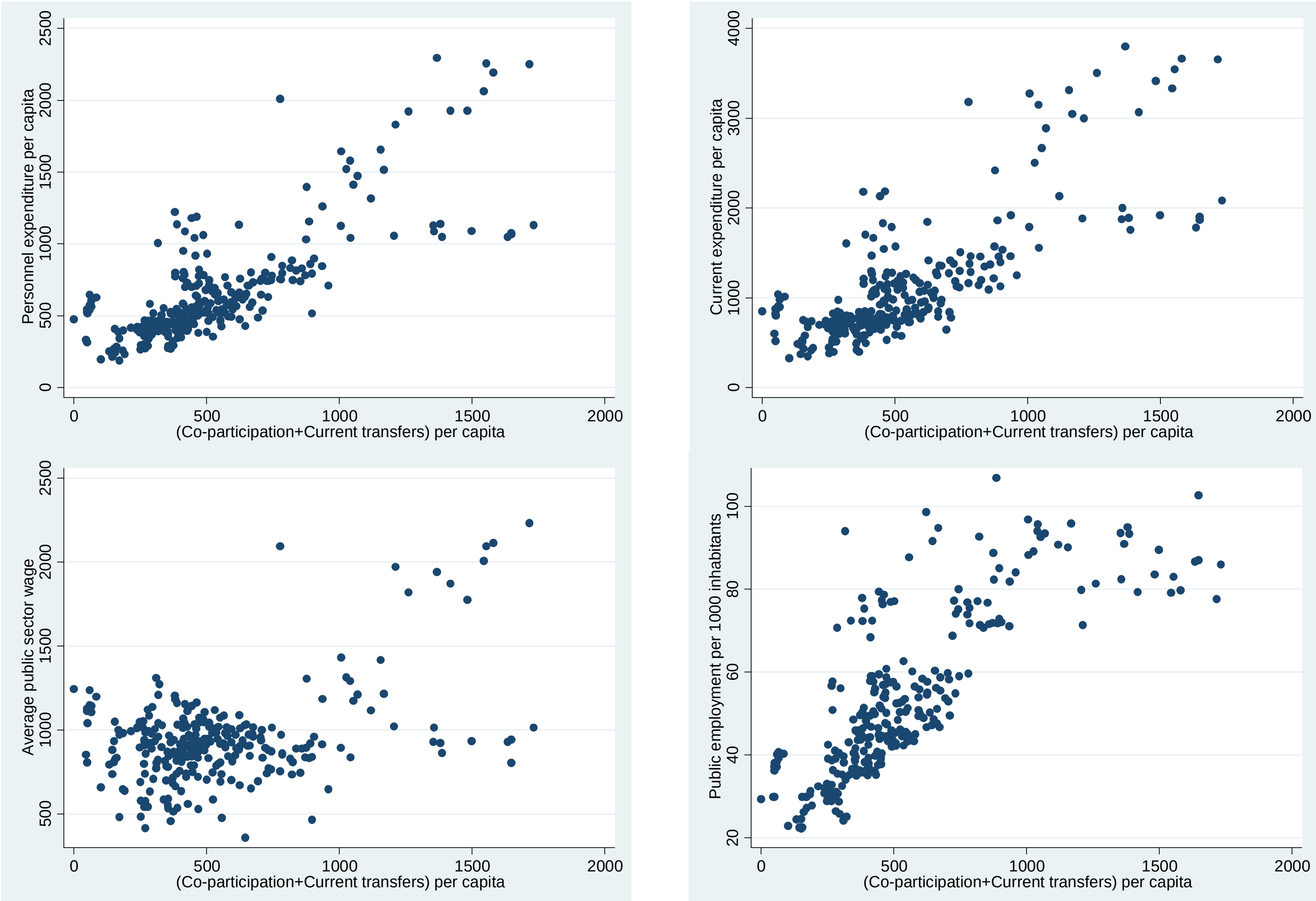


Figure 3
Tax + Current Transfers and State Governments Expenditures
1990-2001 (1993 constant $)

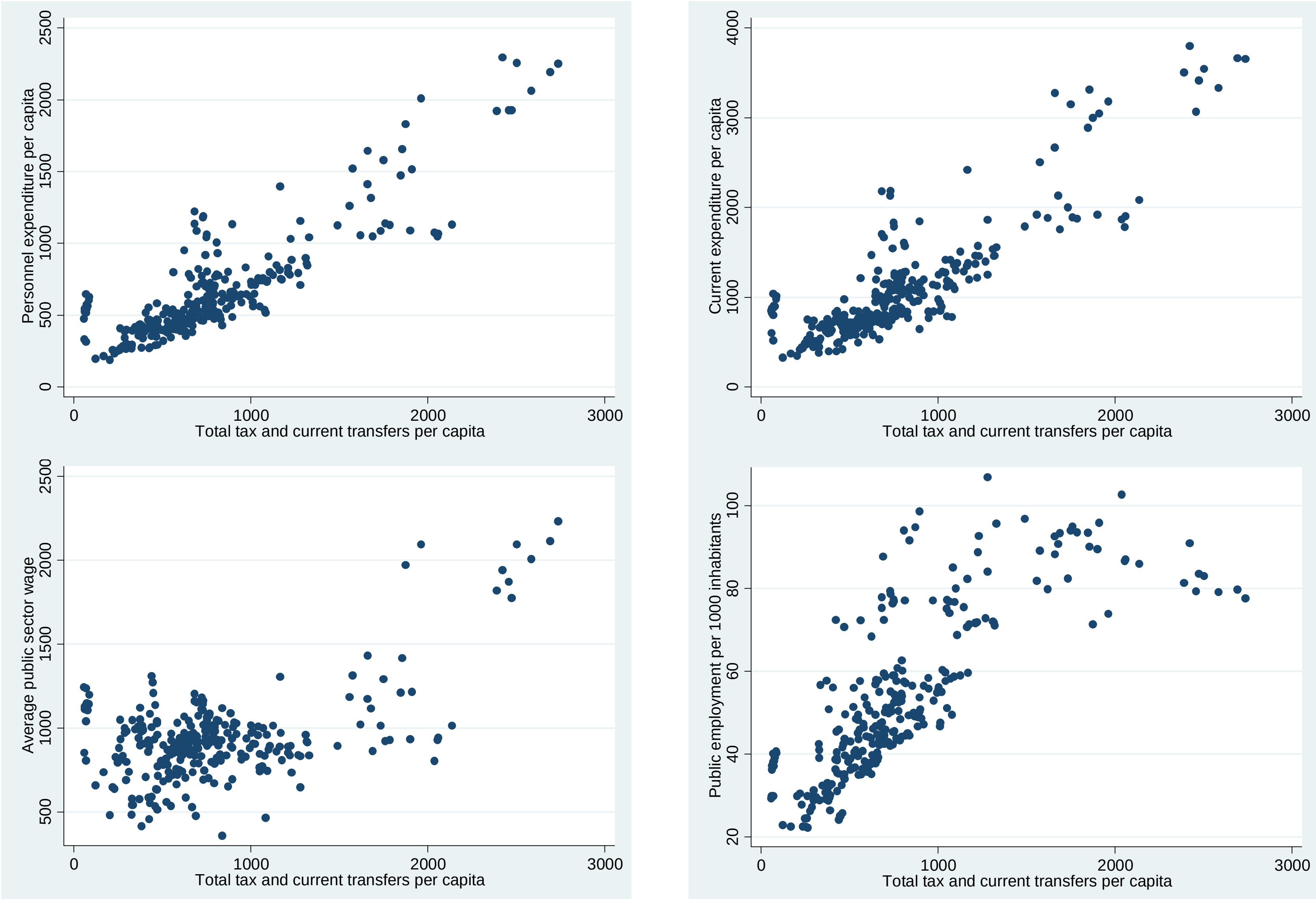


Figure 4
Federal Government transfers and State Governments Tax Pressure
1990-2001 (1993 constant $)

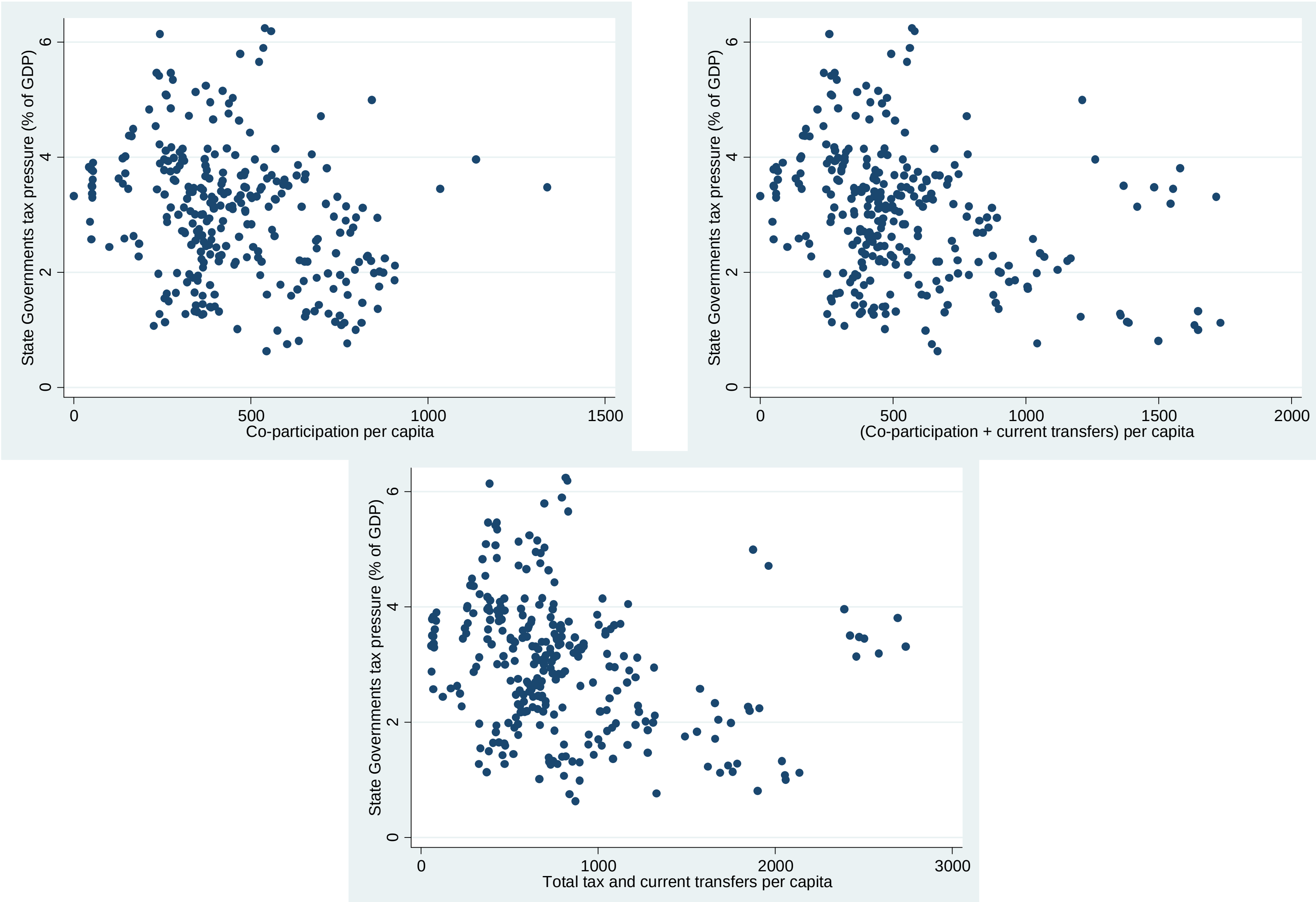


Table 3
Federal transfers and State average manufacturing production growth (±)
Correlation Matrix: 1990-2001, constant 1993 prices

	Total Manufactures GDP	Per capita Manufactures GDP
Co-participation (*)	-0.122	-0.247
Other tax transfers (*)	-0.361 (#)	-0.469 (#)
Current transfers (*)	-0.238	-0.324
Co-participation + Current Transfers (*)	-0.194	-0.317
Tax and Current Transfers (*)	-0.264	-0.387 (#)

(±) State average growth rates are obtained from the linear regression: ln(Y) = a+b*t
(*) Per capita. (#) Statistically significant at 10%.

Departing from this very stylized evidence just presented, we now move onto presenting a formal theoretical model to try to disentangle the potential and some times offsetting effects that changes in the distribution of transfers from the Federal to the State governments may have on the distribution of footloose activities across regions within a country.

III. The model

We extend Rogers and Martin (1995) Footloose Capital Model (FCM) to analyse how changes in the distribution of transfers from the Federal to State governments affect the regional location of manufacturing production. We extend the FCM by including in each region a sector that produces a non-traded good and a local government which uses public resources to hire public employment.

Firstly we will present the full model, and then when we look at the effects of transfers on the location of manufacturing production, we will work with two alternative cases, depending on the number of sectors we consider. The full model includes four sectors, agriculture, manufactures, and a non-traded sector in each of the two regions the country is divided. Both, the agricultural good and the non-traded goods are produced under constant returns to scale (CRS) using only labour (L). The production of manufactures presents increasing returns to scale (IRS), and involves the use of capital (K) as a fixed cost, and labour (L) as a variable cost. The market for manufactures is organised as a monopolistically competitive market *à la* Dixit-Stiglitz, where each firm in the market produces a differentiated variety. Trade of manufactures between the two regions is subject to positive transport costs, which take the well-known Samuelson's iceberg type. The markets for the agricultural good as well as those of the non-traded goods are perfectly competitive. Trade of the agricultural good between the two regions is costless. By definition, each non-traded good is sold only in the region it is produced. We assume also that labour is perfectly mobile between sectors but immobile between regions, capital, instead, is mobile between regions. There are also two levels of governments, a national government and two local governments. The national government, which we do not model explicitly taxes all capital revenues[8] and transfers them to the two regions. These transfers can go either to the local governments or be received directly by consumers. Local governments use all transfers they receive to hire employees[9,10]; consumers get no utility from public employment.

Consumers

Consumers in each region have a two-tier utility function. The first tier takes a Cobb-Douglas form, and is defined over the consumption of the agricultural good, the non-traded good and a composite of manufactures. More specifically, the utility function for the representative consumer living in region *i* can be stated as follows:

$$u_i = \left(c_A\right)^{\beta_A}\left(c_{NT_i}\right)^{\beta_{NT}}\left(c_M\right)^{\beta_M} \qquad \text{with } \beta_A + \beta_{NT} + \beta_M = 1$$

where c_A is the consumption of the agricultural good, c_{NTi} is the consumption of the non-traded good produced in region *i*, and c_M is the consumption of the composite of manufactures. β_A, β_{NT} and β_M are the expenditure shares the consumer spends on the consumption of each good.

The c_M composite takes the following CES form:

$$c_M = \left[\sum_{h \in N} c(h)^{\alpha}\right]^{\frac{1}{\alpha}} \qquad 0 < \alpha < 1$$

[8] This assumption is made based on the literature on public finance which suggests it is more efficient for a Federal government, instead of state level governments, to tax footloose activities that are potentially mobile across regions.

[9] Public employment can be also interpreted as a kind of non-traded good.

[10] This assumption, which we believe is a very good approximation of the way local governments behave in Argentina, follows from the evidence presented in section II.

where $c(h)$ is the units consumed of each variety h, and $N=n_1+n_2$ is the total number of manufacture varieties, n_1 and n_2 are the number of varieties produced in regions 1 and 2 respectively. From the consumer maximisation problem we have that the consumption of each manufactured variety by all consumers living in region i is equal to:

$$C_i = \frac{\left(pT_i^j\right)^{-\sigma}}{\left(PM_i\right)^{1-\sigma}} \beta_M E_i \qquad \sigma = \frac{1}{1-\alpha} > 1$$

where pT_i^j is the consumer price of a variety consumed in region i and produced in region j, PM_i is the manufacture price index in region i, E_i is the total income of consumers living in region i, and σ is the elasticity of substitution between manufactured varieties[11]. The assumption that trade of manufactures is subject to iceberg-type costs means the following relationship between consumer and producer prices:

$$pT_i^j = pT^j \qquad \text{if } i = j$$

$$pT_i^j = \tau pT^j \qquad \text{if } i \neq j$$

where $\tau > 1$ are iceberg transport costs, and pT^i and pT^j are the producer prices in regions i and j respectively. The notion of iceberg transport costs means that for one unit of the good consumed in region i, τ units need to be shipped from j.

With respect to the consumption of the other two goods, these are equal to:

$$C_A = \frac{\beta_A E_i}{pA}$$

$$C_{NT_i} = \frac{\beta_{NT} E_i}{pNT_i}$$

Producers

As stated above, production of the agricultural good and the two non-trade goods are subject to constant returns to scale, and uses only labour. More specifically, we assume the following production functions:

[11] For N large enough, σ is also the price elasticity of demand of each variety.

$$A_i = LA_i$$

$$NT_i = LNT_i$$

where LA_i and LNT_i are the units of labour used in the production of agriculture and the non-traded sector in region *i*. From the producer problems for each of the two sectors, the prices of the agricultural and non-traded goods are:

$$pA_i = pNT_i = w_i$$

where w_i is the wage rate in region *i*. The assumption that the agricultural good has no transport cost between regions means that, if there is a positive production of it in both regions, in equilibrium we have $w_i=w_j=w$. This is not necessarily the case when we consider an economy with no agricultural sector.

In the case of the production of manufactures, this uses capital and labour. The total cost of each variety produced in region *i* is given by:

$$CT_i = \pi_i F + a\ w_i x_i$$

where *F* is the requirement of capital, which does not depend on the scale of production x_i, *a* is the requirement of labour for each unit of production, and π_i is the rent of capital.
From the profit maximisation problem we obtain that the producer price in region *i* is:

$$pT^i = a\frac{\sigma}{\sigma-1}w_i$$

Additionally, the assumption of free entry and exit of firms means that in equilibrium firms obtain zero profits $\left(pT^i x_i - aw_i x_i - \pi_i F = 0\right)$, such that the scale of production of each manufacture variety produced in region *i* is equal to:

$$x_i = \frac{\pi_i F(\sigma-1)}{aw_i}$$

By choice of units we can assume $a = \frac{\sigma-1}{\sigma}$ and *F=1*, such that we get:

$$pT^i = w_i$$

$$x_i = \frac{\pi_i \sigma}{w_i}$$

Once again, the assumption that there is no trade cost for the agricultural good means that $pT^i = pT^j$.

Capital rent and total expenditures

Under Dixit-Stiglitz competition in the manufacturing sector, the rent of capital, also called operating profits, is given by the value of sales (at the producer price) divided by the elasticity of substitution: $\pi_i = pT^i x_i / \sigma$.

Total income is the sum of labour income plus the revenue from capital rent. As we assumed before, capital is mobile between regions, however capital owners remain always at the same location. In the absence of a national government that captures all capital income through taxes, we assume that independently where capital is used each unit is evenly owned between the populations of the two regions. Then, if $L_1=L_2$, residents in each region receive half of total operating profits, which are equal to: $\beta_M E^W/\sigma$, where E^W is total expenditure, that under the assumption that there is no savings is equal to labour income plus operating profits: $E^W = \left(w_i L_i + w_j L_j\right) + \beta_M E^W / \sigma$. Solving for E^W we get:

$$E^W = \frac{\left(w_i L_i + w_j L_j\right)\sigma}{\sigma - \beta_M}$$

Now, let us assume that there exist a national government that taxes all capital income, and redistribute it between the two regions, with a proportion $0 \le e_i \le 1$ going to region *i*, and a proportion $0 \le \left(1 - e_i\right) \le 1$ going to region *j*. Additionally, a proportion $0 \le \phi \le 1$ of these transfers go directly to consumers, while the remaining percentage $0 \le \left(1 - \phi\right) \le 1$ goes to local governments, which use these transfers to finance public employment. Under these assumptions capital rent going to all consumers is equal to $\phi\beta_M E^W/\sigma$, such that world income is:

$$E^W = \frac{\left(w_i L_i + w_j L_j\right)\sigma}{\sigma - \beta_M \phi}$$

From all the above we have that total incomes in regions *i* and *j* are:

$$E_i = w_i L_i + e_i \phi \frac{\beta_M E^W}{\sigma}$$

$$E_j = w_j L_j + (1 - e_i) \phi \frac{\beta_M E^W}{\sigma}$$

Equilibrium conditions

In each market the equilibrium condition is given by the equality between demand and supply, in particular we have:

- **Agriculture**

$$\frac{\beta_A E^W}{pA} = LA_i + LA_j$$

When the agriculture sector is included we assume that both regions have a positive production of good A, meaning that both LA_i and LA_j are positive. This assumption is guaranteed if total spending on the agricultural good, namely $\beta_A E^W$, is greater than maximum value of the agriculture production by either region, namely $pA(\max\{L_i,L_j\})$. This assumption guaranties that $w_i=w_j=w$.

- **Non-traded goods**

$$\frac{\beta_{NT} E_i}{pNT_i} = LNT_i$$

$$\frac{\beta_{NT} E_j}{pNT_j} = LNT_j$$

- **Local government budgets**

As stated above, the national government, which we do not model here explicitly, taxes all capital revenue, and redistributes it between the two regions, in a proportion e_i for region i and $(1-e_i)$ for region j. From these transfers only a proportion $(1-\phi)$ goes to the local governments, which use these transfers to hire labour. Remembering that total operating profits are equal to $\beta_M E^W / \sigma$, government budgets are in equilibrium when:

$$\frac{e_i(1-\phi)\beta_M E^W}{\sigma} = LG_i w_i$$

$$\frac{(1-e_i)(1-\phi)\beta_M E^W}{\sigma} = LG_j w_j$$

where LG_i and LG_j are the numbers of public employees in regions i and j.

- **Manufactures**

The equilibrium condition for each manufacture variety produced in region i is given by:

$$x_i = \frac{(pT^i)^{-\sigma}}{(PM_i)^{1-\sigma}}\beta_M E_i + \frac{\tau(\tau pT^i)^{-\sigma}}{(PM_j)^{1-\sigma}}\beta_M E_j$$

where the first and second terms on the right hand side are, respectively, the total demand, including the quantity that melts in transit, by consumers of regions i and j of each variety produced in region i. A similar condition holds for region j:

$$x_j = \frac{\tau(\tau pT^j)^{-\sigma}}{(PM_i)^{1-\sigma}}\beta_M E_i + \frac{(pT^j)^{-\sigma}}{(PM_j)^{1-\sigma}}\beta_M E_j$$

In the two conditions above PM_i and PM_j are the manufactured price indices which are equal to:

$$PM_i = \left[n_i(pT^i)^{1-\sigma} + n_j(\tau pT^j)^{1-\sigma}\right]^{\frac{1}{1-\sigma}}$$

$$PM_j = \left[n_i(\tau pT^i)^{1-\sigma} + n_j(pT^j)^{1-\sigma}\right]^{\frac{1}{1-\sigma}}$$

Choosing units such that $F=1$, the number of varieties n_i and n_j are equal to the stock of capital in each region K_i and K_j. If the country stock of capital is normalised to 1 we have $n_i=k_i$ and $n_j=(1-k_i)$, where k_i is the share of capital located in region i. Additionally, if $a = \frac{\sigma-1}{\sigma}$ the price indices reduce to:

$$PM_i = \left(k_i(w_i)^{1-\sigma} + (1-k_i)(\tau w_j)^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$$

$$PM_j = \left(k_i\left(\tau w_i\right)^{1-\sigma} + \left(1-k_i\right)\left(w_j\right)^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$$

Furthermore, in the case there is an agriculture sector such that wages equalise across regions, and using the wage rate as *numeraire* (w=1) we obtain:

$$PM_i = \left(k_i + \left(1-k_i\right)\tau^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$$

$$PM_j = \left(k_i\tau^{1-\sigma} + \left(1-k_i\right)\right)^{\frac{1}{1-\sigma}}$$

- **Regional labour markets**

$$L_i = LA_i + LM_i + LNT_i + LG_i$$

$$L_j = LA_j + LM_j + LNT_j + LG_j$$

where labour demands by the manufacturing sectors are $LM_i = n_i a x_i$ and $LM_j = n_j a x_j$.

Transfers and the long run equilibrium

In this section we analyse the distribution of manufacture production as a response to changes in the distribution of transfers from the national government. We divide the analysis in two cases. Firstly, we consider an economy where all sectors are present. Secondly, we consider a model with no agricultural sector.

Case 1: a model with agriculture, manufactures, non-traded goods and local governments

The existence of the agricultural sector, together with the assumption of positive productions in both regions, namely that total spending on the agricultural good ($\beta_A E^W$) is greater than the maximum value of the agriculture production by either region ($pA(\max\{L_i,L_j\})$), mean that wages are equalised across the two regions ($w_i=w_j=w$).

As pointed out before, operating profits are equal to sales divided the elasticity of substitution: $\pi_i = pT^i x_i / \sigma$. If units are appropriately chosen such that: $a=(\sigma-1)/\sigma$, F=1, K=1, L_i+L_j=1, and the wage rate is the *numeraire* (w=1), for a given distribution of capital, operating profits reduce to:

$$\pi_i = \left[\frac{\delta_i}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{\tau^{1-\sigma}(1-\delta_i)}{k_i\tau^{1-\sigma} + (1-k_i)} \right] \frac{\beta_M E^W}{\sigma}$$

$$\pi_j = \left[\frac{\tau^{1-\sigma}\delta_i}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{(1-\delta_i)}{k_i\tau^{1-\sigma} + (1-k_i)} \right] \frac{\beta_M E^W}{\sigma}$$

where $\delta_i = s_{Li}\frac{\sigma - \beta_M\phi}{\sigma} + \phi e_1 \frac{\beta_M}{\sigma}$ is the share of region *i* in total income E^W, $s_{Li} = \frac{L_1}{L_1 + L_2}$ is the share of region *i* in total population, and total income is equal to $E^W = \frac{\sigma}{\sigma - \beta_M\phi}$.

If transfers from the national government are received only by the local governments (ϕ=0), region *i*'s share in total income becomes equal its participation in total population $(\delta_i = s_{Li})$, and total income reduces to E^W=1. The equilibrium conditions reduce to[12]:

$$\beta_A = LA_i + LA_j \quad \text{(a)}$$

$$\beta_{NT} s_{Li} = LNT_i \quad \text{(b)}$$

$$\beta_{NT}(1 - s_{Li}) = LNT_j \quad \text{(c)}$$

$$\frac{e_i\beta_M}{\sigma} = LG_i \quad \text{(d)}$$

$$\frac{(1-e_i)\beta_M}{\sigma} = LG_j \quad \text{(e)}$$

$$x_i = \frac{\beta_M s_{Li}}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{\tau^{1-\sigma}\beta_M(1-s_{Li})}{k_i\tau^{1-\sigma} + (1-k_i)} \quad \text{(f)}$$

$$x_j = \frac{\tau^{1-\sigma}\beta_M s_{Li}}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{\beta_M(1-s_{Li})}{k_i\tau^{1-\sigma} + (1-k_i)} \quad \text{(g)}$$

$$\pi_i - \pi_j = \left[\frac{s_{Li}}{k_i + (1-k_i)\tau^{1-\sigma}} - \frac{(1-s_{Li})}{k_i\tau^{1-\sigma} + (1-k_i)} \right] (1-\tau^{1-\sigma}) \frac{\beta_M}{\sigma} \quad \text{(h)}$$

[12] By Walras' Law, simultaneous equilibrium in all product markets implies equilibrium in the regional labour markets.

As we can see, conditions (b)-(c) and (f)-(h) are not affected, either directly or indirectly, by changes in how transfers are distributed between the two regions. In the case of the budget government conditions (d)-(e) changes in e_i allow the government which receives larger (lower) transfers to hire more (less) people. Then, to labour markets to clear the region where public employment increases (decreases) the number of people employed in the agricultural sectors must fall (rise). Employment levels in the non-traded sectors and in manufactures remain unchanged.

Replacing $\delta_i = s_{Li}$ and E^W=1 into operating profits we have:

$$\pi_i = \left[\frac{s_{Li}}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{\tau^{1-\sigma}(1-s_{Li})}{k_i\tau^{1-\sigma} + (1-k_i)} \right] \frac{\beta_M}{\sigma}$$

$$\pi_j = \left[\frac{\tau^{1-\sigma} s_{Li}}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{(1-s_{Li})}{k_i\tau^{1-\sigma} + (1-k_i)} \right] \frac{\beta_M}{\sigma}$$

As we can observe, when ϕ=0 operating profits do not depend, directly nor indirectly, on how the national government distribute the transfers between the two regions: $\frac{\partial \pi_i}{\partial e_i} = \frac{\partial \pi_j}{\partial e_i} = 0$.

Moreover, the distribution of capital in the log run, that is the one for which $\pi_i = \pi_j$, depends only on the distribution of population. With:

$$\frac{\partial(\pi_i - \pi_j)}{\partial s_{Li}} = \left[\frac{1}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{1}{k_i\tau^{1-\sigma} + (1-k_i)} \right] (1-\tau^{1-\sigma}) \frac{\beta_M}{\sigma} > 0$$

and

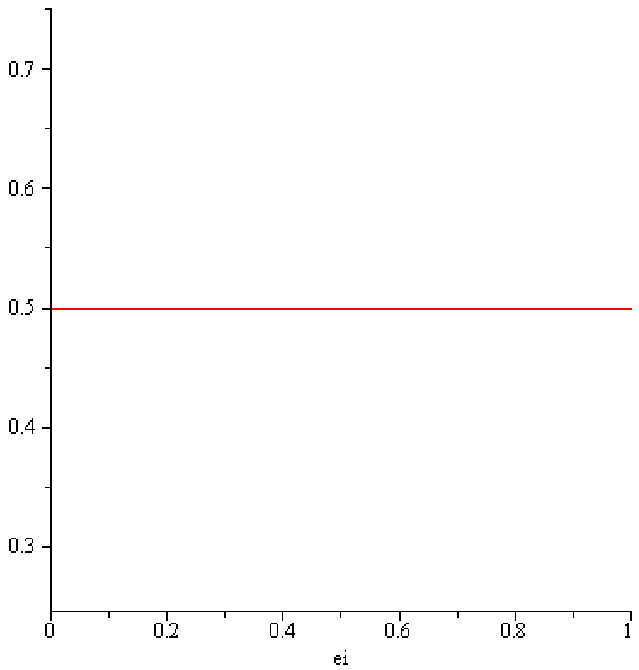
$$\frac{\partial(\pi_i - \pi_j)}{\partial k_i} = -\left[\frac{s_{Li}}{\left[k_i + (1-k_i)\tau^{1-\sigma}\right]^2} + \frac{1-s_{Li}}{\left[k_i\tau^{1-\sigma} + (1-k_i)\right]^2} \right] (1-\tau^{1-\sigma})^2 \frac{\beta_M}{\sigma} < 0$$

we have that in order to achieve a long run equilibrium, the region with the larger population must have a larger share of the capital stock. Totally differentiating $\pi_i - \pi_j$ with respect to s_{Li} (that for ϕ= 0 is equal to δ_i) and k_i, and solving for dk_i/ds_{Li} we get:

$$\frac{dk_i}{d\delta_i} = \frac{dk_i}{ds_{Li}} = \frac{\left[\frac{1}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{1}{k_i\tau^{1-\sigma} + (1-k_i)}\right]}{\left[\frac{s_{Li}}{\left[k_i + (1-k_i)\tau^{1-\sigma}\right]^2} + \frac{1-s_{Li}}{\left[k_i\tau^{1-\sigma} + (1-k_i)\right]^2}\right](1-\tau^{1-\sigma})}$$

As Figures 5 shows, if regions are symmetric, when s_{Li}=1/2, the optimum distribution of capital is also symmetric: k_i=1/2.

Figure 5
Region *i*'s share in manufacturing firms and the distribution of transfers
(L_i=L_j=0.5, τ=1.05; σ=10, β_M=0.25, β_A=0.55, β_{NT}=0.2, ϕ=0, w=1)



A different scenario emerges when $\phi > 0$. From the expressions for π_i and π_j, changes in the way transfers are distributed, namely changes in e_i, affect π_i and π_j through changes in δ_i. Remembering that $\delta_i = s_{Li}\frac{\sigma - \beta_M\phi}{\sigma} + \phi e_1\frac{\beta_M}{\sigma}$, and increase in e_i increases δ_i. Then, if we were in a long run equilibrium situation, as e_i changes the economy moves out of the equilibrium such that it is necessary a different distribution of the capital stock to re-establish the equilibrium. The direction of the change in k_i required to achieve a new long run equilibrium depends on how π_i and π_j reacts to changes in δ_i and k_i.

From the equilibrium conditions for the non-traded goods and the local government budgets[13] it can be show that $\frac{\partial LNT_i}{\partial e_i} > 0$, $\frac{\partial LG_i}{\partial e_i} > 0$, $\frac{\partial LNT_j}{\partial e_i} < 0$ and $\frac{\partial LG_j}{\partial e_i} < 0$, such that an increase in the transfers received by region *i* increases employment in the public and the non-traded sectors. Subtracting π_j from π_i we have:

$$\pi_i - \pi_j = \left[\frac{\delta_i}{k_i + (1-k_i)\tau^{1-\sigma}} - \frac{(1-\delta_i)}{k_i\tau^{1-\sigma} + (1-k_i)}\right]\left(1-\tau^{1-\sigma}\right)\frac{\beta_M E^W}{\sigma}$$

From this expression we have $\pi_i - \pi_j$ is a positive function of □$_i$:

$$\frac{\partial(\pi_i - \pi_j)}{\partial \delta_i} = \left[\frac{1}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{1}{k_i\tau^{1-\sigma} + (1-k_i)}\right]\left(1-\tau^{1-\sigma}\right)\frac{\beta_M E^W}{\sigma} > 0$$

Then, for a fixed distribution of capital k_i, as e_i increases $\pi_i - \pi_j$ also increases. To re-establish the equilibrium we need to know how $\pi_i - \pi_j$ changes when k_i changes. In this case we have:

$$\frac{\partial(\pi_i - \pi_j)}{\partial k_i} = -\left[\frac{\delta_i}{\left[k_i + (1-k_i)\tau^{1-\sigma}\right]^2} + \frac{1-\delta_i}{\left[k_i\tau^{1-\sigma} + (1-k_i)\right]^2}\right]\left(1-\tau^{1-\sigma}\right)^2\frac{\beta_M E^W}{\sigma} < 0$$

Then, to achieve a new long run equilibrium k_i needs to move in the same direction as e_i moves. Totally differentiating $\pi_i - \pi_j$ with respect to e_i and k_i, and solving for dk_i/de_i we have:

$$\frac{dk_i}{de_i} = \frac{\left[\frac{1}{k_i + (1-k_i)\tau^{1-\sigma}} + \frac{1}{k_i\tau^{1-\sigma} + (1-k_i)}\right]\frac{\phi\beta_M}{\sigma}}{\left[\frac{\delta_i}{\left[k_i + (1-k_i)\tau^{1-\sigma}\right]^2} + \frac{1-\delta_i}{\left[k_i\tau^{1-\sigma} + (1-k_i)\right]^2}\right]\left(1-\tau^{1-\sigma}\right)} > 0$$

Totally differentiating $\pi_i - \pi_j$ with respect to δ_i and k_i, and solving for $dk_i/d\delta_i$ we have:

[13] $\beta_{NT}\left(s_{Li} + \phi e_i \frac{\beta_M}{\sigma - \beta_M\phi}\right) = LNT_i$; $\beta_{NT}\left((1-s_{Li}) + \phi(1-e_i)\frac{\beta_M}{\sigma - \beta_M\phi}\right) = LNT_j$; $\frac{e_i(1-\phi)\beta_M}{\sigma - \beta_M\phi} = LG_i$ and $\frac{(1-e_i)(1-\phi)\beta_M}{\sigma - \beta_M\phi} = LG_j$.

$$\frac{dk_i}{d\delta_i}=\frac{\left[\frac{1}{k_i+(1-k_i)\tau^{1-\sigma}}+\frac{1}{k_i\tau^{1-\sigma}+(1-k_i)}\right]}{\left[\frac{\delta_i}{\left[k_i+(1-k_i)\tau^{1-\sigma}\right]^2}+\frac{1-\delta_i}{\left[k_i\tau^{1-\sigma}+(1-k_i)\right]^2}\right](1-\tau^{1-\sigma})}$$

Then, we have that $\frac{dk_i}{de_i}>0$ means $\frac{dLT_i}{de_i}>0$ and $\frac{dLT_j}{de_i}<0$[14], such that together with $\frac{\partial LNT_i}{\partial e_i}>0$, $\frac{\partial LG_i}{\partial e_i}>0$, $\frac{\partial LNT_j}{\partial e_i}<0$ and $\frac{\partial LG_j}{\partial e_i}<0$, we need $\frac{dLA_i}{de_i}<0$ and $\frac{dLA_j}{de_i}>0$ in order to labour markets to clear in each region.

The reason for these different outcomes, depending on $\phi=0$ or $\phi>0$, is explained because in the first case, independently of how the national government distributes transfers between the two regions, total expenditures in each region remain constant. This means that there is no incentive for firms to change location and move from the region transfers are taken away to the region which receives larger transfers. On the other hand, when $\phi>0$ regions' income shares are a positive function of the proportion of transfers received. Then, as e_i increases region *i*'s market increases relative to the one of region *j*, such that operating profits increase in region *i* and decrease in region *j*. In response to this, firms find profitable to move from region *j* to region *i*. As firms move from region *i* to region *j*, operating profits falls in region *i* and increase in region *j*, this continues until operating profits equalise once again in both regions.

As we can see in Figures 6 and 7, the effect on the location of capital is larger the larger is the share of transfers that go directly to consumers (ϕ) instead of going to local governments. The reason for this outcome is that as ϕ increases, the larger is $\partial\delta_i/\partial e_i$, such that for a given distribution of *K*, each unit of change in e_i produces a larger change in $\pi_i-\pi_j$, so the change in k_i required to achieve a new long run equilibrium, namely $\pi_i=\pi_j$, is also larger.

---

[14] Le us remember that the scale of production is a positive function of operating profits and that $\frac{\partial\pi_i}{\partial e_i}>0$ and $\frac{\partial\pi_j}{\partial e_i}<0$.

Figure 6
Region *i*'s shares in manufacturing firms and the distribution of transfers
(L_i=L_j=0.5, τ=1.05; σ=10, β_M=0.25, β_A=0.55, β_{NT}=0.20, w=1)

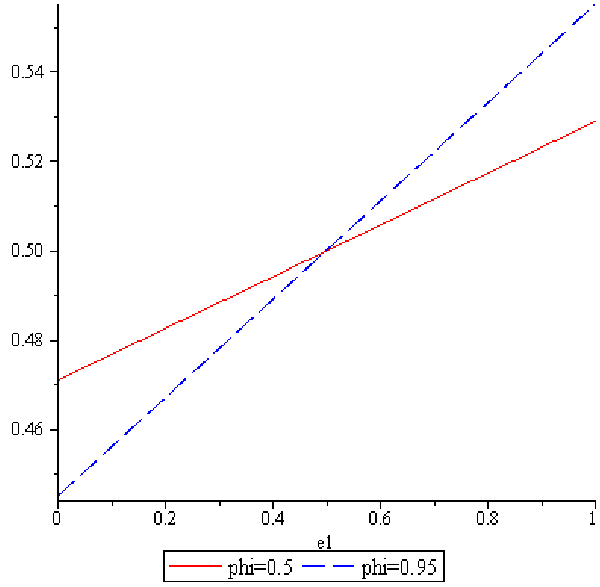
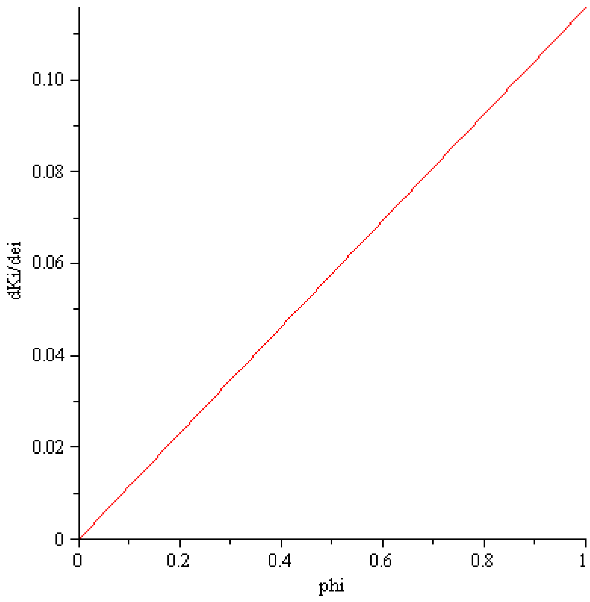


Figure 7
Rate of capital relocation and distribution of transfers between consumers and local governments (ϕ)
(L_i=L_j=0.5, τ=1.05; σ=10, β_M=0.25, β_A=0.55, β_{NT}=0.2, w=1)



Case 2: a model with manufactures, non-traded goods and local governments

The existence of a positive production in both regions by the agricultural sector guaranties that $w_i=w_j=w$. As we saw above this feature simplifies greatly the model. This is not necessarily the case when the agricultural sector is excluded. Only in some very special occasions, the completely symmetric case, wage rates in both regions will be identical.

Using the same normalisations as above, namely $F=1$, $K=1$, $L_i+L_j=1$, $a=(\sigma-1)/\sigma$, and choosing the wage rate in region i as *numeraire* ($w_i=1$), operating profits reduce to:

$$\pi_i = \left[\frac{\delta_i}{k_i + (1-k_i)(\tau w_j)^{1-\sigma}} + \frac{\tau^{1-\sigma}(1-\delta_i)}{k_i\tau^{1-\sigma} + (1-k_i)(w_j)^{1-\sigma}} \right] \frac{\beta_M E^W}{\sigma}$$

$$\pi_j = (w_j)^{1-\sigma} \left[\frac{\tau^{1-\sigma}\delta_i}{k_i + (1-k_i)(\tau w_j)^{1-\sigma}} + \frac{(1-\delta_i)}{k_i\tau^{1-\sigma} + (1-k_i)(w_j)^{1-\sigma}} \right] \frac{\beta_M E^W}{\sigma}$$

where $\delta_i = \frac{s_{Li}(\sigma - \beta_M\phi)}{(s_{Li} + (1-s_{Li})w_j)\sigma} + \frac{e_i\beta_M\phi}{\sigma}$ is the share of region i in total income E^W, $s_{Li} = \frac{L_1}{L_1 + L_2}$ is the share of region i in total population, and total income is equal to $E^W = (s_{Li} + (1-s_{Li})w_j)\frac{\sigma}{\sigma - \beta_M\phi}$.

Now changes in the way transfers are distributed between the two regions will have an effect on wage rates affecting also capital rewards. On the other hand, the distribution of capital affects the equilibrium wage rates. This feature of the model introduces a circularity which makes more difficult, when not impossible, to achieve closed form solutions. Because of this, the analysis in this section is based on numerical simulations.

The behaviour of the model when the agricultural sector is excluded depends on the values taken by four parameters. Two of these parameters depend on consumers' preferences, the distribution of expenditure between manufactures and the non-traded good (β_M), and the elasticity of substitution (σ). The other two parameters are in a more of less degree policy choices; one is the share of transfers that go directly to consumers (ϕ), while the other is transaction costs (τ) that to some extent can be affected by the public sector.

As shown in Figure 8, the simulations show that in the four cases, the larger the value these parameters take, the more likely an increase in the share of transfers received by a region would result in an increase in its share of manufacturing firms. The intuition behind these results is very straightforward. The first result that emerges for the different parameter configurations in the simulation reported in Figure 8 is that as the share of transfers region i (e_i) receives increases, the larger its participation in the country expenditure given by the parameter δ_i. Then, how this extra income is expended will have different effects on the location of manufacturing production. Let us now look at the intuition behind each of the four different cases:

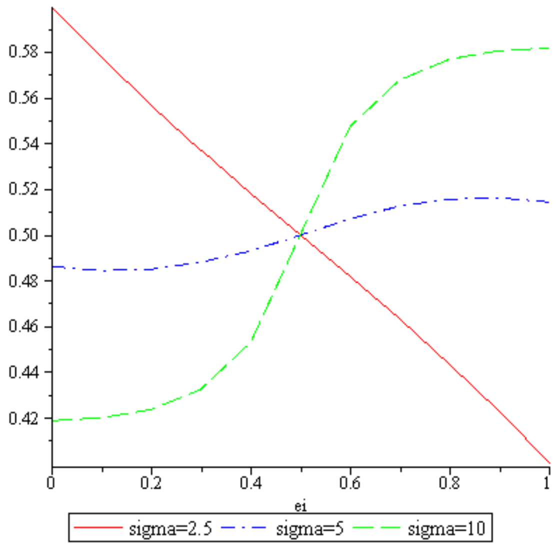
a. A larger elasticity of substitution means that consumers care less about the number of manufactures varieties so they tend to consume more of domestically produced varieties in order to save on transportations costs. So, as the share of transfers (e_i) region i receives increases, the extra income is mostly expended in locally produced varieties, increasing the rate of return of local firms and attracting those located elsewhere.
b. The intuition is relatively similar in the case of β_M, the share of income expended in manufactures instead of the non-trade good. In this case, the larger β_M is, the larger is the share of income coming from transfers that is expended in manufacturing goods than in the non-traded good. Once again, the increasing demand for manufactures in the region which is benefited from the increase in transfers raises the return to capital attracting firms from the other region.
c. With respect to the first of the policy choice parameters, transactions costs (τ), the larger these are the more consumers tend to consume domestically produced varieties in order to save on transaction costs. So, as a region income increases because of the increase in transfers it receives, the larger demand for varieties produced locally increases profits of local firms attracting those located in the other region.
d. Finally, we have the case of the ϕ parameter, the share of transfers going directly to consumers instead of local governments. In one extreme, when ϕ is equal to zero, transfers from the Federal government increases the consumption of manufactures only indirectly, trough the wages paid by the local government with the transfers it receives. However, as ϕ becomes positive, part of these transfers, those received directly by consumers, go directly to the consumption of manufactures, as well as also indirectly whilst $\phi < 1$, such that the demand effect is larger in this second case, making more profitable to firms to relocate to the region which benefits from higher transfers.

IV. Conclusions

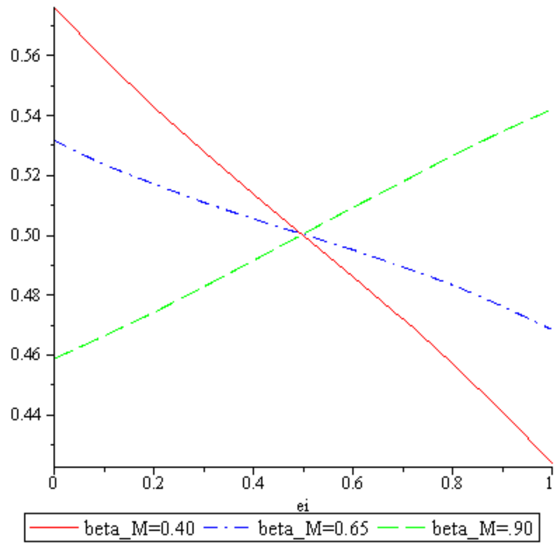
As the references provided above point out, it is theoretically and empirically possible to observe negative effects in terms of growth and development following an exogenous income shock. In the particular case of Argentina, the evidence suggests that regions which receive larger per capita transfers from the National government have shown a worse behaviour in terms of production of footloose activities, i.e. manufactures. The theoretical model presented in Section 3 shows that this outcome depends on factors that are out of control of the public sector, i.e. consumer preferences, as well as other variables over which governments can influence on, such as how transfers are expended, and transaction costs. To be able to draw more conclusive evidence for the case of Argentina, particularly to disentangle among the different forces explaining the observed phenomenon requires a much more data demanding empirical exercise; this is left for future extensions of this research.

Figure 8
Share of Region *i* in the number of manufacturing firms

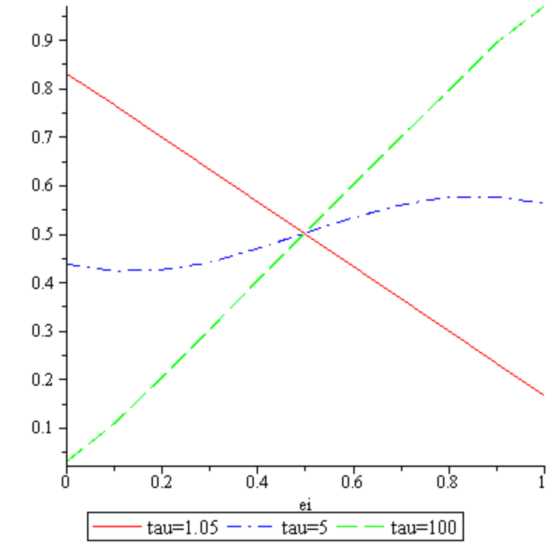
(β_M ***=0.8;*** L_i ***=*** L_j ***=0.5; K=1;*** τ ***=2;*** ϕ ***=0.5;*** w_1 ***=1)***



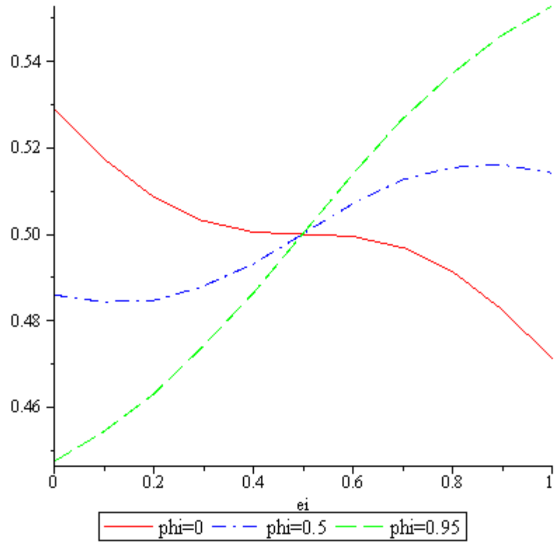
(σ ***=2.5;*** L_i ***=*** L_j ***=0.5; K=1;*** τ ***=2;*** ϕ ***=0.95;*** w_1 ***=1)***



(β_M ***=0.8;*** L_i ***=*** L_j ***=0.5; K=1;*** ϕ ***=0;*** σ ***=2.5;*** w_1 ***=1)***



(β_M ***=0.8;*** L_i ***=*** L_j ***=0.5; K=1;*** τ ***=2;*** σ ***=5;*** w_1 ***=1)***



References

Bhagwati, J., R. Brecher, and T. Hatta (1983). The generalized theory of transfers and welfare: Bilateral Transfers in a Multilateral World, *American Economic Review*, 73(4), 606-618.

Brecher, R, and J. Bhagwati (1982). Immiserizing transfers from abroad, *Journal of International Economics*, 13(3-4), 353-364.

Capello, M. and M. Roca (1999). Desarrollo económico y social en Argentina: análisis de cluster y formación de bloques homogéneos de Provincias, *Actualidad Económica*, 46, 14-22.

Chilchilnisky, G. (1980). Basic goods, the effects of commodity transfers and the international economic order, *Journal of Development Economics*, 7(4), 505-519.

Clemens, M., S. Radelet, and R. Bhavnani (2004). Counting chickens when they hatch: the short-term effect of aid on growth, Center for Global Development, Working Paper 44, Washington.

Doucouliagos, Hristos and Paldam, Martin (2009). The aid effectiveness literature: The sad results of 40 years of research, *The Journal of Economic Surveys*, 23(3), 433-461.

Figueras A., J. Arrufat, and P. Regis (2003). El fenómeno de convergencia regional, Paper presented at the 38th Meeting of the Asociación Argentina de Economía Política, Mendoza (Argentina).

Figueras A., J. Arrufat, D. de la Mata and S. Alvarez (2004). Convergencia Regional: un estudio de indicadores de tendencia, Paper presented at the 39th Meeting of the Asociación Argentina de Economía Política, Buenos Aires (Argentina).

Hirschman, A. (1958). The Strategy of Economic Development, Yale University Press: New Haven, Connecticut.

Lucas, R. (1990). Why doesn't capital flow from rich to poor countries? *American Economic Review*, 80(2), 92-96.

Marina, A. (1998). Convergencia económica en la Argentina. ¿Qué nos dice la evidencia empírica?, Paper presented at the 33rd Meeting of the Asociación Argentina de Economía Política, Mendoza (Argentina).

Martin, P. and C. Rogers (1995). Industrial location and public infrastructure, Journal of International Economics, 39(3-4), 335-351.

Porto, A. and P. Sanguinetti (1998). Political determinants of Federal Grants, evidence from Argentina, UTDT, Buenos Aires.

Porto, G. (1994). Convergencia y Política económica. Algunos resultados para provincias argentinas, Paper presented at the 29th Meeting of the Asociación Argentina de Economía Política, La Plata (Argentina).

Porto, G. (1996). Las Economías Regionales en la Argentina, Grupo Editor Latinoamericano, Buenos Aires (Argentina).

Rajan, R. and A. Subramanian (2008). Aid and growth: what does the cross-country evidence really show? *The Review of Economics and Statistics*, 90(4), 643-665.

Russo, J. and F. Ceña Delgado (2000). Evolución de la convergencia y disparidades provinciales en Argentina, *Revista de Estudios Regionales*, 57, 151-175.

Samuelson, P. (1952). The Transfer Problem and Transport Costs: The Terms of Trade When Impediments are Absent, *The Economic Journal*, 62, 278-304.

Torvik, R. (2002). Natural resources, rent-seeking and welfare, *Journal of Development Economics*, 67, 455-470.

Utrera G. and J. Koroch (1998). Convergencia: evidencia para las provincias argentinas, Paper presented at the 33rd Meeting of the Asociación Argentina de Economía Política, Mendoza (Argentina).

Willington, M. (1998). Un análisis empírico del crecimiento económico regional en Argentina, Estudios, 84, 13-36.

Yano M. and J. Nugent (1999). Aid, non traded goods and the transfer paradox in small countries, *American Economic Review*, 89(3), 431-449.

Yano, M. (1983). Welfare aspects of the transfer problem, *Journal of International Economics*, 15, 277-289.