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Political competition, fiscal policy, and economic performance in techno-creative places

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ABSTRACT

This paper introduces a model of political competition under distinct institutional regimes to trace the economic performance of what we call "techno-creative places." Specifically, we analyze how political competition in high-tech places that are creative in the sense of Richard Florida affects fiscal (tax) policy and consequent economic outcomes. There are three stylized groups of actors in our analysis: laborers or workers, techno-creative class members or entrepreneurs, and the elites who make the political decisions. We study two broad institutional-economic scenarios. In the first (second) scenario, the likelihood of political power shifting permanently from the elites to entrepreneurs is an increasing (decreasing) function of the net income of a representative techno-creative entrepreneur. Our study addresses the institutional implications of both scenarios and then comments

on the implications of these two scenarios for the welfare of the elites and the techno-creative entrepreneurs.

Keywords: Techno-Creative Class, Elite, Entrepreneur, Political Competition, Tax Policy

1. Introduction

In an open spatial economy, the development of nations or regions is not only dependent on the efficient use of territorial capital (Camagni & Capello 2013), but also on the quality of the institutions and governance systems in a competitive economic environment (Olson 1982; Perez 1985; Acemoglu & Robinson 2012; Banica et al. 2024). Institutional and political mechanisms are instrumental in shaping positive economic performances in nations and regions (North, 1990; Williamson, 2000; Tirole, 2023). There is, however, no unambiguous policy-making regime that ensures continuously favorable economic outcomes. Also, there is usually no central economic planner who is always in command.

In many cases, political competition acts as the core mechanism of democratic societies, fostering a diversity of opinions, ideas, and actions, and inducing socio-economic, demographic, and technological dynamics (Strom 1992). In a vibrant political landscape, multiple parties normally vie for power through elections, offering citizens differing actionable visions and strategies of governance and policy formulation. This competition

stimulates debate, creativity, and it encourages policy makers to be responsive to the needs and preferences of the electorate.

That said, the efficacy of political competition hinges on the presence of robust and trustworthy institutional structures that ensure fairness, transparency, and accountability in the electoral process and stimulate consistent actions (Wessels & Schmitt 2008). Without such safeguards, political competition can devolve into strife, undermining the very principles it seeks to uphold.

Clearly, alternate institutional structures offer avenues for exploring different models of governance and representation (Peters 2010). From proportional representation to mixed systems, these structures shape the dynamics of political competition, and they are decisive for policy outcomes regarding the economy. For instance, proportional representation fosters a multiparty system where smaller parties can wield significant influence, thereby promoting inclusivity but potentially complicating the process of forming stable governments (Blais et al. 2005). In contrast, majoritarian systems tend to produce two-party dominance, offering clarity but potentially stifling alternative viewpoints. By experimenting with alternate institutional arrangements, societies can tailor their political systems to better reflect their values and aspirations regarding their economic performance.

Fiscal policy plays a pivotal role in shaping economic growth and development (Easterly & Rebelo 1993; Wehner & de Renzio 2013). Governments utilize taxation, spending, and borrowing to manage aggregate demand, stabilize the economy, and address social needs. Effective fiscal policy can stimulate investment, consumption, and innovation, fueling economic expansion. However, the impact of fiscal measures depends on their design, timing, and coordination with monetary policy. Ill-conceived policies or unsustainable fiscal practices can lead to inefficiencies, distortions, and macroeconomic imbalances, hindering long-term growth prospects (Stiglitz 1999). Therefore, policymakers must carefully calibrate fiscal interventions to foster an environment that is conducive for sustainable economic growth while maintaining fiscal responsibility (Leghari 2023). As mentioned above, territorial capital is instrumental in shaping economic performance in a competitive space-economy. Economic policy and fiscal policy are *not* space neutral.

Given this background about the nexuses between political competition, institutional structures, and fiscal policy, it is important to emphasize two significant points on the geography of the growth process made by Florida (2002, 2005, 2006, 2009). First, places that want to prosper economically in this era of globalization need to do all they can to attract and retain members of the so-called creative class. Second, attracting these creative professionals is critical, because they possess creative capital, which is 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). Put differently and as pointed out by Batabyal & Nijkamp (2022, 2023) and Batabyal et al. (2024), the creative capital possessing members of the creative class are a basic driver of regional economic growth and development.

The creative class was originally conceived of as a qualified group of capable, professional individuals who are, given their education and training, able to design and implement new ideas successfully. More recently, it looks like these professionals are also able to make use of their skills to develop and utilize digital technologies of all kinds. Examples are the use of artificial intelligence (AI), machine learning, digital design, and large language models. Consequently, the creativity of the members of the creative class is shaped jointly by their ability to access, master, and apply digital technologies as a key part of their professional performance. This new phenomenon is termed "techno-creativity" (Kloosterman, 2014; Rantisi, 2014; Yin, 2013). Techno-creative places derive their success from the relative over-representation and high economic performance of the techno-creative class (Rantisi & Leslie, 2010; Sgourev, 2015; Capron et al., 2021).

If one subscribes to the above mentioned and amended Floridian view of place-based economic growth and development, then it seems natural to address the question about how the connections between the trinity of political competition, fiscal policy, and high economic performance play out in places that are techno-creative in the sense

discussed here and where entrepreneurial creative class members are a dominant part of the underlying economy.

We assume in this paper that the economy of the place we are studying consists of three stylized classes of agents or stakeholders: the labor or worker class, the techno-creative entrepreneurial class,[5] and the class of political elites. We aim to answer the question about the extent to which the interdependent actions and responses of these three classes of agents determine the economic performance of places dominated by a techno-creative class.

Specifically, we address the question of how the established elites in a creative place might manipulate tax policy to reduce the likelihood of being removed from power by the techno-creative class. In this regard, we also ask: what impact will the use of tax policy by the elites have on economic outcomes? How is the likelihood of political power shifting from the elites to the techno-creative class affected by the net income of the techno-creative class? Finally, what institutional structures are consistent with the likelihood of a regime change depending on the net income of the techno-creative class?

We maintain that even though these are significant questions to analyze from a research perspective, unfortunately, to the best of our knowledge, they have received *no*

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[5] See Adler and Florida (2021) for an interesting analysis of the activities of one kind of techno-creative entrepreneurial class members.

theoretical attention in the economic geography and the regional science literature. Therefore, we now proceed to review the related issues that have been addressed in the literature and then we state our specific objectives in this paper.

2. Literature Review and Objectives

The above-mentioned research challenges have been addressed by a few authors thus far. We now offer a critical overview, with particular emphasis on lacunae in the contributions of previous researchers. Kim and Park (2004) incorporate the competition for political transfers or rent seeking behavior into a general equilibrium model. They then study the ways in which society can discourage this kind of behavior while ascertaining the optimal size of the public sector. McCann (2007) studies the politics of what he calls "city-regionalism" and "livability" by concentrating on a specific creative city, namely, Austin, Texas. Based on his study, he contends that the city-regional livability agenda is best understood as a geographically selective, strategic, and highly political project.

What impact does the lack of political competition in US states have on economic growth? Besley et al. (2010) analyze panel data and show that the lack of political competition leads to anti-growth policies, i.e., to higher taxes, lower capital spending, and a diminished likelihood of using right-to-work laws. Lu and Landry (2014) focus on China and claim that interjurisdictional competition in authoritarian regimes gives rise to a certain logic for taxation. They demonstrate that the greater the number of officials who

are accountable to the same principal, the more intense political competition is, and this results in higher taxation. Even so, if too many officials are accountable to the same principal, then this leads to lower taxation because of shirking by uncompetitive officials and the fear of political instability.

Baccini et al. (2018) investigate regional policy choices over a tax cut in the aftermath of a fiscal decentralization exercise in Russia. Their statistical analysis demonstrates that the personal business interests of regional governors explain their dissimilar policy choices. They point out that governors with personal business ties refrain from tax cuts because they lead to an increase in market competition.

Graf (2021) studies the French-German-Swiss Upper Rhine region, where three different national governance models come together. He finds that there are two main mechanisms through which education and training are embedded in the cross-border context that is relevant here. On the one hand, the distinct institutional advantages that exist in different parts of this region are effectively leveraged. On the other hand, what he calls "cross-border collective competition goods" in the form of jointly provided educational institutions have been effectively created. Using these two mechanisms, local actors within this region's cross-border industry cluster have converted their peripheral location into an effective institutional advantage.

Questions related to the nexuses between political competition and tax policy in the context of developing nations have received some attention in interdisciplinary development journals. Chibber (1995) analyzes how political parties and their electoral concerns influence policy making in general and government expenditures in particular, in India. The political economy of domestic tax reform in Bangladesh has been studied by Hassan and Prichard (2016). These authors explain why a tax system that is marked by low revenue collection and a great deal of informality continues to persist in this nation. Instead of focusing on a single developing nation, Yogo and Njib (2018) examine the relationship between political competition and tax revenues for 89 developing nations in the 1988-2010 time period. Their econometric analysis shows that political competition has a salient and positive impact on tax revenue collection.

Moving to an alternate aspect of political competition, Shi and Xi (2018) address what they call "neighborhood effects" in political competition in China. Specifically, they demonstrate that the number of accidental coal mine deaths in one prefecture is positively associated with similar deaths in neighboring prefectures. Moving on to Brazil, Chamon et al. (2019) document the ways in which political competition, at the mayoral level, gives rise to additional investment and lowers current expenditures in general and expenditures on personnel in particular. Adhikari and Chhotray (2020) point out that even though Jharkhand and Chhattisgarh both became states in India in 2000, they differ in terms of

their political organization, institutional effectiveness, and the nature of social resistance, and this trinity affects the politics of mineral extraction in both states.

Liao and Wang (2021) conduct a political economy analysis of China's monetary policy and contend that Chinese style fiscal decentralization produces distinct regional effects across China. How does political competition affect the provision of public healthcare? Kailthya and Kambhampati (2022) point out that a one standard deviation increase in the number of political parties raises the likelihood of a village having a public health facility by 8 to 15 percent. Finally, Limberg (2022) shows that whereas democratic governments tend to raise the value added tax (VAT) in dire fiscal times, autocratic governments are more immune to fiscal pressures.

Our review of the contemporary literature on whether and how political competition in techno-creative places influences tax policy and economic outcomes yields the noteworthy conclusion that this literature has paid *no* systematic theoretical attention to the connections between the trinity of political competition, tax policy, and economic outcomes in creative places.

Given this lacuna in the literature, we provide the *first* theoretical analysis of the ways in which political competition in techno-creative places impacts tax policy and economic outcomes. Our dynamic model is adapted from Acemoglu (2007). Section 3 below delineates this model. There are three stylized classes of individuals in the techno-creative

place that we study---laborers or workers, techno-creative class members or entrepreneurs, and the elites who make the political decisions. Section 4 analyzes what we call political competition of the first kind in which the likelihood of political power shifting permanently from the elites to the techno-creative entrepreneurs is an *increasing* function of the net income of a representative techno-creative entrepreneur. Section 5 focuses on what we call political competition of the second kind where the likelihood of political power shifting permanently from the elites to entrepreneurs is a *decreasing* function of the net income of a representative techno-creative entrepreneur. In sections 4 and 5, the equilibrium concept we employ in our analysis is that of Markov perfect equilibrium. In addition, in both these sections, we first discuss the institutional structures that are consistent with these "increasing" (first kind) and "decreasing" (second kind) cases and then we comment on what these cases mean for the welfare of the elites and the techno-creative entrepreneurs. Section 6 concludes and proposes three ways in which the research delineated in this paper might be extended.

3. The Theoretical Framework

Consider a stylized techno-creative place in which time is discrete and which is populated by a continuum of $1 + \alpha^e + \alpha^n$ of risk-neutral individuals[6] with discount factor

[6]

$\theta \in (0,1)$. In the preceding notation, the 1 denotes the total number of laborers or workers whose measure is normalized to unity. The only role the workers in our model play is to supply their labor inelastically. The α^e (α^n) denotes the total number of elites (entrepreneurs) in the place under study. In other words, the three classes of individuals in our creative place are laborers or workers, techno-creative class members or entrepreneurs, and the elites. Let us denote these three classes by $G^l, G^n,$ and G^e respectively.[7]

At the outset of our analysis, the elites hold political power and at any time t, the ith entrepreneur in the class G^n of all entrepreneurs in our place produces a digital good $Q_i(t)$ using a constant-returns-to-scale Cobb-Douglas production technology that can be written as

$$Q_i(t) = \beta^{-1}\{K_i(t)\}^{\beta}\{D_i(t)L_i(t)\}^{1-\beta}, \qquad (1)$$

where $K_i(t)$ denotes physical capital which depreciates (for simplification) at rate $\delta = 1$, $L_i(t)$ denotes labor, $D_i(t)$ is a labor augmenting productivity term, and the parameter $\beta \in (0,1)$. Since we are thinking of $Q_i(t)$ as a digital good, the reader may want to think of

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This assumption of risk-neutrality means that the preferences of the three classes of individuals in our model are linear. This feature is important because it means that even though we now do not have to worry about transition dynamics, we are able to delineate the political economy equilibria of interest to us in sections 4 and 5 below in a much more complete manner. See Acemoglu (2009, pp. 784-792) for additional details on this point.

[7] In what follows, we use the words "laborer" and "worker" and "techno-creative class member" and "entrepreneur" interchangeably. Second, a superscript on a variable refers to a class (worker, entrepreneur, elite) and a subscript on a variable refers to an individual within a particular class. Finally, an individual's class affiliation never changes over time in the analysis we undertake in this paper.

the productivity boost to labor denoted by the term $D_i(t)$ as the outcome of the use of a digital technology but this is not the only possible interpretation. This Cobb-Douglas production technology is a special case of the more general constant elasticity of substitution (CES) production technology. The reader should consult Acemoglu (2009, pp. 54-55) for a textbook discussion of the exact relationship between the Cobb-Douglas and the CES production technologies.

The reader will note that digital goods encompass a vast array of products and services that exist solely in digital form, thereby providing convenience and accessibility to consumers. One example is e-books, which allow readers to instantly access and enjoy literature without the need for physical copies. A second example would be streaming services like Netflix and Spotify that offer digital access to movies, TV shows, and music, thereby revolutionizing the consumption of entertainment. More generally, digital goods also extend to online courses, software subscriptions, and digital artwork, showcasing the diverse range of products available in the digital marketplace.

To simplify our subsequent analysis, we assume that the productivity boost to labor is identical for all entrepreneurs and hence we can write $D_i(t) = D^n, \forall i \in G^n$. To ensure that entrepreneurial activity in our techno-creative place is scattered and not concentrated in a single location, we assume that there exists a ceiling on how much labor any one entrepreneur can hire. This means that $L_i(0) \in (0, \hat{L}]$ for some ceiling $\hat{L} > 0$. If we did not

have such a ceiling then this would be tantamount to assuming that there is *no* maximum scale of operation for an individual entrepreneur. If this were the case then, we emphasize, it would be possible for all production of the digital good described in equation (1) to occur at a single location in our techno-creative place.

Since the size of the total work force equals unity, for the labor market to clear at any time t, we must have

$$\int_{G^n}(t)di \leq 1. \tag{2}$$

Since the primary focus of our paper is on the impact that political competition has on tax policy and economic outcomes in our techno-creative place, it will be convenient to assume, without any loss of generality, that all entrepreneurs hire the same number of workers. In symbols, we obtain

$$L_i(t) = L^* = \min\left(\hat{L}, \frac{1}{\alpha^n}\right), \forall i \in G^n, \forall t. \tag{3}$$

Finally, we assume that there is a shortage of labor demand or, equivalently, that there is excess supply of labor. This means that the equilibrium wage paid to labor in our model or $w = 0$.[8]

A key goal of ours in this paper is to study the outcome of political competition between the elites and the entrepreneurs in our techno-creative place. To this end, we note

[8] The case in which there is no excess supply of labor and hence the equilibrium wage is positive substantially complicates the analysis and hence we leave the study of this case for future research.

that in principle, there are four possible policy instruments available to the elites in our techno-creative place. Most importantly, there is a linear tax rate on the output of the digital good that we denote by $\tau_i(t) \in [0,1]$. Note that we are working with a tax *rate* and not with tax revenues. In addition, there are non-negative lump-sum transfers for the three classes that we denote by $T^l(t) \geq 0, T^n(t) \geq 0$, and $T^e(t) \geq 0$. Observe that because the lump-sum transfers are non-negative, they cannot be used for non-distortionary, lump-sum taxation. The important practical implication of this point is that the taxing class in our techno-creative place can only use the linear tax rate to raise revenue.

Before proceeding further, it is worth highlighting the three kinds of inefficiencies that might arise in our stylized economy with political competition between the elites and the techno-creative class members. Following Acemoglu (2007, pp. 342-343),[9] the first inefficiency concerns *revenue extraction*. The idea here is that the class in power---initially the elites---will set high and distortionary taxes on the techno-creative class to extract resources from them. The second inefficiency is related to *factor price manipulation*. The idea here is that the class in power (the elites) will have an incentive to tax the entrepreneurs to reduce the prices of the factors they use to produce the digital good. This incentive arises because when the elites and the entrepreneurs are both interested in

[9] See Acemoglu (2009, chapter 22) for a textbook discussion of these sources of inefficiency and related matters.

producing digital goods, they will necessarily compete among themselves for the available factors of production. So, by taxing the entrepreneurs, the elites make them worse off and maintain their hold on political power. The third and final inefficiency pertains to *political consolidation*. The idea here is that because the political power of entrepreneurs depends on their economic resources, higher entrepreneurial profits diminish both the political power of the elites and their future rents. Therefore, the elites will have a rationale to tax the entrepreneurs at a high rate to keep their profits low and thereby consolidate their own political power.

We now specify the timing of events at any date t. When our analysis begins, there is a predetermined tax $\tau(t)$ on the output of the digital good. The physical capital stocks of the entrepreneurs are given by $\{K_i(t)\}_{i\in G^n}$. Second, these entrepreneurs decide how much labor to hire $\{L_i(t)\}_{i\in G^n}$. Third, the digital good is then produced and a fraction $\tau(t)$ of the output is collected as tax revenue. Fourth, the politically powerful group (the elites) then determines the transfers $T^l \geq 0, T^n \geq 0,$ and $T^e \geq 0$. These transfers satisfy or, put differently, the budget constraint is given by

$$T^l(t) + \alpha^n T^n(t) + \alpha^e T^e(t) \leq \tau(t)\int_{G^n} \beta^{-1}\{K_i(t)\}^{\beta}\{A_i(t)L_i(t)\}^{1-\beta} di, \qquad (4)$$

where the left-hand-side (LHS) indicates the elite government's expenditure, and the right-hand-side (RHS) denotes the tax revenue which is the product of the predetermined tax rate and the output of the digital good. Fifth, the politically powerful group announces

the tax rate that will prevail in date $t+1$ or $\tau(t+1)$. Sixth, after observing this tax rate, the entrepreneurs choose their capital stocks $\{K_i(t+1)\}_{i\in G^n}$.

Let $\zeta^t = \{\tau(s), T^l(s), T^n(s), T^e(s)\}_{s=t}^{\infty}$ denote a feasible sequence of policies beginning at time t. Then, using proposition 1 in Acemoglu (2007, p. 349), we conclude that ζ^t represents a competitive equilibrium from time t onwards and that the distribution of capital stocks among the entrepreneurs at time t is given by $\{K_i(t)\}_{i\in G^n}$. With this background in place, we are now in a position to begin our analysis of political competition of the first kind between the elites and the entrepreneurs in our techno-creative place.

4. Political Competition of the First Kind

We begin with two straightforward results. First, because the function describing the production of the digital good by the techno-creative class is Cobb-Douglas and given by equation (1), the per capita or intensive production function $g(\cdot)$---see Acemoglu (2009, p. 786) for a textbook account---can be written as

$$g(k_i) = \beta^{-1}(D^n)^{1-\beta}k_i^{\beta}, \tag{5}$$

where $k_i = K_i/L_i$ is the physical capital-labor ratio. Second, since the elites hold political power in the techno-creative place when our analysis begins, we need an expression for the tax $\hat{\tau}$, levied on the output of the digital good produced by the entrepreneurs, that maximizes the utility of the elites. Adapting equation 22.16 in Acemoglu (2009, p. 791) to our model, the tax expression we seek is given by

$$\hat{\tau} = 1 - \beta. \quad (6)$$

Even though this is not a key consideration of ours in the present paper, from proposition 22.4 in Acemoglu (2009, pp. 794-795), we infer that when revenue extraction is the only concern of the political power holding elites, the utility maximizing tax they levy on the entrepreneurs or τ^{re} is equal to the tax given in equation (6). Therefore, in symbols, we have $\hat{\tau} = \tau^{re} = 1 - \beta$.

To keep the subsequent analysis interesting, we suppose that the elites and the techno-creative class can both become entrepreneurs and produce the digital good. We have already noted that the labor augmenting productivity boost is identical for all entrepreneurs and given by D^n. Similarly, let us denote the identical productivity boost to labor for all members of the elites by D^e. These two productivity boosting terms D^n and D^e may or may not be equal to each other.

Because the elites and techno-creative class members can both be entrepreneurs, we now have to consider two taxes levied by the elites. The first tax $\tau^e(t)$ is the tax the elites levy on their own output and the second tax $\tau^n(t)$ is the tax the elites levy on the output of the techno-creative class members. Taking these two taxes into account, the government budget constraint faced by the elites is now an adjusted version of equation (4). Making two specific modifications, we get

$$T^l(t) + \alpha^n T^n(t) + \alpha^e T^e(t) \leq \rho \int_{G^n \cup G^e} [\tau^i(t)\{\beta^{-1}\{K_i(t)\}^{\beta}\{D_i(t)L_i(t)\}^{1-\beta}\}di + R^n. \quad (7)$$

The LHS of the above inequality denotes total government expenditures on transfers.[10] The RHS is the product of the tax rate and the total output of the digital good plus the rent from natural resources or R^n. The inclusion of the rents from natural resources is the first modification to equation (4). The second modification to equation (4) is the introduction of the parameter $\rho \in (0,1)$ on the RHS of (7). This parameter captures the ability of the government of the elites to redistribute tax revenues. So, when ρ is high (low) this means that the government can raise and redistribute a significant (relatively insignificant) amount of tax revenues.

We are now able to formally explain what we mean by political competition of the first kind. There are two features to keep in mind. First, we have political competition between the elites and the entrepreneurs in which there is a permanent but *probabilistic* switch of political power from the elites to the entrepreneurs. To this end, at time t, let $\gamma(t)$ denote the probability that political power switches from the elites to the techno-creative class. In full detail, we have

$$\gamma(t) = \gamma\{\alpha^n C^n(t)\} \in [0,1]. \tag{8}$$

Equation (8) tells us that the *endogenous* probability of political power switching permanently at time t from the elites to the entrepreneurs depends on the net income, or

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[10] In the remainder of this paper, we shall not concern ourselves with these transfers because, following the methodology delineated in Acemoglu (2009, pp. 793-795), they can be shown to be equal to zero in several circumstances.

equivalently, the consumption of a representative entrepreneur. Second, we have $\gamma'(t) > 0$. This means that when the entrepreneurs in our techno-creative place are richer, they are *more* likely to gain political power. In symbols, $C^n(t) \uparrow \Rightarrow \gamma(\cdot) \uparrow$.

Recall that we are assuming that there is a shortage in the demand for labor. This means that we can dispense with the factor price manipulation effect discussed in section 3. In other words, the only two sources of inefficiency we shall be studying relate to the *revenue extraction* and the *political replacement* effects, the latter of which is a version---specifically, the opposite---of what we have previously called the political consolidation effect.

Let the utility of the elites and the entrepreneurs when they are in control of politics be given by $U^e(E)$ and $U^e(N)$ respectively. Then, at date $t-1$, the elites choose the tax rate $\tau^n(t)$ to maximize their utility. Formally, the elites solve

$$U^e(E) = max_{\tau^n}\{\frac{\theta^{\beta/(1-\beta)}D^e\hat{L}}{\beta} + [\frac{\rho\theta^{\beta/(1-\beta)}\tau^n(1-\tau^n)^{\beta/(1-\beta)}D^n\alpha^n(\hat{L}/\beta)+R^n}{\alpha^e}]$$

$$+\theta[(1-\gamma\{\tau^n\})U^e(E) + \gamma\{\tau^n\}U^e(N)]\}. \quad (9)$$

Note that as shown in equation (9), the probability of a permanent switch in political power from the elites to the entrepreneurs is ultimately a function of the tax levied on the output of the digital good produced by the entrepreneurs. That is why we have suppressed the consumption variable $C^n(t)$ and have written $\gamma\{\tau^n\}$. Even so, it should be clear to the reader that the consumption or net income of the entrepreneurs $C^n(t)$ is *decreasing* in the

tax rate τ^n and therefore the likelihood function $\gamma\{\tau^n\}$ is also *decreasing* in this same tax rate τ^n.

The first-order necessary condition for an interior solution to the optimal tax rate choice problem is

$$\frac{\rho\{\theta(1-\tau^n(t))\}^{\beta/(1-\beta)}D^n\alpha^n\hat{L}}{\beta\alpha^e}\left\{1-\frac{\beta}{1-\beta}\frac{\tau^n(t)}{1-\tau^n(t)}\right\}-\theta\frac{d\gamma\{\tau^n\}}{d\tau^n}\{U^e(E)-U^e(N)\}=0. \qquad (10)$$

The first (second) term on the LHS of equation (10) captures the revenue extraction (political replacement) effect. To determine the magnitude of the optimal tax on the entrepreneurs with potential *political replacement* or $\tau^n=\tau^{pr}$, we first need to know the sign of $\{U^e(E)-U^e(N)\}$. From the analysis in Batabyal and Beladi (2024), it follows that $\{U^e(E)-U^e(N)\}>0$. This means that the second term on the LHS of equation (10) is positive. Using this fact and some algebra, we infer that the optimal tax on the entrepreneurs or

$$\tau^n=\tau^{pr}>\tau^{re}=\hat{\tau}=1-\beta. \qquad (11)$$

The result in equation (11) tells us that the elites levy *too high* a tax on the entrepreneurs because their primary concern now is *not* to extract revenue from them but to maintain their hold on political power. Put differently, this excessively high tax helps the elites because it reduces the net income and hence the political power of the techno-creative class and thereby *increases* the likelihood that they (the elites) will continue to hold political power and set tax policy.

Let us now answer some comparative statics questions. First, what is the impact of an increase in the rents from natural resources R^n on the tax with potential political replacement τ^{pr}? To determine the impact, note first that as R^n increases, so does the gap between $U^e(E)$ and $U^e(N)$. Now, consistent with the logic employed in the preceding two paragraphs, this increase in $\{U^e(E) - U^e(N)\}$ means that the equilibrium tax τ^{pr} on the techno-creative class also *increases*. This happens because when the rents from natural resources go up, the elites receive these rents and therefore the value of being in control of political power rises. Therefore, the elites are now more willing to give up tax revenue by overtaxing the techno-creative class and thereby *increasing* the probability that they will retain political power. The reader will note that implicit in this discussion is the idea that there is an "inverted U" or "Laffer curve" type relationship[11] between the tax rate and the resulting tax revenues. Therefore, when the elites tax the techno-creative class at a rate that is beyond the peak of the inverted U or Laffer curve, tax revenues decline.

Second, what is the effect of an increase in the ability of the government to redistribute tax revenues or ρ on the equilibrium tax with political replacement τ^{pr}? To answer this question, observe that an increase in ρ, like an increase in R^n, also increases the gap between $U^e(E)$ and $U^e(N)$. This increase in the gap occurs because a rise in ρ

[11] See Trabandt and Uhlig (2011) for additional details on the Laffer curve.

permits the group holding political power to raise more tax revenue. Therefore, an increase in the ability of the government of the elites to redistribute tax revenues *increases* the equilibrium tax τ^{pr}.

Finally, let us consider the impacts that changes in the likelihood function $\gamma(\cdot)$ have on the equilibrium tax with political replacement or τ^{pr}. Observe that when the likelihood of political replacement is low $\{\gamma(\cdot) \approx 0\}$ and when this likelihood is high $\{\gamma(\cdot) \approx 1\}$, the marginal likelihood of replacement or $\gamma'(\cdot)$ is *low*. Therefore, in both these cases, there is a minimal increase in τ^{pr} over the tax that maximizes revenue. On the other hand, for in-between values of the probability function where $\gamma(\cdot)$ depends on the net income of the techno-creative class, the marginal likelihood or $\gamma'(\cdot)$ will be high. In this case, the political replacement effect will kick in and result in a *highly distortionary* tax by the elites. Another way of saying this is to point out that relative to the two instances in which the elites do not expect to get replaced $\{\gamma(\cdot) \approx 0\}$ and when they almost certainly expect to get replaced $\{\gamma(\cdot) \approx 1\}$, we expect to see *more distortionary* policies when the elites have a hold on political power that is in-between the just discussed two extreme values. This completes our discussion of political competition of the first kind. We now proceed to delineate the properties of what we call political competition of the second kind.

5. Political Competition of the Second Kind

In this section, we reverse a key assumption made in section 4 and now suppose that $\gamma'(t) < 0$. This means that unlike the case studied in section 4, when the entrepreneurs in our creative region are richer, they are *less* likely to gain political power. In symbols, $C^n(t) \uparrow \Rightarrow \gamma(\cdot) \downarrow$. This is what we mean by political competition of the second kind.[12]

Even though we are now focusing on a different kind of political competition, a large part of the theoretical analysis undertaken in section 4 continues to hold. As such, two points are worth emphasizing. First, the optimal (and interior) tax rate for the elites is still given by equation (10). Second, the elites can always choose the same tax policy as the one chosen by the techno-creative class. This tells us that as in section 4, once again we have $\{U^e(E) - U^e(N)\} > 0$. Looking at the issue a little differently, because the maximization problem faced by the elites leads to an equilibrium tax policy that is *not* the same as the tax policy that the techno-creative class members would have chosen, it is clear that $U^e(E) \neq U^e(N)$.

Now, recall from the analysis in section 4 that the optimal tax on the entrepreneurs with political replacement or $\tau^n = \tau^{pr} > \tau^{re} = \hat{\tau} = 1 - \beta$. So, we can ask: what is the

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[12] It is possible to connect this kind of modeling with a real-world scenario in, for instance, Silicon Valley where tech entrepreneurs make political contributions to probabilistically remove power wielding elites who they dislike.

magnitude of the optimal tax that is levied by the elites on the techno-creative class members in political competition of the second kind? To answer this question, let us first confirm that $\tau^n < 1$. Suppose this is not the case and we have $\tau^n = 1$. Then, modifying equation 22.20 in Acemoglu (2009, p. 794) to our problem, we infer that the physical capital-labor ratio at time $t+1$ for our entrepreneurs or $k_i(t+1)$ is equal to the *equilibrium* physical capital-labor ratio given by $\hat{k}_i\{\tau(t+1)\}$ which, as shown, depends on the tax on the techno-creative class at time $t+1$. Using the fact that the output of the digital good is produced by the entrepreneurs in accordance with a Cobb-Douglas production function (see equation (1)), we can express the equilibrium physical capital-labor ratio as

$$k_i(t+1) = \hat{k}_i\{\tau(t+1)\} \equiv [\theta\{1-\tau(t+1)\}]^{1/(1-\beta)} D_i = 0. \qquad (12)$$

This equation clearly *cannot* be optimal because if the equilibrium physical capital-labor ratio is equal to zero then this means that no revenue is being generated from the production of the digital good by the entrepreneurs. Therefore, we conclude that $\tau^n = 1$ is impossible and that $\tau^n < 1$.

Given that $\tau^n(t) < 1$, some thought tells us that the first term on the LHS of the optimality condition given in equation (10) or $\left[\rho\{\theta(1-\tau^n(t)\}^{\beta/(1-\beta)} D^n \alpha^n \hat{L}\right]/\beta\alpha^e > 0$. This last inequality tells us that the motive of the elites for revenue extraction continues to exist in political competition of the second kind and that this motive is *positive*. So, let

us use this finding to evaluate the marginal return to the elites from a tax increase that is given by equation (10) evaluated at the solely revenue maximizing tax or when $\tau^n = 1 - \beta$. Undertaking this exercise, we obtain

$$\frac{\rho(\theta\beta)^{\beta/(1-\beta)}D^n\alpha^n\hat{L}}{\beta\alpha^e}\left(1-\frac{\beta}{1-\beta}\frac{1-\beta}{\beta}\right)-\theta\frac{d\gamma(\tau^n)}{d\tau^n}|_{\tau^n=1-\beta}\{V^e(E)-V^e(N)\}=$$

$$-\theta\frac{d\gamma(\tau^n)}{d\tau^n}|_{\tau^n=1-\beta}\{V^e(E)-V^e(N)\}<0. \quad (13)$$

The inequality in (13) follows in part because the consumption C^n of the techno-creative class is decreasing in the tax τ^n and, using the chain rule of differentiation, we obtain

$$\frac{d\gamma(\tau^n)}{d\tau^n}|_{\tau^n=1-\beta}=\gamma'\{\alpha^nC^n(\tau^n)\}\alpha^n\frac{dC^n(\tau^n)}{d\tau^n}>0. \quad (14)$$

The implication of (13) is that the elites in our techno-creative place can increase their utility by levying a *lower* tax on the techno-creative class and this is why we now have

$$\tau^n=\tau^{pr}<1-\beta. \quad (15)$$

To understand why the result in equation (15) makes sense, let us reason intuitively. In political competition of the second kind, we have $\gamma'(t)<0$ which means that $C^n(t)\uparrow \Rightarrow \gamma(\cdot)\downarrow$. Now, recall from the discussion in section 4 that the probability of the elites being replaced permanently by the techno-creative class or $\gamma(\cdot)$ is *decreasing* in the tax rate τ^n. Therefore, our assumption in this section that $\gamma'(\cdot)<0$ is intended to capture the idea that the techno-creative class is more likely to revolt against the elites when they are

taxed *more* severely and hence their opportunity cost of living under rule by the elites is *higher*. We contend that this scenario is worth studying.

Let us now discuss an institutional structure that might give rise to the $\gamma'(\cdot) < 0$ case as opposed to the $\gamma'(\cdot) > 0$ case that we studied in section 4. This institutional structure can be thought of as one in which resource accumulation is less important in causing the techno-creative class to revolt against the elites than widespread support among the techno-creative class. In other words, relative to the $\gamma'(\cdot) > 0$ case, the $\gamma'(\cdot) < 0$ case captures a setting in which the techno-creative class members revolt because they do *not* like to be economically dominated by the elites.

Looked at another way, observe that in order to describe the decision to revolt against the elites faced by individual techno-creative class members, we need to compare the utility of each member from living under rule by the elites with the utility from revolting against the elites and thereby causing a change in the politically ruling regime. We know that the utility of living under rule by the elites is decreasing in the tax rate. Therefore, a higher tax rate will lead to more techno-creative class members revolting against the elites. If we think of the likelihood of the elites staying in power as being a decreasing function of the *number* of techno-creative class members or α^n wanting to revolt---see equation (8)---then this scenario is captured by our assumption that $\gamma'(\cdot) < 0$.

Finally, let us compare economic outcomes in political competition of the first versus the second kind. The two key equations to focus on are (11) and (15). Combining these two equations, we can write

$$\tau^{pr}_{\gamma'(\cdot)>0} > \tau^{re} = 1 - \beta > \tau^{pr}_{\gamma'(\cdot)<0}. \tag{16}$$

Let our benchmark be the case where, of the three kinds of inefficiencies mentioned in section 3, the only inefficiency to contend with is the revenue extraction effect. In this case, the optimal tax levied by the elites on the output of the digital good produced by the techno-creative class is $\tau^{re} = 1 - \beta$. Compared to this benchmark, political competition of the first kind $\{\gamma'(\cdot) > 0\}$ results in an even *higher* and *more* distortionary tax. On the other hand, compared to the same benchmark, political competition of the second kind $\{\gamma'(\cdot) < 0\}$ leads to a *lower* and hence *less* distortionary tax.

In both kinds of political competition, a key aim of the elites is to retain their hold on power and hence the ability to set tax policy. In political competition of the first kind, as the techno-creative class gets wealthier $\{C^n(t)\uparrow\}$ the probability that the elites will lose political power rises $\{\gamma(\cdot)\uparrow\}$. This explains why the elites levy a very high tax on the techno-creative class to reduce their wealth and thereby increase the likelihood of staying in power. In contrast, in political competition of the second kind, as the tax levied on the output produced by the techno-creative class increases, the likelihood of a revolt $(\tau^n\uparrow)$ and hence the replacement of the elites by the techno-creative class rises $\{\gamma(\cdot)\uparrow\}$. This

explains why the elites levy a relatively low tax on the techno-creative class. By doing this, the elites reduce the likelihood of a revolt by them, and, at the same time, they increase the likelihood of their staying in power. This completes our discussion of political competition, tax policy, and economic performance in techno-creative places.

5. Conclusions

In this paper, we theoretically examined the ways in which political competition in a techno-creative place impacted tax policy, institutional structures, and economic performance. There were three classes of individuals in the techno-creative place that we analyzed---laborers or workers, techno-creative class members or entrepreneurs, and the elites who made the political decisions. In this setting, we first studied the case in which the likelihood of political power shifting permanently from the elites to the entrepreneurs was an increasing function of the net income of a representative entrepreneur. Next, we examined the case where the likelihood of political power shifting permanently from the elites to the entrepreneurs was a decreasing function of the net income of a representative entrepreneur. We discussed the institutional structures that were consistent with the two kinds of political competition studied and then we explained what these cases meant for the welfare of the elites and the techno-creative class.

The analysis in this paper can be extended in several ways. Here are three examples. First, consistent with our observation in footnote 4, it would be interesting to analyze the

interaction between the elites and the techno-creative class when there is no excess supply of labor and hence the equilibrium wage paid to labor is positive. Second, it would be instructive to analyze the interaction between the elites and the entrepreneurs in our techno-creative place when, at the end of time period t, the elites are not necessarily able to commit to the tax rate on the output produced by the entrepreneurs that applies in time period $t+1$. Finally, it would be noteworthy to compare and contrast the results obtained in this paper with the corresponding results when the underlying equilibrium concept is not Markov perfect equilibrium but an alternate concept such as subgame perfect equilibrium. Studies that analyze these aspects of the underlying problem in techno-creative places will provide additional insights into how economic performance and welfare depend on the nature of the probabilistic competition between the political power wielding elites and the political power seeking entrepreneurs.

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