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# CHOOSING A PLACE TO LIVE AND A WORKPLACE[1,2]

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## I. Introduction

Multiple factors determine the decision of agents over where to live, work, and consume. Many individuals have a definite preference to live in a certain place, sometimes originated on personal experience or family history. Yet, by commuting, agents can separate their choice of place to live and work. Communities may have different endowment of resources determining the productivity of workers in the area. Also, government spending on infrastructure is an important factor in this respect. In general, infrastructure acts as a complementary input to labor, increasing its productive capacity. Furthermore, differential provision of local public goods across communities will influence the decision of agents for where to live. In summary, there are many factors interacting when agents are choosing a place to live and a workplace.

The objective in this paper is twofold. First, we provide a simple framework and some theoretical discussions that are useful in a formal analysis of the aforementioned interactions. Our simple model delivers some important insights on the determinants of the geographic distribution of activity in the economy, and the complementary discussions help to create a more complete picture of the main issues. Second, we discuss how some of these localization forces come into place in the context of a specific economic area in Argentina: the Greater Buenos Aires metropolitan area.

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[2] We would like to dedicate this paper to the memory of Professor Horacio Núñez Miñana. We are grateful to María Victoria Fazio and Leonardo Gasparini for their comments, and also to Leonardo Gasparini, for sharing some of his data with us. The views expressed in this paper are those of the authors and do not necessarily represent the views of the Federal Reserve Bank of Richmond or the Federal Reserve System.
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The paper is organized as follows. In the next section we present a simple model that is suitable for the study of the determinants of the localization decision of agents. We also study the decision of agents with respect to whether or not to commute to another region for working purposes. Commuting costs, infrastructure and local public goods play a crucial role in our analysis. In the third section we discuss other factors that may play a significant role in the determination of the distribution of the population and the workforce across different regions of an economy. Section IV provides a short discussion of some of the issues raised by the preceding analysis in the context of a large urban area in Argentina. Finally, the last section contains some concluding remarks.

## II. A Simple Model

Consider a simple model with two regions, 1 and 2 and a continuum of agents with measure $N$. Agents differ in their preference to live in region 1 or 2, but are otherwise homogeneous. Each agent has an endowment of one unit of labor that they supply inelastically.

Let $G_i$ be the level of local public goods provided by the government in region $i$ with $i = 1, 2$. In this model, the local public goods in region $i$ represent the public amenities enjoyed by the people living in that region. Agents, then, consume and enjoy the place where they live, together with its public amenities. We denote by $c$ the level of individual consumption. Formally, agent $n \in [0, N]$ preferences are represented by the following utility function:

$$u(c, G_1) + a(N - n),$$

if agent $n$ lives in region 1, and

$$u(c, G_2) + an,$$

if agent $n$ lives in region 2.[4]

The heterogeneity across agents is indexed by the parameter $n \in [0, N]$ in their utility functions. Individuals with a high value of $n$ have a preference to live in region 2. The constant $a$ indicates the importance workers give to their

[4] Flatters, Henderson and Mieszkowski (1974), Mansoorian and Myers (1993) and Wellisch (1994) are other studies where agents have heterogeneous preferences over locations.

place of residency; if $a = 0$ we say that there is "residential indifference." Similarly, the bigger the value of $a$, the more important is the role of preferences in the localization decision.

Wages in region $i$ depend on the number of agents working in the region ($l_i$) and on the level of infrastructure provided by the government, which we denote by $g_i$ with $i = 1, 2$. Then, we have that wages in region $i$ are given by $w_i (l_i, g_i)$ and we assume that $w_i$ is a decreasing function of $l_i$ and an increasing function of $g_i$. These two assumptions are easily justified. Basically, they are meant to capture the standard assumption of decreasing marginal productivity of labor and the fact that infrastructure is a complementary input in production.[5]

Agents, if they wish to do so, can live in one region and work in the other. Working in a different region than where the agent lives involves some commuting costs, which we summarize with the variable $s$. Consequently, the consumption of an agent that is working in region $i$ is given by $c = w_i - \boldsymbol{I}\, s$, where the indicator variable $\boldsymbol{I}$ takes value one if the agent is commuting and value zero if the agent lives and works in the same region.

**Taxonomy of equilibrium outcomes**

We call equilibrium a situation where, given the distribution of workers and inhabitants in each region, no agent has an incentive to move to the other region or to go to work in the other region. There are many types of possible equilibrium outcomes. In particular, depending on the value of the parameters and the shape of the utility and wage functions we may have equilibriums where no agent commute and equilibriums where some agents commute.

Before we start with our taxonomy, note that in the model there is an implicit tendency to symmetry. Specifically, if both regions have the same levels of (productive) infrastructure and local public goods and the same wage functions (productivity), then population will be split exactly in halves (half living in region 1 and half in region 2). In other words, the specific preference's heterogeneity that we have assumed here will not be the driving

[5] However, it should be mentioned here that in the literature on urban economics it is common to resort to increasing returns as the driving force for many agglomeration outcomes. In this section we stay away from these more complicated issues, which will be later discussed in section III.

force for the possible asymmetries among regions that the different equilibrium situations can have.

**Equilibrium without commuting**

There are two reasons for an equilibrium to exhibit no commuting. One possibility is that all agents choose to live and work in the region with high wages. The analysis of this case is fairly simple and we do not pursue it here.

The other possibility is that some workers live and work in each region. Define the subset $N_{NC}$ of values of $n$ as follows:

$$N_{NC} = \left\{ n \in [0,N] \middle| \begin{matrix} w_1(n,g_1) - s < w_2(N-n,g_2) \quad and \\ w_2(N-n,g_2) - s < w_1(n,g_1) \end{matrix} \right\}$$

Also, let $n^*$ be the value of $n$ that satisfies the following equation:

$$u[w_1(n^*,g_1),G_1] + a(N-n^*) = u[w_2(N-n^*,g_2),G_2] + an^*$$

Then, if $n^* \in N_{NC}$ we have that there is an equilibrium where all agents with $n < n^*$ live and work in region 1 and all agents with $n > n^*$ live and work in region 2. No commuting takes place in this equilibrium.

**Equilibrium with commuting**

There are three possible *types* of equilibrium with commuting. To simplify the analysis we assume that region 2 is the region that is more likely to attract workers (there is a set of equivalent possible equilibriums that correspond to the equilibriums studied here after a re-labeling of the regions).[6] Then, we have that the three types of equilibriums are: (*i*) all agents live in region 1 and some or all (commute and) work in region 2; (*ii*) some agents live in region 1 and some in region 2 but all agents work in region 2; (*iii*) some agents live and

[6] The objective here is to describe the different generic situations that can arise in equilibrium. For this purpose, we concentrate only in the cases where region 2 is the one most likely to attract workers. There are similar (symmetric) cases in which region 1 tends to attract more workers. A region may be attracting workers because the corresponding wage *function* for that region is higher (given the arguments of the function) or because the *arguments* of the function are higher for that region.

work in region 1, some live in region 1 and work in region 2, and some live and work in region 2. We study each case respectively.

(*i.a*) Suppose the following two inequalities hold:

$$w_2(N, g_2) - s > w_1(0, g_1),$$

$$u[w_2(N, g_2) - s, G_1] > u[w_2(N, g_2), G_2] + aN.$$

The first equation tells us that, even when all agents are working in region 2, the wage in region 2, net of commuting cost, is higher than the wage in region 1. Then, all workers will prefer to work in region 2. The second equation tells us that even the agent with the highest value of $n$ (that is, $n = N$) would prefer to live in region 1, and commute to region 2 to work (rather than living and working in region 2). Since all other agents have an even weaker preference for living in region 2, all agents will choose to live in region 1. Under this situation, commuting is maximized. All agents are commuting to work.

(*i.b*) Suppose now that the following two equations hold:

$$w_2(l_2^*, g_2) - s = w_1(l_1^*, g_1),$$

$$u[w_2(l_2^*, g_2) - s, G_1] > u[w_2(l_2^*, g_2), G_2] + aN,$$

then, all agents will live in region 1 but only $l_1$ agents will work in region 1 and the rest ($l_2^* = N - l_1^*$) will live in region 1 but commute and work in region 2.

We can think of these two cases as representing the case where region 1 is a residential area and region 2 is an industrial area. The first case (*i.a*) corresponds to the case of "specialized" regions; one region is exclusively residential and the other is exclusively industrial. The second case, instead, have some agents working in the residential area, perhaps providing certain specific (house-life related) services to the residents of that region. This kind of scenario is more likely if the provision of public goods is very uneven; that is, if $G_1$ is much larger than $G_2$.

(*ii*) This second case corresponds to a situation where both regions have residential space but region 2 is the region where all agents work. The following two equations characterize the equilibrium:

$$w_2(N, g_2) - s > w_1(0, g_1),$$

$$u[w_2(N, g_2) - s, G_1] + a(N - n^*) = u[w_2(N, g_2), G_2] + an^*,$$

where $n^*$ is the measure of agents living in region 1. Under this scenario, all agents living in region 1 are also commuting, hence $n^*$ is also the measure of agents commuting in equilibrium. On the other side, $N$ - $n^*$ agents live and work in region 2; that is, they do not commute.

This case is most likely when the provision of local public goods is fairly even across regions (that is, $G_1 > G_2$), but the level of infrastructure (complementary to production) is significantly better developed in one of the regions (in this case, region 2; that is, $g_2 > g_1$).

The analysis of these special cases allows us to highlight an issue that has been ignored in the model being considered. Suppose that agents consume in the region where they live. Then, in those equilibriums where no people live in region 2 but some people work in it, all the goods produced in region 2 will be exported to region 1. Clearly, this kind of unrealistic situation stresses the importance of studying the role of transport cost for good and its implication over the decisions of agents with respect to where they consume. In particular, note that some agents may be living in region 1 and working in region 2. Hence, without any extra costs, these agents could easily shift their consumption spending across regions in search for, for example, better prices (net of transport cost and presumably adjusted for quality).

(*iii*) The final case that we need to consider is characterized by the following two equations:

$$w_2(l_2^*, g_2) - s = w_1(l_1^*, g_1),$$

$$u[w_2(l_2^*, g_2) - s, G_1] + a(N - n^*) = u[w_2(l_2^*, g_2), G_2] + an^*.$$

Replacing $l_2^* = N - l_1^*$ we have that this is a system of two equations in two unknowns, $l_1^*$ and $n^*$. We assume that the solution to the system of

equations is such that $l_1^* < n^*$ (otherwise, there would be no commuting in equilibrium).

In this case, there are agents living and working in each region but some of the agents living in region 1 commute and work in region 2. In particular, we have that $l_1^*$ agents live and work in region 1, $n^* - l_1^*$ agents live in region 1 and commute to work in region 2, and $l_2^* = N - l_1^*$ agents live and work in region 2. Figure 1 illustrates the determination of the distribution of workers in this scenario.

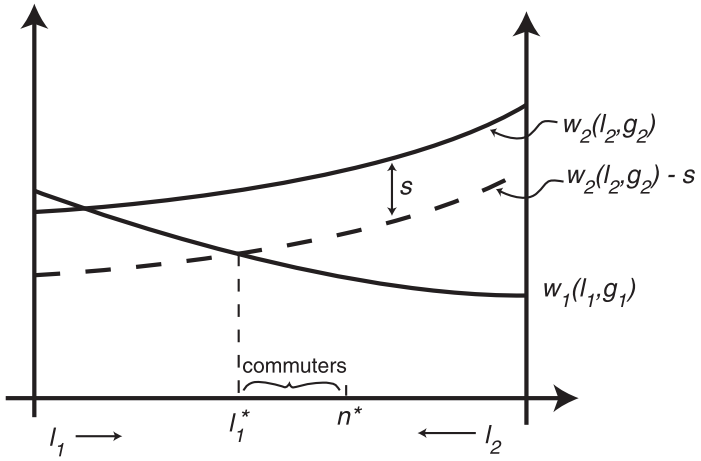


**Figure 1**

In principle, we can argue that this case is the most relevant one. Usually regions have some agents working and some agents living in them. Furthermore, some commuting is likely to be observed among neighboring regions. One limitation of the model is that, because of the homogeneity of workers and jobs, we are not able to capture situations where there is two-way commuting, which is also a fairly common phenomenon.

## Comparative statics

We have argued that the type (*iii*) equilibrium is the most interesting case. For this reason, in what follows, we concentrate our attention on this equilibrium. We want to determine now how the distribution of workers and

households across regions would vary when the fiscal and commuting parameters vary.

Recall that the equilibrium values of $l_1^*$ and $n^*$ are given by the solution to the following system of equation:

$$w_2(N - l_1^*, g_2) - s = w_1(l_1^*, g_1), \tag{1}$$

$$u[w_2(N - l_1^*, g_2) - s, G_1] + a(N - n^*) = u[w_2(N - l_1^*, g_2), G_2] + an^*. \tag{2}$$

In principle we could use Cramer's rule to analyze the comparative statics of this system. However, there is an even simpler way to proceed that originates on the recursive nature of the system. In particular, note that the value of $l_1^*$ is determined uniquely by equation (1). Then, taking the total differential of equation (1), and rearranging terms, we get that:

$$\frac{dl_1^*}{ds} > 0, \quad \frac{dl_1^*}{dg_1} > 0, \quad \frac{dl_1^*}{dg_2} < 0.$$

The first result tells us that when the commuting costs increases, more workers will choose to work in region 1 and avoid commuting. The second result captures the idea that improvements in (production) infrastructure in region 1 will tend to increase wages in that region and hence the number of agents working in that region. Finally, the third result tells us that, if region 2 improves its (production) infrastructure (*ceteris paribus*), then more workers will choose to work in that region.

Now, taking total differential of equation (2), we obtain that:

$$\frac{dn^*}{dG_1} = \frac{1}{2a}\frac{du(c_1, G_1)}{dG_1} > 0, \quad \frac{dn^*}{dG_2} = -\frac{1}{2a}\frac{du(c_2, G_2)}{dG_2} < 0.$$

These two results tell us that when a region increases its provision of local public goods the resulting improve in living amenities tends to induce agents to move to that region.

Determining how the proportion of the population living in region 1 depends on the commuting cost is slightly more complicated. The reason is that now some indirect effects come into place. As we saw before, when the commuting cost $s$ changes the distribution of workers across regions also

changes. This change, in turn, influences the equilibrium wages that then influence the localization decision of agents. To obtain this result formally, first note that:

$$\frac{dw_2}{dl_2}\frac{dl_1^*}{ds}+1>0.$$

Then, taking total differential of (2) we have that:

$$\frac{dn^*}{ds}=\frac{1}{2a}\left[\frac{du(c_2,G_2)}{dc_2}\frac{dw_2}{dl_2}\frac{dl_1^*}{ds}-\frac{du(c_1,G_1)}{dc_1}\left(\frac{dw_2}{dl_2}\frac{dl_1^*}{ds}+1\right)\right]<0.$$

This expression implies that an increase in the commuting cost will derive in a decrease in the number of agents living in region 1. The intuition behind this result is that when there is an increase in the cost associated with living in one region and commuting to work in the other, some agents will actually decide to move their household to the region where they work. In this way, agents will compromise their preference for living in the region of their liking, just to avoid incurring what is now a higher commuting cost.

Finally, we can also study how the proportion of agents living in each region will change as a response to an increase in the (production) infrastructure of one of the regions. Note that this change will originate completely on indirect effects, through the changes induced in wages and the distribution of workers. As before, first note that

$$-\frac{dw_2}{dl_2}\frac{dl_1^*}{dg_1}>0, \qquad \text{and} \qquad \frac{dw_2}{dg_2}-\frac{dw_2}{dl_2}\frac{dl_1^*}{dg_2}>0.$$

Then, we have that

$$\frac{dn^*}{dg_1}=\frac{1}{2a}\left(\frac{du(c_1,G_1)}{dc_1}-\frac{du(c_2,G_2)}{dc_2}\right)\left(-\frac{dw_2}{dl_2}\frac{dl_1^*}{dg_1}\right),$$

and

$$\frac{dn^*}{dg_2}=\frac{1}{2a}\left(\frac{du(c_1,G_1)}{dc_1}-\frac{du(c_2,G_2)}{dc_2}\right)\left(\frac{dw_2}{dg_2}-\frac{dw_2}{dl_2}\frac{dl_1^*}{dg_2}\right).$$

The sign of these expressions depends on the sign of the difference in marginal utility of consumption in the two regions. Note that $c_1 = w_2 - s < c_2 = w_2$, and decreasing marginal utility of consumption implies that, if $G_1$ is not too different from $G_2$, the size of the population living in region 1 will increase when the level of (productive) infrastructure increases in either of the two regions (that is, $dn^*/dg_1 > 0$ and $dn^*/dg_2 > 0$).

Developing an intuition for this result requires some effort. It may appear somewhat surprising at first that improvements in productive infrastructure *in either of the two regions* produce the *same* effect on the distribution of inhabitants. The general idea behind this result is as follows. Government spending in (productive) infrastructure induces workers to go to work in the region where the new infrastructure is located. However, wage equalization (equation 1) requires that the return to labor increases in both regions. The wage increase is valued more by those living in region 1 and this (relative) increase, in turn, drives an increase in the number of agents that wish to live in that region.

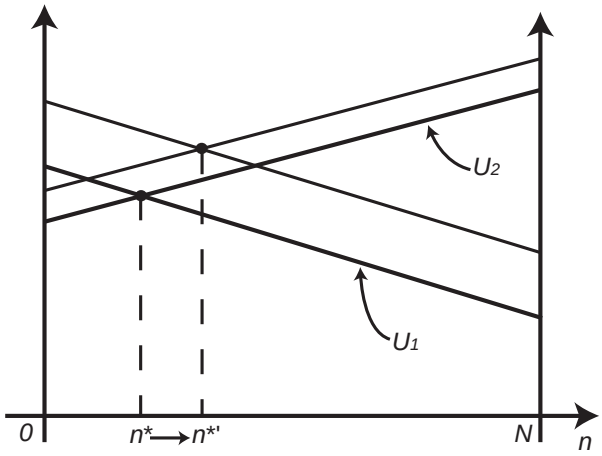


**Figure 2**

Figure 2 provides a graphic representation of the result. The lines $U^1(n)$ and $U^2(n)$ depict the (across agents' types $n$) utility of living in each region. With the same increase in wages in both regions (equation 1) and assuming that the

marginal utility of consumption is greater in region 1 (where consumption was lower because of the commuting costs), the utility of living in region 1 increases more than that of living in region 2. Consequently, the line $U^1$ moves up more than $U^2$ and drives an increase in the equilibrium value of n, the size of the population living in region 1.

**Some extensions**

Consumption prices: We can extend the analysis to include different prices for private goods in each region. Assume, for simplicity, that agents consume in the place where they live and that the price differential comes from an overcharge per unit bought by consumers (with no differential at the production level). Then, the price paid by the residents and consumers of region 2 is $p_2 = 1 + t = p$, while we still assume that $p_1 = 1$ in region 1. In this case, we have $c_2 = w_2 / p$, for the agents that live and work in region 2; and $c_1 = w_1$ (= $w_2 - s$, in equilibrium) for the agents that live and work in region 1 and the agents that live in region 1 and commute to work in region 2.[7]

We now have that the equilibrium is described by the following two equations:

$$w_2(l_2^*, g_2) - s = w_1(l_1^*, g_1),$$

$$u[w_2(l_2^*, g_2) - s, G_1] + a(N - n^*) = u[w_2(l_2^*, g_2)/p, G_2] + an^*.$$

First note that the distribution of workers across regions is independent of $p$. The change in $n^*$ as $p$ changes, is given by:

$$\frac{dn^*}{dp} = \frac{1}{2a}\left(\frac{du(c_2, G_2)}{dc_2}\right)\frac{w_2}{p^2} > 0.$$

This result tell us that if agents consume where they live and the price of consumption goods increases in region 2, then agents will tend to move to live in region 1.

[7] If agents could choose between consuming in the place where they live or in the place where they work, then differences among the price of consumption goods across regions would add new factors influencing the decision of whether to move or commute.

Mixed public goods: Consider now the case when it is not possible to separate (productive) infrastructure from what constitutes just local public goods. This case corresponds to the plausible situation where local public goods not only influence the utility of agents living in the region but also improve the infrastructure available in the region. We call these public goods "mixed." To capture this idea we assume that $dG_i/dg_i$, with $i = 1, 2$, is not equal to zero.[8]

The comparative static results are now a combination of the ones obtained in the previous section. For example, we have

$$\frac{dn^*}{dg_2} = \frac{1}{2a}\left[\left(\frac{du(c_1,G_1)}{dc_1} - \frac{du(c_2,G_2)}{dc_2}\right)\left(\frac{dw_2}{dg_2} - \frac{dw_2}{dl_2}\frac{dl_1^*}{dg_2}\right) - \frac{du(c_2,G_2)}{dG_2}\frac{dG_2}{dg_2}\right].$$

The sign of this derivative is ambiguous because the direct effect of an increase in infrastructure is counterbalanced by the indirect effect of the increase in the level of local public goods in region 2. However, it is not hard to show that increases in $g_1$ result in increases in $n^*$, as in this case the direct effect of the increase in $g_1$ and the indirect effect, through the induced increase in $G_1$, both go in the same direction (no compensation takes place).

Housing costs: An important factor in the analysis of localization decisions is, of course, the cost of housing. An important component of the housing costs is the rent on urban land. We now make some specific assumptions that allow us to capture these issues in a very simple way.

Assume that each individual has to consume one unit of housing and that there is a limited number of houses $K$ in region 2, with $K < N$. Also assume that the number of available houses (or land) in region 1 is unlimited. If houses in a region can only be used as residence for those agents living in that region, then the price of housing in region 1 will be always zero and the price of housing in region 2 may be positive.

[8] Examples of pure "residential" public goods that would only increase the variable $G$ in our model are public playgrounds, a zoo, or a recreational area. An industrial park would be an example of a public project that would (in principle) only increase the value of our variable $g$. But most public projects, like roads, street lights, policing, and others, would tend to increase both $G$ and $g$ and hence would enter our categorization as "mixed" public goods.

Call $r \geq 0$ the price of a house in region 2 and $n^*$ the solution to equation (2) in the previous section. Then, if $N - n^* < K$ we have that $r = 0$, and the distribution of households living in each region is the same as the one we obtained in the previous section (that is, $n^*$ agents live in region 1 and $N - n^*$ live in region 2). But, if $N\text{-}n^* > K$, then only $K$ agents will live in region 2 and the price of houses in region 2 will be positive, that is $r > 0$. The equilibrium value of $r$ is determined by the following equation:

$$u[w_2(N - l_1^*, g_2) - s, G_1] + aK = u[w_2(N - l_1^*, g_2) - r, G_2] + a(N - K).$$

It is interesting to evaluate the comparative statics with respect to $G_2$ under this modified environment. Clearly, an increase in $G_2$ cannot increase the size of the population living in region 2, which is already equal to the upper bound $K$. In fact, the change in $G_2$ will only increase the level of rent $r$ on urban land. Also note that the utility level obtained by the agents living in region 2 does not change when $G_2$ changes. In other words, improvements in the provision of local public goods in region 2 will not result in improvements on the welfare of agents living in that region. Increases in $G_2$ will only increase the rent of the owners of the urban land.

**A transition scenario**

In our taxonomy of equilibrium we studied situations where no agent had incentives to either move or go to work to another region. These situations, if reached, would tend to persist in time. However, no attempt was made to explain how an economy would reach one or another equilibrium situation. Here we provide one possible transition scenario for an economy that may be regarded as having some empirical relevance.

We study a situation where an economy experiences a transition from a no commuting equilibrium to one where commuting happens. Basically, we start with a situation where commuting cost are prohibitively high and move to a situation where these costs become lower and some agents start to take advantage of the possibility of commuting.

Let $s_H$ and $s_L$ be two values of the commuting cost; with $s_H > s_L$. Consider now an economy that satisfies the following inequalities:

$$s_L < w_2(N - n_H^*, g_2) - w_1(n_H^*, g_1) < s_H,$$

where $n_H$* is such that,

$$u[w_1(n_H*, g_1), G_1] + a(N - n_H*) = u[w_2(N - n_H*, g_2), G_2] + an_H*.$$

Suppose first that the commuting cost is $s_H$. Then, the equilibrium of the economy is such that $n_H$* agents are living and working in region 1 and $N$- $n_H$* agents are living and working in region 2. No commuting takes place in this equilibrium.

Now suppose that the commuting cost falls to $s_L$. When this change happens, some agents that were living and working in region 1 will start commuting to region 2, as

$$w_2(N - n_H*, g_2) - s_L > w_1(n_H*, g_1).$$

The new equilibrium will have $l_L$* agents working in region 1, with $l_L$*< $n_H$* (and $N$ - $l_L$* working in region 2), such that:

$$w_2(N - l_L*, g_2) - s_L = w_1(l_L*, g_1).$$

Also, the new equilibrium will have $n_L$* agents living in region 1 (and $N$ - $n_L$* living in region 2), with $n_L$* being the solution to:

$$u[w_1(l_L*, g_1), G_1] + a(N - n_L*) = u[w_2(N - l_L*, g_2), G_2] + an_L*.$$

It is then easy to show that $n_L$* > $n_H$*, so that, while more people go to work to region 2, more people move to live in region 1. We can think of this result as reflecting the fact that, when commuting costs were high, some agents were living in region 2 mainly to be able to work there without having to commute. Once commuting costs decrease, these agents relocate to region 1 and commute to work in region 2.

If we interpret region 1 as being the suburbs of the city and region 2 as the center of the city, this change in commuting costs provides an interest example of a process of suburbanization. Basically, the response to a decrease in the cost of commuting is a flow of people that move to live in the suburbs (region 1) and an increase in the number of commuters that live in the suburbs and work in the city (region 2).

## III. Other theoretical considerations

The simple model presented in the previous section abstracts from a number of important factors that are relevant in the localization decision of workers and households. Many of these factors have been extensively studied in the urban economics literature. In this section we provide a summary discussion of the main insights resulting from these studies. While the motivation for most of the work in this area originates in developments occurring in the US economy, it will become clear that, in many instances, the ideas are applicable to understanding the trends on localization outcomes in Argentina.

### Agglomeration economies

Why is economic activity concentrated in a relatively small number of geographic areas? Many factors have been pointed out by economists to explain this observation. Among these, agglomeration economies definitely play an important role. Agglomeration economies refer to the advantages that proximity has on economic activity. As a result of these advantages, industries and households have an incentive to form clusters, which eventually develop into cities.

Duranton and Puga (2004) provide a detailed description of the microfoundations behind the idea of agglomeration economies. They distinguish three types of mechanisms that generate increasing returns at the local level: sharing, matching, and knowledge spillovers. The first one suggests that the concentration of economic activity gives rise to external benefits that can be shared among firms and households located in the cluster. For instance, agglomeration economies occur when individuals share an indivisible facility. Under these conditions, average costs decline as the community gets bigger. At the same time, however, the facility will be subject to increasing crowding and congestion. Thus, the optimal size of a city can be regarded as the result of a tradeoff between agglomeration economies and urban crowding. Another instance of a productive advantage that can be shared among firms located in large clusters is the benefits from access to a wider variety of input suppliers.

The second mechanism is based on the fact that urban agglomerations improve the quality of matches available to firms and the total probability of

matching. The inputs in these matches may include workers, intermediate inputs, or even ideas. Furthermore, location in large cities can help to ameliorate the exposure to potential hold-up problems. A hold-up problem arises when one party, engaged in a bilateral agreement with another, undertakes an ex-ante relationship-specific investment. Once the investment has taken place, the investor loses all bargaining power, or in other words, it can be held-up in a renegotiation stage. Obviously, this problem can be mitigated if the investor has the possibility of switching to an alternative partner. Agglomeration economies in cities would tend to make the hold-up problem less important, given that the number of potential partners is higher in large urban areas. Thus, cities would help mitigate the possibility of opportunistic behavior. As stated by Duranton and Puga (2004) "…asset specificity is likely to be less of an issue in an environment where the number of potential partners is large."

Finally, the third mechanism stresses how the geographic concentration of people and jobs in cities can stimulate the generation, diffusion, and accumulation of knowledge.

**Financing local public goods**

In principle, local governments should provide public goods as long as there are no significant interjurisdictional externalities. However, many local public goods do satisfy this basic requirement. For instance, citizens educated in one jurisdiction may later move to another creating an external benefit in the receiving area. Pollution control and the lack of thereof, on the other hand, is an example where negative spillovers can be created across jurisdictions.

Olson (1969) suggests that ideally jurisdictions should be designed according to the principle of *fiscal equivalence*: the benefits of local services provided by the jurisdiction should accrue to those who pay the taxes to finance them, and taxes should be borne only by those who enjoy the benefits. When this principle is not followed, local governments generate external benefits or external costs across jurisdictions. To the extent that local governments only consider the welfare of their residents, they will ignore these spillovers. As a consequence, public services subject to positive spillovers will become undersupplied and public services producing negative spillovers will tend to be oversupplied.

The trend towards suburbanization observed in modern economies brings about important spillovers between the central city and suburban areas. For example, those agents who move to the suburbs and then commute to work at the central city can use the facilities in the latter without paying for the full burden of their provision. On the other hand, the central cities with high density of industrial activity are likely to pollute the environment of the suburbs.

Different alternatives have been proposed in the literature to overcome spillover problems. The first one is related to the application of the Coase Theorem: given well-defined property rights, local governments have an incentive to internalize spillover costs and benefits through bargaining. The second alternative advocates for a suitable consolidation of local governments (Hoxby, 1996, Gilbert and Picard, 1996). However, consolidation is not without costs, as large communities loose the informational advantage available to small ones. Smaller communities can better accommodate the provision of public goods to the preferences of their residents and can allocate the costs of provision more accurately among its beneficiaries.

Interregional tax competition: A crucial problem faced by local governments is that smaller regions are subject to significant flows of households, firms, and capital. The decisions of governments with respect to the provision of local public services and local taxes affect the locational choice of private households and firms.

Regions compete to attract (mobile) households and firms by providing public services, with the ultimate goal of increasing the welfare of their residents. This kind of competition may induce regional authorities to strategically provide certain local public goods and gain advantage over their competing neighbors. For example, a regional government may underprovide certain local public goods in order to discourage immigration of households. This is especially the case when new residents increase the costs of a given level of publicly provided services (see Pinto, 2004). Alternatively, certain local public goods may be overprovided in order to attract firms and, in this manner, increase local wages and tax revenue.

Thus, in this context, the following questions arise: Under what conditions do regions supply public services in a socially efficient way when they follow region-specific objectives and take locational responses of mobile households

and firms into account? Do regions have incentives to distort the provision of public services in order to gain locational advantage? The literature on interregional tax competition addresses these issues explicitly (see Oates, 1972, Wilson, 1986, Zodrow and Mieszkowski, 1986, Oates and Schwab, 1988). The crux of the problem can be explained as follows. Suppose that the provision of local public goods is financed by a tax on a scarce mobile factor such as capital. When providing the public good, the tax authority not only considers the costs associated with the transfer of resources from the private to the public sector, but also the fact that the tax base is mobile. If capital is taxed too much, it will leave the region, lowering local wages and tax revenues. From the region's point of view, the latter is considered a cost, even though the tax base eventually increases tax revenues elsewhere (producing a positive externality). This strategic interaction will induce the tax authority in the region to choose a lower tax rate to avoid capital flight and may result in an inefficiently low supply of public goods.

Tax export: Interregional tax export takes place when regions partly shift taxes to nonresidents. The benefits of supplying local public goods are internalized by the residents of a region, but the costs are partly borne by residents of other regions. Consequently, an inefficiently high supply of local public goods may result in equilibrium (see Wildasin (1987) for some important qualification to this general intuition). Typical examples of tax export are: (*i*) source-based taxation of land rents when land is partly owned by nonresidents and (*ii*) origin-based consumption taxes when regional products are also bought by nonresidents.

**Suburbanization**

Many metropolitan areas around the world, and particularly in the U.S., have been undergoing for some decades a process of "suburbanization" characterized by the relocation of their residents from the city-center to the suburbs. Initially, this relocation implied that residents still commuted to work to the central city. But later in the process, the decentralization of residential activity was followed by employment decentralization, with firms "following"

the population to the suburbs.[9] The process of suburbanization led to the development of multiple employment centers, changing the whole structure of metropolitan areas. The new structure also gave rise to more complicated commuting patterns because residents no longer need to only commute to work to the central city.[10]

Urban economists provide different explanations to describe the process of suburbanization. On one hand, suburbanization can be regarded as "a natural consequence in the evolution of cities" (Mieskowski and Mills, 1993), driven, basically, by the following factors:

- Population growth: As population expands, cities grow to spatially accommodate more people.
- Higher income: Rising income increases the demand for dwelling sizes, which itself causes the city to expand spatially. Additionally, given that bigger houses can be consumed at lower cost in the suburban areas, residents are induced to move out of the central areas, strengthening the process of suburbanization.
- Lower transportation costs: Investment in transportation infrastructure and other transportation innovations make travel faster and more convenient, reducing commuting costs. Additionally, previously remote suburban locations become accessible for commuters. As a result, consumers can have access to relatively cheap housing in the suburbs, while facing smaller commuting costs. Ultimately, all these factors permit the development of metropolitan areas at suburban locations, increasing the size of the urban area.

Other explanations emphasize that the process of suburbanization is fundamentally driven by fiscal and socio-economic problems in central cities. These explanations are part of what is commonly known as the "flight from

[9] The empirical evidence suggests that job suburbanization is partly a consequence rather than a cause of residential suburbanization (see Thurston and Yezer, 1994).

[10] In the simple model presented in section II the commuting flows were in one direction. A potentially interesting extension of that model would be to add further heterogeneity across firms and workers such that the equilibrium could involve commuting in both directions (from region 1 to region 2 and from region 2 to region 1). Clearly, in many situations, two-ways commuting is a more realistic description of the empirical outcomes.

blight" hypothesis. Factors such as high taxes, low quality of schools (and other government services), racial tensions, crimes, congestion, and low environmental quality, encourage certain residents to leave the cities. Supporters of this hypothesis claim that the negative locational attributes or disamenities of central cities motivate primarily higher income groups to move to the suburbs. Affluent households will tend to separate themselves from the poor, leading to the development of more homogeneous communities, and, consequently, to income segregation across space. In fact, as this process continues, the quality of life and the fiscal situation in central areas of the cities deteriorate even further, inducing even mo re people to move out to the suburbs.[11,12]

Some authors regard the spatial growth of cities as excessive. According to this view, the size of the city is considered to be bigger than the optimal size as a consequence of market failures (see Brueckner, 2000). These market failures may arise for different reasons. Markets may not take into account the social value of open space when land is converted to urban use. Alternatively, commuters may not consider the social costs of congestion created by their use of the road network, leading to excessive commuting and, as a result, cities that are too large and widespread. Finally, real estate developers may fail to take into consideration the public infrastructure costs of their projects. In such circumstances, the cost of a given development project may appear as (artificially) low from a developer's point of view, encouraging in this way excessive urban growth.

A natural consequence of suburbanization is the decay of central cities. The residential and employment decentralization process explained before reduces the demand for aging central-city housing, driving prices down. As a result, there is less interest in upgrading and redeveloping land areas near the city

[11] Tiebout (1956) was among the first ones to establish the fact that high-income households have a fiscal incentive to form homogenous communities. If households of different incomes are mixed together, then rich individuals will pay a higher share of the cost of public goods. They may also end up with lower public spending than the one that they would prefer to have, due to the lower willingness to pay of their lower-income neighbors. By forming their own jurisdictions, high-income households can lower taxes and increase the level of public good provision because there is no need to subsidize low-income households.

[12] Income segregation may also take place as transportation innovations develop. High-income groups usually move first to the suburbs because, in general, they are the first ones to have access to the modern and relatively more expensive means of transportation.

center, and big cities tend to necessarily and inevitably disappear.[13] However, urban growth rates of many big cities in the world have remained persistently high. So, what explains the fact that big cities remain in place and are still strong?

Many economists have used the concept of agglomeration economies to explain why people and firms want to stay together even after the cities lose many of their competitive advantages. However, Glaser and Gyourko (2005) adopt a different approach. They argue that the slow decline observed in some big cities in the U.S. can be attributed to the fact that cities essentially contain houses and that houses are a durable good. As cities decline, city's house prices go down as well. Then, low-income people continue to live in the city because housing prices there tend to be less expensive than new construction available in the suburbs. Under this view, as long as cities are capable of providing inexpensive housing services, they will remain in place to attract those individuals that are less willing to pay for housing services.

**Spatial Mismatch and Borrowing Constraints**

The process of suburbanization generates a dispersal of new job opportunities away from the city center. However, due to different reasons, these opportunities are not always equally exploited by all workers. The "spatial mismatch" hypothesis addresses this kind of phenomenon. It has its origins in the study of the particular case of the U.S. economy. The hypothesis states that the important job growth in the suburbs combined with serious limitations over the feasible residential choices of low-income households (and, in particular, low-income African-Americans) have created a relative surplus of workers in inner-city areas, where most of these households live. It has been claimed that the main friction that prevents a natural relocation of households and workers is the existence of some degree of discrimination in the suburban housing market. This artificially restricted access to new locations and jobs can be part of the explanation for the weaker labor-market outcomes obtained by African-Americans in the U.S. labor market (the rates of employment and earnings of African-American workers tend to be lower).

[13] Overexpansion, as a result of market failures, would make this problem even worse. The excessive increase in the supply of developed land depresses central-city prices even more, decreasing even further the interest for upgrading and redeveloping aging dwellings.

These locational restrictions can also help to explain the longer average commutes observed for these groups.[14]

In general, besides the issue of discrimination, there are many other barriers that prevent people from relocating their labor supply to suburban areas, creating a "spatial mismatch." The existence of imperfect capital markets is one of the most significant barriers. It is commonly thought that individuals have only limited opportunities to borrow against their future labor income. Borrowing constraints, apart from distorting the intertemporal consumption profile, also affect moving decisions. People who cannot borrow will be restricted in terms of their capability of changing residential location. This means that these individuals will have limited possibilities of working in distant labor markets, or they will be subject to excessive commuting. Furthermore, the localization of labor induced by the behavior of households facing this kind of constraints will also have an impact on production decisions and profits of the affected firms.[15]

**Land Value Capitalization**

The effect that the provision of local public goods has on the value of land is known as capitalization. As illustrated by the model in the previous section, the possibility of capitalization arises mainly because of the interaction of two factors: (*i*) "the enjoyment of local public goods is coupled with land consumption" (Scotchmer, 2002), that is, residents can only enjoy the local public goods if they occupy a piece of land where the local public goods are provided; and (*ii*) households and factors of production reveal their preferences by moving to their desired location. Under these conditions, if a community raises the supply of local public goods, the community becomes more attractive, inducing the immigration of households and businesses. As this relocation takes place, the demand for land goes up, increasing land rent. Thus, the marginal social benefits of the public goods will be, at least partially, reflected in the marginal increase in land rent. If the community is very small

[14] This hypothesis was first enunciated by John Kain in 1964 (see Kain, 1994).
[15] Pinto (2002) develops a model of "spatial mismatch" that incorporates borrowing constraints as a restriction over relocation behavior.

relative to the rest of the world, the marginal benefits will be (effectively) equal to the increase in the total land rent in the community.[16]

The relationship between the value of land and the value of the public goods provided has been exploited in several different ways. For instance, it has been used in cost-benefit analysis to estimate the willingness to pay for public goods (see Rubinfeld, 1987). Additionally, many theoretical models have been used to argue that when choosing the level of local public goods, local decision makers should behave as private land developers. In other words, if local authorities maximize the capitalized value of land net of the cost of providing local public goods (which would be also the objective function guiding the decisions of a private land developer), then the supply of local public goods would be set efficiently.

## IV. The case of Greater Buenos Aires

In this section we discuss some of the factors involved in the choice of where to live and where to work for individuals residing in the area of Greater Buenos Aires (GBA). We divide the region in two sub-regions: the City of Buenos Aires proper, on one side, and the 19 municipalities of the province of Buenos Aires (commonly known as the "*conurbano*") that complete the area of Greater Buenos Aires, on the other side.[17]

We start by describing some statistics that provide a first approximation to the importance of commuting in these regions. After that, we present some data that serves to illustrate the interaction between the commuting phenomenon and fiscal variables, as suggested by the model in the previous section.

The City of Buenos Aires (CBA) comprises a territory of 200 Km² with 2.8 million inhabitants. The 19 municipalities that comprise the suburbs of Buenos

[16] Flatters, Henderson, and Mieszkowski (1974) and Arnott and Stiglitz (1979) were the first ones to show that aggregate land rent equals total expenditure on public goods. This result is usually referred to as the Henry George Theorem. Polinsky and Shavell (1975) and Pines and Weiss (1976) showed that the marginal increase of the land rent in an open and small region reflects the marginal benefit of a public project.

[17] It is probably most appropriate to think of the GBA as a single urban area, in economic terms. While the model discussed in section II refers to the interactions between two regions, many of the issues that arose in that setup also surmise in a model with a city center and a periphery. Furthermore, to the extent that there are different jurisdictions within the GBA urban area, the model is a useful representation of the fiscal interactions among its jurisdictions.

Aires (SBA) have a surface area of around 3700 Km² and almost 8.7 millions inhabitants.

Table 2 provides some general features of the population dynamics in the region. Between census 1914 and 1947, the rate of population growth in the CBA was 89%. At that time, population growth in the SBA was much higher, at 280%, which is also much higher than the average for the country, 102%. Between 1947 and 2001, the population of the CBA decreased by more than 200 thousand inhabitants, while the population of the SBA continued to grow, with almost a 400% increase. In this second period, the total population of the country grew at 128%. The population of the CBA in 1991 was 1.8 times that of 1914; while this ratio was 19 for the SBA and it was 4.6 for the country as a whole.

In terms of migration, between 1914 and 1947, a total of around 850 thousand people came from other parts of the country to live in the GBA area. These flows represented around 5% of the total population of the country in 1947. Table 3 provides a partial explanation of this sharp demographic reallocation. In particular, the area of the GBA had the highest level of economic capacity in the country and a relatively high provision of local public goods (approximated by the level of local government expenditures). Between 1914 and 1947, the net migration of citizens across the provinces of Argentina was also closely related to the economic capacity index. If we consider a simple regression with internal (within the country) migration as a percentage of the population in 1914 (data from Porto 1996), the $\mathbf{R}^2$ of the regression is equal to 0.85 and the coefficient of the independent variable "economic capacity" is positive and significant (higher economic capacity implies higher immigration levels). Even if we use the absolute number of migrants as the dependent variable the $\mathbf{R}^2$ is around 0.64 and the regression coefficient of "economic capacity" is still positive and significant.

Migration flows continued to be important during the period between 1947 and 1960. However, during that time only the suburbs of Buenos Aires attracted population (more than 1.1 million people from other parts of the country migrated to the SBA). The City of Buenos Aires actually exported population during that time, with 226 thousand people actually leaving the proper territory of the City of Buenos Aires (Porto 1996, Table I).

Overall, we can say that the area of Greater Buenos Aires has been a net receiver of population during the last hundred years. Within this area, though,

significant shifts in localization decisions have been taking place. In particular, a pronounced suburbanization process has occurred, especially since the 1960s. People have chosen as their place to live the outskirts of the city, that is, the area we have labeled (broadly defined) as the suburbs of Buenos Aires (SBA).

The geographic proximity between the two regions is an important factor that makes possible the existence of a large number of people living in one region and working in the other. Recent data from two census conducted in 1991 and 1994 confirm the existence of a significant amount of commuting within the two regions. In Table 4 we present data that indicates that, in 1994, the CBA had a net demand for labor (i.e., an excess demand) of around 1.1 million workers, which is 45% of its total labor force. Tables 5 and 6 present data on labor market conditions in the two regions. As suggested by the model in section II, the CBA, which is the net receiver of commuting workers, has on average higher wages. This is so even though, as the model indicates, the existence of commuters is likely to contribute to reduce wages in the CBA and increase them in the SBA.[18]

Another interesting issue is the effect of commuting over the budget of local governments. According to the model in section II, opening the possibility of commuting implies that the population of region 1 grows and the population of region 2 decreases (see the description of the transition scenario). To appreciate the potential quantitative significance of this kind of phenomenon we undertake the following thought experiment. Assume that the possibilities of commuting are (exogenously) reduced, such that one of every two agents that live in the SBA and work in the CBA decides to move to the CBA. Also assume that each of the moving workers has a standard family (a partner and two children), and that the (moving) families originally had access to local public goods in the SBA and pay taxes there, at the average level. Under this scenario, the resulting migration would cause a decrease in government expenditures in the SBA of 1,040 million pesos and a decrease of 566 million pesos in total tax receipts; this would derive in 474 million pesos of net savings for the sub-national (i.e., provincial and municipal) governments of the SBA.

[18] If the possibility of commuting were shut down, the immediate impact would be a reduction in the labor supply in CBA of around 45%; even with a high labor demand elasticity (e.g. 1.5) the increment of wages would be very important (around 30%).

As we said before, differences across regions in (*i*) fiscal variables, like local taxes and the level of provision of local public goods and infrastructure, and (*ii*) non-fiscal variables, like productive capacity and stock of productive factors, determine the importance of the commuting phenomenon. Tables 7 and 8 present some data that suggest that these differences across regions are significant in the area of Grater Buenos Aires.[19]

People living in different regions of the GBA area have access to very different levels of provision of local public goods. Per capita government expenditure in the CBA is almost 26% higher than the average for the SBA (including provincial and municipal expenditures; see Table 8). It is important to mention that per capita government expenditure is lower in the SBA, the relatively poorer region, even though it would be reasonable to expect that poor households tend to consume more intensively local public goods and that the cost of provision of these public goods is likely to be much higher in poor areas. Several indicators suggest that this kind of considerations might be of significant quantitative relevance. In particular, note that: (*i*) the percentage of people under the poverty line is 5.9% in the CBA and 30.5% in the SBA; (*ii*) the Development Index is 100 for the CBA and 62 for the SBA; (*iii*) the percentage of homes with Unsatisfied Basic Needs (UBN) is 7.1% in the CBA and 14.5% in the SBA; and (*iv*) the percentage of people with no health insurance is 26% in the CBA and 52% in the SBA (a proxy for public hospital usage).

Notably, the tax pressure is actually higher in the province of Buenos Aires (PBA) (5.4% in the PBA and 4.4% in the CBA). This difference in fiscal variables arises in part from the disparity in GDP per capita (200% higher in the CBA than in the PBA) and the disparity in the relationship between median income and the poverty line (3.5 in the CBA and 1.4 in the SBA).

The PBA uses relatively less inputs in the provision of public goods than the CBA (19% less government employment as a percentage of the population), and the PBA pays lower remuneration to the inputs that it uses (around 15%). These two measures may be taken as indicative of the fact that the PBA is likely to be providing public goods of lower quality (than those available in the CBA).

[19] The data in Table 7 compares the CBA with the whole province of Buenos Aires (not just the SBA).

As we said, Table 7 shows important differences in the *level* of provision of local public goods across regions. This data then suggests that fiscal factors may be playing an important role in creating differences over labor productivity across regions. Table 8 provides some measures of the relative productivity of workers and the level of government expenditures in each region, and the last row of Table 7 provides a measure of the regions' relative availability of productive capital.

The data presented above suggests that localization decisions and the phenomenon of commuting between the CBA and the SBA is of mayor quantitative importance and is influenced by, and influences the determination of fiscal and non-fiscal variables. Our contribution is only to provide a first, introductory step that shows how essential would be to further study these matters, both in their theoretical and empirical aspects.

In the National Constitution Reform of 1994 the City of Buenos Aires changed its institutional status from Federal District (dependent of the National Government) to a municipality with an autonomous government. The new status of the CBA gives special relevance to the subject studied in this paper. According to the 1994 Constitution, the municipality of Buenos Aires now participates in the federal regime of tax-revenue sharing – by which the provinces and the City of Buenos Aires receive tax revenues collected by the federal government, for a value of around 5% of the GNP. This change in the legal status of the CBA created several interesting, and still unanswered, questions. For example, it would be useful to evaluate how much of the extra fiscal resources assigned to the CBA under the new revenue sharing rules have derived in a mere increase in the rent of urban land.

## V. Conclusions

In general, there is a tendency for agents to live and work in the same community. This concentration of activities in one area is mainly due to the existence of commuting costs (consider in a broad sense). Nevertheless, when there exists heterogeneity across regions, either in terms of labor return or in terms of the comfort that the region provides as a place to live, flows of workers from one community to the other may arise.

In the simple model presented in Section II is able to generate commuting flows across regions; in particular, there is a region that 'exports' workers and another that 'receives' them. The flow of workers (commuters) takes place up

to the point where wages in the 'exporting' region (the one with relatively low productivity of labor) equal wages in the 'receiving' region, net of commuting costs.

In the model, a decrease in commuting costs not only increases the number of workers and commuters, but also reduces the number of agents living in the region with the relatively high wages. Improvements of the (productive) infrastructure in a region tend to increase the number of agents working in that region. The (indirect) effect of infrastructure over the number of residents is less obvious. In fact, no matter which region improves its infrastructure, the population of the region with the (relatively) low wages increases.

The level of provision of local public goods (that is, public goods that benefit the agents that live in a specific region) does not play a role in the determination of the distribution of workers across regions (in the model) but determines the distribution of residents across regions. In consequence, by increasing the provision of local public goods a region can attract new residents to its area.

The model presented in section II is very simple and it abstracts from many important aspects that influence the localization decisions of economic agents. For completeness, section III provided an overview of the main issues not formally introduced in the model, together with a discussion of the current treatment of these issues in the existing (urban economics) literature.

In section IV we discussed some possible determinants of the distribution of households and workers in the area of the Greater Buenos Aires, in Argentina. The Greater Buenos Aires area occupies 0.14% of the total territory of the country. Yet, in this relatively small area live 32% of Argentina's population (2001 census). The fiscal variables and the commuting phenomenon seem to play an important role in localization decisions and appear to have large quantitative relevance.

To conclude, we strongly believe that the fiscal interactions and localization patterns between the City of Buenos Aires and its suburban areas deserve much more careful attention by political and academic forums. Our paper is just a suggestive first step intended to push further thinking in this direction.

**Table 1**

| **Comparative Static Results Summary** | | | |
|---|---|---|---|
| **Parameters** | $l_1^*$ | $l_2^*$ | $n^*$ |
| $G_1$ | + | (–) | + |
| $G_2$ | (–) | + | + |
| $G_1$ | *n.c.* | *n.c.* | + |
| $G_2$ | *n.c.* | *n.c.* | (–) |
| $s$ | + | (–) | (–) |
| $p$ | *n.c.* | *n.c.* | + |

*Note: We indicate with a + sign those comparative statics that are positive, with (–) those comparative statics that are negative, and with "n.c." those that result in no change.*

**Table 2**

| **Inter-census Evolution of Population. City of Buenos Aires (CBA) and Suburbs of Buenos Aires (SBA), 1914-1991 (thousands of people)** | | | | |
|---|---|---|---|---|
| **Census** | **CBA** | **SBA** | **Total (country)** | **(CBA + SBA)/Total (%)** |
| 1914 | 1575.8 | 458.0 | 7885.2 | 25.8 |
| 1947 | 2981.0 | 1741.3 | 15893.8 | 29.7 |
| 1960 | 2966.6 | 3772.4 | 20013.8 | 33.8 |
| 1970 | 2972.5 | 5380.4 | 23364.4 | 35.7 |
| 1980 | 2922.8 | 6843.2 | 27949.5 | 34.9 |
| 1991 | 2961.0 | 7950.4 | 32608.7 | 33.5 |
| 2001 | 2768.7 | 8684.4 | 36223.9 | 31.6 |

*Source: Censos Nacionales de Población.*

**Table 3**

| **Jurisdictions** | **Economic Capacity in 1937 (PBA+CBA=100)** | **Provincial Gov. Expenditures per Capita in 1934 (pesos 1960)** |
|---|---|---|
| *Prov. of Buenos Aires* | 96.4 | 18.3 |
| *City of Buenos Aires* | 106.3 | 21.1 |
| Catamarca | 9.6 | 3.1 |
| Córdoba | 68.7 | 11.6 |
| Corrientes | 21.6 | 6.4 |
| Entre Ríos | 45.1 | 12.4 |
| Jujuy | 44.6 | 13.2 |
| La Rioja | 12.2 | 4.6 |
| Mendoza | 62.2 | 26.7 |
| Salta | 40.1 | 9.05 |
| Santa Fe | 75.3 | 14.2 |
| San Juan | 32.7 | 33.5 |
| San Luis | 18.2 | 9.5 |
| Santiago del Estero | 9.8 | 6.9 |
| Tucumán | 40.4 | 12.7 |
| **Promedio** | 73.9 | 16.3 |

*Source: Bunge, A.* (1940) *and Porto, A.* (1990).

**Table 4**

| **Employment and Net Labor Demand in the CBA** | |
|---|---|
| **Description** | **Employment Estimation CBA (Thousands)** |
| Total of Working Positions | 2402 |
| Working Population | 1324 |
| Excess Demand | 1078 |

*Source: Convenio FCE.UNLP - ME.PBA, Nov. 1996.*
*Data: Censos de Población (1991) y Económico (1994).*

**Table 5**

| **Labor Market Indicators, City of Buenos Aires (CBA) and Suburbs (SBA)** | | | |
|---|---|---|---|
| **Permanent Household Survey (EPH-C), second semester 2005 Males between 25 and 55 years of age. 2005 Pesos** | | | |
| | **CBA** | **SBA** | **Ratio** |
| *Years of education* | 13.1 | 9.7 | 1.4 |
| *Hourly wage, main occupation* | | | |
| Total | 10.1 | 5.4 | 1.9 |
| Non-skilled | 4.2 | 4.0 | 1.1 |
| Semi-skilled | 6.8 | 4.9 | 1.4 |
| Skilled | 14.4 | 10.0 | 1.4 |
| *Total number of hours worked* | | | |
| Total | 43.9 | 42.5 | 1.0 |
| Non-skilled | 42.7 | 39.9 | 1.1 |
| Semi-skilled | 45.6 | 45.5 | 1.0 |
| Skilled | 43.1 | 43.2 | 1.0 |
| *Labor income* | | | |
| Total | 1738.9 | 857.3 | 2.0 |
| Non-skilled | 726.5 | 599.5 | 1.2 |
| Semi-skilled | 1137.5 | 871.8 | 1.3 |
| Skilled | 2503.4 | 1573.3 | 1.6 |
| *Household income per capita* | | | |
| Total | 1127.1 | 488.7 | 2.3 |
| Non-skilled | 459.6 | 315.2 | 1.5 |
| Semi-skilled | 778.0 | 476.0 | 1.6 |
| Skilled | 1596.6 | 1020.0 | 1.6 |

*Source: CEDLAS – Departamento de Economía – UNLP.*

**Table 6**

| Hourly wages (by sector), 1998 Pesos or U$S | | |
|---|---|---|
| | **CBA** | **SBA** |
| Food, drinks and tobacco | 2.973 | 2.345 |
| Textiles and shoes | 4.059 | 2.104 |
| Chemicals | 10.816 | 3.347 |
| Electricity, natural gas, and water | 9.160 | 5.502 |
| Construction | 3.969 | 2.198 |
| Wholesale (Comercio al por mayor) | 5.324 | 3.299 |
| Retail (Comercio minorista) | 2.821 | 1.850 |
| Restaurants and hotels | 2.601 | 1.919 |

*Source: CEDLAS – Departamento de Economía – UNLP.*

**Table 7**

| Comparative Indicators, City of Buenos Aires (CBA) and Province of Buenos Aires (PBA) | | |
|---|---|---|
| | **CBA** | **PBA** |
| Population 2001 (thousand) | 2,768.7 | 13,818.7 |
| % Change in Population, 2001/1991 | -6.5 | 9.9 |
| % of Urban Population (2001) | 100.0 | 96.0 |
| Own Fiscal Resources (2004) | | |
| Per Capita (US$ 2004) | 496 | 202 |
| Over GNP (%) | 4.4 | 5.4 |
| GNP per Capita (US$ 2004) | 11,118 | 3,706 |
| Gov. Expenditures per Capita (US$ 2004) | 482 | 345 |
| Gov. Employment / Population (%) | 3.7 | 3.0 |
| Public Wages, Annual Average (US$ 2004) | 471 | 403 |
| Development Index 2001 (CBA = 100) | 100 | 62 |
| % of Homes with UBN (2001) | 7.1 | 14.5 |
| Stock of Capital 1996 (Per Capita, CBA = 100) | 100 | 68 |

*Source: Departamento de Economía – UNLP.*

**Table 8**

| **Comparative Indicators CBA and SBA** | | |
|---|---|---|
| | **CBA** | **SBA** |
| 1. People under the poverty line in 1998 (% of total population) | 5.9 | 30.5 |
| 2. Median income / poverty line income | 3.5 | 1.4 |
| 3. Government expenditures (provincial and municipal), per capita (U$S 2004) | 482 | 384 |
| 4. Percentage of population with no health insurance in 2001 | 26.2 | 52.0 |
| 5. Value added (per worker). Economic census 1994. CBA = 100 | | |
| 5. 1. Manufacture | 100 | 97 |
| 5. 2. Commercial activities | 100 | 39 |
| 5. 3. Services | 100 | 55 |

*Source: CEDLAS – Departamento de Economía – UNLP, and INDEC.*

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# CHOOSING A PLACE TO LIVE AND A WORKPLACE

**HUBERTO M. ENNIS, SANTIAGO M. PINTO, AND ALBERTO PORTO**

**RESUMEN**

Clasificación JEL: J61, R12, H3, H41, H54, H7.

En este trabajo se estudia como la política fiscal y los costos de transporte determinan la distribución geográfica de los trabajadores y las familias. Se utiliza un modelo simple de dos regiones con costos de transporte, bienes públicos locales e infraestructura local. Se presenta una breve revisión de literatura relacionada que estudia otros factores determinantes de la localización de los agentes. Se argumenta que las cuestiones estudiadas juegan un rol importante en la distribución geográfica de la actividad económica en el área urbana del Gran Buenos Aires.

Palabras claves: costos de transporte, bienes públicos locales, infraestructura local, suburbanización.

**SUMMARY**

Classification JEL: J61, R12, H3, H41, H54, H7.

We study how fiscal policies and commuting costs determine the geographical distribution of workers and households in an economy. We characterize equilibrium outcomes in a simple two-region model with commuting costs, local public goods, and local infrastructure. We also provide a short survey of the related economic literature that discusses other important factors driving the localization decisions of agents. Finally, we argue that the issues raise in this paper play a significant role in the geographic distribution of economic activity in the Greater Buenos Aires urban area of Argentina.

Keywords: Commuting, local public goods, suburbanization, local infrastructure.