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Tax Policy and Interregional Competition for Mobile Venture Capital by the Creative Class

Abstract

We study how tax policy affects the competition for venture capital by the creative class in two regions A and B. The creative class in each region produces a final good with venture capital and creative capital. Venture capital moves freely between the two regions and the representative creative class member in each region has access to an initial amount of venture capital. Each region taxes venture capital at a particular rate and the tax revenue is paid out as a transfer to the representative creative class member. In this setting, we perform five tasks. We begin by determining the first-best tax rates in the two regions. Second, we solve for the net price of venture capital and then express the objective function that is to be maximized in each region as a function of this price. Third, we compute the first-order necessary conditions that describe the optimal tax rates in the two regions and show that the sign of the tax rate depends on the net exporting position of the region. Fourth, for specific parameter values, we calculate the two tax response functions and discuss their properties. Finally, we compute the two equilibrium taxes as a function of the model's key parameters and show that these taxes must be of opposite signs.

Keywords: Competition, Creative Class, Region, Tax Policy, Venture Capital

JEL Codes: R11, H25

1. Introduction

1.1. Setting the scene

Economists, researchers in finance, and regional scientists have known about the salient role that the notion of *creativity* plays in promoting regional economic growth and development at least since Andersson (1985). This notwithstanding, by concentrating on the significance of the so-called *creative class*, the urbanist Richard Florida (2002, 2005, 2008) has gone furthest in the last two decades in persuading researchers and policymakers that creativity matters in the sense that creative people---his creative class---have a fundamental role to play in enhancing the economic growth and development prospects of a wide variety of regions in today's world.

More specifically, Florida (2002, p. 68) helpfully explains that the *creative class* "consists of people who add economic value through their creativity." This class is made up of professionals such as attorneys, engineers, medical doctors, university professors, and, notably, bohemians such as artists, musicians, and sculptors. What is special about the members of the creative class is that they possess *creative capital*, which is defined to be the "intrinsically human ability to create new ideas, new technologies, new business models, new cultural forms, and whole new industries that really [matter]" (Florida, 2005, p. 32).

Therefore, in the Floridian view of regional policymaking, the creative capital possessing members of the creative class are important because this collection of individuals is able, *inter alia*, to produce innovative final goods that are important for the economic dynamism of cities and regions.[4] Hence, it follows that cities and regions that want to thrive in this era of globalization

[4] See Florida *et al*. (2008), Florida *et al*. (2012), and Florida (2014) for a more detailed corroboration of this point.

need to do all they can to draw in and retain members of the creative class because, we are led to believe, this class is the principal driver of economic growth and development. Now, members of the creative class, whether they are artists or electrical engineers, frequently need access to *venture capital* to bring their creative ideas to fruition.[5] As such, we now briefly survey the literature on venture capital and then proceed to discuss the objectives of this paper.

1.2. Literature review

Hochberg *et al*. (2015) estimate a market structure model of competition to explain how industry specialization matters as a type of product differentiation in the venture capital market. Geronikolaou and Papachristou (2016) use a double-sided moral hazard framework to model the impact that competition between venture capitalists has on the risk profile of the investees. These authors show that as competition increases, investors are more willing to finance risky projects that would otherwise not be funded.

Kaya and Persson (2019) focus on incumbent firms, target firms, and what they call gazelles and propose a theory of "gazelle growth." Their analysis demonstrates that if an incumbent firm acquires a target firm then the "gazelle" will invest organically in order to grow and, as a result, the incumbent firm's acquisition of the target firm will be insufficient to protect the incumbent firm's market power. Feng *et al*. (2020) look at initial public offerings (IPOs) and examine whether venture capital backed IPOs are more innovative than otherwise equivalent IPOs that are not backed by venture capital.

5 Go to https://accessventures.org/blog/investing-in-the-future-of-creative-work/ and to https://www.aam-us.org/2019/07/09/investing-in-the-creative-economy-for-good-and-profit/ for additional details on this point. Accessed on 20 January 2022.

Chen *et al*. (2021) analyze the properties of a two-stage model of decision-making by venture capitalists in which, in stage 1, venture capitalists invest in a private market and then, in stage 2, they exit the public market with an IPO. What role does gender diversity play in the performance of venture capital funds? This question has been studied by Calder-Wang and Gompers (2021). These researchers use a dataset containing information about the gender of the children of venture capital partners and then show that when partners have more daughters, the propensity to hire female partners increases. In addition, increased gender diversity improves dealmaking and the performance of venture capital funds.

Moving on to the receipt of venture capital by members of the creative class, we know that this receipt is typically the outcome of a *competitive* process in which these members have to convince potential investors that their ideas or plans are worth investing in. In this regard, Chang *et al*. (2012) focus on the creative class in the context of science parks in Taiwan and argue that the availability of venture capital is a key determinant of regional entrepreneurship and innovation. Second, Kane and Hipp (2019) analyze what they call "superstar cities" with a large number of creative class jobs and venture capital. They show that such cities are not necessarily more unequal but that an overrepresentation of people in creative jobs does attenuate the likelihood of there being economically and socially diverse neighborhoods in such cities. Finally, does the presence of market failures provide a rationale for regional governments to establish venture capital funds? Vogelaar and Stam (2021) study this question in the context of Dutch regions. They note that rationales other than market failure such as the presence of economic competition and the possibility of learning explain why regional governments get into the business of providing venture capital funds.

1.3. Our objectives

Two points are now worth emphasizing. First, the three papers discussed in the preceding paragraph are the only studies that have examined some aspects of the *link* between the creative class and the provision of venture capital. Second and more generally, there are *no* theoretical studies in the literature that have analyzed how tax policy affects the competition between creative class members located in different regions for scarce venture capital. Given this lacuna in the literature, we focus on an aggregate economy consisting of two regions in this paper. Next, we provide the *first theoretical* analysis of the impacts of tax policy on interregional competition for mobile venture capital by members of the creative class who are situated in these two regions.

The remainder of this paper is organized as follows. Section 2 delineates our model of an aggregate economy consisting of two regions denoted by A and B. Members of the creative class in each region produce a final good with venture capital and their own abilities or creative capital. The fixed total amount of venture capital in the aggregate economy moves freely between the two regions and the representative creative class member in each region has access to an initial amount of venture capital. Each region taxes venture capital at a particular rate and the resulting tax revenue is paid out as a transfer to the representative creative class member. Section 3 determines the first-best tax rates in the two regions. Section 4 solves for the net price of the mobile venture capital and then expresses the objective function that is to be maximized in each region as a function of this price. Section 5 computes the first-order necessary conditions that describe the optimal tax rates in the two regions A and B and then shows that the sign of the tax rate depends on the net exporting position of the region. Section 6 calculates, for specific parameter values, the two tax response functions and then discusses their attributes. Section 7 computes the two equilibrium taxes as a function of the model's key parameters and then demonstrates that these taxes must be of opposite signs. Finally, section 8 concludes and then suggests two ways in which the research described in this paper might be extended.

2. The Theoretical Framework

Consider an aggregate economy of two regions denoted by $i = A, B$. Of the total creative class population in the aggregate economy, the fraction λ_A (λ_B) resides in region A (B) and therefore we have $\lambda_A + \lambda_B = 1$.[6] The total amount of venture capital available in the aggregate economy is fixed and normalized to 1. The creative class members in regions A and B compete for this total amount which is to be apportioned between these two regions. For concreteness, the reader may want to think of these creative class members as the owners of startup companies who are competing among themselves for scarce venture capital to convert their ideas and plans into tangible products. A second possible interpretation is that the creative class members are the owners of firms that already produce a specific product but are now looking to expand into a new product line for which they need attract the scarce venture capital. That said, it should be clear to the reader that these are not the only possible interpretations that we can have of the creative class members in regions A and B.

The production function $f(\cdot)$ describes how the final good in each region is manufactured using venture capital and the abilities of the creative class members or their creative capital. This production function can be written as[7]

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Our focus in this paper is exclusively on the creative class and this explains why we do not work with the total population of individuals in the two regions. That said, since the creative class population in each region is a proper subset of the total number of resident individuals, we could also express the creative class population in each region as $\rho_i = \gamma_i N_i, i = A, B$, where N_i is the fraction of the total population of individuals in our aggregate economy that is resident in region i and γ_i is the fraction of N_i that denotes the creative class population in region i. Given our objective, stated in section 1.3 above, this more complicated notation does *not* provide any additional insights. Therefore, we stay with the λ_i interpretation discussed in the body of the paper.

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$$f(v_i) = v_i - \frac{v_i^2}{2}, i = A, B, \tag{1}$$

where v_i denotes the venture capital per creative class member's creative capital that is invested or received in region i. In other words, v_i is the venture capital-creative capital ratio. The two factors of production in our model are paid the value of their marginal products.[8]

The available venture capital moves freely[9] between regions A and B. We suppose that the net price or cost of this venture capital can be described by $\zeta \geq 0$. When our analysis commences, the representative creative class member in region i owns $\bar{v}_i$ units of venture capital. An appropriate authority in region i taxes the venture capital invested in this region at rate τ_i. The resulting tax revenue in region i is paid out as a transfer to the representative creative class member in this region. In addition, the appropriate authority in the ith region chooses the tax rate τ_i to maximize the net income of its representative creative class member. This net income y_i can be written as

$$y_i = f(v_i) - f'(v_i)v_i + \zeta\bar{v}_i + \tau_i v_i, i = A, B. \tag{2}$$

This concludes the description of our aggregate economy of two creative regions. That said, we note that the term "creative region" has also been used by Andersson (1985) in his discussion of

We have written the constant returns to scale "extensive" production function in its so-called intensive form. See Hindriks and Myles (2013, chapter 20) for a textbook exposition of this way of writing the production function.

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Our analysis in this paper is static. As such, the question of growth in the size of the creative class, and hence the associated creative capital, does *not* arise. Now, in either region i, let V_i, R_i, and Y_i denote, respectively, venture capital and creative capital which are the two inputs and the output of the final good. Then, if we let $Y_i = F(V_i, R_i)$ denote the constant returns to scale "extensive" production function, then we can write $Y_i/R_i = F(1, \ (V_i/R_i))$. Now, let $Y_i/R_i = y_i$ and let $V_i/R_i = v_i$. Then, substituting these last two expressions into the "extensive" production function, we get the intensive version of this function that is shown in equation (1). Finally, inspecting the extensive production function, it should be clear to the reader that in our model, creative capital *adds* to output.

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In the United States, for example, the disbursement of venture capital is increasingly not limited to startups and other entities located in the two coasts. Venture capital dollars are now spread throughout the United States meaning that venture capital is certainly mobile. See Florida (2016), Florida and King (2016), Smith (2020), and Metinko and Teare (2021) for more details on this point.

creativity and regional development.[10] Our next task is to determine the first-best tax rates in the two regions.

3. First-Best Taxes

The first-best tax rates τ_A and τ_B maximize the total income Y of the creative class members in the aggregate economy under study. In symbols we have

$$(\tau_A, \tau_B) = argmax(Y = \lambda_A y_A + \lambda_B y_B), \tag{3}$$

where y_i and $f(v_i)$ are given by equations (2) and (1) and it is understood that the net price of venture capital ζ can be expressed as

$$\zeta = f'(v_i) - \tau_i. \tag{4}$$

Some thought tells us that the market clearing condition for venture capital in our aggregate economy is[11]

$$\lambda_A v_A + \lambda_B v_B = 1 \tag{5}$$

and this condition, in turn, implies that

$$v_B = \frac{1-\lambda_A v_A}{\lambda_B}. \tag{6}$$

The arbitrage condition for venture capital in our aggregate economy is given by

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In our static model, the distinction between stock and flow variables, which would be pertinent in a dynamic setting, does *not* arise. This is why it makes sense to include the term $\zeta \bar{v}_i$ in the expression for net income in equation (2). See Hindriks and Myles (2013, pp. 666-667) for a textbook exposition of a similar approach to writing net income involving physical but not venture capital.

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The market clearing condition, which can also be referred to as the equilibrium condition in the aggregate economy venture capital market, can be written in a variety of ways. If we look at venture capital in the two regions V_A and V_B, then one way of writing the market clearing condition would be to write $V_A + V_B = V = 1$, where the last equality follows from our section 2 assumption that the total available venture capital is fixed and normalized to unity. However, since we are working with intensive functions---see equations (1) and (2)---in this paper, to write the market clearing condition as shown in equation (5), we use the conditions $V_A + V_B = 1$, $\lambda_A + \lambda_B = 1$, and the point that the relevant extensive production function---see footnote 5---displays constant returns to scale or, equivalently, is homogeneous of degree 1. See Varian (1992, chapter 1) for a textbook discussion of these issues.

$$f'(v_A) - \tau_A = f'(v_B) - \tau_B. \tag{7}$$

Now, differentiating this arbitrage condition in equation (7) with respect to the tax rate τ_A gives us

$$f''(v_A)\frac{dv_A}{d\tau_A} - 1 = f''(v_B)\left(-\frac{\lambda_A}{\lambda_B}\right)\frac{dv_A}{d\tau_A}. \tag{8}$$

Equation (8) can be simplified further. This simplification yields

$$\frac{dv_A}{d\tau_A} = \frac{\lambda_B}{\lambda_B f''(v_A) + \lambda_A f''(v_B)}. \tag{9}$$

Differentiating the production function in equation (1), we infer that $f''(v_i) = -1.$ Using this last result to substitute for $f''(\cdot)$ in equation (9) gives us

$$\frac{dv_A}{d\tau_A} = -\lambda_B = -(1 - \lambda_A). \tag{10}$$

A line of reasoning, similar to that which led to the derivation of equation (10), allows us to conclude that

$$\frac{dv_B}{d\tau_B} = -\lambda_A = -(1 - \lambda_B). \tag{11}$$

Using the above results in equations (4) through (11), we can write a compact expression for the total income Y of the members of the creative class in the two regions A and B. That expression is

$$Y = \lambda_A y_A + \lambda_B y_B = \lambda_A[f(v_A) + (\bar{v}_A - v_A)\{f'(v_A) - \tau_A\}] + \lambda_B[f(v_B) + (\bar{v}_B - v_B)\{f'(v_B) - \tau_B\}]. \tag{12}$$

Let us now use the result $\lambda_B = 1 - \lambda_A$ to rewrite the right-hand-side (RHS) of equation (12). Then, differentiating this rewritten expression for the total income Y with respect to the tax rates τ_A and τ_B gives us the two first-order necessary conditions for an optimum.[12] These conditions are

$$\lambda_A(1 - \lambda_A)\{\tau_B - (\bar{v}_B - v_B)\} - \lambda_A\{\lambda_A(\bar{v}_A - v_A) + (1 - \lambda_A)\tau_A\} = 0 \tag{13}$$

and

$$\lambda_A(1 - \lambda_A)\{(\bar{v}_A - v_A) + \tau_A\} - (1 - \lambda_A)\{(1 - \lambda_A)(\bar{v}_B - v_B) + \lambda_A\tau_B\} = 0. \tag{14}$$

Inspecting equations (13) and (14) carefully, it is straightforward to confirm that the two tax rates τ_A and τ_B *cancel out* from these two optimality conditions. This tells us that the optimal values of the two tax rates are *undefined*. We obtain this result because, in our model, there is a fixed amount of venture capital in the aggregate economy and what taxation in the two regions does is to reallocate this fixed amount of venture capital between regions A and B. In addition, observe that the revenue from taxation is a transfer from the owners of venture capital to the taxing authorities in the two regions. Therefore, we conclude our analysis of the first-best taxes by pointing out that *any pair* of tax rates that do not distort the allocation of venture capital will be optimal *regardless* of the actual level. We now ascertain the net price of the mobile venture capital

12 The second-order sufficiency conditions are satisfied.

ζ and then move on to express the objective function that is to be maximized in each region as a function of this price.

4. Net Price of Venture Capital

Let us begin by expressing the demand for venture capital in region i as a function of the net price ζ and the tax rate τ_i. To this end, observe that the demand function we seek can be obtained by equating the marginal product of venture capital to its "after tax" marginal cost. Using equation (4), we get

$$f'(v_i) = \zeta + \tau_i, i = A, B. \quad (15)$$

Differentiating the production function in equation (1), we get $f'(v_i) = 1 - v_i$. Substituting this last result in equation (15) gives us

$$1 - v_i = \zeta + \tau_i \Rightarrow \ v_i = 1 - \zeta - \tau_i. \quad (16)$$

Equation (16) gives us the demand function for venture capital that we seek.

Our next task is to solve for the net price ζ as a function of the two creative class population shares (λ_A, λ_B) and the two tax rates (τ_A, τ_B). Using the venture capital market clearing condition given in equation (5) along with equation (16), we get

$$1 = \lambda_A v_A + \lambda_B v_B = \lambda_A(1 - \zeta - \tau_A) + \lambda_B(1 - \zeta - \tau_B). \quad (17)$$

Simplifying the RHS of equation (17) gives us

$$1 = \lambda_A + \lambda_B - (\lambda_A + \lambda_B)\zeta - (\lambda_A \tau_A + \lambda_B \tau_B). \quad (18)$$

Now, using the fact that $\lambda_A + \lambda_B = 1$ in equation (18) and then solving for ζ gives us the expression for ζ that we seek. Specifically, that expression is

$$\zeta = -(\lambda_A \tau_A + \lambda_B \tau_B). \quad (19)$$

Inspecting equation (19) we see that an increase in the tax rate τ_A causes the net price of venture capital or ζ to *decrease*. This result arises because a higher tax rate means that it is costlier to receive venture capital and therefore the demand for venture capital declines and, as a result, the net price of venture capital *falls*.

We are now in a position to express each region's income as a function of, *inter alia*, the net price of venture capital ζ. Using equation (15) in the expression for regional income given in equation (2), we get

$$y_i = f(v_i) - f'(v_i)v_i + \zeta\bar{v}_i + \tau_i v_i = f(v_i) - (\zeta + \tau_i)v_i + \zeta\bar{v}_i + \tau_i v_i. \quad (20)$$

The RHS of equation (20) can be simplified further. This simplification yields

$$y_i = f(v_i) + \zeta(\bar{v}_i - v_i). \quad (21)$$

Equation (21) demonstrates that the relationship between income in the ith region and the net price of venture capital ζ is *positive*. Specifically, as ζ rises, so does income. We now use the expression for a region's income in equation (21) to compute the first-order necessary conditions that describe the two optimal tax rates in regions A and B when there is competition for venture capital. Next, we show that the sign of either tax rate depends on the net exporting position of the region.

5. Optimal Regional Taxes

We suppose that an appropriate authority in each region selects the tax rate taking the other region's tax rate choice as given. In symbols, this authority in the ith region solves

$$max_{\{\tau_i\}}[y_i = f(v_i) + \zeta(\bar{v}_i - v_i)]. \quad (22)$$

The first-order necessary condition for an optimum to this problem is

$$\frac{\partial y_i}{\partial \tau_i} = \{f'(v_i) - \zeta\}\frac{dv_i}{d\tau_i} + (\bar{v}_i - v_i)\frac{d\zeta}{d\tau_i} = 0 \quad (23)$$

for $i = A, B$.

From equation (19) we know that $d\zeta/d\tau_i = -\lambda_i$. Using this result, we can simplify the left-hand-side (LHS) of equation (23) to give

$$-\tau_i(1-\lambda_i) - \lambda_i(\bar{v}_i - v_i) = 0 \tag{24}$$

for $i = A, B$. Finally, isolating the tax rate τ_i in equation (24) on the LHS gives us an expression for the two optimal tax rates that we seek. We get

$$\tau_i = \frac{-\lambda_i(\bar{v}_i - v_i)}{1-\lambda_i}, i = A.B. \tag{25}$$

Inspecting equation (25) it is clear that the creative class population share $\lambda_i \in (0,1)$ and that the denominator $1-\lambda_i > 0$. Therefore, if a region is a net exporter of venture capital, i.e., if $(\bar{v}_i - v_i) > 0$, then $\tau_i < 0$. On the other hand, if a region is a net importer of venture capital then $(\bar{v}_i - v_i) < 0$ and $\tau_i > 0$.

In words, if the representative creative class member's initial ownership of venture capital in a region is *high* so that in the ensuing tax competition between the two regions, this region ends up exporting some of its venture capital to the other region then it is optimal for the appropriate authority in this region to *subsidize* and not tax venture capital. In contrast, if the representative creative class member's initial ownership of venture capital is *low* so that in the resulting tax competition between the two regions, this region imports venture capital from the other region then it is optimal for this region to *tax* venture capital. Put differently, optimal tax policy in the ith region depends, at least in part, on a specific *initial condition* concerning the ownership of venture capital $\bar{v}_i$ in this region. Our next task is to demonstrate the working of our model for specific values of the key parameters.[13]

6. Numerical Analysis

Suppose, for the analysis in this section, that $\lambda_A = \lambda_B = 1/2$, that $\bar{v}_A = 1/2$, and that $\bar{v}_B = 3/2$. Then, plugging these values of the parameters into equation (25) and simplifying, the first-order necessary conditions for an optimum now are

$$-\tau_A - \left(\frac{1}{2} - v_A\right) = 0 \tag{26}$$

and

$$-\tau_B - \left(\frac{3}{2} - v_B\right) = 0. \tag{27}$$

Now using equations (16) and (19) to substitute into the above two first-order necessary conditions, we obtain the two best response functions for regions A and B. They are

$$\tau_A = \frac{1}{3} + \frac{\tau_B}{3} \tag{28}$$

and

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We emphasize that the purpose of this numerical analysis is to demonstrate how our model can be operationalized given actual values of $\lambda_A, \lambda_B, \bar{v}_A$, and $\bar{v}_B$. We are *not* suggesting that our analysis in this section is complete in the sense that it shows how changeable (or not) our results are to multiple variations in the values of of $\lambda_A, \lambda_B, \bar{v}_A$, and $\bar{v}_B$.

$$\tau_B = -\frac{1}{3} + \frac{\tau_A}{3}. \tag{29}$$

These two best response functions described by equations (28) and (29) are plotted in figure 1.

Figure 1 about here

Solving for the intersection point of the two best response functions in figure 1 or solving equations (28) and (29) simultaneously, we infer that the two equilibrium tax rates are given by $\tau_A = 1/4$ and $\tau_B = -1/4$. From equation (19) we see that $\zeta = -(\lambda_A\tau_A + \lambda_B\tau_B) = -\left\{\frac{1}{2} \times \frac{1}{4} + \frac{1}{2} \times \left(-\frac{1}{4}\right)\right\} = 0$. Finally, making the relevant parametric substitutions in equation (16) we get $v_A = 1 - 0 - \frac{1}{4} = \frac{3}{4}$ and $v_B = 1 - 0 - \left(-\frac{1}{4}\right) = \frac{5}{4}$. Using these numerical results, it is clear that region A is a net importer of venture capital because $(\bar{v}_A - v_A) = \left(\frac{1}{2} - \frac{3}{4}\right) = -\frac{1}{4} < 0$. Using a similar line of reasoning, region B is a net exporter of venture capital because $(\bar{v}_B - v_B) = \left(\frac{3}{2} - \frac{5}{4}\right) = \frac{1}{4} > 0$. Now recall from the analysis in section 5 that the optimal tax rate on venture capital in region A (B) ought to be positive (negative). Our numerical analysis in this section shows that $\tau_A = \frac{1}{4}$ and that $\tau_B = -\frac{1}{4}$. In sum, our numerical analysis in this section confirms the predictions made by our theoretical analysis in section 5. Our final task in this paper is to expand on the numerical analysis and to show that the two optimal tax rates on venture capital must be of opposite signs in *general*.

7. Optimal Taxes Have Opposite Signs

To demonstrate the above claim, we begin by expressing the two equilibrium taxes on venture capital τ_A and τ_B in terms of the model parameters $\lambda_A, \lambda_B, \bar{v}_A$, and $\bar{v}_B$. To this end, note that the two first-order necessary conditions for an optimum are given by equation (24). Let us substitute the values of v_i and ζ from equations (16) and (19) into equation (24). After several steps of algebra, it can be shown that the two equilibrium taxes are

$$\tau_A = \frac{\lambda_A\lambda_B(1-\lambda_B)(\bar{v}_B-\bar{v}_A)}{1-\lambda_A^2-\lambda_B^2} \tag{30}$$

and

$$\tau_B = \frac{\lambda_A\lambda_B(1-\lambda_A)(\bar{v}_A-\bar{v}_B)}{1-\lambda_A^2-\lambda_B^2}. \tag{31}$$

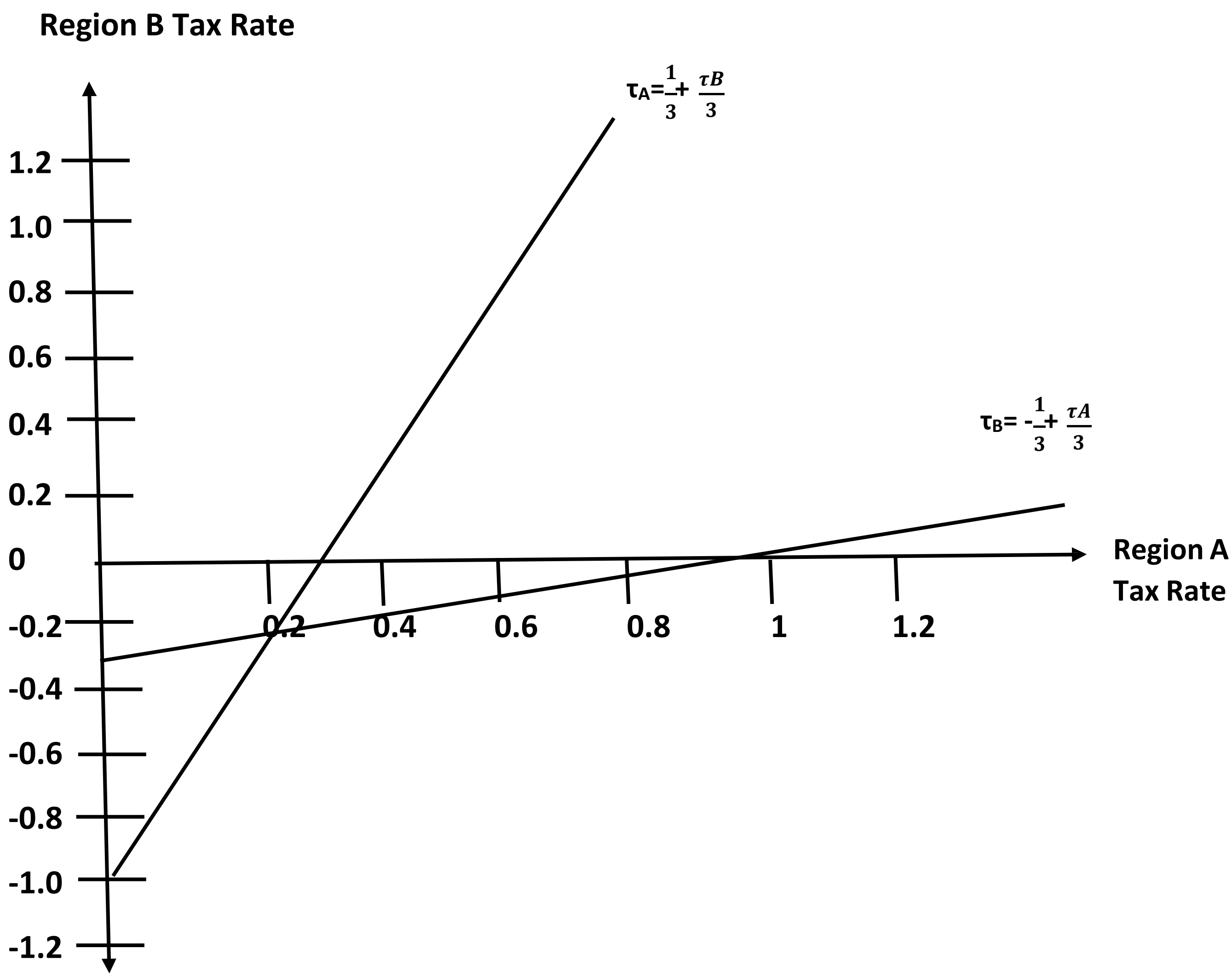
In our model, regions A and B *cannot both* be net exporters or net importers of venture capital. This means that on the RHS of the two tax rate expressions in equations (30) and (31), the terms $(\bar{v}_B - \bar{v}_A)$ and $(\bar{v}_A - \bar{v}_B)$ *cannot both* be positive or negative. Given this finding, it follows that in the general case, the two equilibrium tax rates on venture capital τ_A and τ_B must be of opposite signs. This completes our analysis of tax policy and interregional competition for mobile venture capital by members of the creative class.

8. Conclusions

In this paper, we provided the *first* study of the ways in which tax policy influenced the competition for mobile venture capital by the creative class in an aggregate economy consisting of two regions A and B. The creative class in each region produced a final good with, as pointed out in section 2, the inputs venture capital and creative capital. Venture capital was mobile between the two regions and the representative creative class member in each region had access to an initial amount of venture capital. Each region taxed venture capital at a particular rate and the resulting tax revenue was paid out as a transfer to the representative creative class member. In this setting, we performed five tasks. We began by determining the first-best tax rates in the two regions. Second, we solved for the net price of the mobile venture capital and then expressed the objective function that was to be maximized in each region as a function of this price. Third, we computed the first-order necessary conditions that delineated the optimal tax rates in the two regions and showed that the sign of the tax rate depended on the net exporting position of the region. Fourth, for particular parameter values, we calculated the two tax response functions and discussed their properties. Finally, we computed the two equilibrium taxes as a function of the model's main parameters and showed that these taxes had to be of opposite signs.

Two additional points about our analysis deserve some mention. First, our analysis shows that although tax policy can be used by a region to indirectly attract members of the creative class to this region, there are limits to the use of tax policy. This is because initial conditions matter in our model and these initial conditions determine, in part, whether a region ends up taxing or subsidizing the venture capital that is used by creative class members to produce final goods. More generally, Batabyal (2021) and Batabyal and Yoo (2021a, 2021b) have demonstrated that local public goods, amenities, and enterprise zones can be used to attract and retain creative class members in a region. Second, it is possible that the use of subsidies in a region that has a relatively large amount of venture capital to begin with will have an impact on the underlying distribution of the creative class in this region and, by extension, the aggregate economy under study. However, an analysis of this issue is beyond the scope of our paper.

The analysis in this paper can be extended in a number of different directions. In what follows, we suggest two possible extensions. First, using the methodology in Batabyal (2012), it would be useful to analyze the dynamic interaction between competing members of the creative class situated in different regions and venture capitalists in the presence of asymmetrically held information. Second, it would also be instructive to embed the aggregate economy of two regions analyzed here in a probabilistic environment and to then study the impact that uncertainty about either the entrepreneurial abilities of individual creative class members or their ability to migrate from one region to the other has on the disbursement of venture capital in the two regions under consideration. Studies that analyze these aspects of the underlying problem will provide additional insights into the behavior of creative class members, the provision of venture capital, and the economic welfare of regions.



Region B Tax Rate
$\tau_A = \frac{1}{3} + \frac{\tau B}{3}$
1.2
1.0
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
$\tau_B = -\frac{1}{3} + \frac{\tau A}{3}$
Region A Tax Rate
0.2
0.4
0.6
0.8
1
1.2

Figure 1

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