

CAMPAIGN CONTRIBUTIONS AND LOCAL
PUBLIC GOODS IN A FEDERATION

CONTRIBUCIONES DE CAMPAÑA Y BIENES
PÚBLICOS LOCALES EN UNA FEDERACIÓN

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Resumen: Se desarrolla un modelo de economía política para estudiar la provisión descentralizada de bienes públicos locales (BPLs). Se compara una economía con y sin contribuciones de campaña de los votantes: en la primera economía, los gobiernos locales proveen BPLs que no son Pareto eficientes y no maximizan las ganancias atribuibles a diferenciar los BPLs de acuerdo con la heterogeneidad inter-regional de preferencias de los votantes. Para una economía con contribuciones de campaña, los BPLs, con y sin externalidades, son Pareto eficientes y los gobiernos locales maximizan las ganancias atribuibles a diferenciar la provisión de BPLs de acuerdo con la heterogeneidad inter-regional de preferencias.

Abstract: I develop a voting model of decentralized provision of local public goods (LPGs) with campaign contributions. I compare an economy with and without campaign contributions: in the former economy, local governments do not provide Pareto efficient LPGs and do not maximize the welfare gains associated with matching LPGs with the inter-regional heterogeneity of preferences of voters. For the economy with campaign contributions, LPGs with and without spillovers are Pareto efficient, and the system of local governments maximizes the gains associated with matching LPGs with the inter-regional heterogeneity of preferences.

Clasificación JEL/JEL Classification: H41; H21; H23; H77; D72

Palabras clave/keywords: bienes públicos locales; eficiencia; externalidades; federalismo; elecciones y contribuciones de campaña; local public goods; efficiency; externalities; federalism; elections and campaign contributions.

Fecha de recepción: 25 II 2017

Fecha de aceptación: 06 IX 2017

* I would like to thank the helpful comments of two anonymous reviewers, rponce@uacj.mx.

Estudios Económicos, vol. 33, núm. 2, julio-diciembre 2018, páginas 283-311

1. Introduction

The move towards greater decentralization of fiscal policy is one of the most important political trends in recent decades (see Garman Haggarg, and Willis, 2001; and Hankla, 2008). Among the expected benefits of fiscal decentralization is that local governments can accommodate the heterogeneous preferences of households across jurisdictions. The normative theory of federalism identifies conditions in which a shift from a Pareto efficient but uniform provision of local public goods (LPGs) by a central government towards a Pareto efficient and differentiated provision of LPGs by a system of sub-national governments entails a nationwide gain in the welfare of residents (see Oates 1972, 1999).

However, critics of fiscal decentralization usually stress that, under interregional spillovers, the decentralized provision of LPGs will not be Pareto efficient. Some of the solutions provided in the literature for solving the externality problem in the provision of local public goods include the following alternatives: Oates (1972, 1999) identifies conditions in which LPGs with inter-regional spillovers should be fiscally centralized (instead of decentralized).¹ Another solution is to preserve a fiscally decentralized provision of LPGs but a benevolent central government could implement Pigouvian intergovernmental transfers to internalize spillovers from LPGs, see Oates (1999).

Myers (1990) develops a model of decentralized provision with benevolent governments, free mobility, and inter-regional transfers that sustain Pareto efficient local public goods without the intervention of the central government.² Other applications of this type of model include Silva and Caplan (1997), Hoel and Shapiro (2003), and Mansoorian and Myers, (1993). However, Wellisch (1994) finds that central government intervention might still be needed if households are imperfectly mobile because the decentralized provision would be inefficient.

Inefficiencies in the decentralized provision of LPGs can also arise as a result of coordination failures among sub-national governments. A straightforward application of the Folk Theorem suggests that, in an inter-temporal setting, a decentralized Pareto efficient provision

¹ However, given the decentralization trend in many countries, a move towards fiscal centralization might not be politically feasible.

² Hindriks and Myles (2003) extend Myers' analysis to the case of redistribution; they characterize a Nash-equilibrium with efficient inter-regional transfers that are equivalent to the outcome achieved by a centralized redistributive policy.

could be achieved if local governments are patient enough, and the cost of deviating from Pareto improving strategies is high enough.³

However, voting and legislative models cast doubts on whether the solutions to the problem of spillovers that depend on benevolent governments are compatible with weakly dominant strategies of candidates in elections, and of public officials in the legislature. For instance, the analyses of Lockwood (2002) and Besley and Coate (2003) suggest that the sub-national provision of LPGs with and without inter-regional spillovers is not necessarily Pareto efficient if policy choices are determined by a legislature.^{4,5}

Recent analysis on political economy has focused on interest groups and fiscal federalism: Lockwood (2008) studies whether the decentralization theorem holds (see Oates, 1972) when collective choices are made by majority rule and lobbying. Bordignon, Colombo and Galmarini (2008) characterize conditions in which lobbying induces a decentralized provision with spillovers that is Pareto efficient when there is some optimal weight attached to social welfare (as opposed to money) but inefficient if politicians become too greedy. Guriev, Yakovlev and Zhuravskaya (2010) find that different measures of performance of firms improve for an economy with multi-state lobbies in comparison with local lobbies.

In this paper, I develop a political economy model with interest groups in a system of sub-national governments in which the provision of local public goods with and without spillovers is Pareto efficient. In my analysis ideological parties face a tradeoff between campaign contributions and the design of local public spending. In my model, families can contribute to parties participating in the local elections of different jurisdictions in exchange for a more favorable policy.⁶

³ For an application of tax coordination strategies in a tax competition model see Cardarelli, Taugourdeau and Vidal (2002).

⁴ In the analysis of Besley and Coate (2003), local public goods are Pareto efficient because there is no heterogeneity of preferences or endowments in the district. In this case, the median voter is equivalent to the average voter and local public goods are Pareto efficient. But under heterogeneity of preferences or income within the district, the policies of the median voter are not, in general, Pareto efficient.

⁵ For a recent literature review on political economy models of the decentralized provision of public goods, see Lockwood (2015).

⁶ For instance, voters can donate to a special interest political action committee (a super PAC), which in turn can spend money to influence the political platforms of candidates in local elections of different districts.

Parties realize that they can attract campaign contributions from voters of different regions and, therefore, parties have incentives to recognize the full distribution of benefits from LPGs with regional spillovers. As a result, the decentralized provision of LPGs is Pareto efficient.

My paper is different from the previous literature, since the efficiency in the provision of LPGs does not require benevolent governments, perfect mobility of families, or the intervention of the central government. My analysis is also different from the literature on interest groups mentioned above, since I focus on the process of preference aggregation associated with the provision of LPGs and campaign contributions.⁷

My paper is also related to the literature on how different structures of governments can (or cannot) accommodate an inter-regional heterogeneous distribution of preferences into policy. In his seminal work, Oates (1972) considers that the decentralized provision of local public goods maximizes the society's gains associated with matching the heterogeneous preferences of individuals with the government's policies. However, recent models of political economy suggest that this might not necessarily be the case. For instance, the political process might produce the ideal policy of a minority coalition within the electorate (see Wittman, 1973, 1983; Myerson, 1993; and Roemer, 2001) instead of maximizing the wellbeing of the society, resulting in a suboptimal degree of policy differentiation.

In this paper, I also study whether local governments maximize the gains attributed by Oates (1972) to policy differentiation once I relax the assumption that governments are benevolent social planners. In particular, I compare the relative merits of decentralization in matching the heterogeneous preferences of voters with economic policies both with and without campaign contributions. To the best of my knowledge, I am the first to provide such analysis. In this paper, I show that an increase in the heterogeneity of preferences over local spending does not necessarily lead to a more differentiated provision of LPGs. In particular, if local public goods do not show spillovers or if the spillovers are moderate, then the more heterogeneous the

⁷ Bordignon, Colombo, and Galmarini (2008) and Guriev Yakovlev and Zhuravskaya (2010) are also interested in the efficiency of goods with externalities. However, in these papers policy makers seek to maximize a multi-objective function that includes, among other objectives, a social welfare function, while in this paper I am interested in the representation of preferences in a democracy and the political calculus in which votes and money are traded off.

preferences of voters for public goods across districts, the more heterogeneous is the inter-regional provision of public goods. In this case, a system of local governments can successfully accommodate different preferences of households across jurisdictions.

However, if spillovers of LPGs for districts with a high demand for public spending are sufficiently large or if heterogeneity of preferences is significant, then the more heterogeneous the inter-regional preferences of voters, the higher the political incentives for the low-demand district to free ride. In this case, even if local preferences are heterogeneous, only the local government with a sufficiently high demand for public spending provides a public good while the low demand district free rides. This result means that the inter-regional distribution of voters' preferences could change without a corresponding change in the provision from local governments. This outcome also means that local governments do not necessarily maximize the society's gains attached to matching the preferences of voters with the provision of local public goods.⁸

Finally, in this paper I develop a comparative analysis of the incentives to differentiate the supply of LPGs according to inter-regional differences in preferences for economies with and without campaign contributions. I show that for an economy in which campaign contributions are not allowed, the decentralized provision of LPGs does not maximize the society's welfare gains attached to policy differentiation because parties select a policy to maximize the welfare of a minority coalition in the electorate (parties do not select policy to maximize the welfare of the society).

However, in an economy with campaign contributions, local governments select the ideal policy of a weighted average voter (that is to say, parties select middle-of-the-road policies) and therefore, a system of local governments provides public goods that maximize the society's welfare gains from matching local spending with the heterogeneous preferences of voters.

This paper is structured as follows: the baseline voting model with ideological parties and without campaign contributions is de-

⁸ Kochi and Ponce-Rodriguez (2011) study whether local public goods are supplied uniformly or are differentiated according to the inter-regional heterogeneity of preferences. They, however, analyze a centralized provision of LPGs throughout a Downsian model of electoral competition with probabilistic voting. The institutional setting of our analysis is different, since I consider a decentralized provision of LPG's, voting is not probabilistic, and I introduce the role of campaign contributions in determining the policy positions of parties.

veloped in section 2. I develop a model with ideological parties and campaign contributions in section 3. Sections 2 and 3 show the relative efficiency outcomes in the provision of LPG's for economies with and without campaign contributions. The comparative analysis of LPGs in the political equilibriums with and without campaign contributions is also provided in section 3. Section 4 concludes.

2. The model

Consider an economy with districts i and $-i$ and $n^i = 1, 2, \dots, N^i$ individuals in each district such that $N^i \neq N^{-i}$. Preferences of a household j living in district i are $\mu_j^i(x_j^i, g^i, g^{-i}, \alpha_j^i) = x_j^i + \alpha_j^i \ln(g^i + k^{-i}g^{-i})$ where x_j^i is a private good, the overall consumption of local public goods by a resident of district i is $G^i = g^i + k^{-i}g^{-i}$ where g^i is a local public good provided by district i and g^{-i} is provided by district $-i$.⁹ The parameter $k^{-i} \in [0, 1)$ measures the extent of inter-regional spillovers of g^{-i} over residents of district i . For local public goods without spillovers $k^{-i} = 0$.

The parameter $\alpha_j^i \in \mathbb{R}_+ : \alpha_j^i \in [\alpha_{min}^i, \alpha_{max}^i] \forall i, \forall j$ measures the intensity of the individual's preferences for public goods. I assume that the individuals' preferences over public goods are heterogeneous across districts. The budget constraint of household j living in district i is $x_j^i = e_j^i - t^i$, where e_j^i is the household's endowment and t^i is a head tax on residents of district i .

2.1. Political equilibrium without campaign contributions

In this section I develop a partisan voting model to rationalize the provision of local public goods in a system of sub-national governments. I assume that parties have preferences over policies because this model can explain recent empirical evidence that suggests that the tax and spending policies of parties at the sub-national level diverge. In particular, recent evidence suggests that administrations identified ideologically as "left-wing" increase subnational taxes

⁹ This utility function is chosen for simplicity of analysis. Moreover, this type of utility function is common in the literature: see Besley and Coate (2003), and Lockwood (2015), among many others.

and choose more progressive fiscal policies relative to administrations identified as “right-wing”.¹⁰

In my economy, conflicts among residents in the same district and among voters of different districts over the size of local public goods arise because of the heterogeneity of preferences and endowments of voters in the economy. The collective choice that solves the problem of differences among voters over fiscal policy is the delegation of the design of public spending to a policy maker elected in a local election. In a two party system, candidates in districts i and $-i$ compete in elections in each district by proposing a fiscal platform constituted by a head tax on residents that finances the provision of a local public good in the district. Parties have preferences over local fiscal policy since parties are controlled by a coalition of voters with preferences over fiscal outcomes (see Wittman 1973, 1983; Roemer 2001).

The timing of the political process is as follows: in the first stage, candidates announce policies. The types (or preferences) of parties are common knowledge. In the second stage, voters observe the candidates’ platforms and vote sincerely for the policy that maximizes their preferences over local spending. I follow the literature (see Persson and Tabellini, 2002) by assuming that voters are rational, forward looking and well informed about the parties’ preferences over public spending. All residents in each district vote in the local election. Voters do not have mobility across jurisdictions.¹¹

I also distinguish the type of voters through the intensity of their preferences for LPGs. Hence, the indirect utility of a voter type α_j^i in district i is given by $\nu_j^i(g^i, g^{-i}, \alpha_j^i) = e_j^i - \frac{g^i}{N^i} + \alpha_j^i \ln(g^i + k^{-i} g^{-i})$.¹²

¹⁰ For example, in the US, Reed (2006), Alt and Lowry (2000), Caplan (2001) and Rogers and Rogers (2000) find evidence that state taxes increase when Democrats have significant control of the legislative body of state governments. Fletcher and Murray (2008) find that states with Democrat governors are more likely to choose progressive provisions. Chernick (2005) finds that party control by Republicans leads to more regressive state tax structures. Caplan (2001) finds that corporate and income taxes rise under Democratic control of state legislatures and fall with larger Republican majorities.

¹¹ The issue of mobility is ignored in this paper not because I consider migration unimportant but because it has been studied in other papers (see Myers 1990, Mansoorian and Myers 1993, Wellisch 1994, Silva and Caplan 1997, and Hoel and Shapiro 2003). Moreover, I want to highlight a different mechanism (the tradeoff between votes and campaign contributions) for the allocation of local public goods.

¹² To characterize the indirect utility of voter type α_j^i in district i $\nu_j^i(g^i, g^{-i}, \alpha_j^i)$

Under the spending policies of administrations of party L , g^{Li} , and party R , g^{Ri} , the indirect utilities of a voter type α_j^i in district i are, respectively, $\nu_j^i(g^{Li}, g^{-i}, \alpha_j^i)$ and $\nu_j^i(g^{Ri}, g^{-i}, \alpha_j^i)$. A voter type α_j^i votes for party L if $\chi_j^{Li}(\alpha_j^i) = \nu_j^i(g^{Li}, g^{-i}, \alpha_j^i) - \nu_j^i(g^{Ri}, g^{-i}, \alpha_j^i) > 0$. If $\chi_j^{Li}(\alpha_j^i) < 0$, he votes for party R , and the voter flips a coin if $\chi_j^{Li}(\alpha_j^i) = 0$.

In the third stage, the candidate with the highest plurality of the votes wins the election, forms the local government in each district (the winning party takes all) and implements the policy platform that maximizes the party's utility. In this setting, the party's problem of local public spending design is to maximize the preferences of the average member of the coalition of voters controlling the party subject to this voter's budget constraint and the constraint that LPG's are financed by local taxation. Formally, the problem of policy design is

$$\begin{aligned} \text{Max}_{\{g^i\}} \nu^{mi}(g^i, g^{-i}, \alpha^{mi}) = & \quad (1) \\ \left\{ \begin{array}{l} \mu^{mi}(x^{mi}, g^i + k^{-i}g^{-i}, \alpha^{mi}) \\ \text{subject to } x^{mi} = e^{mi} - t^i \text{ and } g^i = N^i t^i \end{array} \right\} \end{aligned}$$

In (1), $\nu^{mi}(g^i, g^{-i}, \alpha^{mi})$ is an indirect utility over feasible local public goods, $x^{mi} = e^{mi} - t^i$ is the budget constraint of the representative voter controlling party $m = \{L, R\}$ in district i , α^{mi} is the party's type and it is exogenously given, $g^i = N^i t^i \forall i$ is the government's budget constraint.

DEFINITION 1. *The subgame perfect Nash equilibrium (SPNE) for this economy is characterized by policy choices \hat{g}^{mi} and \hat{g}^{m-i} for parties $m = \{L, R\}$, and voting choices for voters type α_j^i in districts i and $-i$ such that¹³*

1.i) *In the first stage, parties announce policies $\hat{g}^{mi} \forall m, \forall i$ such that*

$$\hat{g}^{mi} \in \text{argmax } \nu^{mi}(g^i, \hat{g}^{m-i}, \alpha^{mi}) \forall m, \forall i$$

use the voter's budget constraint $x^i = e^i - t^i$ and the constraint that local public goods are financed by local taxes $g^i = N^i t^i$ into the direct utility $\mu_j^i(x_j^i, g^i, g^{-i}, \alpha_j^i) = x_j^i + \alpha_j^i \ln(g^i + k^{-i}g^{-i})$.

¹³ Because in my model there is perfect information about the parties' types, parties have no incentive to announce median voter policies in the first stage of the game.

1.ii) In the second stage, voters type α_j^i in districts i and $-i$ vote

For party L if $\chi_j^{Li} = \nu_j^i(\hat{g}^{Li}, \hat{g}^{m-i}, \alpha_j^i) - \nu_j^i(\hat{g}^{Ri}, \hat{g}^{m-i}, \alpha_j^i) > 0$

If $\chi_j^{Li} < 0$, he votes for party R

1.iii) In the third stage, the elected party implements $\hat{g}^{mi} \quad \forall m, \forall i$ such that

$$\hat{g}^{mi} \in \operatorname{argmax} \nu^{mi}(g^i, \hat{g}^{m-i}, \alpha^{mi}) \quad \forall m, \forall i$$

DEFINITION 2. A candidate $m = L \vee R$ wins the election in district i , if, for a strictly non-decreasing monotonic cumulative distribution function $\Omega^i : \mathbb{R} \rightarrow [0, 1]$, it is satisfied that

$$\Omega^i(\exists \alpha_j^i \in [\alpha_{min}^i, \alpha_{max}^i] : \chi_j^{mi}(\alpha_j^i) > 0) > 1/2 \quad (2)$$

Definition 2 says that, given the policies of parties, if there is at least a majority of voters with $\chi_j^{mi}(\alpha_j^i) > 0$ then party m wins the local election in district i .

PROPOSITION 1. Suppose some party $m = \{L \vee R\}$ in district $i, \forall i$ satisfies the condition of majority vote $\Omega^i(\alpha_j^i \in [\alpha_{min}^i, \alpha_{max}^i] : \chi_j^{mi}(\alpha_j^i) > 0) > 1/2 \quad \forall i$. Then party $m = \{L \vee R\}$ wins the local election in the district. At the political equilibrium $\hat{g}^{mi} \quad \forall m, \forall i$ is not, in general, Pareto efficient and given by

$$\hat{g}^{mi} = \frac{N^i \alpha^{mi} - k^{-i} N^{-i} \alpha^{m,-i}}{1 - k^i k^{-i}} \quad \forall m = \{L \vee R\}, \forall i \quad (3)$$

PROOF. In district i , if party m satisfies $\Omega^i(\exists \alpha_j^i \in [\alpha_{min}^i, \alpha_{max}^i] : \chi_j^{mi}(\alpha_j^i) > 0) > 1/2 \quad \forall i, \forall m = \{L \vee R\}$ then this party wins the local election in that district. Hence, the optimal spending policy satisfies $\partial \nu^{mi}(g^i, g^{m-i}, \alpha^{mi}) / \partial g^i \leq 0$ for $\hat{g}^{mi} \geq 0$ and $\partial^2 \nu^{mi}(g^i, g^{m-i}, \alpha^{mi}) / \partial^2 g^i < 0$. If $\partial \nu^{mi}(g^i, g^{m-i}, \alpha^{mi}) / \partial g^i = 0$ then

$$\hat{g}^{mi} = N^i \alpha^{mi} - k^{-i} g^{-i} \quad (4)$$

Similarly, the local election in district $-i$ produces $\hat{g}^{m-i} = N^{-i} \alpha^{m-i} - k^i g^i$. The Cournot-Nash equilibrium is given by

$$\hat{g}^{mi} = \frac{N^i \alpha^{mi} - k^{-i} N^{-i} \alpha^{m-i}}{1 - k^i k^{-i}} \quad \forall m = \{L \vee R\}, \forall i \quad (5)$$

■

Proposition 1 shows that the size of \hat{g}^{mi} depends positively on N^i (since an increase in the district's population reduces the marginal costs of producing a public good in district i) and positively on α^{mi} (since an increase in α^{mi} means a higher marginal utility from public goods produced in districts i and $-i$). Moreover, \hat{g}^{mi} depends negatively on N^{-i} and α^{m-i} because increases in N^{-i} and α^{m-i} leads to higher levels of \hat{g}^{m-i} and, by the effect of spillovers, the overall consumption of public goods $\hat{G}^i = \hat{g}^{mi} + k^{-i} \hat{g}^{m-i}$ increases which in turn leads to a fall in the marginal utility of providing a local public good in district i and a fall in the equilibrium level of \hat{g}^{mi} . The size of \hat{g}^{mi} also depends positively on the spillovers from the local public good provided in district i , that is k^i , and $\frac{d\hat{g}^i}{dk^{-i}} \geq 0$ on the spillovers of the local public good provided in district $-i$ that is k^{-i} .

In this equilibrium, Pareto inefficiency arises because the political process fails to account for the preferences of the whole electorate. This equilibrium is Pareto efficient if local public goods do not show spillovers and if the type of coalition of voters controlling the government coincides with the type of the average voter in the district. However, this can be considered as a peculiar outcome. Hence, in general, \hat{g}^{mi} is not Pareto efficient.

2.2. Local public goods in a fiscally decentralized economy

The normative literature on fiscal federalism suggests that a system of local governments will provide local public goods that are differentiated according to the inter-regional heterogeneity of preferences over public spending (see Oates 1972, 1999). Proposition 2 shows that there is a class of equilibria in which preferences over districts i

and $-i$ are differentiated but only the district with the high demand for public spending provides a positive level of the local public good while the low demand district free rides and does not provide a local public good. Formally,

PROPOSITION 2. *If local public goods do not show spillovers, or there is moderate inter-regional heterogeneity of preferences, then an increase in the heterogeneity of preferences leads to more differentiation in the provision of public goods of districts i and $-i$. However, if spillovers are sufficiently large, or there is significant heterogeneity of preferences, then an increase in the heterogeneity of preferences does not necessarily lead to more differentiation of public goods between districts i and $-i$.*

2.i) For $k^i = k^{-i} = 0$ then $\hat{g}^{mi} > 0$ and $\hat{g}^{m-i} > 0 : \hat{g}^{mi} \neq \hat{g}^{m-i}$ satisfying $\hat{g}^{mi} = N^i \alpha^{mi} \quad \forall m, \forall i$

2.ii) For $k^{-i} \in (0, 1) \exists \Theta^i < 1 : \Theta^i = \frac{N^{-i} \alpha^{m-i}}{N^i \alpha^{mi}}$ and $0 \leq k^i < \Theta^i < 1 : \hat{g}^{mi} \neq \hat{g}^{m-i}$ and $\hat{g}^{mi} > 0, \hat{g}^{m-i} > 0$ satisfying

$$\hat{g}^{mi} = \frac{N^i \alpha^{mi} - k^{-i} N^{-i} \alpha^{m-i}}{1 - k^i k^{-i}} \quad \forall m, \forall i$$

2.iii) For $k^{-i} \in (0, 1), \exists \Theta^i < 1 : \Theta^i = \frac{N^{-i} \alpha^{m-i}}{N^i \alpha^{mi}} \quad \forall i$ and $0 < \Theta^i \leq k^i$ implying $\hat{g}^{mi} = N^i \alpha^{mi} > 0$ and $\hat{g}^{m-i} = 0$. In this case, district i is the only provider of a local public good (since $\hat{g}^{mi} > 0$) while district $-i$ free rides and sets $\hat{g}^{m-i} = 0$.

PROOF. Results are directly implied by the first order conditions of the parties' problem and condition (4) of proposition 1 for districts i and $-i$. ■

Proposition 2 shows that an increase in the heterogeneity of preferences does not necessarily means more policy differentiation in the provision of local public goods of districts i and $-i$. In particular, if local public goods do not show spillovers (for $k^i = k^{-i} = 0$) and for local public goods with moderate spillovers $k^{-i} \in [0, 1) : 0 \leq k^i < \Theta^i$, where $\Theta^i = N^{-i} \alpha^{m-i} / N^i \alpha^{mi} < 1$, the more heterogeneous the parties' preferences over local public goods or the larger the difference between the size of population of districts i and $-i$ (that is, the larger the difference between $N^i \alpha^{mi}$ and $N^{-i} \alpha^{m-i}$), the more heterogeneous is the provision of LPG's between districts i and $-i$ with $\hat{g}^{mi} > 0$ and $\hat{g}^{m-i} > 0$. In this class of equilibria, an increase in the heterogeneity

of preferences for LPG's leads to more policy differentiation in the provision of local public goods of districts i and $-i$.

However, if spillovers of local public goods for the high demand district are sufficiently large, for $k^{-i} \in [0, 1)$, $\Theta^i < 1 : 0 < \Theta^i \leq k^i$, then the more heterogeneous the preferences of the elected parties and the population in districts i and $-i$, the higher the political incentives for the district with low demand for local public spending to free ride, in which case, $\hat{g}^{mi} = N^i \alpha^{mi} > 0$ and $\hat{g}^{m-i} = 0$. Hence, only the government with the high demand for public spending (district i) provides a local public good while the local government with the low demand for public spending (district $-i$) does not provide a local public good.

More importantly, this outcome means that there could be an increase in the inter-regional heterogeneity of preferences of parties for local public goods and yet the provision from local governments does not respond to changes in the inter-regional preferences of parties. For instance, in this case, there are changes in α^{m-i} such that the heterogeneity of preferences across districts increase, however the equilibrium supply of LPG's remains unchanged and given by $\hat{g}^{mi} = N^i \alpha^{mi} > 0$ and $\hat{g}^{m-i} = 0$.

In this last equilibrium, a system of local governments does not maximize the society's gains associated with policy differentiation because a fiscally decentralized system of governments might not respond to changes in the heterogeneity of preferences across districts. This outcome is explained by two factors: first, parties maximize the utility of a minority coalition of voters instead of a social welfare function, hence the political process leads to a failure of preference aggregation. Therefore, the supply of public goods by subnational governments does not necessarily maximize the society's gains associated with policy differentiation.

Second, because of strategic interactions between local governments, the local provision of public goods might not respond to changes in the heterogeneity of preferences of voters across districts. To see this, note that if the inter-regional distribution of preferences for public goods is too heterogeneous or there are significant spillovers then the provision of a public good by the high demand jurisdiction (district i) drives the party's net marginal benefit of providing a local public good in district $-i$ to zero. In this case, the best response of the elected government in district $-i$ is to free ride and set $\hat{g}^{m-i} = 0$.

Hence, there could be a change in the heterogeneity of preferences of voters for LPG's of districts i and $-i$ and still the local provision of public goods does not respond to an increase in the heterogeneity of

voters' preferences. This outcome, calls into question the notion that a system of local governments maximizes the society's gains associated with matching the inter-regional preferences of voters with the provision of LPGs.

3. Political equilibrium with campaign contributions

In this section, I characterize an economy in which voters can make campaign contributions to parties participating in local elections of districts i and $-i$. The timing of the political process is as follows: In the first stage, voters offer a platform-campaign package to parties in which different campaign contributions correspond to different levels of local public spending. Political contributions seek to influence the design of public spending. Each voter makes an offer knowing that the rest of voters are, simultaneously and non-cooperatively, offering their corresponding platform-contribution packages. Also, in the first stage, parties announce their policy platforms¹⁴

In the second stage, voters observe the candidates' platforms and vote sincerely for the policy that maximizes the voters' own preferences. Voters are sequentially rational and recognize that after the election takes place (in the third stage), the party winning the election takes all and implements the policy that maximizes the party's preferences over public spending and the size of campaign contributions.

Following the literature, including Grossman and Helpman (2001), and Bernheim and Whinston (1986), and for simplicity of analysis, I ignore the issue of the dynamic inconsistency of the parties' policies since campaign contribution take place at the first stage and the implementation of policy in the third stage. In a model with repeated interactions between voters and parties, through sequential elections, there is an equilibrium in which parties commit to their promises to voters to change policy for contributions to guarantee future contributions from voters. However, such analysis is left for future work.

¹⁴ In practice, voters can use different mechanisms to make campaign contributions. One avenue is to make a direct donation to a candidate, another possibility is to donate to a special interest political action committee which in turn could spend money in elections of different districts. For simplicity of the analysis, in this paper I assume voters can make direct donations to candidates of all districts.

For the analysis that follows, I characterize the indirect preferences over public goods of a voter type α_j^i in district i by:¹⁵

$$\nu_j^i (g^{mi}, g^{m,-i}, c_j^{mi}, c_j^{m-i}, \alpha_j^i) = x_j^{mi} + \alpha_j^{mi} \ln (g^i + k^{-i} g^{-i}) \quad (6)$$

s.t: a) $x_j^i = e_j^i - t^i - c_j^{mi} (\alpha_j^i) - c_j^{m-i} (\alpha_j^i)$, b) $g^i = N^i t^i$

The voter's budget constraint is $x_j^i = e_j^i - t^i - c_j^{mi} (\alpha_j^i) - c_j^{m-i} (\alpha_j^i)$ where $c_j^{mi} (\alpha_j^i)$, $c_j^{m-i} (\alpha_j^i)$ are the contributions of voter type α_j^i to parties m in districts i and $-i$.

Moreover, the parties' preferences over local public spending are given by:

$$\nu^{mi} (g^{mi}, g^{m-i}, C^{mi}, \alpha^{mi}) = \mu^{mi} (x^{mi}, g^i + k^{-i} g^{-i}, \alpha^{mi}) \quad (7)$$

s.t: a) $x^{mi} = e^{mi} - t^i + C^{mi}$, b) $g^i = N^i t^i$

Where $C^{mi} = \sum_{\forall i, -i} \sum_{j=1}^{N^i} c_j^{mi} (\alpha_j^i) \quad \forall i, \forall m$ is the amount of contributions-policy offers from all voters in districts i and $-i$ to a party $m = \{L, R\}$ in the election of district i .

DEFINITION 3. *A subgame perfect Nash equilibrium for the economy is characterized by the parties' policy announcements g^{*mi} and g^{*m-i} , by the voters' contributing choices $c_j^{*mi} \quad \forall m = \{L, R\}$ and voting choices in districts i and $-i$ such that:*¹⁶

3.i) *In the first stage, voters in all districts offer platform-campaign contributions schedules $c_j^{*mi} (g_j^i, \alpha_j^i) \quad \forall i, \forall m$ to parties such that*¹⁷

$$c_j^{*mi} (g_j^i, \alpha_j^i) \in \operatorname{argmax} \nu_j^i (g^{mi}, g^{m-i}, c_j^{mi}, c_j^{m-i}, \alpha_j^i)$$

¹⁵ The only distinction between the voter's preferences of the previous section and this section is that in this economy, voters can make campaign contributions.

¹⁶ My analysis belongs to the domain of common agency problems. In this paper, I follow Bernheim and Whinston (1986) and Dixit, Grossman and Helpman (1997).

¹⁷ Because of space constraints, in some instances I wrote equations with a simplified notation, for example writing $\nu^{mi} (g^{*mi}, g^{*m-i}, C^{*mi})$ instead of $\nu^{mi} (g^{*mi}, g^{*m-i}, C^{*mi}, \alpha^{mi})$.

$$s.t. \nu^{mi} (g^{*mi}, g^{*m-i}, C^{*mi}) \geq \text{Max} \left\{ \nu^{mi} \left(\bar{g}^{mi}, \bar{g}^{m-i}, \bar{C}^{*mi} \right) \quad \forall m, \forall i \right\}$$

Where

$$\nu^{mi} (g^{*mi}, g^{*m-i}, C^{*mi}) \geq \text{Max} \left\{ \nu^{mi} \left(\bar{g}^{mi}, \bar{g}^{m-i}, \bar{C}^{*mi} \right) \quad \forall m, \forall i \right\}$$

is an incentive compatibility constraint for parties where C^{*mi} corresponds to the sum of all contributions of voters in which voter type α_j^i contributes with a strictly positive amount to party m such that

$$C^{*mi} = \sum_{\forall i, -i} \sum_{\forall h \neq j}^{N^i-1} c_h^{*mi} (g^{*mi}, \alpha_h^i) + c_j^{*mi} (g^{*mi}, \alpha_j^i) \text{ and } c_j^{*mi} (g^{*mi}, \alpha_j^i) > 0, \text{ while } \bar{C}^{*mi} = \sum_{\forall i, -i} \sum_{\forall h \neq j}^{N^i-1} \bar{c}_h^{*mi} \left(\bar{g}_h^i, \alpha_h^i \right) \text{ corresponds to the sum of all contributions from voters and, in this case, voter type } \alpha_j^i \text{ does not make a campaign contribution and sets } \bar{c}_j^{*mi} \left(\bar{g}_j^i, \alpha_j^i \right) = 0 \forall m, \forall i.$$

Moreover, $c_{\forall h \neq j}^{*mi} (g^{*mi}, \alpha_h^i)$, $\bar{c}_{\forall h \neq j}^{*mi} \left(\bar{g}_h^i, \alpha_h^i \right)$ are best response offers of all voters $h \neq j$ in each district, and $\bar{g}^{mi} \in \text{argmax} \nu^{mi} \left(g^{mi}, g^{m-i}, \bar{C}^{*mi}, \alpha^{mi} \right) \quad \forall m, \forall i$.

Also, in the first stage, parties announce policies $g^{*mi} \quad \forall m, \forall i$ that maximize the parties' preferences over local public goods and the size of campaign contributions C^{*mi} such that:

$$g^{*mi} \in \text{argmax} \nu^{mi} (g^{mi}, g^{m-i}, C^{*mi}, \alpha^{mi}) \quad \forall m, \forall i$$

3.ii) In the second stage, voters type α_j^i in districts i , $\forall i, -i$ vote for Party L if $\chi_j^{Li} = \nu_j^i (g^{*Li}, g^{*m-i}, c_j^{*mi}, c_j^{*m-i}, \alpha_j^i) - \nu_j^i (g^{*Ri}, g^{*m-i}, c_j^{*mi}, c_j^{*m-i}, \alpha_j^i) > 0$.

If $\chi_j^{Li} < 0$, they vote for party R .

3.iii) In the third stage, the elected party in each district implements $g^{*mi} \quad \forall m, \forall i$.

$$g^{*mi} \in \text{argmax} \nu^{mi} (g^{mi}, g^{m-i}, C^{*mi}, \alpha^{mi}) \quad \forall m, \forall i$$

The main difference between my political equilibrium with campaign contributions in this section, and the equilibrium of the last section is that in this section, voters of all districts provide a platform-campaign contributions offer $c_j^{*mi}(g_j^i, \alpha_j^i) > 0 \forall m, \forall i$ that seeks to maximize the voters' utilities subject to an incentive compatibility constraint in which the government's payoff under the distribution of political contributions is given by $C^{*mi} = \sum_{\forall i, -i} \sum_{\forall h \neq j}^{N^i-1} c_h^{*mi}(g^{*mi}, \alpha_h^i) + c_j^{*mi}(g^{*mi}, \alpha_j^i)$.

The incentive compatibility constraint says that a voter type α_j^i makes a campaign contribution to some party $m = L$ or R (that is $c_j^{*mi}(g^{*mi}, \alpha_j^i) > 0$) if the utility associated with the package of campaign contributions and the government's corresponding policy, g^{*mi} , that is selected as the government's response to the voter's contribution, is at least as high as the utility of the voter under the state of the economy in which the voter does not contribute, that is $\tilde{c}_j^{*mi}(\tilde{g}^{mi}, \alpha_j^i) = 0 \forall m, \forall i$, and in this case the government selects the alternative policy $\tilde{g}^{mi} \in \operatorname{argmax} \nu^{mi}(g^{mi}, \tilde{g}^{m-i}, \tilde{C}^{*mi}, \alpha^{mi}) \forall m, \forall i$.

Proposition 3, below, characterizes the subgame perfect Nash equilibrium for an economy with campaign contributions and shows that the decentralized provision of local public goods with and without spillovers is Pareto efficient.

PROPOSITION 3. *In the SPNE, assume some party $m = \{L \vee R\}$ satisfies $\Omega^i(\exists \alpha_j^i \in [\alpha_{min}^i, \alpha_{max}^i] : \chi_j^{mi}(\alpha_j^i) > 0) > 1/2 \forall i, -i$. Then, in each district some party wins the local election, and Pareto efficient local public goods with and without inter-regional spillovers are provided in each district. For $\theta_j^i \in \mathbb{R}_{++} \forall j, \forall i$, at the political equilibrium, $g^{*mi} \forall i, \forall m$ is given by*

$$\sum_{\forall i, -i} \sum_{j=1}^{N^i} \theta_j^i MRS_j^i(\alpha_j^i) = \frac{1}{N^i} \quad \forall m = \{L \vee R\}, \forall i, -i \quad (8)$$

Where $\sum_{\forall i, -i} \sum_{j=1}^{N^i} \theta_j^i MRS_j^i(\alpha_j^i)$ is the weighted sum of the marginal rates of substitution $MRS_j^i(\alpha_j^i) = \frac{\partial \mu_j^i}{\partial G^i} / \frac{\partial \mu_j^i}{\partial x_j^i} \forall j, \forall i$ and $\theta_j^i \in \mathbb{R}_{++} \forall j$,

$\forall i$ is the weight that the elected candidate in district i assigns to the preferences of voters of district i and $-i$ such that the weights are allocated as follows:

$$\theta_j^i = \begin{cases} 2/(N^i + 1) & \text{for the voter - candidate } m \text{ in district } i \\ 1/(N^i + 1) & \text{for all voters } j \neq m \text{ in district } i \\ k^i/(N^i + 1) & \text{for all voters } j \text{ in district } -i \end{cases} \quad (9)$$

PROOF. The problem is solved by backward induction. In the third stage of the game $\Omega^i (\exists \alpha_j^i \in [\alpha_{min}^i, \alpha_{max}^i] \chi_j^{mi}(\alpha_j^i) > 0) > 1/2 \forall i, -i$, which means that party $m = \{L \vee R\}$ wins the local election in each district. In the third stage, party m selects $g^{*mi} \in \operatorname{argmax} \nu^{mi}(g^{mi}, g^{m,-i}, C^{*mi}, \alpha^{mi}) \forall m, \forall i, -i$. It is simple to show that $\partial \nu^{mi}(g^{mi}, g^{m,-i}, C^{*mi}, \alpha^{mi}) / \partial g^i = 0$ for $g^{*mi} > 0 \forall m, \forall i$ implies

$$MRS^{mi} + \sum_{j=1}^{N^i} \frac{\partial c_j^{*mi}(\alpha_j^i)}{\partial g^i} + \sum_{j=1}^{N^{-i}} \frac{\partial c_j^{*m-i}(\alpha_j^{-i})}{\partial g^i} - \frac{1}{N^i} = 0 \quad (10)$$

Where $MRS^{mi} = \frac{\partial \nu^{mi}}{\partial G^i} / \frac{\partial \nu^{mi}}{\partial x^{mi}} = \frac{\partial \mu^{mi}}{\partial G^i} / \frac{\partial \mu^{mi}}{\partial x^{mi}}$.

In the first stage of the game, voters type α_j^i in districts i and $-i$ provide an offer of local spending-campaign contributions $c_j^{*mi}(g_j^i, \alpha_j^i) \forall m, \forall i, -i$ to parties to be elected in districts i and $-i$ in the third stage such that

$$\begin{aligned} c_j^{*mi}(g_j^i, \alpha_j^i) &\in \operatorname{argmax} \nu_j^i(g^{mi}, g^{m-i}, c_j^{mi}, c_j^{m-i}, \alpha_j^i) \quad (11) \\ &\nu^{*mi}(g^{*mi}, g^{*m-i}, C^{*mi}) \geq \\ \text{s.t:} & \operatorname{Max} \left\{ \nu^{mi}(\tilde{g}^{mi}, \tilde{g}^{m-i}, \tilde{C}^{*mi}) \quad \forall m, \forall i \right\} \end{aligned}$$

Parties will accept campaign contributions in exchange for changes in public spending if¹⁸

¹⁸ The equality in (12) says that voters offer campaign contributions to ensure that the elected government gets a payoff equal to its outside opportunity. It is clear that voters have no incentives to give the party in the government more than its outside opportunity.

$$\nu^{*mi} (g^{*mi}, g^{*m-i}, C^{*mi}) = \quad (12)$$

$$\text{Max} \left\{ \nu^{mi} \left(\bar{g}^{mi}, \bar{g}^{m-i}, \bar{C}^{*mi} \right) \quad \forall m, \forall i \right\}$$

From (12), it follows that the government's tradeoff between political contributions of voters of type $\alpha_j^i \forall m, \forall i$ and changes in local public spending is given by

$$\left. \frac{dc_j^{*mi} (g_j^i, \alpha_j^i)}{dg^i} \right|_{d\nu^{*mi}=0} = - \frac{\partial \nu^{mi}}{\partial G^i} / \frac{\partial \nu^{mi}}{\partial x^{mi}} \quad (13)$$

The voters' political contribution problem in (11) can be solved by selecting the ideal spending policy of voter type $\alpha_j^i, \forall m, \forall i$, given by g_j^{*i} , which maximizes

$$\nu_j^{mi} (g^{mi}, g^{m,-i}, c_j^{mi}, c_j^{m-i}, \alpha_j^i) \quad (14)$$

s.t:

a) $x_j^i = e_j^i - t^i - c_j^{mi} - c_j^{m-i};$ b) $g^i = N^i t^i$

c) For $c_j^{*mi} (g^i, \alpha_j^i) \quad \forall m, \forall i, -i$: $\left. \frac{dc_j^{*mi} (g^i, \alpha_j^i)}{dg^i} \right|_{d\nu^{*mi}=0} = - \frac{\partial \nu^{mi}}{\partial G^i} / \frac{\partial \nu^{mi}}{\partial x^{mi}}$

State the problem in (14) as follows:

$$\nu_j^i (g^{mi}, g^{m,-i}, c_j^{mi}, c_j^{m-i}, \alpha_j^i) = \quad (15)$$

$$= \mu_j^i (e_j^i - g^{mi}/N^i - c_j^{*mi} (g^i) - c_j^{*m-i} (g^{-i}), g^i + k^{-i} g^{-i})$$

The first order condition for the problem of voters' type α_j^i implies

$$\left. \frac{dc_j^{*mi} (g^i, \alpha_j^i)}{dg^i} \right|_{d\nu^{*mi}=0} = MRS_j^i (\alpha_j^i) - \frac{1}{N^i} \quad \forall m, \forall i \quad (16)$$

And

$$\left. \frac{dc_j^{*m-i}(g^{-i}, \alpha_j^i)}{dg^{-i}} \right|_{d\nu^{*m-i}=0} = k^{-i} MRS_j^i(\alpha_j^i) \quad \forall m, \forall i \quad (17)$$

Where $MRS_j^i(\alpha_j^i) = \frac{\partial \mu_j^i}{\partial G^i} / \frac{\partial \mu_j^i}{\partial x_j^i} \quad \forall j, \forall i$ ¹⁹

The size of contributions of voter type α_j^i evaluated at some feasible level of \tilde{g}_j^{*mi} and $\tilde{g}_j^{*m,-i}$ are given by

$$c_j^{*mi}(\tilde{g}_j^{*mi}, \alpha_j^i) = \int_0^{\tilde{g}_j^{*mi}} \left\{ MRS_j^i(\alpha_j^i) - \frac{1}{N^i} \right\} dg^i$$

and

$$c_j^{*m-i}(\tilde{g}_j^{*m,-i}, \alpha_j^i) = \int_0^{\tilde{g}_j^{*m,-i}} k^{-i} MRS_j^i(\alpha_j^i) dg^i.$$

Substitute (16) and (17) into (10) to show that

$$MRS^{mi} + \sum_{j=1}^{N^i} MRS_j^i(\alpha_j^i) + k^i \sum_{j=1}^{N^{-i}} MRS_j^{-i}(\alpha_j^{-i}) = 1 + \frac{1}{N^i} \quad (18)$$

Define $\theta_j^i \in \mathbb{R}_{++} \quad \forall j, \forall i, -i$ as the weight that the elected party in district i assigns to preferences of voters of district i and $-i$ such that

$$\theta_j^i = \begin{cases} 2/(N^i + 1) & \text{for the voter - candidate } m \text{ in district } i \\ 1/(N^i + 1) & \text{for all voters } j \neq m \text{ in district } i \\ k^i/(N^i + 1) & \text{for all voters } j \text{ in district } -i \end{cases} \quad (19)$$

¹⁹ Condition (17) also means that the contributions to party m of a voter type α_j^i living in district $-i$ are given by $dc_j^{*mi}(g^i | \alpha_j^{-i})/dg^i |_{d\nu^{*mi}=0} = k^i MRS_j^{-i}(\alpha_j^{-i})$

Therefore condition (18) is equivalent to

$$\sum_{\forall i, -i} \sum_{j=1}^{N^i} \theta_j^i MRS_j^i(\alpha_j^i) = \frac{1}{N^i} \quad (20)$$

■

As I mentioned before, parties realize that they can attract campaign contributions from voters of different regions by offering changes in the parties' policy positions. In fact, parties may face a tradeoff between campaign contributions and the design of local public spending: On the one hand, parties would like to design policy to benefit their local supporters, but on the other hand, they recognize that they can offer changes in local policy in exchange of campaign contributions from voters living in other jurisdictions.

Hence, proposition 3 says that the tradeoff between policy platforms and campaign contributions induces the party controlling the local government in each district to recognize the distribution of marginal benefits of g^{*mi} over all residents in district i plus its external benefits over residents of district $-i$ against the marginal costs of providing g^{*mi} . As a result, the *SPNE* in (8) leads to a fiscally decentralized provision of local public goods with and without inter-regional spillovers that is Pareto efficient. Condition (8) is a modified Samuelsonian condition of the equilibrium provision of LPG's. In particular, the left hand side of condition (8) $\sum_{\forall i, -i} \sum_{j=1}^{N^i} \theta_j^i MRS_j^i(\alpha_j^i)$

is a weighted sum of marginal rates of substitution $MRS_j^i(\alpha_j^i) = \frac{\partial \mu_j^i}{\partial G^i} / \frac{\partial \mu_j^i}{\partial x_j^i} \forall j, \forall i, -i$ and $\theta_j^i \in \mathbb{R}_{++} \forall j, \forall i, -i$ is the weight that the elected candidate in district i assigns to the preferences of voters of district i and $-i$ while the right hand side of (8) is the social marginal cost of providing g^{*mi} .

In what follows, proposition 4 shows that the inter-regional heterogeneity of preferences is linked with the incentives of local governments to provide (and to free ride in the provision of) a local public good in their corresponding districts.

PROPOSITION 4. *The distribution of local public goods for districts i and $-i$ for the political equilibrium with campaign contributions is given by:*

4.i) For $k^i = k^{-i} = 0$, $g^{*mi} > 0$ and $g^{*m-i} > 0$: $g^{*mi} \neq g^{*m-i}$ satisfying $g^{*mi} = N^i \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i \quad \forall m, \forall i$

4.ii) For $k^{-i} \in [0, 1)$, $\exists \tilde{\Theta}^i = \gamma^{-i}/\gamma^i < 1$ with

$$\gamma^i = \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i / \left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right) \quad \text{and} \quad \gamma^{-i} = \sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i} / \left(\frac{1}{N^{-i}} - \frac{k^i}{N^i} \right),$$

such that $0 \leq k^i < \tilde{\Theta}^i < 1$ and $g^{*mi} \neq g^{*m-i}$ with $g^{*mi} > 0$ and $g^{*m-i} > 0$ satisfying $g^{*mi} = \gamma^i - k^{-i} \gamma^{-i} \quad \forall m, \forall i$.

4.iii) For $k^{-i} \in [0, 1)$, $\exists \tilde{\Theta}^i = \gamma^{-i}/\gamma^i$: $\tilde{\Theta}^i < 1$, and $0 < \tilde{\Theta}^i \leq k^i$: $g^{*mi} = N^i \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i > 0$ and $g^{*m-i} = 0$. In this case, district i is the only provider of a local public good (since $g^{*mi} > 0$) while district $-i$ free rides and sets $g^{*m-i} = 0$.

PROOF. From proposition (3), $g^{*mi} \forall i, -i$ is given by $\sum_{\forall i, -i} \sum_{j=1}^{N^i} \theta_j^i MRS_j^i$
 $(\alpha_j^i) = \frac{1}{N^i} \quad \forall i, -i$ which is equivalent to

$$\frac{\sum_{j=1}^{N^i} \theta_j^i \alpha_j^i}{g^{*mi} + k^{-i} g^{*m-i}} + k^i \frac{\sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i}}{g^{*m-i} + k^i g^{*mi}} = \frac{1}{N^i} \quad \forall m, \forall i, -i \quad (21)$$

Condition (21) leads to a system of two equations that correspond to the equilibrium conditions for g^{*mi} and g^{*m-i} . Solve the system and reduce terms to show that g^{*mi} is given by

$$g^{*mi} = \frac{\left\{ \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i \right\} \left\{ 1 - k^i k^{-i} \right\}}{\left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right)} - k^{-i} g^{*m-i} \quad \forall m, \forall i \quad (22)$$

The Cournot-Nash equilibrium is

$$g^{*mi} = \frac{\sum_{j=1}^{N^i} \theta_j^i \alpha_j^i}{\left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right)} - k^{-i} \frac{\sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i}}{\left(\frac{1}{N^{-i}} - \frac{k^i}{N^i} \right)} \quad \forall m, \forall i \quad (23)$$

Define $\gamma^i = \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i / \left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right)$ and

$\gamma^{-i} = \sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i} / \left(\frac{1}{N^{-i}} - \frac{k^i}{N^i} \right)$. The outcomes of 4.i), 4.ii) and 4.iii) follow by assigning the values of k^i and k^{-i} identified in the proposition. ■

Proposition 4 has a similar interpretation to that given in proposition 2, and it shows that an increase in the heterogeneity of voters' preferences over public spending does not necessarily lead to greater policy differentiation in the local provision of public goods for an economy with campaign contributions. In particular, if local public goods do not show spillovers, then their provision is differentiated according to $g^{*mi} = N^i \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i > 0$ and $g^{*m-i} = N^{-i} \sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i} > 0$. In this equilibrium g^{*mi} depends on the intensity of the party's preferences for LPGs.

If the heterogeneity of preferences is moderate or the spillovers are also moderate (see conditions 4.ii)), then the supply of public goods is also differentiated with $g^{*mi} = \frac{\sum_{j=1}^{N^i} \theta_j^i \alpha_j^i}{\left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right)} - k^{-i} \frac{\sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i}}{\left(\frac{1}{N^{-i}} - \frac{k^i}{N^i} \right)}$
 > 0 and $g^{*m-i} = \frac{\sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i}}{\left(\frac{1}{N^{-i}} - \frac{k^i}{N^i} \right)} - k^i \frac{\sum_{j=1}^{N^i} \theta_j^i \alpha_j^i}{\left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right)} > 0$. In this case, the size of g^{*mi} depends not only on the distribution of preferences of voters in district i (note that g^{*mi} depends positively on $\sum_{j=1}^{N^i} \theta_j^i \alpha_j^i$) but also on the whole distribution of preferences of the electorate since g^{*mi} also depends on the preferences of voters of district $-i$ (since g^{*mi} is a function of $\sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i}$). In the last two cases, if preferences become more heterogeneous, then local public spending reflects this heterogeneity into a set of differentiated local public goods with $g^{*mi} > 0$ and $g^{*m-i} > 0$.

However, if the heterogeneity of preferences is sufficiently high or if spillovers are sufficiently high (see condition 4.iii)) then the party's marginal benefit of producing a local public good in the low demand district will be below its marginal cost and therefore only the high

demand district will produce a public good with $g^{*mi} = N^i \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i > 0$ and $g^{*m-i} = 0$. In this case, the low demand district free rides and sets $g^{*m-i} = 0$.

This outcome is explained by the strategic interaction between local governments in districts i and $-i$. When there is too much heterogeneity, the local government with high demand for local public goods has incentives to provide a local public good in district i that is $g^{*mi} > 0$. Through the effect of spillovers of g^{*mi} in district $-i$, the marginal benefit for parties in district i of providing a local public is driven below its marginal cost. As a result, the local government of district $-i$ free rides and sets $g^{*m-i} = 0$.

Therefore, there could be a change in the heterogeneity of preferences of voters for LPG's of districts i and $-i$ without a corresponding change in the local provision of public goods. This outcome also highlights the limitations of a system of local governments in maximizing the society's gains associated with matching the inter-regional preferences of voters with the provision of LPGs.

One interesting question is whether the issue of free riding from the low demand district is more prevalent in an economy in which campaign contributions are not allowed (see proposition 2), or in which they are allowed (see proposition 4)? Proposition 5 provides a simple comparison between the results in propositions (2) and (4) and identifies sufficient conditions under which the provision of local public goods with campaign contributions might reduce the incentives of the low demand district to free ride. This proposition shows that a system of local governments in which campaign contributions are allowed is more likely to maximize the society's gains associated with matching the inter-regional preferences of voters with the provision of LPGs. Formally:

PROPOSITION 5. For $\theta_j^i \in \mathbb{R}_{++} \forall j, \forall i, -i$ and $E[\alpha_j^i] = \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i \forall i$ is a weighted average of the preferences for local public goods of residents in district i . If

$$\alpha^{m-i} < E[\alpha_j^{-i}] < E[\alpha_j^i] < \alpha^{mi} : \frac{E[\alpha_j^{-i}]}{E[\alpha_j^i]} > \Phi \frac{\alpha^{m-i}}{\alpha^{mi}} \tag{24}$$

Where

$$\Phi = \left\{ \frac{1 - (N^{-i}/N^i) k^i}{1 - (N^i/N^{-i}) k^{-i}} \right\} \tag{25}$$

Then the strategic interaction between elected local governments and the special interests groups for an economy with campaign contributions reduces the incentives of the district with the low demand for local public goods to free ride relative to the incentives to free ride in the political equilibrium without campaign contributions.

PROOF. The electoral-economic equilibrium for an economy without campaign contributions implies, from proposition 2.iii), that $\exists k^{-i} \in [0, 1)$, $\Theta^i = N^{-i} \alpha^{m-i} / N^i \alpha^{mi} : \Theta^i < 1$ and $0 < \Theta^i \leq k^i \Rightarrow \hat{g}^{mi} = N^i \alpha^{mi} > 0$ and $\hat{g}^{m-i} = 0$. Similarly, from the equilibrium with campaign contributions (in proposition 4.ii)), $\exists k^{-i} \in [0, 1)$, $\tilde{\Theta}^i = \gamma^{-i} / \gamma^i < 1$ with $\gamma^i = \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i / \left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right)$ and $\gamma^{-i} = \sum_{j=1}^{N^{-i}} \theta_j^{-i} \alpha_j^{-i} / \left(\frac{1}{N^{-i}} - \frac{k^i}{N^i} \right) : 0 \leq k^i < \tilde{\Theta}^i < 1$ and $g^{*mi} \neq g^{*m-i}$ with $g^{*mi} > 0$ and $g^{*m-i} > 0$ satisfying $g^{*mi} = \gamma^i - k^{-i} \gamma^{-i} \quad \forall m, \forall i$. Therefore, if $0 < \Theta^i < \tilde{\Theta}^i \leq k^i$ proposition 5 holds.

Let $\exists \tilde{\Theta}^i = \left\{ \frac{\sum_{j=1}^{N^i} \theta_j^{-i} \alpha_j^{-i}}{\left(\frac{1}{N^{-i}} - \frac{k^i}{N^i} \right)} \right\} / \left\{ \frac{\sum_{j=1}^{N^i} \theta_j^i \alpha_j^i}{\left(\frac{1}{N^i} - \frac{k^{-i}}{N^{-i}} \right)} \right\} < 1$ and $\Theta^i = N^{-i} \alpha^{m,-i} / N^i \alpha^{mi} : \Theta^i < 1$:

$$\Gamma = \tilde{\Theta}^i - \Theta^i = \frac{E[\alpha_j^{-i}]}{E[\alpha_j^i]} \left\{ \frac{N^{-i} - N^i k^{-i}}{N^i - N^{-i} k^i} \right\} - \frac{N^{-i} \alpha^{m,-i}}{N^i \alpha^{mi}} \quad (26)$$

For $N^i, N^{-i} \in \mathbb{R}_{+++}$, $\left(\frac{N^i}{N^{-i}} \right) \Gamma > 0 \Leftrightarrow \Gamma > 0$ and the expression $\left(\frac{N^i}{N^{-i}} \right) \Gamma$ is equivalent to $(N^i / N^{-i}) \Gamma = \frac{E[\alpha_j^{-i}]}{E[\alpha_j^i]} \left\{ \frac{1 - (N^i / N^{-i}) k^{-i}}{1 - (N^{-i} / N^i) k^i} \right\} - \frac{\alpha^{m,-i}}{\alpha^{mi}}$. Define $\Phi = \left\{ \frac{1 - (N^{-i} / N^i) k^i}{1 - (N^i / N^{-i}) k^{-i}} \right\}$ then $\frac{E[\alpha_j^{-i}]}{E[\alpha_j^i]} > \Phi \frac{\alpha^{m,-i}}{\alpha^{mi}} \Rightarrow (N^i / N^{-i}) \Gamma > 0$. ■

Under the political equilibrium without campaign contributions (see proposition 1), the provision of local public goods reflects the ideal policies of the minority coalition of voters that is in control of the elected party in each district. If parties take into account

only the preferences of a minority coalition of voters in the electorate then local public policy could be extreme or polarized (implying that the provision of public goods could be too high or too low) if the preferences of voters in control of the party are not moderate.

Therefore, in this type of equilibrium, the heterogeneity of preferences across districts could be high leading to the outcome in which the district with low demand for local public goods free rides and only the district with the high demand for public spending provides a LPG. Also, recall that in this case, there could be an increase in the inter-regional heterogeneity of preferences of parties for LPGs and yet the provision from local governments does not respond to changes in the inter-regional preferences of parties.

In the political equilibrium with campaign contributions (see proposition 3), local public goods reflect the ideal policies of residents of all districts of the economy, and therefore, the provision of LPGs with campaign contributions leads to more moderate policies relative the distribution of public goods under the equilibrium without campaign contributions, (see conditions 24 and 25).²⁰ It follows that if policies are moderate then the district with the low demand for local public spending has less incentives to free ride. Hence, it is more likely that the provision of local public goods is positive in each district and differentiated according to the inter-regional differences in the voters preferences.

Hence, proposition 5 identifies conditions in which a system of local governments in an economy with campaign contributions maximizes the welfare gains associated with the differentiation of local public goods while, in an economy without campaign contributions, a system of local governments is likely to produce suboptimal inter-regional policy differentiation. This outcome is explained by the fact

²⁰ It is likely that for a large economy the political equilibrium with campaign contributions lead to policies as moderate or more moderate than those policies predicted by the political equilibrium without campaign contributions. To see this, define $\theta_j^i = \rho_j^i / (N^i + 1)$ where, according to condition (19), $\rho_j^i = \{1, 2, k^i\}$. For a large economy, $N^i \rightarrow \bar{N}^i$, where \bar{N}^i is sufficiently large, hence $\lim_{N^i \rightarrow \bar{N}^i} \theta_j^i \cong \theta_h^i \forall h \neq j$. This implies that $\lim_{N^i \rightarrow \bar{N}^i} \sum_{j=1}^{N^i} \theta_j^i \alpha_j^i \rightarrow \bar{\alpha}_j^i$ where $\bar{\alpha}_j^i = \sum_{j=1}^{N^i} \alpha_j^i / (N^i + 1)$ is “close” to the average preference of voters in district i , which, in turn, means that the policies in the political equilibrium with campaign contributions are moderate. Moreover, in the political equilibrium without campaign contributions in a large economy, policies reflect the preferences of a coalition of voters controlling the party in the government, which might or might not be moderate.

that, for an economy with campaign contributions, local public goods are supplied as if local governments select public spending to maximize a weighted social welfare function.

In addition, in the equilibrium with campaign contributions, policies are more moderate than the corresponding policies adopted in the equilibrium with no campaign contributions. As a result, for an economy without campaign contributions, policies could be more extreme and then the difference between $\hat{g}^{mi} - \hat{g}^{m-i} > 0$ is larger which makes more likely that the marginal political benefits of producing \hat{g}^{m-i} in the low demand district falls below its marginal cost, in which case, district $-i$ free rides and the supply of local public goods in the federation is $\hat{g}^{mi} > 0$ and $\hat{g}^{m-i} = 0$.

4. Conclusion

In this paper I analyze the fiscally decentralized provision of local public goods with and without inter-regional spillovers in a political economy model with and without campaign contributions. In my economy, parties recognize that they can offer to change their local policy on public goods in exchange for campaign contributions from local residents and voters living in neighborhood jurisdictions. Due to this possibility, a tradeoff exists between the parties policy platforms and campaign contributions that induces local governments to recognize the distribution of marginal benefits of local spending over all districts in the economy. As a result, the fiscally decentralized provision of local public goods with and without inter-regional spillovers is Pareto efficient.

I also show that, an increase in the heterogeneity of preferences over local spending does not necessarily lead to a more differentiated provision of LPGs. In particular, if the heterogeneity of preferences is moderate and local public goods show low or moderate inter-regional spillovers, then the provision of local public goods is differentiated according to the heterogeneity of the parties' preferences in the equilibrium with no campaign contributions and the distribution of preferences of all voters of all districts in the equilibrium with campaign contributions. In this case, an increase in the heterogeneity of preferences induces local governments to recognize the more heterogeneous preferences and their supply of local public goods across districts is differentiated according to this heterogeneity.

However for economies without campaign contributions and with sufficiently large spillovers or high heterogeneity of preferences, only

the high demand district provides a public good and the low demand district free rides. In this case, an increase in the heterogeneity of preferences does not necessarily lead to more inter-regional policy differentiation.

Finally, in this paper I develop a comparative analysis of the incentives of local governments to maximize the society's welfare gains associated with matching the heterogeneous preferences of voters with the provision of local public goods for economies with and without campaign contributions. For an economy without campaign contributions, the decentralized provision of local public goods does not maximize the society's gains from policy differentiation since public spending seeks to maximize the preferences of a minority of voters in the electorate. However, campaign contributions induce ideological parties to recognize the whole distribution of preferences of voters in all districts and local public goods maximize the society's gains from policy differentiation.

In addition, in the equilibrium with campaign contributions, policies are more moderate (relative to the policies without campaign contributions), so it is more likely that the provision of local public goods is positive in each district and differentiated according to inter-regional differences in the voters' preferences. In contrast, in the equilibrium without campaign contributions, the provision of local public goods is positive only in the high demand district. In this latter case, changes in the parties' preferences for local public goods might not result in corresponding changes in the inter-regional provision of LPGs.

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