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Modeling economic growth policy interaction with local government reform: Evidence from Eastern Macedonia and Thrace

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ABSTRACT: The paper studies the process of local economic growth in the period just after the implementation of a local government institutional reform. Cooperation is a basic determinant for upgrading local economic activity especially in lagged regions. The methodology that is used in order to analyse the options of local development is game theory. The analytical level of the game is Eastern Macedonia and Thrace (NUTS II), a region that confronts problems of uneven development. According to the results of the game, social cohesion and effective implementation of reform are considered key elements for local economic growth.

Keywords: Local Economic Growth, Institutional Reform, Game Theory

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Introduction

Institutional reforms of local government reorganize space and rearrange administrative structures. The transfer of jurisdictions and power rights from central governments to local governments diversifies the status quo of local economies and reshapes actor's strategies.

Despite the fact that previous studies focused on the benefits of local governments' institutional reforms (Lalenis and Liogas, 2002; Wollmann, 2004; Feld et al, 2003; Bell et al., 2007), their main attention was on the bureaucratic and on the financial conditions. Thus, there is a lack of interest in the literature about the impact of institutional reforms of local governments on the cooperative strategies of local actors.

The main argument of the paper is that cooperation strategies of local actors could promote local economic growth. Collaboration can be developed through enforcement of social cohesion and through effective implementation of institutional reforms. It is further suggested that the dynamic interaction amid enterprises and local governments promotes investment activity and ameliorates subsidies distribution.

Kallikrates' institutional reform in local governments in Greece, (Law 3852/2010), established new terms for cooperation between regional authorities and enterprises. Apart from the merger of communities and municipalities into enlarged municipals and the transformation of prefectures into regional unities, a plethora of rights and services were conveyed to regional governments. The new law establishes two new agencies namely the Regional Consultation Committee and the Regional Development Fund in order to maximize cooperative spillovers in local/regional context.

Game theory is used in order to study the basic options of institutional collective action in regional growth. Regional governments and professional chambers are the main actors of the game. Their strategies exert significant influence on the living standards of regions, as effective investment projects and rational provision of subsidies improve local living standards. The analytical level of the game is Eastern Macedonia and Thrace, (NUTS II). The results of the game highlight that Nash equilibrium and Pareto Optimum for a regional economy accrues when levels of social cohesion and effective implementation of reform are strong enough to attract investments. Under these circumstances, professional chambers are motivated to invest in the headquarters of their district and regional governments are forced to execute efficiently the reform in order to maximize possibilities of reelection.

The paper is structured as follows: After the introduction, section 2 studies the basic aspects of institutional collective actions that affect regional economic growth. Section 3 focuses on the most important dimensions of recent local governance institutional reforms in Greece. Section 4 analyses key statistics of Eastern Macedonia and Thrace while Section 5 introduces a game between two actors namely regional governments and firms. Finally, section 6 concludes and underlines fundamental results of the game model.

Literature Review

The withdrawal of central state from regulatory policies permits local actors to apply interaction strategies. Locality becomes a cohesive bond in the exploitation of comparative advantages particularly when local actors have different interests (Harvey, 1989; Jessop, 1993). Dominant actors adopt cooperative strategies that consolidate local interests and promote regional prosperity (Brusco and Righi, 1989; Amin, 1999). Within this dynamic interaction the actors responsible for innovative investments are regional bureaucrats, business associations, social capital institutions and regional offices (Cooke et al., 1998; Morgan, 1997; McLeod, 2000).

Moreover, new conditions in local communities enforce actors to transform their isolated strategies into collective agreements. A dynamic interplay structured by acceptable norms and values sets local development in progress (Feiock, 2002). As a consequence, there is an urgent necessity to build cognitive networks for cooperation among local/regional actors in several developmental issue-areas (Hazakis, 2010).

The aforementioned suggestions oblige firms and regional governments to reassess their role in local circuits for the reason that both became adjusters. Investment and location decisions are thoroughly examined by local firms (Malecki, 1994) while subsidies distribution among local economic activities becomes the basic task for regional administrations (Ha & Feiock, 2011; Sullivan and Green, 1999). However, there are episodes of contradiction among local actors concerning the criteria of financing innovative investment projects.

The provision of subsidies from regional government to firms takes a variety of forms, i.e. tax abatement, low-cost loans, infrastructure assistance and grants [Feiock, (2002), p. 125]. Regional officials ought to distribute financial resources based on rational decision making taking into account that too often their reelection depends on the local economic performance. According to Sullivan [(2002), p. 115], “local governments, should apply controls when offering

subsidies in order to secure that the benefit of local economy exceeds the respective cost”.

As global experience demonstrates the decision of local governments to provide facilities to enterprises is determined by different factors. High levels of socioeconomic status in urban districts favor specific branches, for instance construction industry [Lubell et al., (2009), p.662]. Adversely, high levels of poverty and unemployment in smaller cities compel regional governments to employ strategies that attract labor-intensive investments (Neiman and Fernandez, 1999). Furthermore, other socioeconomic determinants like high education profile and efficient income distribution urge local policies to promote entrepreneurship (Dellet et al., 1997).

All these findings illustrate that improvement of local economic environment is highly influenced by social cohesion. Communities that are characterized by high levels of social cohesion have more chances to achieve high investment rates, (Gradstein and Justman, 1999) based on reciprocity and trust.

Equally important, the role of institutional reforms is catalytic in ameliorating public service delivery, in improving structures of local administration and in generating favorable conditions for local actors' interaction (Hansen et al., 2012; Wollmann, 2004). Accordingly, reforms have an impact on the content of local economic decision making bringing forward new cooperative rules, norms and principles (Amin and Thrift, 1995; McLeod and Goodwin, 1999; Furst et al., 2001).

It is also perfectly true that collective choices of local actors are institutionalized during the implementation of a reform (Feiock, 2007). The final outcome of institutional collective action is being influenced by characteristics of communities, level of political cooperation and structure of policy networks. Key instruments of this collective action game are decisions that lead to local development and depart from situations of uncertainty. The most important function of institutional collective action is the melding of dissimilar socioeconomic institutions into commonly accepted strategies, outweighing risk (Feiock, 2005) and transaction cost (Andersen & Pierre, 2010).

The latter is one of the most significant determinants of institutional collective action. Coase (1937) and Williamson argue (1981) that enterprises seek strategies to reduce transaction costs and eliminate uncertainty over bargaining of prices. Obviously, apart from firms, transaction cost impacts on the efficiency of other institutions like regional governments. The option of contracts that reduce transaction cost is the optimal choice for regional governments in delivering a variety of services (Brown and Potoski, 2003). This also means that

local networks and city's characteristics could decrease the transaction cost of local administration (Feiock and Park, 2005) leading to optimum outcomes for local economic agents.

On the content of Local Institutional Reforms in Greece

Institutional reforms since the constitution of Third Greek Republic in 1974 targeted at modernization of public authorities structures. The large number of local government's institutions (5.755 in 1997) was also a significant reason for local government reorganization. In order to understand the major traits of local governance in Greece some notifications about the most important local reforms are necessary.

During the 1980's two main reforms of local government took place. Law 1416/1984 unified branches of urban settlements into urban domains and networks of rural communities into cities. The consolidation of different urban entities with relatively common spatial and socioeconomic characteristics was the main feature of the regulation. However, the results have been disappointing as the majority of local administrations sought strategies to secure vested interests (Lalenis and Liogas, 2002). A few years later, law 1622/1986 constituted three levels of local government i.e. municipalities/communities (first level), prefectures (second-NUTS III), and regions (third-level, NUTS II). According to the law's provisions, only head officials of the first level of local government were elected whilst the latter were appointed by the central government.

In the 1990's efforts for decentralized local governance continued. The second level of local government was transformed substantially by the law 2218/1994. Greece was divided into 52 prefectures and three greater super-prefectures. Prefects were elected whereas prefectural administration was reinforced by a set of jurisdictions. Although the intentions were candid the dispersion of local governments' institutions provinces and emerging uncertainty over responsibilities prohibited de facto cooperative strategies. Persistent malfunctions of local governmental institutions increased the transaction cost of local services and intensified uncertainty.

The next step in the path dependence of institutional reforms was Ioannis Kapodistrias plan. Law 2539/1997 imposed the amalgamation of 5.755 municipalities and rural communities into 900 larger municipals and 134 enlarged rural communities. The headquarters of the new municipals were based either in the biggest settlement of the entity or in the most traditional one in

historical terms. The conveyance of jurisdictions from central state to municipal administrations completed the reform. A crucial issue of this reform was the enforcement of municipal committees in decision making process. Likewise, the decrease of the average number of municipalities per prefecture as well as the increase of the number of inhabitants per municipality, paved the way for the improvement of local government's functions (Hlepas, 2010).

Kapodistrias plan strengthened local governments administrative agenda (Hlepas and Getimis, 2011) despite the fact that there was insufficient financial aid from central government. Grants that were distributed to local governments were based more on terms of pork-barrel politics rather than on terms of regional development (Hazakis and Ioannidis, 2012). Additionally, the gap between formal rules and informal practices operated as a brake to maximization of positive spillover effects of Kapodistrias reform (Spanou, 1998).

Kallikrates reform followed in 2011 modifying significantly the administrative map of the county (Law 3852/2010). The 900 municipalities and the 134 rural communities merged in 325 enlarged municipals while the 52 prefects and the 3 super-prefects became regional unities. Additionally, the 13 regions of the country constituted the second level of local government. New responsibilities and duties have been transferred from central to local governance structures. Although the primary goal of Kallikrates plan is to achieve intergovernmental economies of scale as well as to support strategies of spatial collaboration, lack of adequate financial resources impedes local governance efforts.

Two new regional institutions were established via Kallikrates plan, namely Regional Consultation Committee and Regional Development Fund. The former promotes regional advantages and the latter targets investment flows in the regions. Both local governing bodies are represented by officials of regional governments, professional chambers and societal organizations of regional unities. The paper suggests that Regional Consultation Committee and Regional Development Fund can significantly promote cooperation between enterprises and local governments in a regional context.

Key facts on Eastern Macedonia and Thrace

After the implementation of Kallikrates reform, Eastern Macedonia and Thrace is one of the thirteen regions of Greece and hence, belongs to the second level of local government. It is constituted by six regional units and according to the 2011 census its total population is 606.170 (5,619% of the total population of Greece).

Table 1 reports the distribution of population among the six regional units of Eastern Macedonia and Thrace. Evros is the multitudinous unity, Kavala is the most populous and Drama is the less crowded.

Table 1. Population of Eastern Macedonia and Thrace

	Total Population	Density/km²
Regional Unity of Drama	98.540	28,41
Regional Unity of Evros	147.530.	34,78
Regional Unity of Kavala	124.480	71,89
Regional Unity of Xanthi	110.290	61,51
Regional Unity of Rodopi	111.610	43,89
Regional Unity of Thasos	13.720	36,10
Region	606.170	42,82

Source: Hellenic Statistical Authority (2012) Regional Accounts

Kallkrates amalgamated the 46 municipalities and the 7 rural communities of the region into 22 municipals. Table 2 portrays the new administrative map of the region. Regional unities of Drama and Evros include 5 municipalities, Rodopi and Xanthi four, Kavala three and Thasos one. Interestingly, following Thasos, Drama has the lowest average number of inhabitants per municipality and Kavala the highest. Moreover, Evros, Rodopi and Xanthi are in almost equivalent shares of inhabitants per municipality matching with the regional one (27.533, 18).

Table 2. Municipalities and Population in Eastern Macedonia and Thrace

	Number Of Municipalities	Inhabitants per Municipality
Regional Unity of Drama	5	19.708
Regional Unity of Evros	5	29.506
Regional Unity of Kavala	3	41.493,33
Regional Unity of Xanthi	4	27.572,5
Regional Unity of Rodopi	4	27.902,5
Regional Unity of Thasos	1	13.720
Region	606.170	27.553,18

Source: Hellenic Statistical Authority (2012) Regional Accounts

Table 3. Per Capita Income in Eastern Macedonia and Thrace

	2005	2006	2007	2008	2009
Regional Unity of Drama	10.506	10.950	11.899	11.825	11.732
Regional Unity of Evros	12.664	12.655	14.293	14.978	15.437
Regional Unity of Kavala	14.748	15.543	17.532	18.123	17.878
Regional Unity of Xanthi	13.239	14.508	14.004	15.047	15.677
Regional Unity of Rodopi	12.223	13.074	14.215	14.664	14.565
Region	12.807	13.440	14.579	15.137	15.272
Greece	17.386	18.737	19.903	20.728	20.531

Source: Hellenic Statistical Authority (2012) Regional Accounts

As it is shown in table 3, regional per capita income is lower than the respective of Greek territory. The income of frontier region corresponds approximately to the $\frac{3}{4}$ of the mean income of Greek citizens for years 2005 to 2009. The poorest regional unity is Drama and the richest is Kavala whilst Evros, Xanthi and Rodopi are in the middle¹⁰. Remarkably, all the regional unities of Eastern Macedonia and Thrace are lagged due to the mean income distribution of the country.

Finally, the first row of table 4 shows the contribution of Eastern Macedonia and Thrace in the gross value added of the county. Obviously, Kavala had the greatest share in the regional gross value added (more than one quarter), a little bit more than Evros. Likewise, Xanthi and Rodopi contributed roughly 17% to 18% while Drama had the lowest share, decreased over time.

Table 4. Share of Gross Value Added in Eastern Macedonia and Thrace

	2005	2006	2007	2008	2009
Eastern Macedonia and Thrace	4,03	3,91	3,97	3,94	4,00
Regional Unity of Drama	13,62	13,51	13,50	12,89	12,64
Regional Unity of Evros	24,30	23,11	24,04	24,25	24,76
Regional Unity of Kavala	26,66	26,73	27,75	27,60	26,95
Regional Unity of Xanthi	17,93	18,82	16,83	17,51	18,18
Regional Unity of Rodopi	17,49	17,83	17,87	17,75	17,46

Source: Hellenic Statistical Authority (2012) Regional Accounts

¹⁰ In table 3 per capita income of regional unity of Thasos is included in the unity of Kavala. This computation took place by Hellenic Statistical Authority. This practice was also followed in table 4.

The statistics in the aforementioned tables highlight the low levels of growth in Eastern Macedonia and Thrace as well as the interregional inequalities. In order to overcome these socioeconomic distortions, the paper suggests new cognitive terms for cooperation among local actors.

Regional economic growth as a game between dominant actors

The dynamic interplay among actors determines regional economic growth especially when it takes the form of institutional collective action (Feiock and Park, 2005). The paper suggests that the strategies of regional actors can be reorganized based on terms of a cooperative game. The proposed model is also useful as an instrument for confronting uneven development in Eastern Macedonia and Thrace, particularly during the implementation of Kallikrates reform.

The basic principle of the game is that cooperation is a fundamental input in regional economic growth. Cooperation is a key issue for local actors' strategy, diminishing transaction cost and uncertainty (Feiock and Steinacker, 2003; Hazakis and Ioannidis, 2012). On the other hand, cooperation strategies are not a choice always leading to maximization (Sarafopoulos, 2009).

As mentioned in the literature review section, subsidies reduce significantly the total cost of firms. Additionally, regional growth gives strong opportunities to local governments to claim reelection. It could be stated then that the provision of subsidies from regional governments to firms, counterweighs risk and advances local cooperation (Steinacker, 2002).

In the following sections, regional economic growth is analyzed as a cooperation game between regional governments and firms. The normative form of the game takes for granted that the period just after the implementation of local government reform has experimental elements. It is more realistic that after the conveyance of services and authorities from central government to local administration local actors come to a revised acquaintance. Thus, the form of normative game is more appropriate to represent their interplay through a trial and error process. The game is played separately in the three periods and has the structure of a non perfect information game. Therefore, in the normative form of the game, three games are played through simultaneous movements of actors. Respectively, the extensive form of the game is more suitable to portray the process of interaction in ordinary time. Payoffs are discounted by actors in the extensive form, as there is perfect information in strategies over time.

The normative form of the game

Let a normative form game, with two actors namely Regional Government (RG) and Professional Chamber (FC), which operate in a specific administrative region. Game's assumptions are the follows:

1. Regional Government's objective is the enhancement of regional prosperity.
2. Professional Chamber's aim is to maximize firm's profits.
3. Both actors have perfect information about rival strategies and payoffs.
4. Game is being repeated in three periods. After the third period, regional elections are scheduled.

Payoffs of the three periods of the game are depicted at tables 5, 6 and 7. Let $p_i q - (c_i + t_i - s)q$ the unit profit function of professional chamber in region i, and respectively $p_k q - (c_k + t_k - s)q$ its profit function in region k. The aggregate quantity q is the same in both regions as firms select the level of price (p_i or p_k). Further, c denotes the total cost, t represents the transaction cost and s is the subsidy that regional governments offer to firms in order to attract investment. As it can be seen above, there are differentiations in the interregional costs but not in the subsidy level. This seems reasonable as the final amounts of subsidies offered to firms are the same inside the regions and different across regions¹¹. In addition, u_G^R is the utility of regional government, p_G^R is the political gain when firms invest in the prefecture and t_G^R indicates the transaction cost of regional government¹². Political gain of regional government exceeds in any case its transaction cost of participating in negotiations i.e. $p_G^R > t_G^R$.

In the first period of the game, multiple equilibriums coexist. When regional governments choose subsidy, then firms invest in the region i when $(p_i + s - c_i - t_i) > (p_k + s - c_k - t_k)$. In contrast, when $(p_i + s - c_i - t_i) < (p_k + s - c_k - t_k)$ then professional chamber urges the enterprises to invest in neighboring region k. However, if the two terms are

¹¹ See Law 3908/2011 for more details.

¹² Following Feiock [(2007), p.51], the transaction cost is composed for regional governments by negotiation and coordination cost and for professional chamber by information, negotiation and coordination cost.

equal then firms are indifferent. When regional governments' option is no subsidy the professional chambers dominant strategy, is to invest in neighboring region if there are reductions in cost. Evidently, when professional chamber invest in region i then regional government should subsidy. On the other hand, if firms decide to invest in the neighboring region k then regional administration should not subsidy at all.

The Nash equilibrium of the first period game underlines the necessity for scrutinizing the incentives of actors in order to comprehend their strategies. Social cohesion and local institutional thickness could act as catalysts in this process. Therefore, two new coefficients in the second period of the game are introduced namely coefficient σ of social cohesion and coefficient μ of implementation of local government institutional reform.

Table 5: First Period Game (Launch of the Reform)

		Regional Government	
		S	NS
Professional Chamber	I _i	$p_i q - (c_i + t_i - s)q$ $u_G^R + p_G^R - t_G^R$	$p_i q - (c_i + t_i)q$, $u_G^R - t_G^R$
	I _k	$p_k q - (c_k + t_k - s)q$, $u_G^R - t_G^R$	$p_k q - (c_k + t_k)q$, u_G^R

Table 6: Second Period Game

		Regional Government	
		S	NS
Professional Chamber	I _i	$(1 + \sigma_i)(p_i + s - c_i - t_i)q$, $(1 + \mu)(u_G^R + p_G^R - t_G^R)$	$(1 + \sigma_i)(p_i - c_i - t_i)q$, $(1 + \mu)(u_G^R - t_G^R)$
	I _k	$(1 + \sigma_k)(p_k + s - c_k - t_k)q$, $(1 + \mu)(u_G^R - t_G^R)$	$(1 + \sigma_k)(p_k - c_k - t_k)q$, $(1 + \mu)(u_G^R)$

Table 7: Third Period Game

		Regional Government	
		S	NS
Professional Chamber	I _i	$(1 + \sigma_i)(p_i + s - c_i - t_i)q, (1 + \mu)(u_G^R - t_G^R)$	$(1 + \sigma_i)(p_i - c_i - t_i)q, (1 + \mu)(u_G^R - t_G^R)$
	I _k	$(1 + \sigma_k)(p_k + s - c_k - t_k)q, (1 + \mu)(u_G^R - t_G^R)$	$(1 + \sigma_k)(p_k - c_k - t_k)q, (1 + \mu)(u_G^R)$

(Note: RG: Regional Government, PF: Professional Chamber, S: Subsidy, NS: No Subsidy, I_i: Invest in Region i, I_k: Invest in Neighboring Region k)

Social cohesion is defined as follows $\sigma = \frac{e}{l} + \frac{m}{e} + \frac{h}{p}$ (1), where e denotes the

number of inhabitants of a region that are economically activated, l is the labor force, m the number of people that are members of societal associations, h the number of house owners in a region and p the total population. Moreover, the

implementation of reform takes the form: $\mu = \frac{j}{\bar{j}}$ (2), where \bar{j} denotes the new

jurisdictions that are conveyed from central government to local government throughout the reform and j is the jurisdictions that local governments managed to apply. Obviously, according to (1) & (2) σ and μ are greater than zero.

Payoffs of table 6 indicate that the level of regional σ is critical for the achievement of equilibrium. To be more specific when regional governments choose to subsidy then professional chambers compare the following payoffs:

$(1 + \sigma_i)(p_i + s - c_i - t_i)$ and $(1 + \sigma_k)(p_k + s - c_k - t_k)$. Let for simplicity, the unit profit margin of region i, equal to $\pi_i = (p_i + s - c_i - t_i)$ (3) and the

unit profit margin of region k, equal to $\pi_k = (p_k + s - c_k - t_k)$ (4). Then,

professional chambers choose to invest in region i when

$$(1 + \sigma_i)\pi_i > (1 + \sigma_k)\pi_k \quad (5). \quad (5) \text{ can also be written as } \frac{1 + \sigma_i}{1 + \sigma_k} > \frac{\pi_k}{\pi_i} \quad (5a).$$

Thus, it can be understood that the final selection of the investment project is a matter of comparison between net profit margins and social cohesion. If (5a) is valid then professional chamber will invest in region i. If this is not the case professional chamber will invest in neighbor region k.

The result matches the option of subsidy strategy for regional governments. However, when regional governments choose not to subsidy then firms have the option to invest in the neighboring regional unity. Moreover, when firms adopt the strategy of investing in region i, regional governments must subsidy. If this is not the case, the regional administration should defect.

The third period, of the game is the time that precedes the regional elections. As it can be seen in table 5, payoffs are the same with those of previous period. As the game is played separately in each period, there is a chance for both actors to cooperate. Moreover, if the result of the game in the second period is conflict (i.e. invest in neighboring region, no subsidy), then there is one more chance for players to achieve cooperation. Also, there is one more chance if the result of the game in the second period is cooperation (i.e. invest, subsidy). Thus, it is

consistent to support that if the Pareto Optimum was not achieved in the two previous periods, it should be integrated, for the reason that regional government should implement policies that enhance social cohesion and maximize possibilities of reelection. Table 5, depicts the payoffs for the strategies of two actors in the electoral period.

The Pareto Optimum lies identically with the Nash equilibrium if social cohesion of region i exceeds social cohesion of region k. In that case, the net profit margin of an investment in region k exceeds the relevant net profit margin of an investment in region i. Evidently, high levels of social cohesion favor employment, stimulate consumption and ameliorate living standards. Equally important, the dynamic interplay, between regional governments and professional chambers can lead to social optimal point, satisfying diverse interests of both actors.

The extensive form of the game

In figure 1, the game between regional governments and professional chamber is portrayed as an extensive form. The privilege of the first move belongs to regional government and afterwards professional chambers follow. The game is played also in three periods but it is not developed immediately after the implementation of a reform. Consequently, coefficient μ is present but denotes the ordinary efficiency of local administration.

As both actors have perfect information about the rival pay offs over the three periods, they discount payoffs in the present. It is notified that two alternative routes are scanned in backward induction¹. More specifically, professional chamber of region I perceives that if the game ends in the third period, the regional government will choose to subsidy as the time for elections is getting on. In this case the firms' association will compare $\delta^2(1 + \sigma_i)(p_i + s - c_i - t_i)q$ with $\delta^2(1 + \sigma_k)(p_k + s - c_k - t_k)q$. Or,

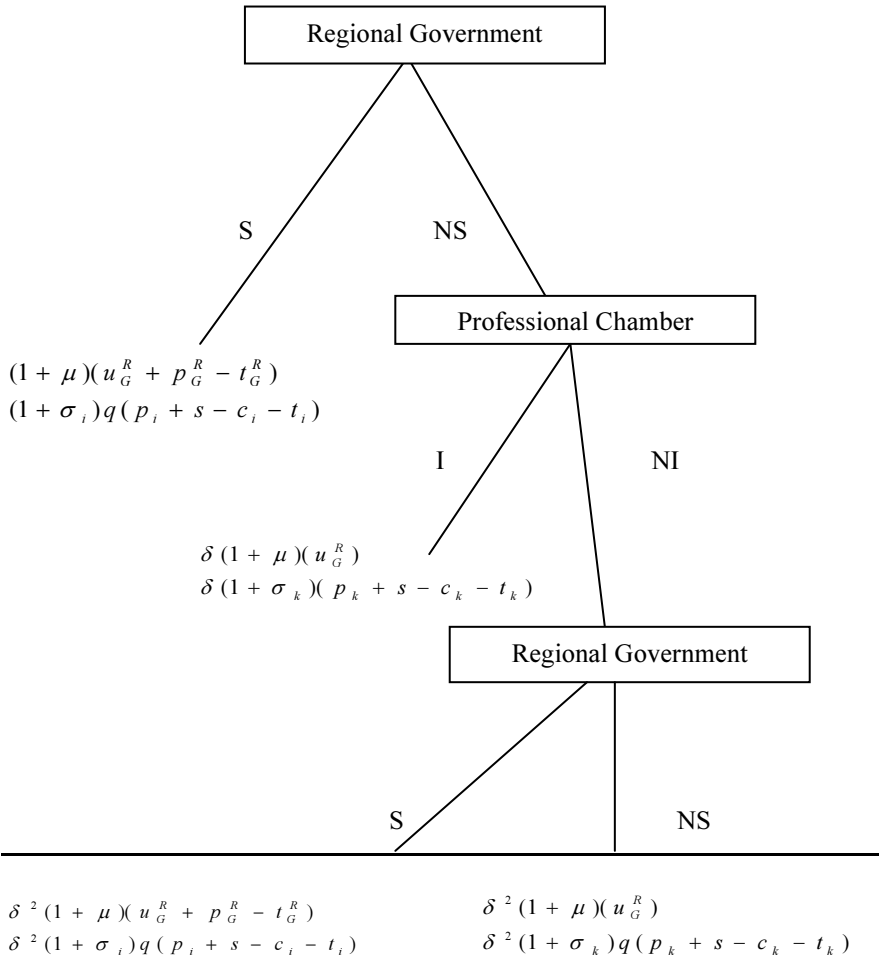
according to (5a), if $\delta \frac{1 + \sigma_i}{1 + \sigma_k} > \frac{\pi_k}{\pi_i}$ (5b), then the best option for professional

chamber (taking into account that the game goes to second period), is not to invest. However, if $\delta \frac{1 + \sigma_i}{1 + \sigma_k} < \frac{\pi_k}{\pi_i}$ (5c), then the best option in the second period is to invest in the neighbor region².

¹ The aforementioned four hypotheses are valid also in the process of extensive form.

² See Appendix for more details.

Figure 1. The interaction of regional government and professional chamber as an extensive form game



Indeed, if regional government observes that (5c) is valid, then the investments will take place elsewhere. In this case local officials compare $(1 + \mu)(u_G^R + p_G^R - t_G^R)$ with $\delta(1 + \mu)(u_G^R)$. As μ is the percentage of efficiency of local government, it is rational to suggest that it is not strongly

differentiated between two periods. On the other hand, if there are dissimilarities in μ index, it is in the interest of local government to choose $(1 + \mu)(u_G^R + p_G^R - t_G^R)$ than $\delta(1 + \mu)(u_G^R)$.

Thus, when the level of social cohesion in the neighboring region exceeds domestic social cohesion, regional governments should subsidy immediately. If regional government subsidies are in the first period, it will receive more as $(1 + \mu)(u_G^R + p_G^R - t_G^R)$ exceeds $\delta^2(1 + \mu)(u_G^R + p_G^R - t_G^R)$. So, regional authorities have strong motives to offer subsidies in the first period and therefore to end the game.

Finally, there is also another issue that needs clarification. The level of social cohesion in the two neighboring regions (σ_i, σ_k) may be increased or decreased during the three periods. Indeed, this is the most probable outcome as societies and economies are considered dynamic systems. Obviously, it is suggested that in the beginning of the game both players perceive in which levels μ, σ_i, σ_k will be until regional elections occur. As a result, the equilibrium of the game depends on the abovementioned coefficients.

Conclusions

According to μ, σ_i, σ_k coefficients, regional economic growth depends on employment, citizenship, house ownership and efficient local governance. Despite differences in interregional unit margin, socioeconomic environment is crucial for investment inflows. Employment increases the levels of purchasing power, citizenship reinforces the interest in local affairs and house ownership pushes up consumption due to lower demand for rents. Further, efficient service of local government favors stability and predictability in a specific region.

The game tested important aspects of regional economic growth after the implementation of local institutional reforms. Improvements in its elements might be necessary in order to understand clearly the options as well as the behavior of local dominant actors. As social cohesion is considered a determinant of the entrepreneurial strategies, its measurement can shed strong light on interregional growth.

It is also suggested that regional economic growth is based primarily on the advantages of local resources. To a more extended frame, regional economic growth is considered an attractive option for local economic actors (Benz and

Furst, 2002). The equilibrium of the game reveals that inhabitants of a region have also a particular share in local growth benefits.

Moreover, it is apparent that the key movement in the game belongs to local government. The better an institutional reform is implemented by a local government, the greater are the benefits for social welfare. Similarly, successful completion of the reform shapes suitable cognitive norms, for actors' participation.

The findings point that Kallikrates reform is a window of opportunity for local governance in Greece and despite the economic crisis, it can improve the terms of collaboration among firms and local governments. Efficient operation of administrative bodies such as Regional Consultation Committee and Regional Development Fund could help allocation of duties for the achievement of local economic growth.

Evidently, all actors involved should focus on the enhancement of conditions that improve social cohesion and modernize functions of local governments. Apart from the effective completion of reform, local governments are responsible for the financial assistance to local investment. Distribution of subsidies to firms should take into account the priorities and needs of local economy. Professional chambers can play a determinant role in this process as they have the knowledge to direct subsidies to firms that invest in efficient operations. Furthermore, inhabitants of communities have the duty to support the reforms and enterprises have the opportunity to participate in new cooperative schemes raised in local-regional contexts. Last but not least, social cohesion could not be ignored as it enforces significantly trust and reciprocity among involved actors.

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Appendix

A1. Normative form of the game

Table A1: First Period Game (Launch of the Reform)

		Regional Government	
		S	NS
Professional Chamber	I _i	$p_i q - (c_i + t_i - s)q$ $u_G^R + p_G^R - t_G^R$	$p_i q - (c_i + t_i)q$ $u_G^R - t_G^R$
	I _k	$p_k q - (c_k + t_k - s)q$ $u_G^R - t_G^R$	$p_k q - (c_k + t_k)q$ u_G^R

First period

-When Professional Chamber plays investment, Regional Government plays subsidy as $u_G^R + p_G^R - t_G^R > u_G^R - t_G^R$.

-When Professional Chamber plays investment in neighboring region Regional Government plays no subsidy as $u_G^R > u_G^R - t_G^R$.

-When Regional Government chooses subsidy, professional chamber chooses investment if $p_i q - (c_i + t_i - s)q > p_k q - (c_k + t_k - s)q$ But if $p_i q - (c_i + t_i - s)q < p_k q - (c_k + t_k - s)q$ then invests in neighbouring region. Professional chamber is indifferent if payoffs are equal.

-When Regional Government chooses no subsidy professional chamber realizes investment if $p_i q - (c_i + t_i)q > p_k q - (c_k + t_k)q$. On the contrary, it invests in the neighboring region if $p_i q - (c_i + t_i)q < p_k q - (c_k + t_k)q$ and is indifferent if payoffs are equal.

Two possible equilibriums: (Subsidy, Investment), (No Subsidy, No Investment).

Table A2: Second Period Game

		Regional Government	
		S	NS
Chamber	Professional	$(1 + \sigma_i)(p_i + s - c_i - t_i)q \cdot$ $(1 + \mu)(u_G^R + p_G^R - t_G^R)$	$(1 + \sigma_i)(p_i - c_i - t_i)q \cdot$ $(1 + \mu)(u_G^R - t_G^R)$
	PF	$(1 + \sigma_k)(p_k + s - c_k - t_k)q \cdot$ $(1 + \mu)(u_G^R - t_G^R)$	$(1 + \sigma_k)(p_k - c_k - t_k)q \cdot$ $(1 + \mu)(u_G^R)$

RG: Regional Government

PF: Professional Chamber

Second Period.

-When Professional Chambers invest then regional government chooses subsidy as $(1 + \mu)(u_G^R + p_G^R - t_G^R) > (1 + \mu)(u_G^R - t_G^R) \cdot$

-When professional chambers invest in neighboring region, the regional government plays no subsidy as $(1 + \mu)(u_G^R) > (1 + \mu)(u_G^R - t_G^R) \cdot$

-When regional government chooses subsidy then professional chamber choose to invest if $(1 + \sigma_i)(p_i + s - c_i - t_i)q > (1 + \sigma_k)(p_k + s - c_k - t_k)q \cdot$

However, if $(1 + \sigma_i)(p_i + s - c_i - t_i)q < (1 + \sigma_k)(p_k + s - c_k - t_k)q$, professional chamber invests in neighboring region. If payoffs are equal professional chamber is indifferent.

-When regional government chooses no subsidy then professional chamber choose to invest if $(1 + \sigma_i)(p_i - c_i - t_i)q > (1 + \sigma_k)(p_k - c_k - t_k)q$ and invest in neighboring region if $(1 + \sigma_i)(p_i - c_i - t_i)q < (1 + \sigma_k)(p_k - c_k - t_k)q$ If payoffs are equal there is no difference.

Two possible equilibriums: (Subsidy, Investment), (No Subsidy, No Investment)

Table A3: Third Period Game

		Regional Government	
		S	NS
Professional Chamber	I _i	$(1 + \sigma_i)(p_i + s - c_i - t_i)q, (1 + \mu)(u_G^R - t_G^R)$	$(1 + \sigma_i)(p_i - c_i - t_i)q, (1 + \mu)(u_G^R - t_G^R)$
	I _k	$(1 + \sigma_k)(p_k + s - c_k - t_k)q, (1 + \mu)(u_G^R - t_G^R)$	$(1 + \sigma_k)(p_k - c_k - t_k)q, (1 + \mu)(u_G^R)$

Third Period

-When professional chamber invest then regional government plays subsidy as

$$(1 + \mu)(u_G^R + p_G^R - t_G^R) > (1 + \mu)(u_G^R - t_G^R) .$$

-When professional chambers invest in neighboring region, the regional government plays no subsidy as

$$(1 + \mu)(u_G^R) > (1 + \mu)(u_G^R - t_G^R) .$$

-When regional government chooses subsidy then professional chamber chooses to invest if

$$(1 + \sigma_i)(p_i + s - c_i - t_i)q > (1 + \sigma_k)(p_k + s - c_k - t_k)q \quad \text{If} \quad (1 + \sigma_i)(p_i + s - c_i - t_i)q <$$

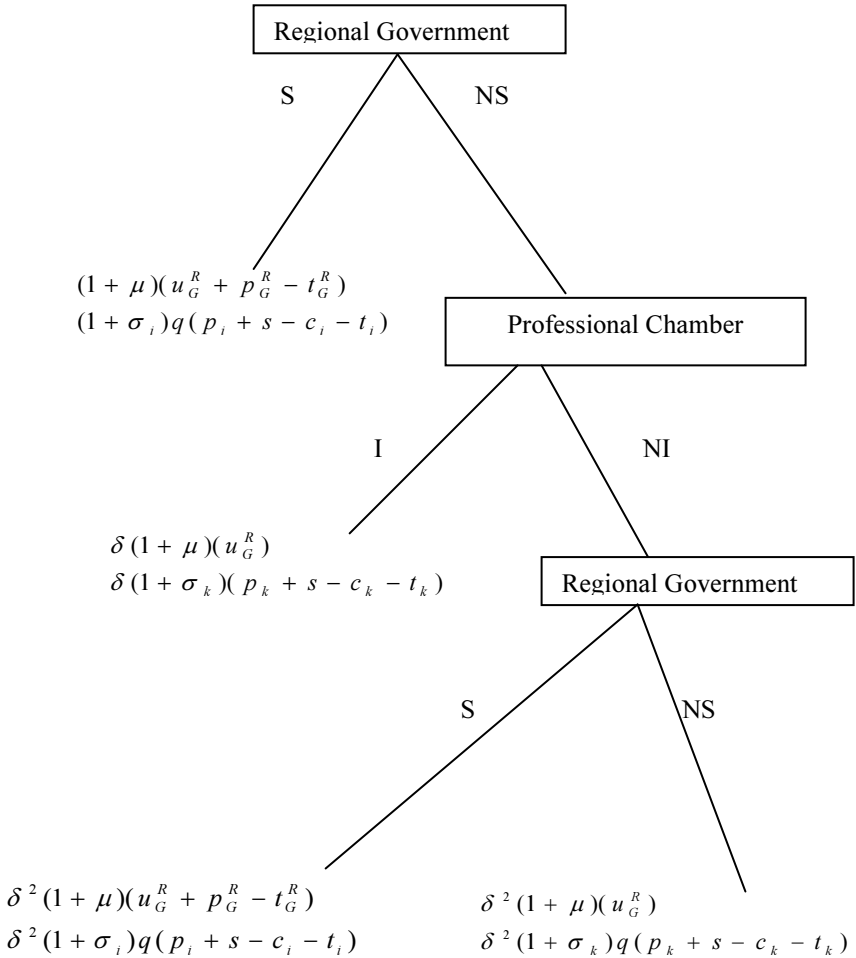
$(1 + \sigma_k)(p_k + s - c_k - t_k)q$ then professional chamber invests in neighboring region. As in the previous periods if payoffs are equal, professional chamber is indifferent.

-When regional government chooses no subsidy then professional chamber chooses to invest if $(1 + \sigma_i)(p_i - c_i - t_i)q > (1 + \sigma_k)(p_k - c_k - t_k)q >$ and invests in neighboring region if $(1 + \sigma_i)(p_i - c_i - t_i)q < (1 + \sigma_k)(p_k - c_k - t_k)q$. If payoffs are equal there is no difference.

Two possible equilibriums: (Subsidy, Investment), (No Subsidy, No Investment).

A2 Extensive Form of the Game

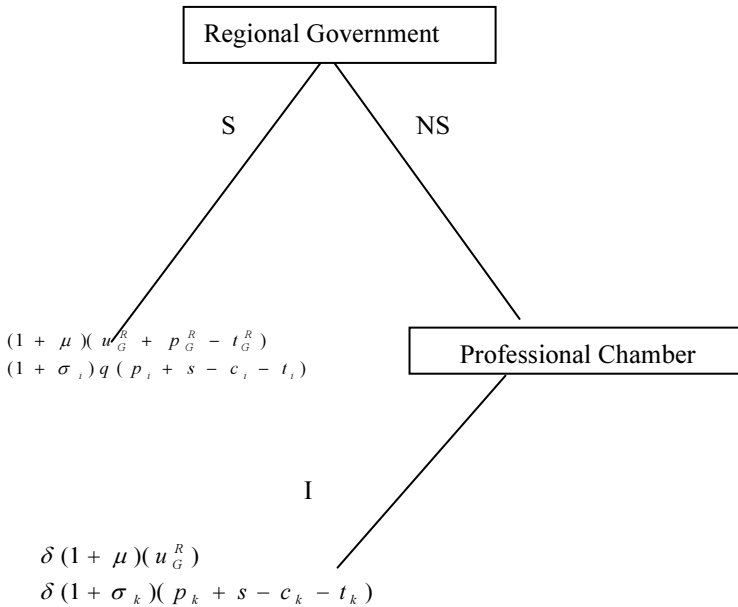
Figure A1. The Interaction of Regional Government and Professional Chamber as an Extensive Form Game



Backward Induction

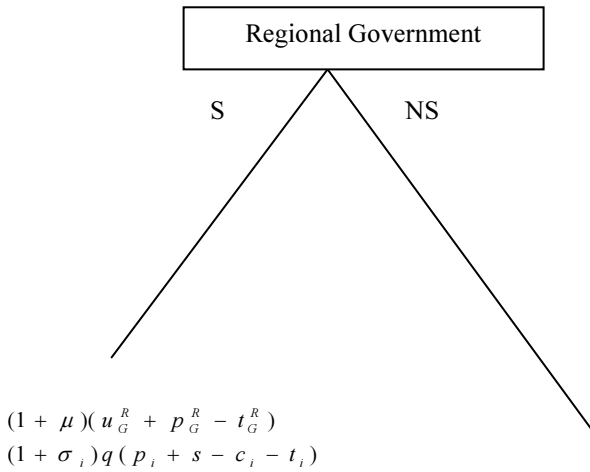
- If the game proceeds until the third period then regional government will choose subsidy as $\delta^2(1 + \mu)(u_G^R + p_G^R - t_G^R) > \delta^2(1 + \mu)(u_G^R)$. Thus, professional chamber will not invest in the second period if $\delta^2(1 + \sigma_i)(p_i + s - c_i - t_i)q > \delta^2(1 + \sigma_k)(p_k + s - c_k - t_k)q$. If $\delta^2(1 + \sigma_i)(p_i + s - c_i - t_i)q < \delta^2(1 + \sigma_k)(p_k + s - c_k - t_k)q$ in the second period then professional chambers choose to invest in the neighboring region. Thus, the game takes the following form:

Figure A2. First Step of Backward Induction



Regional government observes that if the game ends up, it will lose in the second period, as $\delta(1 + \mu)(u_G^R) < (1 + \mu)(u_G^R + p_G^R - t_G^R)$. Evidently, its best option is to consider subsidy in the first period. So the game takes the form:

Figure A3. Second Step of Backward Induction



Two possible equilibriums:

i) (NS, NI, S)

when $\delta^2(1 + \sigma_i)(p_i + s - c_i - t_i)q > \delta^2(1 + \sigma_k)(p_k + s - c_k - t_k)q$

ii) (S)

when $\delta^2(1 + \sigma_i)(p_i + s - c_i - t_i)q < \delta^2(1 + \sigma_k)(p_k + s - c_k - t_k)q$