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by

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Abstract

We study the decision problems faced by a city authority (CA) who focuses on two different objectives in her attempt to attract members of the creative class to her city by providing a local public good (LPG). First, we compute the maximum tax that a creative class member is willing to pay to enjoy the LPG on offer by living in the CA's city. Second, assuming that the CA acts like a "monopolist" interested in maximizing the *total benefit* to her city, we determine the number of members N to attract to her city and the amount of the LPG L to provide so that the total benefit is maximized. Third, supposing that the CA maximizes the welfare of an individual member, we ascertain the values of N and L that maximize this *individual welfare*. Finally, we compare and contrast the outcomes that arise from the CA's focus on these two distinct objectives.

Keywords: City Authority, Creative Class, Local Public Good, Optimal Membership, Tax

JEL Codes: R11, R50

1. Introduction

The eminent physicist Albert Einstein once said that "creativity is contagious, pass it on." The urbanist Richard Florida would, most likely, agree with this statement. Indeed, in his copious writings about creative people and creativity---see Florida (2002, 2003, 2005, 2008, 2014)---Florida has suggested to students of regional economic development that cities and regions that hope to prosper in this age of globalization need to first understand that creativity is contagious and then put in place policies that will attract different kinds of creative people who, as it turns out, often like to live and work together.

In other words, cities and regions need to do all they can to attract and retain members of what he calls the *creative class*. The creative class "consists of people who add economic value through their creativity" (Florida, 2002, p. 68). In particular, this class is composed of specialists such as engineers, information technology professionals, medical doctors, scientists, university professors, and, markedly, bohemians such as artists, musicians, and sculptors.

In this paper, we do not quibble with Florida's central policy prescription stated above but concentrate on two questions that follow naturally once one acknowledges Florida's position about the centrality of the creative class for the economic vibrancy of cities. The first question is: "What specifically might a city authority (CA) do to attract the creative class?" Since attracting the creative class is generally not costless for cities, the second question is: "How many members of the creative class should a CA seek to attract?

Research by Buettner and Janeba (2016), Batabyal and Beladi (2019), Batabyal *et al.* (2019), and Batabyal and Yoo (2020a, 2020b) has shed light on the first question by pointing out that local public goods (LPGs)[3] such as museums, high-quality educational institutions, theatres, and public transit can be used by a CA to carry out the "attract" task.[4]

In this regard, Batabyal *et al*. (2019) study a model in which the creative class members are able to migrate between the two cities under study. In this setting, they first delineate the equilibrium distribution of the creative class in the two cities and then determine the conditions under which the provision of a LPG is efficient. Batabyal and Beladi (2019) build on this work and analyze a model of competition between two cities that use a LPG to draw in members of the creative class. They follow Batabyal and Beladi (2018) and partition the total creative class population into "artists" and "engineers." They then carry out the remainder of their analysis with a representative artist and a representative engineer.

Batabyal and Yoo (2020a) demonstrate that the use of a "representative artist and engineer" modeling strategy can lead one to focus on an inefficient equilibrium in the combined economy of two cities. Finally, Batabyal and Yoo (2020b) also analyze a model with two cities and point out that the provision of the LPG in either city is inefficient because the CA is able to choose *only* the optimal amount of the LPG to provide and not, also, the optimal number of creative class members to attract to her city.

This review of the literature leads to two conclusions. First, some researchers have now studied the pros and cons of a CA using a LPG to attract members of the creative class to a city. Second, despite the finding in Batabyal and Yoo (2020b) stated in the preceding paragraph, there is *no* research on the question about how many creative class members a CA ought to attract to her city when she is able to choose *both* the number of members to draw in and the quantity of a LPG

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3 See Hindriks and Myles (2013, chapter 7) for a textbook exposition of LPGs.

4 For a discussion of related matters, see Hansen and Niedomysl (2009), Richardson (2009), and Audretsch and Belitski (2013).

to provide. Therefore, our objective in this paper is to use a simple theoretical framework and shed light on this question.

The remainder of this paper is arranged as follows: Section 2.1 delineates our stylized model of the interaction between a CA and members of the creative class. Section 2.2 ascertains the maximum tax that a creative class member is willing to pay to enjoy the LPG on offer by residing in the CA's city. Section 2.3 first assumes that the CA acts like a "monopolist" interested in maximizing the total benefit to her city and then determines the number of members N to attract to her city and the amount of the LPG L to provide so that this *total benefit* is maximized. Section 2.4 first supposes that the CA maximizes the welfare of an individual member and then ascertains the values of N and L that maximize this *individual welfare*. Section 2.5 compares and contrasts the outcomes that arise from the CA's focus on the two distinct objectives studied in sections 2.3 and 2.4. Finally, section 3 concludes and then suggests four ways in which the research delineated in this paper might be extended.

2. The Theoretical Framework

2.1. Preliminaries

Batabyal and Yoo (2020b) rightly point out that the creative class, in general, is made up of an assortment of specialists such as bankers, engineers, medical doctors, sculptors, university professors, and is therefore heterogeneous. That said, a city that is looking to bring together members of the creative class is generally *not* looking to bring together every possible type of member. In other words, a city like New York is more likely to be interested in attracting bankers and, in contrast, a city like Los Angeles is probably more interested in drawing in film industry professionals. In addition, even if a CA wanted to attract multiple types of creative class members to her city, it is difficult to believe that she would be able to do so by offering a *single* LPG.

Hence, to focus our ensuing discussion, we suppose that a CA is looking to attract a particular *subset* of members of the creative class such as bankers or sculptors. Because these members are either all bankers or all sculptors, and so and so forth, we can think of this subset as a *homogeneous* set of individuals.

Now, consider a city with a CA. We denote the LPG that is provided by this CA to the relevant creative class members by L. We assume that $N \geq 1$ creative class members live in this city. The income possessed by any one creative class member is $I > 0$. When a specific creative class member, attracted by the LPG on offer, decides to live in this city and the CA provides L to the N members who live in the city, this individual member obtains utility U denoted by the function

$$U = \{\alpha + \beta L - \gamma N\} + I - \tau, \quad (1)$$

where $\alpha > 0, \beta > 0, \gamma > 0$, and $\tau > 0$ is the maximum tax that a creative class member who lives in the city is willing to pay to enjoy the LPG on offer. This creative class member's reservation utility, i.e., the utility he obtains if he chooses to not live in the city under study is I.

Inspecting equation (1), we see that an individual creative class member's utility is (i) increasing in both the quantity of the LPG or L that is provided and in his personal income I, (ii) decreasing in the maximum tax τ that he has to pay, and (iii) decreasing in the number of creative class members N that are living in the city. This last property captures the idea that when a sculptor, for instance, is deciding whether to pay the tax τ for the LPG offered by the CA and live in this city, he takes into account how many other sculptors there already are and too many sculptors make the city "congested with sculptors" and hence attenuates his utility.[5]

[5] This way of modeling the impact of the number of members in certain creative class professions living in cities is consistent with the way in which the popular press has described such professions. To give two examples, Hughes (2011) points out that there are

With this description of the theoretical framework out of the way,[6] our next task is to ascertain the maximum tax that a creative class member is willing to pay to enjoy the LPG on offer by residing in the CA's city.

2.2. The tax

An arbitrary member of the creative class will agree to live in the city under study if and only if his utility from doing so is at least as big as not doing so or his reservation utility. Mathematically, this means that the maximum tax levied by the CA on this creative class member must satisfy the inequality

$$\{\alpha + \beta L - \gamma N\} + I - \tau \geq I. \tag{2}$$

Rewriting the inequality in (2) in order to isolate the tax τ, we get

$$\{\alpha + \beta L - \gamma N\} \geq \tau. \tag{3}$$

From (3), it should be clear to the reader that the *maximum* tax that a creative class member will be willing to pay to live in the city under study is

$$\tau = \{\alpha + \beta L - \gamma N\}. \tag{4}$$

Inspecting equation (4), it is straightforward to verify two points. First, the higher the amount of the LPG or L that is provided by the CA, the greater is the maximum tax that any creative class member is willing to pay. Second, the larger the number of creative class members living in this city, the greater is the congestion factor we alluded to in section 2.1 and hence the lower is the maximum tax that an arbitrary creative class member is willing to pay.

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very many lawyers in Washington DC and Russell (2019) contends that the number of "tech workers" in San Francisco is not only large but also growing. That said, equation (1) can also be thought of as denoting a public good with a congestion effect.

6 Our modeling of the LPG or L provision problem has some similarities with aspects of the literature on the provision of club goods.

We now proceed to analyze a setting in which the CA acts like a “monopolist” and chooses the LPG L and the number of members N to attract to her city to maximize the *total benefit* accruing to the city from these two optimal choices.

2.3. Monopoly

Before we compute the total benefit to the CA, we’ll need to specify what it costs her to provide the LPG L to the creative class members. To this end, we suppose that it costs the CA $L + N$ to provide the LPG and thereby “run” her city. With this cost specification, the total benefit B to the CA is given by

$$B = \tau N - \{L + N\}. \tag{5}$$

We now substitute the value of τ from equation (4) into equation (5). This gives us

$$B = N\{\alpha + \beta L - \gamma N\} - \{L + N\}. \tag{6}$$

The CA chooses L and N to maximize the total benefit function given by equation (6).[7]

Differentiating the maximand in equation (6) with respect to L and N gives us the two first-order necessary conditions for a maximum.[8] These two conditions are

$$\frac{\partial B}{\partial L} = \beta N - 1 = 0 \tag{7}$$

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Our modeling strategy in this paper involves the use of linear functional forms for the utility function and the cost of providing the LPG. We use linear functional forms because of three reasons. First, our paper is fundamentally about the use of LPGs and it is very common to use either linear or quasi-linear functional forms to model both utility and cost in the extant literature on public goods. In other words, there are several precedents for the use of linear functional forms in this literature. See Frank (2010) and Postlewaite (2018) for a more detailed corroboration of this claim. Second, the use of linear functional forms allows us to obtain explicit solutions for the two key decision variables---L and N---that we care about in this paper. Finally, because we use linear functional forms, we are able to compare the outcomes that arise in the “Monopoly” and the “Individual welfare” cases in section 2.5 below in a manner that is transparent and hence easy to comprehend. These three reasons notwithstanding, we acknowledge that linear functional forms, if not used carefully, can give rise to either corner solutions or to indeterminate solutions. Specifically, this can happen when one part of an objective function is linear and another part is, say, multiplicative. To see this concretely, if were to replace the linear and additive LPG provision cost of $L + N$ with the multiplicative form $L \cdot N$ then algebra shows that we get $\beta = 1$ and, *inter alia*, the value of N is indeterminate.

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We obtain $\partial^2 B/\partial L^2 = 0 \leq 0$ and $\partial^2 B/\partial N^2 = -2\gamma < 0$ and hence the second-order necessary conditions are satisfied.

and

$$\frac{\partial B}{\partial N} = \alpha + \beta L - 2\gamma N - 1 = 0. \quad (8)$$

Simplifying equations (7) and (8) gives us the optimal values of the LPG or L^* and the number of members attracted to the city or N^*. We get

$$L^* = \frac{2\gamma + \beta\{1-\alpha\}}{\beta^2} \quad (9)$$

and

$$N^* = \frac{1}{\beta}. \quad (10)$$

Recall from equation (1) that the marginal utility to a creative class member from an incremental increase in the number of members resident in the city or $\partial U/\partial N = -\gamma < 0$. Also, from equation (9) we infer that $\partial L^*/\partial\gamma > 0$. Therefore, putting these two pieces of information together, we see that the total benefit maximizing level of the LPG or L^* is an increasing function of the absolute value of the marginal utility arising from a small increase in the number of members living in the city.

Similarly, from equation (1) we know that the marginal utility to a creative class member from an incremental increase in the amount of the LPG that is provided or $\partial U/\partial L = \beta > 0$. Straightforward differentiation of equation (9) tells us that

$$\frac{\partial L^*}{\partial \beta} = \frac{\alpha\beta - \beta - 4\gamma}{\beta^3}. \tag{11}$$

Inspecting equation (11) we see that an increase in the marginal utility from the LPG increases the optimal amount of the LPG or L^* that is provided by the CA if $\alpha\beta > (\beta + 4\gamma)$.

Finally, equation (10) tells us that an increase in the marginal utility from the LPG or β lowers the total benefit maximizing number of creative class members attracted by the CA to the city under study. We now study a setting in which the CA focuses on the welfare of an individual creative class member and then ascertains the values of N and L that maximize this *individual welfare*.

2.4. Individual welfare

In contrast to section 2.3, we now suppose that the CA concentrates on the welfare of an individual member and then ascertains the values of N and L that maximize this *individual welfare*. The cost of providing the LPG and thereby "running" her city is now shared equally by all the resident creative class members who are assumed to have identical preferences. This means that the charge levied upon a member living in the city is $\{L + N\}/N$. With this cost description, our CA selects L and N to maximize

$$U = \{\alpha + \beta L - \gamma N\} + I - \frac{L+N}{N}. \tag{12}$$

The first-order necessary conditions for an optimum are[9]

[9] We get $\partial^2 U/\partial L^2 = 0 \leq 0$ and $\partial^2 U/\partial N^2 = -2L/N^3 < 0$ and therefore the second-order necessary conditions are satisfied.

$$\frac{\partial U}{\partial L} = \beta - \frac{1}{N} = 0 \tag{13}$$

and

$$\frac{\partial U}{\partial N} = \frac{L}{N^2} - \gamma = 0. \tag{14}$$

Simplifying equations (13) and (14), we see that optimality calls for setting

$$L^* = \frac{\gamma}{\beta^2} \tag{15}$$

and

$$N^* = \frac{1}{\beta}. \tag{16}$$

Our final task in this paper is to compare and contrast the results of this individual welfare maximization case with the corresponding results obtained in the "monopoly" case analyzed in section 2.3.

2.5. Monopoly vs. individual welfare

From equation (15), we see that as in section 2.3, the individual welfare maximizing level of the LPG or L^* is an increasing function of the absolute value of the marginal utility arising from a small increase in the number of members living in the city or γ. Second, equation (15) tells us that unlike the case studied in section 2.3, an increase in the marginal utility from the LPG or β *unambiguously* reduces the optimal amount of the LPG or L^* that is provided by the CA.

Next, comparing equations (10) and (16), we see that the optimal number of creative class members who are attracted to and live in the city under study or N^* is the *same* irrespective of whether the CA maximizes the total benefit to the city or the welfare of an individual creative class member.

Finally, comparing equations (9) and (15), we confirm that *unlike* the above result for N^*, the optimal amount of the LPG or L^* that is provided by the CA is *not* the same in the total benefit and individual welfare maximization cases. In particular, L^* *does* depend on which objective function the CA chooses to optimize. In this regard, simple algebra shows that the amount of the LPG provided when the CA behaves like a "monopolist" is *greater* than the amount provided when she focuses on individual welfare maximization as long as $\gamma > \{\alpha - 1\}\beta$. This concludes our discussion of total benefit vs. individual welfare maximization when a CA uses a LPG to attract members of the creative class to her city.

3. Conclusions

In this paper, we studied the decision problems faced by a city authority (CA) who focused on two different objectives in her attempt to attract members of the creative class to her city by providing a local public good (LPG). First, we computed the maximum tax that a creative class member was willing to pay to enjoy the LPG on offer by living in the CA's city. Second, assuming that the CA acted like a "monopolist" interested in maximizing the *total benefit* to her city, we determined the number of members N to attract to her city and the amount of the LPG L to provide so that this total benefit is maximized. Third, supposing that the CA concentrated on the welfare of an individual member, we ascertained the values of N and L that maximized this *individual* *welfare*. Finally, we compared and contrasted the outcomes that arose from the CA's focus on these two distinct objectives.

The analysis in this paper can be extended in a number of different directions. Here are four potential extensions: First, it would be interesting to model the interaction between a CA and creative class members in an intertemporal setting and to then analyze the time-paths of the optimal amount of the LPG that is provided and the optimal number of members that are attracted to the city. Second, it would also be informative to partition the creative class population into different clusters and to then examine how successful a CA is in attracting these different clusters of members to her city with a LPG and other fiscal policy instruments such as tax breaks and subsidies. Third, one could analyze the interaction between a CA and creative class members as in Oladi (2005). Finally, with regard to the analysis in section 2.4, one could follow the approach in Beladi *et al.* (2014) and examine a situation in which the resident creative class members have heterogeneous preferences. Studies that analyze these aspects of the underlying problem will provide additional insights into the nature of the static and the intertemporal dealings between creative class members and city authorities.

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