Bobos in Paradise: Urban Politics and the New Economy

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1 Introduction

The term "bobo" stands for "Bourgeois Bohème" and was coined by David Brooks (2000) in a famous book about the rise of a new knowledge elite. This new kind of bourgeoisie is generally considered as prevalent in globalized capital cities, and its lifestyle and political attitude stand in contrast to that of the traditional bourgeoisie. Furthermore, the bobos are generally viewed as a politically powerful group. They have been instrumental in bringing about left-wing governments in municipalities such as Berlin, Paris or San Francisco, despite the relatively high economic status of this social class.

Economically, the bobos are "symbol manipulators": teachers, intellectuals, professionals, journalists, advertisers, architects, and "connected" workers of the new economy.

In terms of consumption attitudes, the bobos promote a relaxed lifestyle where conspicuous consumption is banned. They seek human scale habitat and a "village" atmosphere, while generally living in large metropolitan areas (an early example of such conceptions is Jacobs (1961)). They insist on environmental quality and promote public transportation or bicycles. They value "arts", in particular in their most modern forms: contemporary arts, rock concerts, and so forth.

Politically, the bobos are generally supportive of environmentalists and/or socialist parties. Their takeover of major cities has led to policies that recognizably differ from the ones implemented both by the right and by the traditional left. These policies can be summarized as follows[1]:

- Greater investment in collective urban amenities and socialized recreational events.
- Reduced urban space for the automobile, generally coupled with a reduction in parking space, higher taxes and more stringent regulations and

[1] See Brooks (2001), Chapter 7.

constraints for personal vehicles. More investment in public transportation and in dedicated areas for bicycles, skate-boards, roller skates, and so forth. Deregulation of the use of bicyles (authorization to use wrong ways and bus corridors). Public provision of cheap bike and electrical car rental, and dedication of public spade to those devices.

- Promotion of "social mixity" and "diversity", by means of transfer policies and/or subsidized housing that maintain a critical mass of lower class dwellers in the city center, while intermediate classes are eliminated and relocate themselves in the outer periphery. (See Clerval and Fleury, 2009, for a discussion in the case of ¨Paris).

This paper provides some elements for understanding these developments from a "pure economic perspective". By this I mean that I will attempt to explain them as a consequence of technological developments, instead of just assuming that bobos are a new kind of individuals with their own preferences. The paper focuses on the relative roles of, and conflict of interest between two kinds of bourgeoisie: The skilled workers of the old economy versus the skilled workers of the new economy (bobos). The former work in activities that are more land intensive, while still preferring to live in a city centre. As a result they derive more utility from commuting and are less willing to raise commuting costs in order to improve urban amenities than the bobos. The paper shows that as the new economy grows faster than the old economy, the bobos overtake the cadres as the politically decisive group in the city. As a result, the level or urban amenity goes up and so do transportation costs. The consequences for house prices and the cost of services are also studied, as well as the implications for suburban unemployment of the lower classes. House price dynamics in the transition from one regime to another are also studied. It is also show that the date of this transition is self-fulfilling.

Finally, I also show that it may be profitable for the decisive bobo class to subsidize location of lower class unskilled workers in the city, in absence of any altruism or intrinsic taste for a socially diverse makeup of the city. This is because such subsidies allow to force the economy to settle in a "bunkerized" equilibrium in which the service providers to city dwellers are located in the city, so that the price of services no longer goes up with the amenity level. As a result, ex-post there is no cost to raising the amenity level in the city, and the resulting political equilibrium involves the highest possible level of amenities and transportation cost. Such an equilibrium, when it exists, has much higher house prices than non-bunkerized equilibria. As a result, it is in the interest of an incumbent constituency to implement such a subsidy, because the subsequent move to a bunkerized equilibrium generates capital gains for them when reselling their homes.

The model is an application of voting equilibrium theory under interjusdictional mobility, as was studied by Rose-Ackerman (1979), Westhoff (1977), Richter (1982), Epple et al. (1983, 1984), to the specific urban trends that have been oberved in the recent decades. It is also related somewhat to the large soci-

ological literature on gentrification pioneered by Glass (1964)[2]. This literature, however, generally fails to identify conflicts of interest within the bourgeoisie, sticking instead with the traditional marxist scheme of class conflict. In this paper's model, gentrification has already occurred in the sense that (as in most economic models of residential location), residential segregation arises so that land prices make it suboptimal for the working class to reside in the city. Instead, I focus on the conflict of interests between two categories of skilled workers that work in different types of occupation.

An illustration of those evolutions in the case of Paris is the fate of the so-called "axes rouges". These policies were introduced by Paris mayors Jacques Chirac and Jean Tiberi and consisted in preventing parking along the side of a number of designated large communication ways (such as Avenue Denfert-Rochereau), in order to improve traffic on those axes. In contrast, the socialist Delanoe administration, which tookover in 2001, had a deliberate policy of reallocating space away from automobile traffic and in favor of alternative means of transport as well as recreational activities. Consequently, the axes rouges were abolished. It is generally considered that the gentrification process was already well under way under the Chirac and Tiberi administrations. The introduction of axes rouges should therefore be understood as catering to the Parisian upper-middle class voter of that time, and conversely their abolition should be interpreted as a shift in the preferences of the median voter, as analyzed in this paper, not as public policies working toward gentrification.[3]

2 The model

In this section, I lay out the main assumptions of the model. This is a partial equilibrium model of an area with two locations: city and periphery. Unlike the traditional central business district models, economic activity is not constrained to take place in the city[4].

2.1 Workers and skills

There are three categories of workers:

- Skilled workers specialized in the new economy, thereafter referred to as "Bobos". The total number of bobos is equal to H_1. .Each of themis

[2] There are also a number of economic studies of gentrification, like Rossi-Hansberg et al. (2008), Guerrieri et al. (2010), who focus on the geographical spread of increases in land prices following income growth or investment in amenities. This kind of effects is also present in the current model, but the focus is on the politico-economic equilibrium, not on gentrification per se.

[3] Clerval and Fleury (2009) document the evolution of the Delanoe administration's urban policies and the differences with the preceding administration. They also show that gentrification had occured prior to the taking over of the Socialist Party, although they also argue that Delanoe's policies reinforced the gentrification process, contrary to his claims.

[4] For the analysis of polycentric cities, see Anas and Kim (1996), Anas et al. (1998) and Okamoto (2007).

endowed with one unit of specialized skilled (type 1) labor.

- Skilled workers specialized in the old economy, that I will refer to as "Cadres"[5]. There are H_2 of them, each endowed again with one unit of (type 2) skilled labor.
- Unskilled workers, called "workers", who are specialized in services. There are L workers in the economy, each endowed with one unit of unskilled labor.

2.2 Goods and production

There are five goods:

- A generic consumption good which is imported, and whose price is normalized to one. This good will be used as the numéraire.
- Two exported goods:
  - A new economy good, good 1, whose production only involves type 1 skills. The production function is

    $$y_1 = a_1 h_1,$$

    where y_1 is output and h_1 the input of type-1 skill.
  - An old economy good, good 2, whose production uses both type 2 skills and land. The production function is

    $$y_2 = \min(a_2 h_2, t/b),$$

    where t is the land input and h_2 the type 2 skill input. The wage of type 2 labor working in location i is therefore equal to

    $$w_2 = a_2(1 - bR_i),$$

    where R_i denotes the rental cost of housing in location i.
- Services, denoted by subscript S. These services only use labor. The production function is

  $$y_S = a_S l_S,$$

  where l_S is the input of labor. Furthermore, in order to supply a service to their customers, workers must be physically located in the residence of the customer.

[5] This French word loosely means "executive", but it is also associated with a conventional lifestyle with a substantial emphasis on consumer's society, as opposed to the more countercultural lifestyle of the bobos. The cadre lifestyle is described to some extent in Barthes (1957), and its somewhat more austere U.S. equivalent is discussed in Brooks (2001), in his analysis of the "Bourgeois" versus the "Bohemians".

- Housing: at any time, one unit of land can be converted into one unit of housing at no cost. Therefore, the production fonction for housing is $y_H = t$, but in practice we will not distinguish between housing and land.

2.3 Geography

There are two areas

- The center (C), or "city", which has a fixed size X in terms of land. I will assume that $\max(H_1, H_2) < X < 2\min(H_1, H_2)$. This land is usable for housing or as an input for good 2. In addition to that, a fixed amount of additional land is allocated to public goods, that are divided between urban amenities and transportation infrastructures. As will be clear below, we do not actually need to specify that amount.

- The periphery (P), or "suburb", with an infinite supply of land. In the periphery, there is a fixed, exogenous level of amenities, which is normalized to zero. This allows us, for simplicity, to limit the political economy analysis to the city, which is the focus of the paper[6].

In the city, public decisions over amenities involve reallocating available space for public goods between amenities and transportation infrastructures. As a result, there is a trade-off between amenities and commuting costs. I assume that this trade-off is summarized by a positive relationship between ϕ, the level of transportation cost, and α, the amenity level in the city:

$$\phi = \phi(\alpha), \phi' > 0.$$

2.4 Preferences

There are overlapping generations of agents who live for two periods. Each cohort's size is equal to one. People can borrow and lend at the fixed real international interest rate equal to r. In the first period of their life, people decide where to locate (city vs. suburb), and they purchase housing, if needed, from the preceding generation. In the second period of their life, people vote on the level of amenities in the city, work, sell their home to the next generation, and consume. All agents have the same utility function, given by

$$\ln c + \beta \ln c_S - \delta\phi + \gamma,$$

where

[6] The analysis would probably change little if one assumed that the amenity level in the periphery was decided by the working class. It would then elect a lower amenity level than in the city. Bourgeois suburban communities with a high amenity level are similar to the "city" in the context of this model.

- c is the consumption of the generic consumption good,
- c_S is consumption of services
- δ is a dummy equal to one if the person commutes and zero if not
- γ if the amenity level, which is equal to α in the city and zero in the suburb.

Furthermore, each individual needs exactly one unit of housing, and therefore of land, so as to survive.

Instead of working and consuming, people can instead live in autarky, in which case they get a reservation utility equal to $\bar{u}$. Unless there is a housing bubble, i.e. house prices grow at or faster than the real interest rate, such an option would make people insolvent if they live in the city, in which case they have to borrow to buy a house. But the option is viable in the suburb where the equilibrium land price is zero. Therefore, to get the reservation utility one has to live in the suburb. Also, I will limit the analysis to a regime where the constraint $u \geq \bar{u}$ is binding for workers only. Consequently, only a fraction of the total mass of workers L will be employed, and the others will be "unemployed". An increase in $\bar{u}$ can also be interpreted as an increase in the generosity of welfare benefits.

2.5 Timing

The timing of decisions is as follows: In the first period of their life, people decide where to locate and purchase housing. In the second period, they vote on the level of amenities in the city (if they are residents, i.e. have purchased a home there in the preceding period), work, sell their home, and consume.

3 Consumption, production, and location

In this section and the following I describe how to solve for the equilibrium. I will solve the problem in three steps:

1. The consumption and production decisions of all three social classes when old, as a function of their residential location

2. The locational decisions of the young of the three classes, as a function of expected amenity levels and house prices

3. The voting decision of urban households on amenities, as a function of the sociological composition of the city

The equilibrium concept prevailing here is essentially the same as in Epple et al. (1984): there is equilibrium in goods markets, each location is internally in a majority voting equilibrium, and no individual can gain by changing residence. However, here voters (rationally) internalize the effects of electoral outcomes on

the resale value of their house, contrary to the assumptions made in Epple et al. (1984)[7].

3.1 Consumption and production decisions

In the last period of their life, people consume by maximizing their utility function subject to $c + p_{Sj}c_S = y$, where y is their income net of total costs and revenues from housing, and p_S is the price of services in their community, denoted by p in the periphery and by p^* in the city. Therefore, $c = \frac{y}{1+\beta}$ and $c_S = \beta\frac{y}{(1+\beta)p_S}$. Consequently, indirect utility is equal to, up to a constant

$$V(R, p_S, \delta, \alpha) = (1+\beta)\ln y - \beta \ln p_S - \delta\phi + \gamma$$

Two social classes may potentially be commuters. Workers may commute to offer their service to consumers not located in their area. Cadres may commute to a production site in the other area, as land itself is not moveable.

Table 1 gives us the income when old, net of the rental cost of housing, of the three social classes of the generation born at t as a function of their residential location and their work location. Note that this does not reflect commuting costs that are incurred as a disutility instead of an income loss. The rental cost of housing in the city for this generation is $R_t = (1+r)q_t - q_{t+1}$.

Class	Work in city	Work in suburb
Workers in city	$p_t^* a_S - R_t$	$p_t a_S - R_t$
Workers in suburb	$p_t^* a_S$	$p_t a_S$
Bobos in city	$a_1 - R_t$	$a_1 - R_t$
Bobos in suburb	a_1	a_1
Cadres in city	$a_2(1 - bR_t) - R_t$	$a_2 - R_t$
Cadres in suburb	$a_2(1 - bR_t)$	a_2

Table 1: Income

From this, we can compute the utility of each class

Class	Work in city
Workers in city	$(1+\beta)\ln(p_t^* a_S - R_t) - \beta \ln p_t^* + \alpha$
Workers in suburb	$(1+\beta)\ln(p_t^* a_S) - \beta \ln p_t - \phi$
Bobos in city	$(1+\beta)\ln(a_1 - R_t) - \beta \ln p_t^* + \alpha$
Bobos in suburb	$(1+\beta)\ln a_1 - \beta \ln p_t - \phi$
Cadres in city	$(1+\beta)\ln(a_2 - R_t(1+a_2 b)) - \beta \ln p_t^* + \alpha$
Cadres in suburb	$(1+\beta)\ln(a_2(1 - bR_t)) - \beta \ln p_t - \phi$

[7] This is immaterial, though, because house prices only depend on the expected amenity level in the subsequent period, not on the current amenity level.

Class	Work in suburb
Workers in city	$(1+\beta)\ln(p_t a_S - R_t) - \beta \ln p_t^* + \alpha - \phi$
Workers in suburb	$(1+\beta)\ln(p_t a_S) - \beta \ln p_t$
Bobos in city	$(1+\beta)\ln(a_1 - R_t) - \beta \ln p_t^* + \alpha - \phi$
Bobos in suburb	$(1+\beta)\ln a_1 - \beta \ln p_t$
Cadres in city	$(1+\beta)\ln(a_2 - R_t) - \beta \ln p_t^* + \alpha - \phi$
Cadres in suburb	$(1+\beta)\ln a_2 - \beta \ln p_t$

Table 2 – Utilities

3.2 Locational decisions

Given those assumptions, a number of configurations may arise regarding the city's sociological composition. I am only going to consider equilibria that satisfy the following characteristics:

1. It is never optimal for cadres to work in the city.

Clearly, this will hold provided b, the land intensity of the old economy technology, is large enough.

2. Workers are at their reservation utility $\bar{u}$.

For this to hold, it is enough that the supply of workers is large enough. In equilibrium, this pins down the price of services in the suburbs:

$$\ln p_t = \bar{u} - (1+\beta)\ln a_S, \tag{1}$$

3. Workers are never a majority in the city

This leaves four possible regimes:

I. Cadres are a majority in the city, bobos are indifferent between the city and the periphery, and workers live in the suburb

II. Bobos are a majority in the city, cadres are indifferent between the city and the periphery, and workers all live in the suburb

III. Bobos are a majority in the city, workers live in the city and periphery, cadres are all in the suburb

IV. Cadres are a majority in the city, workers are in both locations, and bobos are all in the suburb.

I will first discuss regimes I and II and the transition between the two regimes. Then I will study the specific characteristics of regime III. The analysis of regime IV is left out, because it is less plausible and less relevant to this paper's focus.

In both regime I and regime II, all workers live in the suburb. Part of them commute to offer their services to the city. Workers must be indifferent between that option and that of working in the suburb. Consequently, this pins down the price of services in the city:

$$\begin{aligned} \ln p_t^* &= \ln p_t + \frac{\phi}{1+\beta} \\ &= \bar{u} - (1+\beta)\ln a_S + \frac{\phi}{1+\beta}. \end{aligned} \tag{2}$$

We also need, in those regimes, that workers be below their reservation utility should they decide to live in the city, i.e.

$$(1+\beta)\ln(p_t^* a_S - R_t) - \beta \ln p_t^* + \alpha < \bar{u}.$$

4 Equilibrium in Regime I

In Regime I, bobos are indifferent between living in the city and living in the suburb. In either case, they do not pay the commuting cost. Therefore, the following condition must hold:

$$(1+\beta)\ln(a_1 - R_t) - \beta \ln p_t^* + \alpha = (1+\beta)\ln a_1 - \beta \ln p_t.$$

Using(2), we find that

$$(1+\beta)\left[\ln(a_1 - R_t) - \ln a_1\right] = -\alpha + \frac{\beta\phi}{1+\beta}.$$

This determines the rental cost of housing in equilibrium:

$$R_t = a_1\left(1 - \exp\lambda(\alpha,\phi)\right) = R_A$$

where

$$\lambda(\alpha,\phi) = \frac{\beta\phi - \alpha(1+\beta)}{(1+\beta)^2}.$$

The $\lambda()$ function captures the net utility cost of living in the city for the bobos, ignoring housing. For this regime to be possible, we need that

$$\alpha > \frac{\beta\phi}{1+\beta}.$$

House prices are larger, the greater the amenity level and the smaller the commuting cost. The bobos in the city, while not suffering directly from commuting costs, suffer indirectly due to more expensive services in the city. Therefore, the greater the commuting cost, the lower should house prices be in the city. Also, house prices are higher, the greater the bobo's productivity. This captures the effect of income on the willingness to pay for amenities of the bobos, which is reflected in rental costs, since they are the marginal group.

We now turn to the cadres. Their utility is $(1+\beta)\ln(a_2 - R_t) - \beta \ln p_t^* + \alpha - \phi$. They set amenities so as to maximize this utility. This decision is made after they have picked their residence and paid the house price q_t, but before selling

back their real estate to the new generation. As long as amenities are not a state variable, q_{t+1} will depend on the amenities set by the next generation. Therefore the amenity level has no effect on q_{t+1}, and hence no effect on R_t. In this model, there are no capital gains associated with investing in greater amenities. On the other hand, p^* goes up with transportation costs. Therefore, the cadres set amenities by just maximizing $\alpha - \phi(\alpha) - \beta \ln p_t^*$, or equivalently, given (2), $\alpha - \frac{1+2\beta}{1+\beta}\phi(\alpha)$. Let α_A, ϕ_A be the corresponding amenity level and commuting cost. The corresponding utility of the cadres is equal to $(1+\beta)\ln(a_2 - R_t) - \beta \ln p_t^* + \alpha_A - \phi_A$. For regime I to prevail, this must be larger than their utility from residing in the suburb, which is equal to $(1+\beta)\ln a_2 - \beta \ln p_t$. This is equivalent to

$$\frac{a_2}{a_1} > \frac{1 - \exp(\lambda_A)}{1 - \exp(\mu_A)} = z_A > 1, \tag{3}$$

where

$$\begin{aligned} \lambda_A &= \lambda(\alpha_A, \phi_A), \\ \mu_A &= \frac{(1+2\beta)\phi_A - \alpha_A(1+\beta)}{(1+\beta)^2} = \mu(\alpha_A, \phi_A) > \lambda_A. \end{aligned}$$

We note that $a_2(1 - \exp(\mu_A))$ is the cadre's willingness to pay for living in the city. The $\mu()$ function is the net utility cost of residing in the city for the cadres, ignoring housing costs. Since the cadres, unlike the bobos, have to commute, we have that $\mu(\alpha, \phi) > \lambda(\alpha, \phi)$ for all α, φ. Equation (3) therefore states that in regime I, this quantity is larger than the cost of housing, itself equal to the bobos willingness to pay for living in the city.

It is also interesting to compute the employment level in the service sector. Total income in the city is

$$Y_C = a_2 H_2 + a_1(X - H_2) - R_A X.$$

Total service demand in the city is therefore equal to

$$C_{SC} = \beta \frac{a_2 H_2 + a_1(X - H_2) - R_A X}{(1+\beta)p^*}.$$

Therefore, the number of service workers who work in the city is

$$\begin{aligned} L_C &= \beta \frac{a_2 H_2 + a_1(X - H_2) - R_A X}{(1+\beta)p^* a_S} \\ &= \beta \frac{a_2 H_2 + a_1(X - H_2) - R_A X}{(1+\beta)p a_S} \exp(-\frac{\phi_A}{1+\beta}) \\ &= L_C^A \end{aligned}$$

and their total income is

$$Y_{SC} = \beta \frac{a_2 H_2 + a_1(X - H_2) - R_t X}{(1+\beta)}.$$

In the periphery, the demand for services comes from the working class and the bobos who live there. Their combined income is

$$Y_P = a_1(H_1 + H_2 - X) + p^* a_S L_C + p a_S L_P,$$

where L_P denotes the unskilled employment level in the periphery. Again we must have $L_P = \frac{\beta}{1+\beta}\frac{Y_P}{a_S p}$, yielding

$$\begin{aligned} L_P &= \frac{\beta}{p a_S}\left[\frac{\beta}{1+\beta}\left(a_2 H_2 + a_1(X - H_2) - r q_A X\right) + a_1(H_1 + H_2 - X)\right] \\ &= L_P^A. \end{aligned}$$

It is easy to see that $\partial(L_P^A + L_C^A)/\partial a_1 > 0$, although the rise in house prices associated with an increase in the new economy's productivity may well lead to a reduction in services consumption in the city.

These derivations allow us to summarize the main properties of Regime I:

- An equilibrium in regime I prevails if $\frac{a_2}{a_1}$ is larger than a critical threshold, which is itself greater than 1. Other things equal, Bobos are willing to pay more to live in the city than cadres, because the former do not have to commute.
- In regime I, the cost of housing goes up with productivity in the new economy sector.
- In regime I, employment of unskilled workers goes up with productivity in the new economy.

5 Regime II

Let us now turn to Regime II. The indifferent social group in residential choice is now the cadres, while the bobos are politically pivotal. The indifference condition for the cadres reads

$$(1+\beta)\ln(a_2 - R_t) - \beta \ln p_t^* + \alpha - \phi = (1+\beta)\ln a_2 - \beta \ln p_t \tag{4}$$

House rental costs are now equal to

$$R_t = a_2\left(1 - \exp \mu(\alpha, \phi)\right) = R_B. \tag{5}$$

For this regime to be possible, we need that $\mu < 0$, i.e.

$$\alpha > \frac{1+2\beta}{1+\beta}\phi.$$

The utility of the bobos is $(1+\beta)\ln(a_1 - R_t) - \beta \ln p_t^* + \alpha$. They maximize $-\beta \ln p_t^* + \alpha$, or equivalently $\alpha - \beta\phi(\alpha)/(1+\beta)$. Let α_B, ϕ_B be the corresponding amenity level and commuting cost. The corresponding utility of the bobos is, in steady state, equal to $(1+\beta)\ln(a_1 - R_t) - \beta \ln p_t^* + \alpha_B$. For regime II to prevail, this must be larger than their utility from residing in the suburb, which is equal to $(1+\beta)\ln a_1 - \beta \ln p_t$. This is equivalent to

$$\frac{a_2}{a_1} < \frac{1 - \exp(\lambda_B)}{1 - \exp(\mu_B)} = z_B > 1, \tag{6}$$

where[8]

$$\begin{aligned} \lambda_B &= \lambda(\alpha_B, \phi_B), \\ \mu_B &= \mu(\alpha_B, \phi_B) > \lambda_B \end{aligned}$$

We have the following Lemma:

LEMMA – $\lambda_A > \lambda_B$ and $\mu_B > \mu_A$

Proof – The optimization problem of the pivotal voter in each regime implies that $\mu(\alpha, \phi)$ is minimum in regime I, while $\lambda(\alpha, \phi)$ is minimum in regime II.

Corollary – $z_B > z_A$

This corollary implies that there may be multiple equilibria[9]. Expectation of winning the election makes it more valuable for the winning group to locate in the city, as they get an amenity level closer to their preferences. Therefore, that expectation is to some extent self-fulfilling.

Finally, we can compute unskilled employment as in the preceding section:

$$L_C^B = \beta \frac{a_1 H_1 + a_2(X - H_1) - R_B X}{(1+\beta) p a_S} \exp(-\frac{\phi_B}{1+\beta})$$

$$L_P^B = \frac{\beta}{p a_S} \left[\frac{\beta}{1+\beta} \left(a_1 H_1 + a_2(X - H_1) - R_B X \right) + a_2(H_1 + H_2 - X) \right]$$

We note that in this regime, house prices are independent of productivity in the new economy. On the other hand, productivity in the new economy has a positive effect on service employment (since $dL_C^B/da_1 > 0$ because of demand effects, and $dL_P^B/da_1 > 0$ because of the positive spillovers on the periphery of the additional service workers hired by the bobos in the city.

[8] Again, this inequality means that the bobo's WTP, $a_1(1 - \exp(\lambda_B))$, exceeds the cost of housing, $a_2(1 - \exp(\mu_B))$.

[9] This mutliplicity issue is recognized in Epple et al. (1984) and Westhoff (1977).

6 Comparing the two regimes.

I now establish a number of results regarding the comparison between the two regimes.

Proposition 1 – Amenities, and therefore commuting costs and the price of services in the city, are larger in regime II.

As the bobos do not have to commute, they incur a lower cost from increasing amenities. Therefore they vote for a greater amenity level.

Proposition 2 – House prices are larger in regime II if and only if

$$\frac{a_2}{a_1} > \frac{1 - e^{\lambda_A}}{1 - e^{\mu_B}} = \tilde{z} \in [z_A, z_B]$$

Proof – Straightforward from the expression of house prices and the fact that $\mu_B > \mu_A > \lambda_A > \lambda_B$.

House prices may go up as the bobos take over, because amenities make living in the city more desirable. But, at the same time, the cadres become the marginal buyers of land and they suffer from the excess level of amenities and transportation costs. The political takeover of the bobos would increase house prices if the cadres are rich enough compared to the bobos – but not so rich that regime II would not exist.

The model does not systematically validate the naive view that more amenities would increase house prices, since in regime II the marginal city dwellers suffer from greater commuting costs, that are the price to be paid for raising the amenity level.

We can also compare the employment levels of unskilled workers in the two regimes. The preceding formulas highlight that there are three effects:

- The price of services is higher in the city in the regime where the bobos are politically decisive. This tends to reduce the demand for services and unskilled employment. Essentially, greater commuting costs are similar to a negative productivity shock affecting the service sector.
- If the cost of housing (R) is larger in regime B than in regime A, this depresses the demand for services in the city. The converse holds if the cost of housing actually falls in regime B compared to regime[10]
- In regime B, the bobos who live in the suburbs are replaced by cadres. In the zone where a switch may occur, the latter are richer than the former. The cadres who live in the suburb instead of the city consume more services than the bobos they have replaced. The bobos who live in

[10] Note that these interest payments accrue to the rest of the world. An increase in house prices would be financed by a capital inflow, i.e. a trade deficit.

the city instead of the suburb consume fewer services than the cadres they have replaced. But, because services are more expensive in the city, the former effect is stronger than the latter. On net, therefore, this change in the suburban bourgeois population tends to raise service employment.

7 The rise of the new economy and the transition from regime I to regime II

Suppose now that, due to the progress of the new economy, a_1 rises over time, while a_2 remains constant. Then the preceding analysis implies that at some stage, the composition of the city will change: the economy will shift from regime I to regime II. However, due to multiple equilibria, the date of the transition cannot be predicted. During the period such that $a_2/a_1 \in [z_A, z_B]$, multiple transitions in both directions may even occur. To simplify the analysis, let us plausibly assume that there is a unique transition date T. Therefore, the economy is in regime I before T and in regime II after.

The rental cost of housing keeps going up until date T, and stabilizes thereafter. As for house prices, they evolve according to

$$q_t = \frac{1}{1+r}\left(q_{t+1} + a_{1t}(1-e^{\lambda_A})\right).$$

We can show that house prices go up monotonically in the run-up to the bobo's takeover, provided the transition does not occur too late:

Proposition 3 – Assume

$$a_{1T-1} < a_2 \frac{1-e^{\mu_B}}{1-e^{\lambda_A}}, \tag{7}$$

then q_t is monotonically increasing with time for $t \leq T$, and constant thereafter.

Proof – Clearly, for $t \geq T$, we have that $q_t = R_B/r = a_2(1-e^{\mu_B})/r$. Furthermore, $q_{T-1} = \frac{a_{1T-1}(1-e^{\lambda_A})}{1+r} + \frac{R_B}{r(1+r)}$. This is clearly lower than R_B/r if (7) holds. Furthermore, we have that

$$q_{t+1} - q_t = \frac{q_{t+1}r - a_{1t}(1-e^{\lambda_A})}{1+r}.$$

We now show that this quantity is positive. Note that for $t \leq T-2$

$$\begin{aligned}
rq_{t+1} &= r\sum_{s=t+1}^{T-1} \frac{a_{1s}(1-e^{\lambda_A})}{(1+r)^{s-t}} + \frac{R_B}{(1+r)^{T-t-1}} \\
&> a_{1t}(1-e^{\lambda_A})\left(1 - \frac{1}{(1+r)^{T-1-t}}\right) + \frac{a_{1T-1}(1-e^{\lambda_A})}{(1+r)^{T-1-t}} \\
&> a_{1t}(1-e^{\lambda_A})\left(1 - \frac{1}{(1+r)^{T-1-t}}\right) + \frac{a_{1t}(1-e^{\lambda_A})}{(1+r)^{T-1-t}} \\
&= a_{1t}(1-e^{\lambda_A}).
\end{aligned}$$

This proves that $q_{t+1} > q_t$. QED.

Condition (7) means that house prices are higher after the transition than before, which, given that a_1 is growing over time, is a weaker condition than for house prices to be higher in regime II than in regime I.

8 The bunkerized equilibrium (regime III)

In this section I characterize an equilibrium in regime III, where only workers and bobos live in the city, and cadres are all in the suburb. Such a regime is likely to exist, for the following reason: if workers are located in the city, an increase in commuting costs no longer raises the price of services in the city. This will induce the politically decisive bobos to elect the highest possible level of amenities, making it very costly for the cadres to locate in the city and commute to work. In such a regime, the city becomes bunkerized, in that no commuting takes place between the city and the periphery.

Let us now characterize this regime. I will limit the analysis to the zone where a regime II equilibrium also exists, i.e. $a_1 > a_2/z_B$.

8.1 Equilibrium determination and properties

First, it must be that workers are indifferent between locating in the city and the periphery. We assume (and will check that it holds in equilibrium), that workers do not commute. Therefore, we have from Table 2 that

$$\begin{aligned} \bar{u} &= (1+\beta)\ln(p_t^* a_S - R_t) - \beta \ln p_t^* + \alpha \\ &= (1+\beta)\ln(p_t a_S) - \beta \ln p_t. \end{aligned} \tag{8}$$

The price of services in the suburbs is still determined by (1). However, the price of services in the city is determined by equilibrium between supply and demand. Total city income is

$$Y_C = a_1 H_1 + p_t^* a_S (X - H_1) - X R_t.$$

Equilibrium in the service market in the city is such that

$$S^d = \frac{\beta}{1+\beta}\frac{Y_C}{p_t^*} = S^s = a_S(X - H_1).$$

Rearranging, we get that

$$R_t = a_1 \frac{H_1}{X} - \frac{a_S}{\beta} p_t^* \left(1 - \frac{H_1}{X}\right). \tag{9}$$

This defines a downward sloping relationship between R and p^*, labeled SME. The greater the cost of housing, the lower the city dwellers' purchasing power, and the lower the equilibrium price of services.

It can be checked that Equation (8) defines a positive relationship between p^* and R, representing equilibrium in the housing market (HME). the greater p^*, the greater the incentives for workers to locate in the city, and the higher the equilibrium rental cost of housing. As illustrated on Figure 1, the two relationships HME and SME uniquely determine the equilibrium values of R and p^*. I will label these values R_C and p^*_C.

An increase in the productivity of the new economy (Figure 2) shifts SME up and leads to an increase in the price of services and in the cost of housing; part of the rise in the bobos' purchasing power is spent on services, which raises their price and attracts new workers to the city. These workers bid the price of housing up, to the point where they are again indifferent between locating in the city and in the periphery. Note that this response stands in contrast to that of regime II, where the price of services was insulated from the bobo's income due to commuting of workers from the suburbs, and the price of housing also did not depend on the bobo's income because it was pinned down by productivity in the old economy, due to the cadres being the marginal city dwellers.

Consequently, in the bunkerized regime an increase in a_1 has no effect on service employment, contrary to regimes I and II. Service employment in the city is constrained by available space (there are $X - H_1$ housing units left for the workers), and service employment in the suburb is determined by the cadre's income, which is fixed.

An increase in the amenity level α shifts HME up: workers have a greater incentive to locate to the city, which bids rents up, eventually depressing the demand for, and prices of services. It should be stressed that this should be an *expected* increase in α, as housing has to be purchased before the utility from amenities is incurred.

What amenity level will the bobos choose? Again, given our timing of events, this choice does not affect q_{t+1}, while its expectation was already priced in q_t. Nor does it affect p^*_t, since the supply of services is frozen by the locational decisions of service workers made at t. Therefore, the bobos will simply maximize α and pick the highest possible level of amenities (and therefore of commuting costs). I will denote that level by α_C, and the corresponding commuting cost by ϕ_C.

8.2 Conditions for a bunkerized equilibrium to exist

The preceding analysis discusses the properties of an equilibrium in regime III, but fails to characterize its conditions for existence. This is done in the following Proposition:

Proposition 4 – An equilibrium in regime III exists if and only if the following conditions hold:

(i) $(1+\beta)\ln(a_2 - R_C) - \beta \ln p^*_C + \alpha_C - \phi_C < (1+\beta)\ln a_2 - \beta \ln p.$

(ii) $(1+\beta)\ln(a_1 - R_C) - \beta \ln p^*_C + \alpha_C > (1+\beta)\ln a_1 - \beta \ln p.$

(iii) $(1+\beta)\ln(p^* a_S) - \beta \ln p - \phi_C < (1+\beta)\ln(p a_S) - \beta \ln p.$

(iv) $(1+\beta)\ln(a_2 - R_C(1+ba_2)) - \beta \ln p^*_C + \alpha_C < (1+\beta)\ln a_2 - \beta \ln p.$

(v) $\alpha_C - \alpha_B \geq \beta(\ln p_C^* - \ln p - \frac{\phi_B}{1+\beta})$.

Proof – For an equilibrium in regime III to exist, the the cadres must be better-off in the periphery. This is equivalent to (i). Second, the bobos must be better-off in the city, which is equivalent to (ii). Third, the workers in the periphery should not have an incentive to commute to the city, implying that (iii) must hold. Fourth, the cadres should not be better-off locating and working in the city, i.e. (iv) should hold.

Finally, the bobos should not be better-off by deviating from the equilibrium value of α and picking an ex-post level of amenities that would induce the workers to commute to the city. The price that would induce them to do so is given by the RHS of (2), which we now denote by $p_{AB}^*(\phi)$[11]. If this is lower than the autarky price of services obtained from (8) and (9), then suburban workers commute to the city. This happens iff $p_{AB}^*(\phi) < p^*$, or equivalently

$$\phi < (1+\beta)(\ln p_C^* - \ln p) = \phi_{\max}.$$

In the zone where $\phi < \phi_{\max}$, the bobo's utility is given by $(1+\beta)\ln(a_1 - R_C) - \beta \ln p_{AB}^*(\phi) + \alpha$.[12] Therefore they maximize $\alpha - \beta\phi(\alpha)/(1+\beta)$, as in regime II, and pick $\alpha = \min(\alpha_B, \phi^{-1}(\phi_{\max})) = \alpha'$. The bobos will vote for this outcome if and only if it delivers a greater utility than the maximum possible value of α, that is $(1+\beta)\ln(a_1 - R_C) - \beta \ln p_C^* + \alpha_C < (1+\beta)\ln(a_1 - R_C) - \beta \ln p_{AB}^*(\phi(\alpha')) + \alpha'$, or equivalently, denoting by $\phi' = \phi(\alpha')$,

$$\alpha_C - \alpha' < \beta(\ln p_C^* - \ln p - \frac{\phi'}{1+\beta}).$$

We note that if $\phi' = \phi_{\max}$, the RHS is equal to zero. The LHS cannot be negative, as α_C is the maximum value of α. Therefore, this inequality is violated for $\phi' = \phi_{\max}$. It may only hold for $\alpha' = \alpha_B$, which is equivalent to (v) being violated. If that is the case, then ex-post the bobos would pick an amenity level such that workers commute from the suburbs to the city to offer their services. But we can then check that it cannot be rational for workers to locate to the city ex-ante. The reason is as follows: Service prices and amenity levels are the same as in regime II. But in regime II workers prefer to reside in the suburbs, i.e. would get a utility level lower than $\bar{u}$ should they live in the city. For them to locate in the city ex-ante despite that (**??**) holds, it must therefore be that rents are lower than in regime II, that is, $R_t < R_B$. However, we know that under regime II, cadres are indifferent between the two areas. For them to now strictly prefer the periphery, it must be that $R_t > R_B$, a contradiction. Consequently, it must be that (v) holds for regime III to exist.

Conversely, if (i)-(v) hold, then clearly, the otucome computed in the preceding subsection satisfies all the equilibrium conditions. QED.

[11] The subscript AB refers to the fact that this relationship between p^* and ϕ must hold in both regimes I and II.

[12] Choosing an amenity level $\alpha' \neq \alpha_C$ *ex-post* has no effect on R, since the resale value of the home depends on expected future amenities, while the purchase price of the home depends on expected curren amenities, given by α_C.

8.3 A numerical example

Given that we cannot get a closed form solution for p^* and R, I compute a numerical solution. The key variables of interest are reported in Figures 3-5, as a function of a_1. The range of values for a_1 is such that equilibria in both regimes II and regime III exist – below this range, an equilibrium in regime II does not exist since (6) is violated, and above this range, the simulations indicate that (**??**) is violated. The parameter values corresponding to those figures are $X = 1, H_1 = H_2 = 0.7$, $\bar{u} = -2, a_S = 1, a_2 = 1.5, \beta = 1, \phi(\alpha) = \alpha^4$, and I impose a maximum value of $\alpha = 5$ (which will prevail in regime III, along with a very high transportation cost $\phi = 625$).

Figure 3 plots the rental cost of housing as a function of a_1, while, Figure 4 reports the price of services. As a comparison benchmark, their corresponding values for regime II are plotted too. As proved above, both $p^*$and R go up with a_1. Furthermore, at least in this simulation, both are well above their regime II counterpart for the whole range of values of a_1. This is relatively intuitive: the very high level of amenities that is voted for in regime III makes it highly desirable to reside in the city, as long as one does not commute; and services are relatively scarcer in regime III because they cannot be imported from the periphery.

Figure 5 compares the bobo's utility between the two regimes. We see that for relatively low levels of a_1, the bobos are better-off in the bunkerized equilibrium: despite higher land and service prices, they enjoy a greater amenity level. If a_1 is high, however, amenities are no longer sufficient to compensate the bobos for the greater amenity level of the bunkerized equilibrium (and for even higher level the bobos are better-off in the periphery and regime III ceases to exist).

9 "Diversity"

In this section I illustrate how the model may be useful to understand the reason why a city politically dominated by bobos may want to subsidize lower class service workers for residing in the city. Based upon the preceding discussion, we may think of a number of economic mechanisms through which such subsidies may raise the utility of the bobos:

1. If amenities and commuting costs are high, bringing the workers in the city may reduce urban service prices.

2. If the bobos are not numerous to capture political power, the presence of non-commuting workers in the city may help them build a coalition in favor of high amenities/high commuting costs.

3. A subsidy for workers to reside in the city may force the equilibrium to be in regime III, that is, it could eliminate an equilibrium in regime II. This may be profitable for the bobos whenever the bunkerized equilibrium delivers a higher utility to the bobos.

4. By triggering a shift from a low amenity to a high amenity equilibrium,

such subsidies may raise house prices, thus delivering capital gains to the incumbent generation of old city dwellers – indeed, we have seen that house prices are higher in regime III than in regime II. Interestingly, this effect affects all incumbent residents, including the cadres.

Let us just illustrate points 3 and 4 by assuming that at date $t+1$, the makeup of the city is the one associated with regime II (consequently, the amenity level and commuting cost will respectively be equal to α_B and ϕ_B. Let us assume that the incumbent generation of old can provide any young worker who buys a house in the city with a subsidy s. Let us assume that this subsidy is matched by a tax on τ on any young bourgeois who buys a house in the city. For simplicity, I assume that no taxes are in place from $t+2$ on, and that the economy is in a steady state after date $t+2$. Furthermore, I also assume that absent a subsidy the economy could be either in a regime II or a regime III steady state, and that whenever these two equilibria coexist, the status quo prevails.

I am going to show that the incumbent constituency will pick a positive value of s. The reason is that for s high enough, an equilibrium in regime II ceases to exist. Consequently, the equilibrium is bunkerized from $t+2$ on. Furthermore, they will select the highest possible value of s for regime III to exist; this is because the equilibrium house price at $t+1$ is an increasing function of s in regime III.

Suppose regime II holds from $t+2$ on. Then the price of housing from $t+2$ is $q_B = R_B/r$. House prices at $t+1$ are determined by the young generation of cadre's indifference condition:

$$(1+\beta)\ln(a_2-(1+r)(q_{t+1}+\tau)+q_B)-\beta\ln p^*+\alpha_B-\phi_B=(1+\beta)\ln a_2-\beta\ln p.$$

Since R_B must satisfy (4), it must be that

$$q_{t+1}=q_B-\tau. \tag{10}$$

For regime II to hold, the workers must be better-off residing in the suburb, in spite of the subsidy. That is,

$$(1+\beta)\ln(p^*a_S-(1+r)(q_{t+1}-s)+q_B)-\beta\ln p_B+\alpha_B<\bar{u}.$$

Given (10), (1) and (2), this condition is equivalent to

$$(1+r)(s+\tau)<A=rq_B+e^{\bar{u}-\beta\ln a_S}\left[e^{\frac{\beta}{1+\beta}\bar{u}+\lambda_B}-e^{\frac{\phi_B}{1+\beta}}\right]. \tag{11}$$

Clearly, for s (and therefore τ) large enough, this condition will be violated, which rules out the regime II steady state.

In a regime III steady state, the equilibrium values of q_{t+1} and p^*_{t+2} are determined by (8) and (9), which has to be adapted to take into account that the subsidy exists in $t+1$, so that q_{t+1} and p^*_{t+2} deviate from their regime III steady state values. Noting that the city's budget constraint implies that

$$\tau=s\frac{X-H_1}{H_1}, \tag{12}$$

we get:

$$(1+\beta)\ln(p^*_{t+2}a_S-(1+r)(q_{t+1}-s)+q_C)+\alpha_C-\beta\ln p^*_{t+2} = \bar{u}; \quad (13)$$

$$(1+r)q_{t+1}-q_C = a_1\frac{H_1}{X}-\frac{a_S}{\beta}p^*_t\left(1-\frac{H_1}{X}\right) \quad (14)$$

In the (p^*_{t+2}, q_{t+1}) plane, these two equations again define an upward sloping relation ship HME between q_{t+1} and p^*_{t+2}, along with a downward sloping relationship SME. Furthermore, HME shifts up with s : the greater the subsidy, the higher the real estate price paid to generation t by generation $t+1$. Since the price of services falls as one moves along SME, it must also be, for the housing market equilibrium to hold, that the house price net of the subsidy, $q_{t+1}-s$, falls.

This equilibrium prevails as long as the bobos of generation $t+1$ are better-off in the city compared to the suburb, that is:

$$(1+\beta)\ln(a_1-(1+r)(q_{t+1}+\tau)+q_C)+\alpha_C-\beta\ln p^*_{t+2} > (1+\beta)\ln a_1-\beta\ln p. \quad (15)$$

Since the subsidy is financed by the new generation of city dwellers, the incumbent generation of old in the city will select the level which delivers the highest possible resale price for their homes. Since that resale price is increasing with s, this means the highest possible level of s such that (11) is violated and (15) holds. A "diversity" bunkerized equilibrium therefore arises provided these conditions are met over a range of values of s. This range is non empty, in particular, provided (15) holds at an equilibrium defined by (13) and (14) for the minimum subsidy level which violates (11), i.e., given (12),

$$s_{\min} = \frac{H_1}{(1+r)X}A.$$

I have checked that for the simulations reported on figures 3, 4 and 5, the conditions just described are met. Therefore, over this range, the incumbent city dwellers will subsidize workers for residing in the city, so as to force a transition to an equilibrium in regime III, which they benefit from thanks to the higher resale value of their home.

The diversity subsidy deters the cadres from locating in the city, which destroys the regime II equilibrium. By influencing the initial social makeup of the city, the incumbent voters commit to a bunkerized equilibrium in the subsequent period. In turn, such an equilibrium delivers a high resale value of their homes, in anticipation of the high amenity levels. While it is not possible for the old generation to commit on future amenities, it is possible to commit on regime III by distorting the current locational choices of the new generation. We also note, from the analysis of the previous section, that if a_1 is not too large, the diversity subsidy benefits the bobos of the next generation.

Since all the gains from forcing a bunkerized equilibrium come from higher house prices, it is also likely that the incumbent old would like to force such

an equilibrium even if the economy is initially in regime I. That is, the old cadres also benefit from being replaced by bobos in a bunkerized city, as long as this entails capital gains on their real estate. On the other hand, the young cadres clearly suffer from being in regime III instead of regime I, by revealed preferences[13]. Consequently, if one were to extend the model by introducting intergenerational altruism, and a positive transmission of occupational status, then the bobos would be more likely to support "diversity" subsidies than the cadres.

10 Conclusion

This paper has show that one can explain some recent trends in urban sociology and policies without referring to an evolution of the preferences of the decisive voters in the city. Rather, these trends can be explained by productivity growth in the new economy goods relative to other sectors, along with the specificity of the production process for those goods.

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[13] The price vector in the suburbs is the same in all regimes, and in regime I the cadres are strictly better-off in the city.

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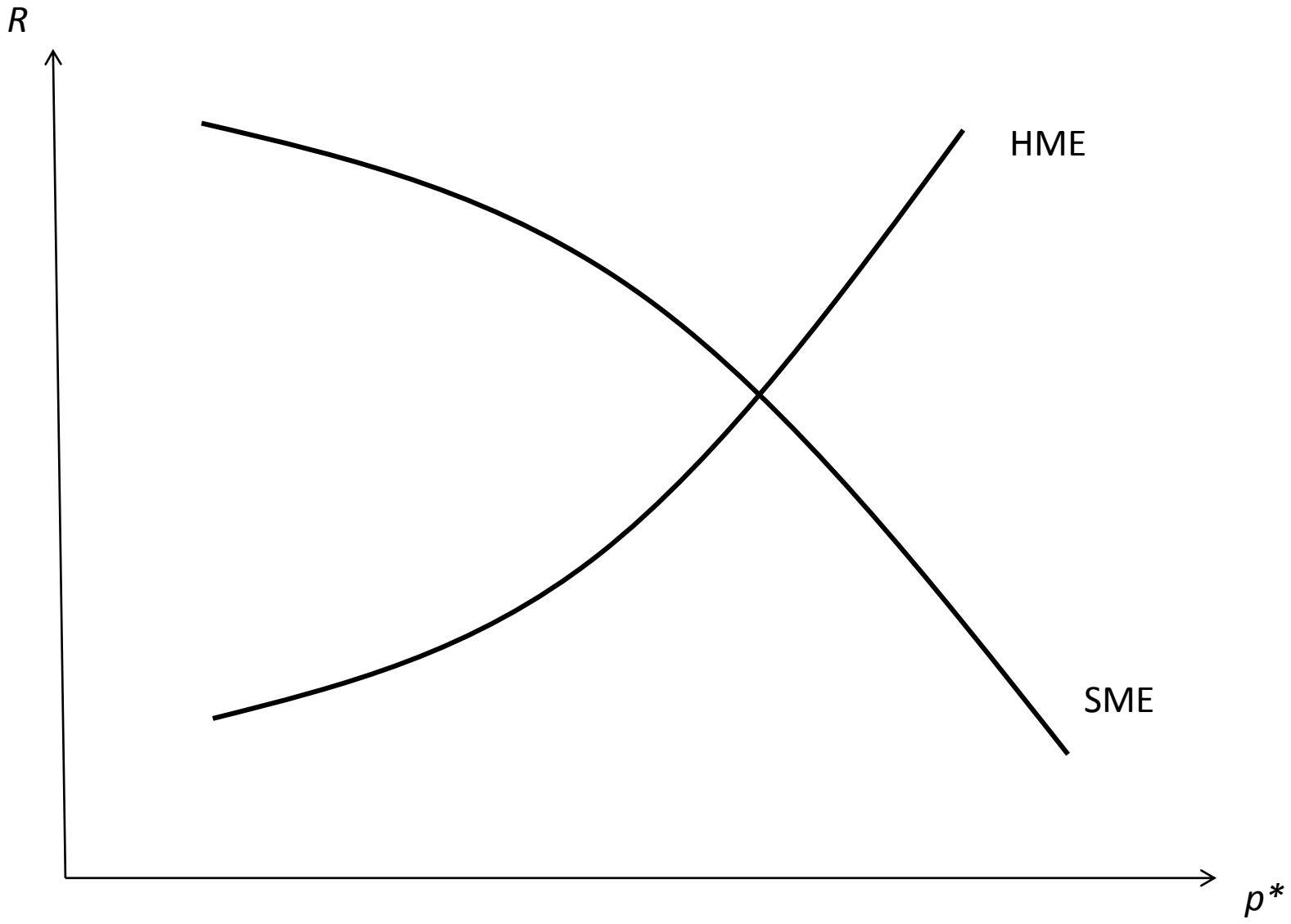


Figure 1 – Equilibrium determination in regime III

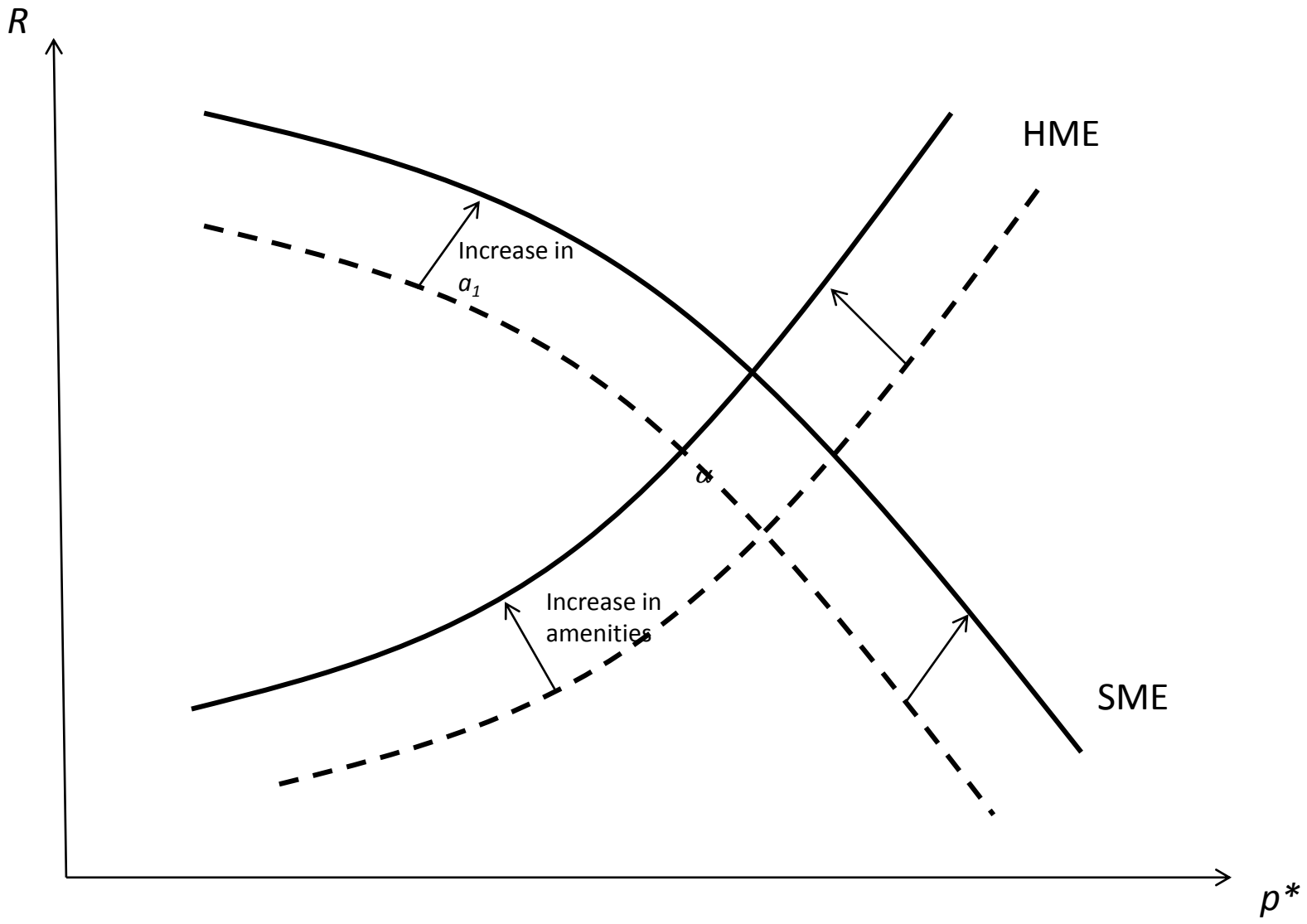


Figure 2 – Effect of α and a_1 on equilibrium rentals and service prices

Figure 3: House rental price in regimes II and III

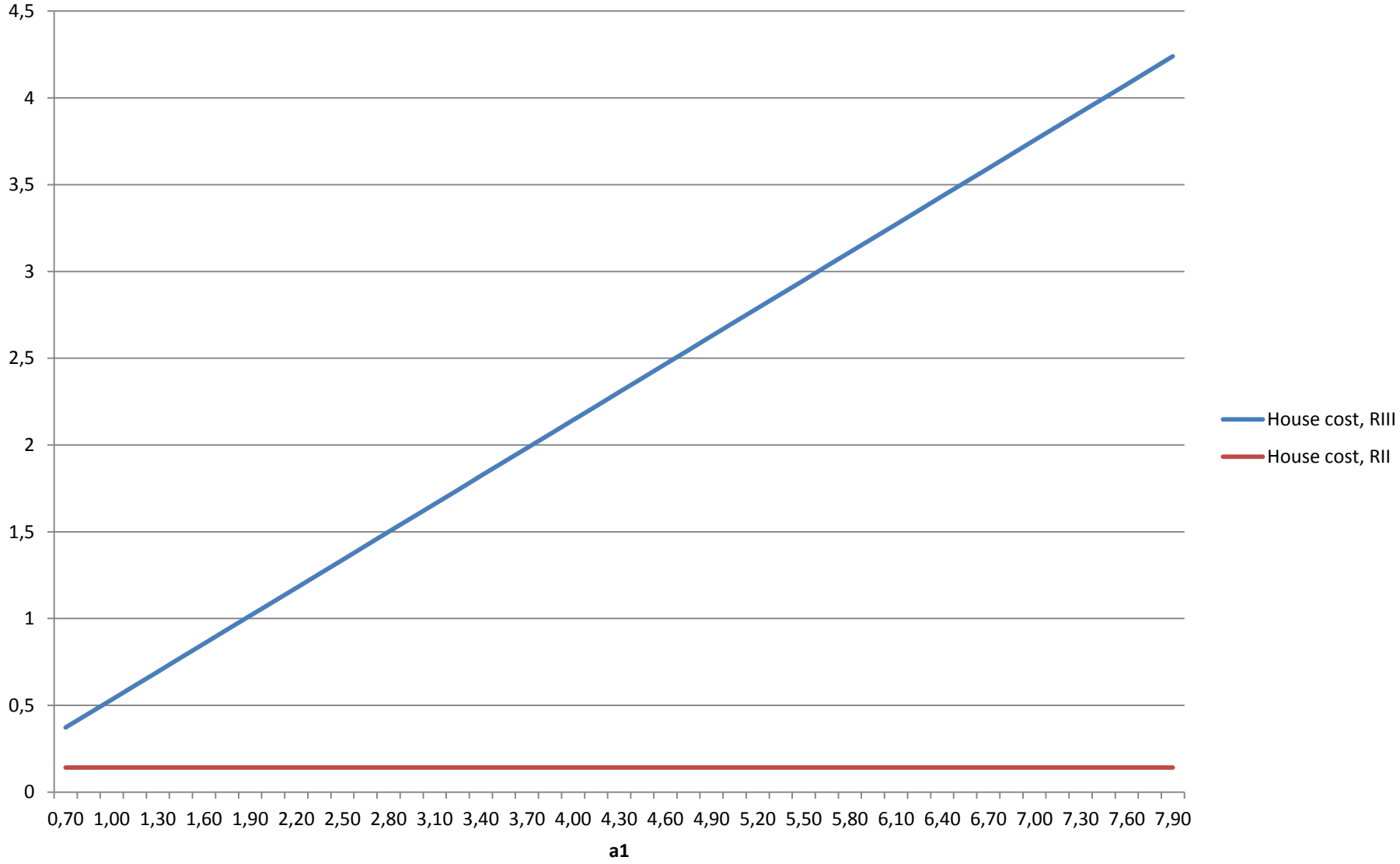


Figure 4: Service price in city in regimes II and III

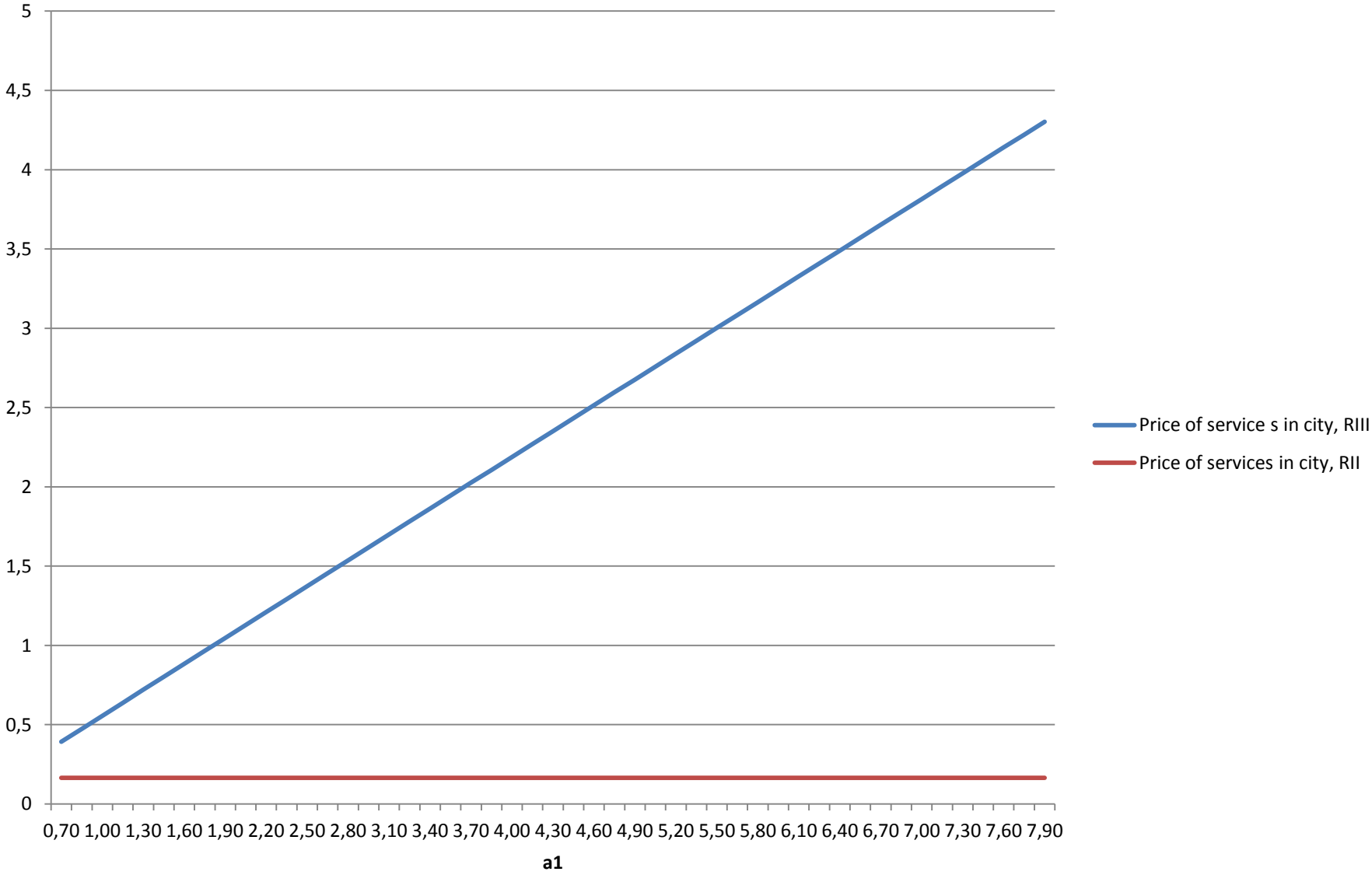


Figure 5: Bobo utility in regimes II and III

