

**THE 'DANGERS OF DECENTRALIZATION' AND THEIR
RELEVANCE TO LOCAL PUBLIC SERVICES**

Doctoral thesis submitted to the University of Bremen for
examination in consideration of the award of the doctoral degree
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Mexico City, 15 April 2018

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¹ Note that different parts of this doctoral thesis change between British and American spelling, depending on the requirements of the publisher. Therefore, the spelling of the titles of the four chapters differs as well.

To my parents

CHAPTER I

THE ‘DANGERS OF DECENTRALIZATION’ AND PUBLIC SERVICE DELIVERY: A REVIEW OF ISSUES

1. INTRODUCTION

Over the past decades, mistrust in the abilities of central government to efficiently provide public services has caused a wave of fiscal decentralization reforms. The belief is that local governments, which are much closer to their citizens, can deliver public goods much more efficiently. Yet, there are reasons to suspect that lower levels of government may encounter severe challenges in adequately exercising fiscal competences, too. For example, recent struggles with large infrastructure projects in the German federal states indicate that lower levels can be overburdened with complex and technology-intensive projects: The new airport of the city state of Berlin and the federal state of Brandenburg, which is at the moment foreseen to be completed with a delay of nine years, will be 4.5 billion Euros more expensive than the 2 billion Euros initially planned. Also, the Elbe Philharmonic Hall owned by the city state of Hamburg was inaugurated seven years late in 2017 and turned out to be 548 million Euros more expensive than expected.

In the 1990s, the observation of similar management and planning problems at the sub-national level gave rise to the discussion about potential ‘dangers of decentralization’. The debate pointed at the fundamental risks decentralization processes could entail, in particular with regard to reduced efficiency, increasing regional inequalities and weakening local accountability (Prud’homme, 1995; Tanzi, 1996). While the above cited examples relate to the construction and maintenance of infrastructure, which belong to the group of ‘traditional competences’ of sub-national governments, the efficient use of public resources may even be a more challenging task when complex systems of service provision such as healthcare and education but also public security form part of sub-national governments’ responsibilities. At the same time, bilateral and international donor organizations and policy advisors continue to promote decentralization as a remedy to inefficient central government service provision in these sectors as well. For example, decentralization is currently being supported by donors in less developed countries such as Zambia, Iraq and Peru.

Against this background, the underlying motivation of this doctoral thesis is to review the basic rationale behind decentralizing public services and blending it with the discussion about possible dangers of fiscal decentralization with regard to efficient, equitable and accountable public service provision. While the issue of (in)efficiency has received some attention in the empirical literature, the issues related to regional inequalities and to unaccountable local service provision have only scarcely been discussed. This is surprising, in particular because these two dimensions are fundamental to social cohesion and democratic governance.

In what follows, I empirically evaluate the relevance of these dangers for the provision of local public goods related to health, education and public security. As will be exposed in more detail later on, I add insights to a debate which is characterized by a strong focus on the relationship between decentralization and economic growth, by a misconception of the notion of ‘efficiency’ and by a lacking understanding of the micro-level mechanisms that underlie macro-level effects.

Therefore, I examine specific sectors and country contexts as exemplary cases. I will ask myself the following questions:

- A) *Does fiscal decentralization lead to more or less efficient health sectors in the OECD?* I investigate the relationship between different specifications of fiscal decentralization and health sector spending, outcomes and efficiency across and within 32 member countries of the Organization for Economic Co-operation and Development (OECD) over the period 1995-2013 (Chapter II).
- B) *Does fiscal decentralization lead to higher regional inequalities in terms of education?* I look at the effect of teacher pay decentralization on educational poverty in the 16 German federal states (‘*Länder*’) over the period 2004-2014 (Chapter III).
- C) *Does a combination of fiscal decentralization and local capture through interest groups lead to increased organized crime violence in Mexico?* I analyze the relationship between the level of local spending and organized-crime related homicide rates using different samples of the population of 2456 Mexican municipalities in 2010 and between 1995 and 2010 (Chapter IV).

The answers to these questions will be empirically approximated in the following chapters. The current chapter will present the thematic framework this cumulative thesis relates to. It provides an overview over the current state of research, identifies research gaps, develops the main research questions, and connects the results of this thesis to the general discussion on the dangers of decentralization. Thus, the remainder of this chapter presents the basic rationale behind decentralization theory (2), discusses three potential dangers of decentralization for the provision of public goods (3), provides more detail in terms of the structure and concept of this thesis (4) and draws some general conclusions, going beyond the more subject-specific conclusions provided at the end of each of the following chapters (5). However, before moving on to these sections, let me briefly define (fiscal) decentralization and provide some background on why fiscal decentralization has become so popular over recent years.

a. Decentralization: a definition

Until now, I have used decentralization in a generic way, implying that decentralization means some kind of shift of power from the central government to sub-central bodies. However, a more detailed review of the literature makes clear that decentralization can mean different things in different country-contexts, languages, research areas and studies. This is why Dubois and Fattore (2009, p. 712) worry about the plethora of definitions and diagnose decentralization research with the ‘risk of disorder’. What is more, the multidimensional nature of decentralization reforms adds to the complexity of attempts to define decentralization. Nonetheless, in general, decentralization can be clustered along three broad spheres: democratic, administrative and fiscal decentralization.²

Democratic or political decentralization refers to a process by which the power to govern is passed on to lower-level governments. Mechanisms of political representation imply a higher degree of independent local decision-making. Citizens articulate their preferences about local affairs. Local parties and movements compete in local elections. Other channels to foster

² Note that Dubois and Fattore (2009, p. 717) identify an additional category of decentralization, namely that of *silent decentralization*. Silent decentralization refers to unintended decentralization processes, e.g., through unexpected side-effects of policy reforms or shifts in political power. For example, silent decentralization can occur when sub-national administrations increasingly belong to parties other than the party forming the national government. This would usually imply a shift of political power from the national to the sub-national level. Hence, the degree of decentralization is not only determined by formal arrangements but also by the distribution of *de facto* power between the different layers of government.

participation and representation such as public hearings or council meetings increase the political legitimacy of the sub-national governments. These act independently and on behalf of the respective jurisdiction's constituency (Schneider, 2003, pp. 39–40). At the core of this discussion lies the democratically legitimized decision autonomy, which is hoped to increase power of local entities over their own jurisdiction and to foster the influence of local governments in higher-level decision making at the same time (Dubois & Fattore, 2009, pp. 714–715).

Scholars dealing with *administrative decentralization* generally refer to the distribution of competences within or between bureaucracies across layers of government. The most prominently used classification was proposed by Rondinelli, Nellis, and Cheema (1983): They distinguish between the 'deconcentration', 'delegation' and 'devolution' of competences. Deconcentration refers to passing down administrative functions to lower levels within a bureaucracy, e.g., by empowering regionally dispersed field offices of a particular ministry. Delegation is defined as handing over administrative and public service delivery functions to local governments or semi-autonomous bodies which are not directly under the control of the central-level bureaucracy, but which remain accountable to it. Devolution, the most far reaching form of administrative decentralization, implies the transfer of full decision autonomy over a specific policy area to a local government (Schneider, 2003, p. 39). 'Privatization' or 'deregulation' are often brought forward as additional organizational arrangements related to administrative decentralization as they imply passing on governmental functions to private businesses or non-profit private organizations (Rondinelli, McCullough, & Johnson, 1989, p. 72). While all of these dimensions have received considerable attention in decentralization research, for many scholars, devolution is the 'true form' of administrative decentralization as it implies the most radical transfer of responsibilities to lower governmental levels (Asthana, 2012, p. 28).

Fiscal decentralization comprises the shift of fiscal competences to local levels in order to maximize social welfare (Litvack, Ahmad, and Bird 1998, 14) irrespective of the political autonomy of a local entity (Schneider, 2003, p. 36). While many scholars define fiscal decentralization from the perspective of the revenue side, i.e., how sub-national revenues are composed and how local fiscal resources are being mobilized (e.g., type of tax or fee, local tax bases and rates), a more encompassing definition of fiscal decentralization also includes the spending side. This involves the specific spending and thus service delivery functions passed on to the local level which puts the spotlight on issues related to administrative capacities and to planning of public goods provision (Dubois & Fattore, 2009, p. 714).

What becomes clear is that decentralization is essentially multidimensional. This is why I define decentralization in a rather broad way as the transfer of political power, administrative functions and/or fiscal competences from the central government to lower-level tiers of government which exert some control over a limited geographic area within a country. While this is the definition of decentralization, in this thesis, I take on the more narrow perspective of *fiscal decentralization*, as I specifically look at the impact of certain constellations of revenue or spending competences on the efficiency, equality and accountability in public service delivery. In this regard, just as Litvack, Ahmad, and Bird (1998, p. 14), I define fiscal decentralization as the transfer of revenue mobilization and expenditure functions from central to sub-central levels of government.

Of course, my reflections will also profoundly delve into the other dimensions of decentralization, as these can hardly be treated in an isolated manner. For example, the amount of local resources spent at the local level has implications for local administrative structures. At the same time, the amount spent also depends on how efficiently local bureaucracies manage the provision of certain local services. Also, there is rarely a situation of complete devolution of responsibility over a certain policy area without a parallel devolution of fiscal autonomy and accountability mechanisms (usually in the form of local elections). Finally, it seems pointless to legitimize local governments through local elections without giving them the power to administer and finance important local affairs.

The relation between decentralization and federalism needs some clarification, too. From the discussion above, it becomes clear that decentralized competences in terms of political power, administrative functions and fiscal competences are closely related to the definition of federalism. Obinger, Castles, and Leibfried (2004, pp. 8–9) describe federal countries as countries characterized by a set of institutional provisions and decision rules that facilitate the incorporation of interests of the regions, by a set of territorial actors with region-specific interests, by a division of responsibilities in the provision of public goods between levels of government and by a system of fiscal transfers. These characteristics may be complemented by informal arrangements between and within levels of government. According to this definition, fiscal decentralization is one element of federalism, relating to the issues of allocation of policy responsibilities and their financing. Federalism, in turn, implies a broader perspective on institutional arrangements to effectively limit the power of the central government (Rodden, 2002, p. 674), which brings us back to the integrated conception of decentralization in its three dimensions (political, administrative, fiscal), exemplifying that considerable conceptual overlaps persist. The close

relation between federalism and (fiscal) decentralization becomes clear in Chapter III when I discuss inequalities in educational outcomes in federal Germany, but also in Chapter IV, when the relationship between fiscal decentralization and violence in Mexico will be examined.

As a final word, it needs to be stressed that decentralization can be understood as a static or as a dynamic concept (Dubois & Fattore, 2009, p. 707). The *state* of decentralization refers to a structure of a political system, something I will be dealing with in Chapter IV, when I explore the relationship between the fiscally decentralization, local capture and violence in the year 2010 (although I also look at the period 1995-2010 as a robustness check). The *process* of decentralization will be dealt with in Chapter III, as I look at the specific impact of federalism *reform* in Germany on educational poverty. A mix between static and dynamic fiscal decentralization is subject to discussion in Chapter II, where I investigate differences in health decentralization *between* OECD members, i.e., between different states of decentralization, and differences in decentralization *within* OECD countries *over time*, i.e., the dynamic evolution of sub-national expenditures. However, I do not directly look at the process of reform in that particular chapter.

b. The decentralization 'buzz'

Enthusiasm about decentralization has sparked over the past decades. From a historical point of view, a centralization of power in the hands of national governments during the Second World War triggered a counter-reaction during the immediate post-war era about how powers can be decentralized to lower levels. Then, decolonization processes around the world, especially those that took place in the 1970s, led to a shift of power from the highly centralized colonial regimes to political systems that were characterized by a decentralized institutional set-up (Dubois & Fattore, 2009, p. 705). After the fall of the Iron Curtain, many reform forces saw the need to transfer power from the highly centralized governments of the former Soviet Union to lower levels of government (Asthana, 2012, p. 27). In addition, the creation of the European Union, which was essentially a discussion about the relation between a central, European government and its constituting regions, caused an intensification of the decentralization debate, too.

Over time, the justification for decentralization changed. Rodríguez-Pose and Gill (2005, p. 407) point out that the decentralization of governmental functions were for a long time justified with reference to preserving and protecting cultural, ethnic and religious rights. This argument was

closely related to the perception that the uniqueness of regions was under threat and needed to be conserved through increased local autonomy. While these nationalist and regionalist arguments remain part of the public discourse, they were overshadowed by ‘new regionalist’ movements in the 1990s. These underscored the economic benefits of decentralization, in particular with regard to its fiscal dimension, as it promised the efficient application of public resources and increased interjurisdictional competition (Keating, 1998). A general skepticism towards the positive role of central government and the view that more emphasis should be put on market mechanisms emerged (Tanzi, 1996, p. 296). For example, the diffusion of the concept of ‘New Public Management (NPM)’ comprised the element of ‘managerial decentralization’ as one key element to make the public sector and ultimately public service delivery more efficient (Hood, 1991). Thus, in the developing world, decentralization was increasingly considered an adequate response to the failure of central governments to ensure adequate economic growth. In the developed world, too, the idea of tailoring public policies to local preferences was a major rationale for engaging in decentralization reforms (Oates, 2005, p. 349).³

Catalyzed by the enthusiastic support for decentralization reforms through multilateral organizations such as the World Bank, bilateral donors and policy experts, decentralization as public sector reform spread all over the world (Litvack et al., 1998, pp. 1–2). From 75 developing countries that were analyzed at the beginning of this century, 80 percent had undergone some kind of decentralization. Also, from 42 democracies under investigation in 2010, 70 percent had undergone decentralization processes over the previous 60 years (Martinez-Vazquez, Lago-Peñas, & Sacchi, 2017, p. 1096). For example, in Europe, Belgium, Italy and Spain implemented major decentralization reforms. Also, in the wake of President Reagan’s New Federalism agenda, the federal states of the United States (US) received considerably more liberties in the 1980s. In the developing world, comprehensive decentralization reforms took and continue to take place in all regions, for example in Latin America (Mexico and Brazil) and Asia (China, Indonesia, Vietnam, Philippines) (Rodríguez-Pose & Ezcurra, 2010, p. 621).

³ There is also some econometric work that attempts to explain the decentralization buzz of recent decades. Treisman (2006, p. 291) presents evidence that colonial history is indeed important to explain differences in (fiscal) decentralization, with British, French and Russian colonies being significantly more decentralized than Spanish or Portuguese colonies. Together with country size, colonial history explains more than half of variation in decentralized expenditures and revenues. In addition, richer and federal countries are likely to exhibit higher degrees of decentralization. Letelier (2005, p. 156) argues that urbanization decreases fiscal decentralization while population diversity and income distribution does not seem to be relevant. Both researchers find a positive effect of democratic regimes on the degree of decentralization.

In sum, driven by an optimistic view about its chances, the concept of decentralization is now a key characteristic of political systems all over the world, both in developing and developed countries. Most experts expect substantial gains in terms of economic growth, efficient public service delivery, spatial equity and increased accountability. Before entering into these dimensions with greater detail, I now take a closer look at the basic arguments brought forward by most proponents of fiscal decentralization reforms.

2. THE RATIONALE BEHIND FISCAL DECENTRALIZATION

In his *Theory of Public Finance*, Richard Musgrave defines three core objectives of public financial and fiscal policy: a) the need to ensure stable prices and full employment (‘stabilization branch’), b) the importance to provide for a socially acceptable distribution of income and wealth (‘distribution branch’) and c) the efficient allocation of public resources for the provision of public goods (‘allocation branch’) (Musgrave, 1959). While scholars generally agree that stabilization and distribution should remain in the hands of the central government (see Oates, 1968) – even though decentralization can have major impacts in the realm of these branches as will be discussed later on – the argument for fiscal decentralization is a response to the ‘fundamental problem of the provision of public goods’ encountered by the allocation branch. Samuelson (1954, 1955) defines this problem as the inability of the public sector to determine the efficient level of expenditures on public goods. The nature of public goods⁴ but also merit goods⁵, namely its non-excludability from consumption (Olson, 1969, p. 481), makes it nearly impossible to get an exact picture of the preferences of the consumers, in particular with regard to the true price they would be willing to pay for the consumption of a particular level of the public good. In fact, a self-interested consumer would have an incentive to understate the importance,

⁴ *Public goods* are defined as goods which are not characterized by rivalry in consumption and from which people cannot be excluded, such as national security, some civil protection measures or clean groundwater. This definition stands in contrast to those of *open access or common-pool resources*, for which exclusion is not easily enforceable as well but where rivalry in consumption exists, i.e., the availability of the good depletes with more people consuming it. Examples are common fishing grounds or rivers. Then, a *club or toll good* is a good which can be provided exclusively to a group of people and which is not subject to rivalry in consumption, e.g., some types of roads or electricity. In theory, a market mechanism could provide these goods. Finally, *private goods* are goods from which people are easily excluded and which cannot be consumed by others at the same time (E. Ostrom, 1990; Rondinelli, McCullough, & Johnson, 1989, pp. 63–65).

⁵ Merit wants refer to those wants that, in principle, could be satisfied by the private market but which are of such importance that the government takes on the role of providing the service to all members of society (Musgrave, 1959, p. 13). In the following chapters I deal with three of such wants, or in this case, goods, namely health, education and public security. For the sake of simplicity, I will refer to them as public goods as well.

and thus price, ascribed to the consumption of a particular public good (Samuelson, 1954) making it impossible to adequately tax them. Consequentially, the argument goes, public goods are not provided in an efficient manner.

While there have been various suggestions to resolve this problem, such as voting mechanisms or auctions (Inman & Rubinfeld, 1997, p. 46), Tiebout (1956) proposed a market-like mechanism that would encourage consumers to reveal their true preferences for public good consumption. The core assumption behind 'Tiebout-sorting' is the notion that consumers are mobile and move to jurisdictions where they can benefit from their preferred level and quality of a particular public service provided at the price they are willing to pay. Thus, creating a multitude of local communities with each of them providing a different bundle of public services increases the choice in the 'market of publically provided goods'. City managers are assumed to compete for an efficient population size within their jurisdictions, a state which is reached when the average cost per utilization of the provision of a congestible service, i.e., a service the benefit of which declines with an increased number of consumers, is equal to the marginal cost of an additional user (Inman & Rubinfeld, 1997, p. 45). With a sufficient number of jurisdictions and a sufficiently high variation in the levels, costs and kinds of services provided, the provision of (local) public goods approaches an efficiency level comparable to that of privately provided goods (Tiebout, 1956, p. 420). At the end of the process, Tiebout expects a situation where the benefit from consumption will equal its cost in terms of taxes (Tanzi, 1996, p. 299).

However, it has been acknowledged that the notion of consumers shopping for their preferred localities is based on strong assumptions. In particular, Tiebout-sorting requires fully mobile citizens disposing over complete knowledge about the revenue-expenditure packages offered by all local governments. Other factors that would limit the mobility of citizens such as family ties or employment opportunities are not being considered. Also, the model assumes that there are a large number of local communities which would offer different bundles of public goods (Tiebout, 1956, p. 420), something that may not always be feasible. The issue of missing benefits from economies of scale, i.e., the problem that smaller communities operate at a smaller scale which implies higher costs per unit produced, is not being considered. Finally, it is not clear why local officials would have an incentive to strive for the optimal population size.

Despite these doubts, the Tiebout-model has initiated the debate on competition between localities, and laid the ground for arguments either related to the 'race to the bottom' between local authorities, i.e., the reasoning that local governments continuously lower taxes and thus the

level of local services provided in order to attract mobile capital or labor, or related to the ‘race to the top’, i.e., local decision-makers overproviding local public goods in order to attract citizens and to broaden their tax-base (Busemeyer, 2008, p. 455).

The second, probably even more influential rationale for fiscal decentralization was brought forward by Oates (1972). He argued that even if the preconditions needed for Tiebout-sorting to properly function were not present, decentralization would still be a powerful instrument to promote the process of preference matching in order to satisfy everybody’s particular needs. The starting point of the argument is the assumption that central government provision of public services are uniform and do not take account of spatial differences in preferences of the population for a range of public services and differences in provision costs (Oates, 1999, p. 1122). It may be the case that while for some public goods, such as clean air, a uniform provision is inevitable, many public goods, such as regional transportation systems or forestry services, should be provided in a differentiated form, depending on the specific characteristics of a country’s regions. A central government ‘one-size fits all’ approach to the provision of public services would lead to under- or overprovision in some regions (Tanzi, 1996, pp. 298–300), ultimately compromising public service efficiency.

At the heart of the issue lies the challenge of imperfect information. According to Oates, the government is simply too far away from the population to grasp the full complexity of the distribution of preferences. Local governments benefit from the proximity to their constituency and can better assess what their people really want and what they are willing to pay. Also, they have better knowledge of other local conditions, such as service provision cost functions (Oates, 2005, pp. 253–259). Consequentially, local policy makers tailor public services to local preferences, which increases efficiency of public resource allocation in the aggregate and thus of the allocation branch (Oates 1994). Following this argument, if local public service provision is Pareto-efficient and if cost savings from central government provision are absent, overall welfare will be at least as high as the one generated by centralized provision (Oates, 1972, p. 54).

While the most straightforward counter-argument would be to assume that central government could also respond to territorial differences in preferences through its own bureaucracy, e.g., through the creation of field offices (i.e., deconcentration) (see Martinez-Vazquez et al., 2017, p. 1097), without devolving entire functions to local governments, Oates (2005, p. 253) argues that local policy-makers would still be in the advantage as they interact more comprehensively with ‘their’ constituency and remain in possession of superior local knowledge. Furthermore, a

territorially adjusted provision of public services by the central level is difficult to achieve as there are political constraints rendering it impossible to provide public services more generously in one region than in others. Thus, fiscal decentralization and the resulting process of ‘preference matching’ would remain the best solution to overcome the problem of identifying the true preferences of consumers of public goods.

A third argument in favor of decentralization presented by Breton (1987) and Salmon (1987) emphasises again the issue of competition between governments. In contrast to Tiebout-sorting, which is based on the idea of citizens voting with their feet when confronted with inefficient provision of public services (the exit option), the idea of ‘yardstick-competition’ underscores the ability of citizens to compare the performance of ‘their’ local government with that of neighboring or otherwise similar governments, and punish their local leaders in the context of local elections if necessary (the voice option). Afraid of not being reelected, local leaders try to improve the quality of services delivered while keeping costs as low as possible, ultimately satisfying their electorate. For such a reward-punishment relationship to function properly, Salmon (1987, p. 32) stresses the importance of an environment that enables local governments to enter into horizontal competition with each other for the best efficiency outcomes.⁶ As a consequence, based on an assessment of comparative performance, voters reward or punish the decision makers in office, laying the ground for a virtuous cycle of ever improving local governance. Clearly, the precondition for functioning yardstick-competition is the availability and successful diffusion of comparative performance data, the motivation of citizens to hold governments to account, and functioning local democratic processes, which also exemplifies the close link between fiscal and political decentralization.

A fourth major argument underscores the increased innovation potential fiscal decentralization can bring about. The idea is that local jurisdictions would serve as ‘laboratories of experimentation’ (Tanzi, 1996, p. 300): A high number of local governments, usually implying a substantial diversity in governing political parties and different organizational cultures, cause a high variety of policies applied, all of them with the objective of achieving efficient public service delivery in a certain sector (Pierson, 1995, p. 456). According to the argument, policy innovations which have proven successful in one jurisdiction would then be diffused to other localities so that they

⁶ Salmon argues that such an incentive scheme could not be established in a centralized setting, because, in this case, the performance of the central government could only be assessed through an evaluation of performance over time, an assessment which would likely to be biased through time-varying external shocks that are beyond the control of the administration in office (Salmon, 1987, p. 30).

ultimately become national standard (De Vries, 2000, p. 197). Some even argue that governments engage in competitive innovation (Rodríguez-Pose & Gill, 2005, p. 409). Moreover, policy experimentation at the local level is less risky than innovation at the central government level since a failure of the applied innovation would affect a smaller number of people.

Among scholars of various disciplines the above presented main arguments have sparked considerable enthusiasm about fiscal decentralization, leading to the commencement of a vast number of decentralization reforms. For local governments in many countries, this implied that they had to manage an exponentially higher amount of policy areas, staff and public resources. Also, if not backed by intergovernmental transfers, local governments were expected to considerably expand the level of resources they generate from local taxes or revenues. In the wake of these decentralization-induced challenges, in particular in the 1990s, some scholars – and among these famously Rémy Prud'homme with his essay on *The Dangers of Decentralization* – shared their concern that fiscal decentralization might bring along a range of problems, cancelling out the assumed positive effects of fiscal decentralization just presented. I will now review three core families of these concerns.

3. FISCAL DECENTRALIZATION AND ITS THREE DANGERS

While the above presented ‘first-generation theory of fiscal federalism’ generated the underlying rationale for fiscal decentralization, a ‘second-generation theory of fiscal federalism’ (Qian & Weingast, 1997) deals with more detailed questions, including with institutional design, intended and unintended side-effects, and enabling conditions for successful fiscal decentralization. The need to take a closer look at the different facets of the decentralization process is a consequence of the notion that fiscal decentralization may not be a one-size-fits all solution to make the public sector more efficient, but on the contrary, cause substantial negative effects in terms of local well-being, regional distributional justice and accountability.

These negative effects were first systematically brought forward by Prud'homme (1995) who groups the dangers of decentralization into three broad categories: a) the negative effects on macroeconomic stability, mainly through excessive sub-national borrowing; b) possible detrimental effects on efficiency in service delivery, and c) the risk of increasing income and regional disparities. These three dangers correspond to Musgrave's three objectives of public fiscal policy which I presented above.

Also, the discussion about the dangers of decentralization puts the spotlight on a, until that point, underreported additional danger which has been intensively discussed thereafter, namely the danger of local corruption and collusion. Subsequently, deficient accountability relations between local governments and citizens have been presented as an additional category when referring to the dangers of decentralization. For example, Rodríguez-Pose & Gill (2005, p. 406) argue that the ‘downsides of devolution’ fall largely into three areas, namely efficiency losses, equity concerns and burdens related to institutional and governance issues, mainly lacking local accountability and the risk of corruption. In contrast to Prud’homme, these authors do not discuss the stability objective as a fourth dimension, but treat the related issues as part of the efficiency dimension. As I look at the dangers related to public service delivery and not at economic growth⁷, for which the stability dimension would be of especial relevance and should be discussed separately, I follow the classification of Rodríguez-Pose & Gill (2005). Hence, I will discuss the dangers of decentralization according to the following three dimensions:

- A) *Inefficient service delivery*, i.e., the danger that fiscal decentralization decreases the input-output relationship in the delivery of public services.
- B) *Unequal service delivery*, i.e., the danger that fiscal decentralization causes inequalities in public service delivery outcomes to increase between regions.
- C) *Unaccountable service delivery*, i.e., the danger that fiscal decentralization promotes rent-seeking, corruption and state capture and thus leads to a deterioration of the fundamentals of democratic governance.

These three dangers of decentralization for public service delivery will now be reviewed in more detail.

⁷ The dangers of decentralization have largely been dealt with from an economic perspective, discussing the effects of fiscal decentralization on economic growth and macroeconomic stability. Yet, as I have shown in the previous section, the starting point for the fiscal decentralization literature, and thus the basic rationale behind fiscal decentralization, is not the objective to improve economic growth but the strive for more efficient public goods delivery. This issue has received far less attention in the literature. In parallel, a vast scientific literature has emerged in specific policy areas, most prominently in health and education, which also investigates the effects of decentralization reform mainly on the efficiency dimension in public service delivery (see, for example, Saltman, Bankauskaite, & Vrangbaek, 2007). At the same time, these debates remain rather disconnected from the general fiscal decentralization literature as I will argue in Chapter II.

a. Does fiscal decentralization make public service delivery less efficient?

The fundamental promise of fiscal decentralization relates to efficiency gains in the delivery of public or merit goods. Efficiency can be defined as either accomplishing an output with the least amount of inputs ('input orientation') or accomplishing a maximum output with a given amount of inputs ('output orientation') (Charnes, Cooper, & Rhodes, 1978). Efficiency is usually being discussed in two dimensions: Allocative efficiency refers to the adequate allocation of public resources so that expenditures match local demand for public services. In particular, Tiebout-sorting and preference matching are the two concepts that shall bring about a more exact allocation of revenues according to the true preferences of the population. This way, governments will not over- nor underspend on specific public functions. Production efficiency, in turn, is present when a given quantity and quality of public service is being produced and provided at lowest costs (Litvack et al., 1998, p. 20).⁸ The concepts of yardstick competition and the notion of laboratories of innovation both refer to possible improvements in production efficiency through decentralization – although in particular the former is also relevant when it comes to allocative efficiency. Decentralization sceptics have brought forward concerns with regard to both dimensions of efficiency.

In terms of allocative efficiency, the most prominent argument is the danger of interjurisdictional spillovers. Spillovers or externalities refer to the situation when the benefits or costs of public service provision are imposed on persons outside the jurisdiction which is providing the service. This means that allocative efficiency is being compromised, especially when no compensation takes place (Blom-Hansen, Houlberg, Serritzlew, & Treisman, 2016, p. 816).⁹ For example, services provided by city-center governments such as free parks which are being used by citizens from the entire metropolitan area, i.e., people not belonging to the jurisdiction and thus not paying local taxes, tend to suffer from uncompensated externalities. Uncompensated benefits to outside populations, in turn, can lead to the decision of local policy-makers that a specific service

⁸ As mentioned, this is the input-oriented definition of production efficiency.

⁹ Mechanisms would consist of, e.g., horizontal intergovernmental transfers which are dedicated to compensate for additional cost a specific jurisdiction may have through spillovers (Oates, 1999, p. 1126).

should not be provided anymore although the local population would prefer a continuation of the service (Olson, 1969, p. 482).¹⁰

Another concern relates to a possible ‘race to the bottom’ between local governments. The starting point is the enthusiastic ‘Leviathan hypothesis’ brought forward by Brennan and Buchanan (1980, p. 184). It holds that decentralization can be a powerful means to tame the expansive nature of the public sector. Since local governments will have to compete for mobile households and for mobile economic factors, local decision-makers are forced to keep local taxes and spending as low as possible in order to remain competitive. While Oates (1985) rejects the hypothesis as he does not find a statistically significant relationship between fiscal decentralization and the size of the public sector,¹¹ the basic concern of decentralization sceptics remains that local governments enter into ‘destructive interregional competition’ as these lower spending to such levels that the provision of essential public service cannot be guaranteed (Cumberland, 1981). With the objective of attracting new businesses and creating jobs, local governments would compete by lowering taxes and expenditures and loosen regulations, such as environmental standards, ultimately leading to an underprovision of public services (Kunce & Shogren, 2007).¹²

However, in recent years, not underspending but overspending has been considered a danger to macroeconomic stability and efficiency. The notion that local governments may get bigger and bigger gave rise to the ‘flypaper effect’ argument, i.e., the hypothesis formulated by Courant, Gramlich, and Rubinfeld (1979, p. 6) that spikes in intergovernmental transfers cause the increase of public expenditures much more rapidly than do spikes in local income. Local officials avoid reducing taxes even though they receive additional non-matching grants. The underlying explanation is that local populations are unable to note the marginal price of an increase in

¹⁰ The issue of spillovers leads Olson (1969, p. 479) to formulate the ‘principle of fiscal equivalence’ as one way of counteracting the issue of uncompensated externalities. As a representative of functional federalism theory, he proposes to tailor service-specific boundaries so that these prevent spillovers of public service provision from happening. Every public good would have its own individual functional unit with a unique boundary. This way, Pareto-efficient service provision would be ensured. As Litvack, Ahmad, and Bird (1998, p. 10) argue, in practice, a grouping of specific services in local (e.g., street lighting), regional (e.g., road construction) and national (e.g., national security) functional levels has emerged.

¹¹ In fact, Rodden (2003, pp. 696–697) argues that public sector growth depends on the nature of decentralization, with transfer-based local expenditures leading to faster public sector growth while own-tax financed transfers lead to slower public sector growth.

¹² Scholars argue that this risk is particularly eminent when local governments do not reflect the benefit principle of taxation but finance their revenues through non-benefit taxes, e.g., taxes on income or profits (Hines, 2000). The only strategy to avoid these taxes is to move to another jurisdiction instead of just stopping consuming the particular public service they are paying the tax for. Also, emphasizing resident-based taxes instead of source-based taxes can reduce tax competition, as businesses have less scope for tax exporting (Inman & Rubinfeld, 1996).

revenues from transfers, because these are perceived as additional funds from external resources (Hines & Thaler, 1995).

The fear that local governments have incentives to over-indebt themselves stems from the debate about a ‘soft-budget constraint’. Local governments face soft-budget constraints when they can expect to be bailed-out from the central government in case of debt default. Thus, the disciplining force of the capital market is ineffective and local governments would accumulate ever increasing deficits. As Kornai, Maskin, and Roland (2003) note, central governments can encounter severe limitations in credibly ‘selling’ their no-bail-out position because letting an (important) local government default can imply severe welfare (e.g., in the form of high unemployment) and reputational costs (e.g., in the form of local officials blaming the central government for not having taken on its responsibility). The result of the soft-budget constraint would be that local governments spend way above the efficiency threshold (see Goodspeed, 2002). However, some remedies have found to be quite effective, such as strict balanced-budget rules (Bohn & Inman, 1996, p. 15) and ‘double-budget constraints’, i.e., the imposition of overall limits to the budgets and a detailed prescription on how the local funds should be spent (Oates, 2005, p. 358).

The structure of local government revenues is considered to be important for both allocative and production efficiency. The ‘fiscal illusion hypothesis’ holds that when citizens, who are also voters and taxpayers, cannot make the link between taxes paid and benefits received, they are less likely to sanction local politicians for overspending or bad quality in service delivery. Thus, when local revenues are dominated by grants from higher levels of government or by tax-sharing schemes, citizens perceive public services to be funded and provided from outside the local jurisdiction. This ultimately weakens the agency relationship between the local population and local officials (Martinez-Vazquez & Timofeev, 2010, p. 605; Rodden, 2002, p. 672). This is why Rodden (2003, p. 724) presents evidence which, in its aggregate, suggests that local governments that are financed through local taxes and fees spend public resources more efficiently because local constituencies want to know in more detail how much value they receive for their money. This argument is closely connected to the argument of yardstick competition presented above. On the contrary, local governments financed by grants from the central government spend these funds less efficiently.

With regard to production efficiency, probably the most extensively discussed issue relates to scale economies. The argument goes that in decentralized countries small sized and fragmented local governments suffer from high fixed costs in comparison to the volume of public services

delivered, rendering delivery less efficient (Blom-Hansen et al., 2016, pp. 813–816).¹³ For example, in China, India and Brazil, the devolution of tasks has substantially increased bureaucratic costs caused by the duplication of basic administrative functions (Rodríguez-Pose & Gill, 2005, p. 414), making service provision more expensive. Although it has been stressed that population size matters most, the volume of the public service provided and the dispersion of population over a certain territory are key to the issue of scale economies as well (Bel & Warner, 2016, p. 93). Issues related to scale economies were central to the justification of recentralization processes during the 1950s with many small communities not being able to meet the growing demands for sophisticated service delivery that arose from welfare states becoming larger and more complex (Blom-Hansen et al., 2016, p. 813).¹⁴

Closely related, one concern allegedly diminishing the production efficiency of public service delivery is the issue of weak administrative capacities at the local level. Prud'homme (1995, p. 210) argues that central government bureaucracies work far closer to the technical production frontier than local bureaucracies. On the one hand, central governments can attract more qualified people primarily because they have better career opportunities to offer. The central government civil service would provide for more diverse tasks, a higher probability of getting promoted and enable working under a long-term perspective. In fact, decentralization reform has encountered some opposition from, e.g., health workers or teachers in several countries, as these groups did not want to give up privileges granted from central government employment schemes (Blair, 2000, p. 27). On the other hand, central government can invest more in technology and innovation, putting its government in a better position to tackle complex issues of service delivery (Martinez-Vazquez & Timofeev, 2010, p. 603). Tanzi (1996, p. 303) holds that in particular financial management may pose a challenge to local governments. With fiscal decentralization, local governments come to manage substantially larger amounts of public funds which may present a strain on absorption capacity, i.e., overburdening local financial management and auditing systems. Others point out that tax collection may be challenging for local governments, too. The property tax – a major revenue income source for most communities around the world –

¹³ Scale economies are in fact an additional issue brought up in the wake of the principle of fiscal equivalence, that is, in the search of the optimal geographical coverage of local government (see Olson, 1969, p. 485).

¹⁴ There are two strategies discussed to counteract the issue of lacking economies of scale. Inter-municipal *cooperation* between local governments implies the joint production and regional service coordination across governments (V. Ostrom, Tiebout, & Warren, 1961). Municipal *amalgamation* involves merging various small jurisdictions into one larger one that can produce local services more efficiently. However, evidence on the efficiency-enhancing effect of these strategies through economies of scale is inconclusive (see Bel & Warner, 2016; Blom-Hansen, Houlberg, Serritzlew, & Treisman, 2016).

requires highly specialized competences, for example, when it comes to assessing the property value (Oates, 1993, p. 242). This is why several experts favor a division of labor between central and local governments with the central government collecting taxes on behalf of local governments (Oates, 1999, p. 1128).¹⁵ In fact, and as I will discuss further below, the issue of lacking administrative capacities is likely to be especially pronounced in highly technical and complex sectors, such as health and education. These sectors need a substantial amount of specialized knowledge, capital and technological investments as well as general planning capacities, which may be more limited at the local level.

The effect of decentralization on efficiency remains a contested issue. The research is as complex as the topic itself. However, it is worth noting that although decentralization is essentially about efficiency in public service delivery, a substantial body of literature concentrates on the effects of decentralization on gains in economic growth (Díaz-Cayeros, Magaloni, & Ruiz-Euler, 2014, p. 81) and not on public service delivery performance. At the same time, those studies dealing with the effect of decentralization on the performance in public goods provision such as health and education seem to suffer a misconception of the notion of efficiency. As the overview of Channa and Faguet (2016) shows, almost all research in this area looks either at the effect of fiscal decentralization on health or education *spending*, i.e., the input-side, or at the *outcome* of services, i.e., the output side. An integrated discussion of the effects of decentralization on efficiency in public service delivery has only very rarely been undertaken. As I will show in Chapter II, while there is some quantitative research on the effect of decentralization on health sector outcomes, there is less research on the effect on spending (Channa & Faguet, 2016, p. 228) and very little research on health sector efficiency.

Therefore, there is a need to go beyond the focus on economic growth and further investigate the effect of fiscal decentralization on efficiency in public service delivery. This is especially true for the health sector, as many countries have recently entered a *recentralization* path. Moreover, there remains much room for discussion about the more general question whether the negative effects of decentralization cancel out the positive effects of fiscal decentralization on efficiencies in public service delivery. In Chapter II, I will address these issues and take a closer look at the effect of fiscal decentralization on the input-output relationship in the health sector – which has been one focus sector of decentralization reforms in the past – in 32 OECD countries over the

¹⁵ However, some argue that local governments may be more efficient in tax collection because local tax collectors know their tax base and because tax collection can be combined with the collection of user charges (Martinez-Vazquez & Timofeev, 2010, p. 603).

period 1995-2013. I will evaluate the performance in terms of efficiency by means of a three-pronged approach: I begin by testing arguments related to the impact of decentralization on health spending. I go on and investigate the impact of fiscal decentralization on health outcomes, namely, on infant mortality. Finally, I present a measure of health sector efficiency, generated by Data Envelopment Analysis (DEA), in order to provide a more complete perspective on efficiency effects in the health sector. I will also take a closer look at several of the above presented dimensions, e.g., the distinction between transfer-dependent and own-revenue-dependent decentralization or the effect of borrowing-autonomy on spending decisions. This way, I provide a more finely grained picture of important issues related to the relationship between fiscal decentralization and efficiency in public, or, to be precise, merit goods provision.

b. Does decentralization make public service delivery more unequal?

While the most prominently discussed question is whether decentralization is conducive or detrimental to the efficiency of public goods provision, a smaller body of literature revolves around the question whether fiscal decentralization increases regional inequalities. Clearly, the degree to which regional inequalities are of national concern depends on the value each society ascribes to them. For some countries, however, regional inequalities can be pronounced to such a degree that it threatens national unity and promotes disintegration (Le Breton & Weber, 2003). Thus, understanding and revising this particular danger of decentralization can be fundamental especially as major bilateral and international development organizations continuously promote fiscal decentralization (Lessmann, 2012, p. 1363) also in countries characterized by high levels of segregation and instability such as Iraq (see World Bank, 2016). Increasing inequalities constitute the second danger of decentralization which I will now turn to.

Many decentralization enthusiasts argue that centralized countries are more prone to increasing inequalities. Shankar and Shah (2003) provide evidence indicating that federal countries are more successful in ensuring a relatively low level of regional inequalities. They find that the dispersion of income in federal states reduces over time ('sigma-convergence'). They argue that because territorial disparity is politically risky as it promotes the above mentioned possibility of secession of particular regions, central government policy-makers in federal countries may have a strong incentive to ensure regional equality. Also, since national parties depend on electoral success in *all* regions, they focus on equal regional development. Finally, the authors hold that federal state

politicians are more accountable to the local electorate and pursue – when compared to policies of the center – more developmental policies.

Focusing only on the fiscal dimension of decentralization and usually focusing on inequalities in economic development, some have argued that decentralization leads to lower regional inequalities in particular because it initiates a catch-up effect: those regions with lower initial levels of economic development show relatively higher growth rates than those regions with higher initial levels of development ('beta-convergence') (Canaleta, Pascual Arzoz, & Rapun Garate, 2004, p. 88). The major underlying argument is that more developed regions already find themselves at an efficiency frontier, with little room for improvement in terms of decentralization-induced efficiency gains and subsequent growth effects. Less developed regions, however, benefit more from decentralization, as they are further away from the frontier (Lessmann, 2012, p. 1368). Others hold that because of strong local electoral accountability relations, local politicians from poorer regions have stronger incentives to engage in 'developmental policies' to attract mobile production factors through fiscal competition and more flexible labor regulations (Qian & Weingast, 1997). In particular, the increased transparency and comparability of local government actions pressures underperforming regions to improve the efficiency of their policies (Kyriacou, Muinelo-Gallo, & Roca-Sagalés, 2015, p. 90).

On the contrary, Prud'homme (1995, p. 203) emphasizes that decentralization could be a 'mother of segregation' in many countries. He argues that in decentralized systems there is no central authority pursuing a redistribution of fiscal resources from fiscally strong to fiscally weak regions through vertical equalization schemes, leaving disadvantaged regions without central government support with regard to their development challenges. Richer regions tend to benefit from advantageous initial conditions such as better developed infrastructure, a better educated work force and a stronger tax base, and have better access to production factors such as credit. These conditions attract even more private sector investment. At the same time, poorer regions are relatively weaker when it comes to exploiting economies of scale from service provision and are often assumed to suffer from weaker local governance structures making it difficult to reap the assumed efficiency gains of decentralization (Zhang, 2006). In this scenario, decentralization exacerbates path dependency and economic agglomeration. It reproduces pre-existing inequalities and inhibits beta-convergence.

The risk of a missing level-playing field has also been stressed when it comes to political influence. In decentralized contexts, different local jurisdictions may encounter themselves

competing for resources and general attention from the central government. More economically and politically powerful regions, usually those endowed with a larger electorate, can create pressure and make the central government grant preferential treatment in terms of policy initiatives, general political support and fiscal transfers (Rodríguez-Pose & Gill, 2005, p. 412). In fact, political influence can be used to manipulate the allocation of block grants from the central level in a locality's own favor (Rodríguez-Pose & Ezcurra, 2010, pp. 623–624). Also, the central government may have a stronger interest in bailing out politically and economically important jurisdictions in order to avoid a debt default and to maintain macroeconomic stability or to avoid being blamed by the electorate for inaction.

A potential trade-off between efficiency and equality goals has been singled out: The more the efficiency goal of decentralization is pursued, i.e., the more rigorously decentralization is implemented without significant central-governmental involvement to ensure a minimum degree of equalization, the higher the risk of increasing inequalities (Besley & Ghatak, 2003, p. 245; Lessmann, 2012, p. 1368). Many argue that decentralization should not be pursued if equalization mechanisms were not in place.^{16, 17}

There is a substantial body of empirical literature investigating the relationship between decentralization and inequalities in terms of economic development. It consists of single-country case studies, cross-country studies looking separately at the group of developed and developing countries or at both groups together (see Lessmann, 2012, p. 1369). However, the direction of the effect on regional inequalities depends on the method applied and the sample investigated, with country-case studies usually proving an inequality-increasing effect of decentralization and cross-country studies displaying a negative association when developed countries are compared and a positive association when developing countries are investigated (Kyriacou et al., 2015, p. 91; Rodríguez-Pose & Ezcurra, 2010, p. 626). In particular the latter pattern corresponds with the finding by others that the effect of fiscal decentralization on regional inequalities may depend on

¹⁶ In particular, unconditional grants to less developed regions either from the central government ('vertical equalization') or from richer regions ('horizontal equalization') were brought forward as an appropriate mean to ensure regional cohesion within a country (Oates, 1999, p. 1128).

¹⁷ The relationship between decentralization and regional inequalities may actually be more subtle. For example, Kyriacou, Muinelo-Gallo, and Roca-Sagalés (2015, pp. 89–90) argue that the effect of decentralization on regional equalities depends on the institutional quality a country is endowed with. They argue that the issue of decentralization-induced inequalities is particularly pronounced in countries with weak administrative capacities and problems of corruption. In these contexts, sub-national governments are not able to manage fiscal resources adequately and miss to initiate a catch-up effect in terms of economic growth. They hold that differences in quality of institutions explain why richer countries, which usually display stronger sub-national governance, have been less prone to increasing inequalities due to decentralization.

the level of development, with poorer countries being characterized by a positive relationship and richer countries with a negative relationship (Lessmann, 2012, p. 1364).

Just as with the efficiency question, the question whether decentralization is decreasing or increasing inequalities remains unanswered as well. At the same time, the investigation of regional inequalities takes place in a fairly narrow conceptual dimension, as it is strongly geared around the issue of divergence in economic development, usually referring to the coefficient of variation in economic output as dependent variable. This is surprising especially because the major promise of decentralization theory is about improved provision of local public goods and not primarily economic growth, as mentioned in the previous section already. In this vein, the effect of decentralization on inequalities in public service delivery is mentioned as an additional issue, usually dealt with in relation to differences in fiscal power.¹⁸ However, the literature dealing with the relationship between decentralization and regional inequalities in the provision of public goods is scant and, to my knowledge, non-existent with regard to educational outcomes. Therefore, the lack of looking at regional inequalities in service delivery outcomes is a major gap in the current literature, especially as decentralization reform has focused on key public services that are being considered key elements of making societies more equitable, namely education and health (Martinez-Vazquez et al., 2017, p. 1100). In Chapter III, I explore the effect decentralization reform can have on the regional distribution of public service delivery outcomes in Germany, looking specifically at the education sector. By asking myself the question if the decentralization of teacher pay has an impact on educational poverty, I intend to go beyond the mere macro relationship between the degree of decentralization and outcomes and look at one potential underlying micro mechanism. This way, I attend another shortcoming in the decentralization literature, namely the tendency to assume that a bundle of very diverse underlying forces explains results at the macro level (here the relationship between the degree of decentralization and inequalities), without specifying which force really is at work.

¹⁸ It is assumed that richer localities have a larger tax base and can provide a certain level of public service at lower tax rates. This is an advantage which may lead to a vicious circle since taxpayers (private persons and enterprises) are attracted through better social and physical infrastructure, even further reducing the tax base available to poorer regions (Kyriacou et al., 2015; Prud'homme, 1995, p. 91). These poorer regions have it ever more difficult to attract qualified staff and acquire adequate equipment and technology that are needed to provide quality public services (Rodríguez-Pose & Krøijer, 2009, p. 391) which are essential especially in complex sectors, as will be analyzed later on.

c. Does decentralization make public service delivery less accountable?

A third danger that on the one hand relates to the effectiveness of public service delivery, and to the validity of fundamental principles of democratic governance on the other, is the question whether fiscal decentralization renders public service delivery more accountable or not.

Indeed, a major promise of decentralization enthusiasts is that fiscal decentralization improves local public service delivery by making local politicians and bureaucrats more responsive to the voter-taxpayers' demands. This expectation is especially prevalent in the first generation theory of fiscal decentralization, as it is based on the assumption that local officials are generally seeking to promote social welfare in the interest of the entire local community.¹⁹ Based on this perspective, fiscal decentralization increases the democratic element in public service delivery because local bureaucrats are simply closer to citizens and become more flexible and responsive to citizen desires (De Vries, 2000, p. 202).

At the same time, moving away from the view that local officials are necessarily social welfare maximizers, there are further arguments that fiscal decentralization as such increases the accountability relationship between local governments and its citizens. These arguments are mainly based on the constraining effect of competition between local jurisdictions. The argument goes that those governments known for wasting or stealing local public resources will lose residents and businesses as they move to better governed jurisdictions. Ultimately, this will reduce the tax-base of the badly governed localities. Interjurisdictional competition would thus be a remedy to issues such as over-regulation or bribing, leading to a preservation of favorable market conditions (Brennan & Buchanan, 1980; Fan, Lin, & Treisman, 2009; Weingast, 1995, p. 18).

The already mentioned issue of yardstick competition is also presented as a factor leading to enhanced accountability relationships, with imperfectly informed inhabitants of one jurisdiction comparing the performance of 'their' jurisdiction, i.e., the taxes paid for services received, with that of others. This leads to citizens pressuring local officials to improve efficiency of local public service delivery to a maximum and to refrain from wasting or stealing local resources (Allers & Elhorst, 2005; Besley & Case, 1995; Salmon, 1987). In particular when fiscal decentralization is

¹⁹ Oates (2005, p. 351) calls this assumption the 'Arrow-Musgrave-Samuelson (ASM) perspective' as these three scholars have provided the intellectual basis for this claim.

mingled with political decentralization,²⁰ citizens can punish their local leaders during elections (Fan et al., 2009, p. 18).

Contrary to the rather optimistic view, various arguments have been brought forward that fiscal decentralization leads to deficient accountability relations between citizens and government. One issue is that decentralization oftentimes implies an increase in the number of layers of government, which is seen to lead to an ‘overgrazing’ in terms of the formulation of new taxes and regulations at multiple governmental levels. Also, the increase of the number of levels of governments makes it more difficult to assign credit or blame to a specific level of government, an argument closely related to the issue of fiscal illusion (Kyriacou & Roca-Sagalés, 2011, p. 191). In addition, some scholars have argued that in a multilevel system, local government activities are not as easily monitored as activities carried out by the central government directly (Altunbaş & Thornton, 2012, p. 67), leading to a loss of accountability if it is not strengthened by means of other channels – in particular by those implied by democratic decentralization.

According to decentralization sceptics, the loss of central government oversight (i.e., vertical accountability) may not be compensated by increased scrutiny through local citizens (i.e., horizontal accountability). In fact, there seems to be a growing consensus that local politicians are not necessarily the ‘custodians of the public interest’ (Oates 2005: 350) as the first generation decentralization theory suggests, because the ‘public interest’ does not always match the ‘self-interest’ (and in many cases rent-seeking behavior) of local officials (Rodden, 2003, pp. 699–700).

In the context of the discussion about fiscal decentralization and accountability, the issue of corruption²¹ has been discussed most prominently, in particular because it has a fundamental meaning for the adequate functioning of a democracy and the responsiveness of the state to citizen’s concerns (Warren, 2004).

²⁰ Including the political dimension of decentralization is usually considered to imply a considerable increase in opportunities for citizens to ensure accountability in public service delivery. There are various channels that may improve participation, e.g., local elections but also the right to demonstrate or campaigning. Inclusive city councils or consultative bodies and publicly held meetings can lead to better representation of local constituencies’ interests, empowering underrepresented and marginalized groups. Oversight through local elected bodies improves bureaucratic accountability. Political decentralization strengthens the voices of local institutional actors such as opposition parties, civil society and local media. In general, however, these mechanisms and processes are acknowledged to take time to function properly (see Blair, 2000).

²¹ Corruption occurs when a public servant acts against the public interest and in order to benefit a third party. The third party rewards the public servant for having received access to a benefit which it would otherwise not have been able to benefit from (Philp, 2006, p. 45).

Sceptics consider fiscal decentralization to promote corruption and local capture because of a higher degree of intimacy and frequency of interactions between local officials and local interest groups. The latter tend to be more cohesive than interest groups at the central level. This argument is complemented by the notion that local government officials are more likely to be captured than their central government counterparts because these are under stronger scrutiny due to their national relevance and because they are better paid and qualified (Kyriacou et al., 2015, p. 91). In fact, the above mentioned issue of dividing responsibilities induced by fiscal decentralization can make it easier for local officials to conceal their involvement in corrupt practices such as embezzlement or collusion (Fan et al., 2009, p. 19). Administrative capacities and weak auditing and monitoring mechanisms are noted to be less developed at the local level. Moreover, in a decentralized system, incentives for local politicians to blame higher levels of government for their own poor performance exist (Neudorfer & Neudorfer, 2015, p. 31). Particularly when local services are financed through federal transfers, taxpayers have difficulties following up on the causal chain between taxes paid to the federal government and the quality of local services received (i.e., ‘fiscal illusion’). Because, in this case, they cannot hold local politicians to account, many advocate for financing local public services through a local government’s own-source revenues (Rodden, 2003). Contrary to this view, there are authors who are generally sceptical about local officials handling large amounts of own-revenue funds as these are often spent without central government oversight. Altunbaş and Thornton (2012, p. 79) argue that fiscal decentralization only reduces corruption when fiscal resources are still largely controlled by the central government, pointing to the need to incorporate institutional arrangements such as strong auditing and monitoring mechanisms in fiscal decentralization reforms. The issue of who should be controlling funds in order to avoid fiscal illusion remains an issue of contention.²²

Again just as with the previous dimensions discussed, the empirical literature dealing with the effect of fiscal decentralization on corruption is inconclusive (Ivanyna & Shah, 2011, p. 347).²³ Treisman (2007, p. 235) reasons that there is no clear-cut pattern with regard to the relationship

²² The above mentioned argument of ‘overgrazing’ in the case of multi-layer governments has also been applied to the area of corruption: in contexts of generalized corruption, adding levels of government implies more officials that ask for a bribe in exchange for a certain service, increasing the overall number of bribes that need to be paid (Fan, Lin, & Treisman, 2009, p. 33).

²³ Part of the reason for the mixed empirical picture is the difficulty to adequately measure the extent of corruption in a certain context, as corruption by nature is a secret act which is seldom directly observed and usually underreported (see Philp, 2006).

between decentralization and corruption. The unclear empirical results support the notion of Bardhan and Mookherjee (2000, p. 139) that the effect of decentralization on corruption is mediated by a multitude of factors which are highly context-specific, such as the type of the electoral system and the extent of electoral competition.²⁴

While the effect of fiscal decentralization on local corruption seems to be context specific, the question about what local corruption means for the provision of public goods has received less attention. What does it mean for the broader population when local officials are not held accountable? How does it affect people and the circumstances they live in? Although there is some research on the consequences of local corruption (see Bardhan, 1997; Lambsdorff, 2007), conclusions remain rather general. Therefore, in Chapter IV I will look at the issue of corruption not as an outcome of fiscal decentralization but as a mediating factor. Specifically, I analyze to what degree the decentralization of fiscal resources, when taking place in contexts of corruption and local capture, can lead to increases in organized crime homicide rates. The analysis is based on data from different samples from the population of 2456 Mexican municipalities in 2010 as well as over the period from 1995 until 2010. This way, I deal with the effect of fiscal decentralization on one of the most fundamental public goods, namely public security. This relationship has so far been neglected in the fiscal decentralization literature.

4. ON THE APPROACH AND STRUCTURE OF THE DISSERTATION PROJECT

In the preceding section, I presented three broad dimensions of possible dangers of decentralization for public goods provision. Each of these potential dangers will be analyzed and assessed with regard to their relevance to public service delivery in health, education and public security in more detail in the following chapters of this doctoral thesis. Table 1 relates the three chapters to the articles published or under review.

²⁴ As mentioned, in many contexts, the issue of corruption may be enabled by weak local media, including the disadvantage of local affairs in investigative journalism which usually covers central government affairs because these are more relevant to the nation as a whole (Fan et al., 2009, p. 19).

Chapter	Dimension	Article
II	Efficiency	Arends, H. (2017b). More with less? Fiscal decentralisation, Public Health Spending and Health Sector Performance. <i>Swiss Political Science Review</i> , 23(2), 144–174.
III	Equality	Arends, H. (2017a). Equal Living Conditions vs. Cultural Sovereignty? Federalism Reform, Educational Poverty and Spatial Inequalities in Germany. <i>Publius: The Journal of Federalism</i> , 47(4), 673–706.
IV	Accountability	Arends, H. (under review). Decentralization and Death. <i>World Development</i> .

Table 1: List of articles published or under review

In this section, I will present the rationale with regard to the choice of sectors, the level of analysis, the country-context and the methods applied.

a. On the choice of sectors

In the following chapters, I will analyze three public or merit goods, namely healthcare, education and public security. I chose these sectors for two reasons:

On the one hand, there is a consensus that these sectors are fundamental to human development and well-being. Over the last three decades, health and education have become cornerstones of poverty reduction strategies as many realized that economic growth alone does not necessarily lead to an improvement in the living conditions of the most vulnerable groups of the population, especially in the developing world. In fact, proper healthcare and education have been singled out as the most important sectors to build adequate competences and to provide populations with opportunities to form part of a country's development process (Fukuda-Parr, 2003). Also, in the OECD world, health status, education and personal security are three out of eight dimensions applied to measure the concept of quality of life, which together with a set of material conditions constitutes the OECD's paradigm of well-being (OECD, 2017). Hence, the adequate functioning of these three sectors can generally be considered to be of particular relevance to all societies around the world.

On the other hand, health, education and public security have either been subject to massive decentralization processes in the more recent past (health and education) or have historically been decentralized sectors (public security) in many countries. Health and education are probably the most important decentralized sectors (Martinez-Vazquez et al., 2017, p. 1100). As Channa and Faguet (2016, p. 201) argue, fiscal decentralization is one of the most advocated solutions to render health and education sectors more efficient.

In these areas, strong decentralization took – and continues to take – place despite some indications that these sectors are not so easy to decentralize. For example, Prud'homme (1995, p. 215) argues that decentralized sectors should be of low *technicity*, i.e., the level of technical and managerial skills needed to adequately provide the public service should be low enough for them to be provided by local bureaucracies. Also, they should display a low degree of externalities and geographical spillovers in order to ensure an efficient application of fiscal resources (*low externability*). Finally, it should be possible that the local services be financed by means of local fees and not by taxes in order to diminish incentives for mobile actors to flock to low-tax areas (*high chargeability*).

On the basis of these criteria, the sectors under investigation can be considered to be far from ideal to be decentralized: health and education are highly complex sectors which need a considerable degree of planning and management skills. Also, public security needs qualified staff, capable of applying the most recent standards of rule of law, and techniques related to crime prevention and criminal investigation. Also, while all sectors could in principle be financed through fees, due to their social importance, especially education and public security are usually financed through taxes. With the exception of healthcare, which has been at least partially financed by means of the fees for service payment scheme, chargeability is relatively low. Moreover, depending on their specific institutional design, all sectors can have considerable positive or negative externalities.²⁵ In spite of these indications, ample decentralization processes have taken place in all of the three sectors.

Thus, I analyze three sectors which are of fundamental importance to well-being and human development (Alkire, 2002) and which have taken on a key role in decentralization reforms. At the same time, the sectors' nature may imply significant difficulties in the decentralization process.

²⁵ For example, in the area of public security, weak local police forces usually lead to increased crime activities which, in turn, tend to spillover to other regions as well – diminishing the effectiveness of neighboring regions to prevent crime even when disposing over a well trained police force (see Anselin & Bera, 1998).

b. On the choice of methods and levels of analysis

In this doctoral thesis, the main statistical method applied is regression analysis. Clearly, regression analysis has strong advantages with regard to generalizability and transparency in the interpretation of results. However, it also carries well-known limits, in particular with regard to the risk of confounding correlation with causation, presenting endogenous relationships or omitting important variables from the analysis. While I attempt to underpin each of the subsequently developed arguments with more detailed and qualitative evidence, and thus moving towards a middle-ground between quantitative and qualitative analysis, the limits of the econometric toolbox should always be kept in mind when looking at the evidence. The econometric methods used and the levels of analysis chosen are the following:

Chapter II is based on a time-series cross-section linear regression analysis using country-level data, comparing 32 OECD countries with regard to the relationship between decentralization and health sector spending, outcomes and efficiency. The advantage of an analysis at such aggregate level is that the derived conclusions have more power in terms of generalizability. However, the diversity of different governmental structures and contextual conditions between countries also carries the risk of low degrees of comparability. I counteract these difficulties emanating from cross-country analyses by computing fixed effects models, which hold unique country-characteristics constant. As a robustness check, I also compute an error-correction model, which avoids the risk of non-stationarity of the panel data. In Chapter III, I also apply a time-series cross-section analysis, investigating the relationship between teacher pay and educational poverty in the 16 German *Länder*. By analyzing state-level data, I avoid most issues related to lacking comparability and differences in context, since states usually share the same history and culture as well as legislative and institutional foundations. Looking at state-level data provides me with the opportunity to deal with the relationship between decentralization reform and regional inequalities in education in a more detailed manner, including the micro mechanism underlying the assumed macro effect. The macro effect is then investigated by means of an interrupted time-series analysis, which enables me to draw inferences on the differences in the pre- and post-reform levels and trends in terms of educational poverty. In Chapter IV, I start with a cross-sectional analysis of the relationship between decentralization and organized crime homicides, comparing Mexican municipal governments in 2010. Since the dependent variable is semi-continuous, i.e., divided in a binary part (a municipality experiences a murder or not) and a

continuous part (containing the sub-set of municipalities with a positive homicide rate), I compute a two-part model (TPM), that is, I separately analyze the binary part (by means of a logistic regression) and the continuous part (by means of ordinary least squares (OLS) regression). I then expand the analysis to the period 1995-2010 by computing an uncorrelated longitudinal TPM. I conclude the analysis by applying a spatial analysis in order to test for spillovers of violence induced by fiscal decentralization. I do this by including a spatial lag of the independent variable ('spatial lag of X (SLX)'). With regard to the level of analysis, in Chapter IV, I look at the lowest-level of government which is supposed to be closest to the voter-taxpayer. From a statistical point of view, analyzing municipal-level data tends to increase the number of observations substantially, adding significant robustness to the results obtained.

c. On the choice of the units of analysis

The geographic scope of this doctoral thesis is limited to the group of OECD countries. I focus on this group of highly developed countries because one would assume that these are characterized by sufficiently solid institutional preconditions in order to adequately manage fiscal decentralization in an efficient, equitable and accountable manner, especially in complex sectors such as health, education and public security (Rodden, 2003, p. 705; Shankar & Shah, 2003, p. 1426). Although Chapter IV looks at the case of Mexico which is classified as an upper-middle income economy, I generally refrained from looking at a sample lumping together developed and developing countries at the same time because this would mean mixing institutional, cultural and historical trajectories which are very difficult to compare.

In fact, the different trajectories of decentralization in the developed and the developing world have been subject to some discussion. For example, the Bahl-Linn thesis holds that fiscal decentralization is an outcome of the development process, with highly developed countries displaying high degrees of decentralization, while developing countries are fairly centralized (Bahl & Linn, 1992). The underlying argument is that only with higher levels of development do citizens become more sophisticated and demanding with regard to local public services, leading to an increasing importance of local service provision. While this pattern may have changed over the past decades as especially international donor organizations have advocated for decentralization around the world, the argument that developing countries face severe administrative, human capital and accountability challenges, for example with regard to

adequately collecting and administering the property tax, is even supported by many decentralization enthusiasts (Oates, 1999). In order to focus on a fairly homogenous group of countries where the rationales behind fiscal decentralization can be assumed to be valid, the focus of my analysis in Chapter II is limited to the world of OECD countries. Within the group of OECD countries, in Chapter III, I then look at the case of Germany since this country is characterized by a strongly decentralized education sector and has recently undergone a federalism reform, enhancing the role of the *Länder* in ensuring proper education for their population even further. In Chapter IV, I then look at a less developed OECD country, namely Mexico. Just as Germany, Mexico is a federal country with a long history of self-determination of the lowest levels of local government (see Rodríguez, 1993), although Mexico has only recently experienced a comprehensive decentralization of fiscal responsibilities. I choose Mexico as unit of analysis mainly because of its acknowledged governance challenges at the local level and the strong presence of organized crime, which are both exogenously assumed preconditions for the relationship between fiscal decentralization and organized crime violence to be relevant. Admittedly, choosing the case of Mexico is a deviation from the general line that only institutionally strong countries are being investigated.

Table 2 provides an overview over the research design of each part of the thesis.

Dimension	Efficiency	Equality	Accountability
<i>Relationship analyzed</i>	Fiscal decentralization → efficiency in public service provision	Fiscal decentralization → regional inequalities	Fiscal decentralization*local capture → violence
<i>Public good</i>	Healthcare	Education	Public security
<i>Level of analysis</i>	Cross-country	State-level	Municipal-level
<i>Unit of analysis</i>	32 OECD countries	16 German <i>Länder</i>	1874 Mexican municipalities (baseline)
<i>Investigation period</i>	1995-2013	2004-2014	2010, 1995-2010
<i>Methodological approach</i>	Time-series cross-sectional linear regression, error-correction model	Time-series cross-sectional linear regression, interrupted time-series analysis	Cross-sectional two-part model (logistic and OLS), uncorrelated longitudinal two-part model, spatial lag of X model
<i>Existing research</i>	<ul style="list-style-type: none"> ▪ Substantial existing research on fiscal decentralization and health outcomes ▪ Less research on decentralization and spending ▪ Scant research on decentralization and efficiency 	<ul style="list-style-type: none"> ▪ Some research on the relationship between teacher pay and educational outcomes ▪ Scant research on decentralization and inequalities in service delivery in education 	<ul style="list-style-type: none"> ▪ Substantial research on decentralization and corruption ▪ No research on fiscal decentralization and organized crime violence
<i>Added value</i>	<ul style="list-style-type: none"> ▪ Integrated view on effect of decentralization on health sector spending, outcomes and efficiency ▪ Differentiated view on decentralization (spending vs. tax decentralization) ▪ Blending of health-sector specific discourse on decentralization with general decentralization literature ▪ Updating the discussion about decentralization and health using largest OECD-sample with recent data 	<ul style="list-style-type: none"> ▪ First analysis of the relationship between decentralization and regional inequalities in education ▪ Differentiation between macro effect and micro mechanism ▪ Inference about the forces that explain differences in teacher pay ▪ Inference about the consequences differences in teacher pay entail with regard to educational poverty ▪ Focus on a so far neglected element of German federalism reform, namely decentralization of teacher pay 	<ul style="list-style-type: none"> ▪ Development of a novel argument putting the spotlight on the relationship between decentralization and organized crime violence ▪ Focus on an interaction effect between fiscal decentralization and state capture/corruption (and organized crime presence) and its impact on violence ▪ Analysis of possible decentralization-induced spillover effects in terms of organized crime violence in neighboring municipalities

Table 2: Research design and added value

5. CONCLUSIONS

Beyond a number of more detailed insights presented in the discussion and concluding sections of each of the following chapters, there are some broader conclusions that can be drawn from the analyses. I will review these conclusions in the following sub-sections.

a. A danger foreseen is half avoided

First and foremost, the empirical results underscore the continuous relevance of the downsides of fiscal decentralization, especially with regard to public service delivery. Indeed, I conclude that the enthusiastic arguments related to fiscal decentralization cannot be assumed to hold across the board.

There are indications that decentralization can make the provision of key public services less efficient. The main conclusion of Chapter II is that fiscal decentralization, when looking at local spending, leads to higher spending levels in healthcare but to worse health sector outcomes in terms of infant mortality. The integrated look at health sector efficiency scores confirms that decentralization may actually lead to a deterioration of the input-output relationship in healthcare delivery. Thus, going against the mainstream argument that decentralization makes public sectors more efficient, policy-makers must keep in mind that decentralization does not necessarily mean ‘more with less’. It may just mean ‘less’.

There are also indications that decentralization can make public service delivery less equal. In Chapter III I present evidence that decentralization reform in Germany promoted disparities in teacher pay, which, in turn, explains differences in levels of educational poverty between the German *Länder* and over time. At the macro level, the results provide reasons to believe that this led to an overall increase in inequalities in educational poverty. These findings fan the fire of the discussion related to the importance a society ascribes to regional cohesion and justice. While, at the end of the day the trade-off between ‘equal living conditions vs. cultural sovereignty’ is a value-judgment, policy-makers must keep in mind that decentralization reform can contribute to deciding the game in favor of the latter.

Finally, there are indications that, when taking place in contexts of low local accountability and a strong presence of local pressure groups, in this case criminal organizations, decentralization as such can promote violent processes of rent-seeking. Chapter IV concludes that the

decentralization of public resources to lower levels of government can actually function as pull factor for criminal groups to enter into the extortion business and intensify turf battles in order to gain access to decentralized public funds. Whether the deployment of more police makes a difference and reduces violence is by no means clear. These findings shed light on an entirely new topic in decentralization research, namely the relation between decentralization and violence. At the same time, it is an analysis of the consequences of decentralization processes that take place in contexts of high levels of local corruption. This analysis of the relationship between ‘decentralization *and* death’ leads the identification of an additional danger of decentralization, namely the ‘decentralization *of* death’.

Of course, it is not that simple. The results show that the effect of fiscal decentralization on the three dimensions analyzed must be looked at in a nuanced manner. For example, the effect of fiscal decentralization on healthcare seems to be non-linear with highly (spending) decentralized countries performing better than less decentralized countries, indicating that these countries may be less prone to the issue of fiscal illusion. Also, while differences in the level of teacher pay explain differences in educational poverty, i.e., the share of students leaving school without a leaving certificate, they do not explain differences in learning achievements. Also, while fiscal decentralization seems to make existing battles between criminal organizations more intense causing a deterioration of public security, it may not be important enough for criminal organizations to initiate turf battles. Clearly, the relationship between decentralization and local public service provision is a complex one that will need considerable future research.

b. Decentralization ≠ decentralization

A main conclusion drawn from the three empirical analyses relates to the nature of decentralization. Fiscal decentralization can take on different forms: it can consist of a decentralization of competences to provide a particular service without passing on revenue autonomy while service provision is financed through intergovernmental transfers instead. It can be based on passing on service provision competences without transferring any additional funds, pushing local governments to raise their own revenues. Also, fiscal decentralization can consist of transferring both service provision and additional revenue raising autonomy. Of course, transfers themselves can be designed in a different manner. They can be discretionally allocated, matched or formula based. They can be block-grants or earmarked to the provision of particular services.

Also, the structure of own-source revenues of local governments can differ in important ways. They can be financed by local taxes and fees of different forms, tax-sharing schemes with higher levels of governments or by debt (Stegarescu, 2005).

While many of the mentioned issues are beyond the scope of this doctoral thesis, I focus on one main distinction in the decentralization literature, namely the difference between spending and own-revenue-based decentralization and the related discussion about a fiscal illusion effect. From the following chapters one can derive the conclusion that the distinction between spending and own-revenue based local financing is crucial. Chapter II indicates that while spending decentralization is making health sectors bigger while not leading to better health outcomes, tax-based decentralization does not have an effect on spending and may even improve outcomes and efficiency. Also, those countries where local governments have more sub-central borrowing autonomy – and are therefore subject to a softer budget constraint – are generally characterized by larger health sectors, which may be an indication for the bail-out expectation. The findings in Chapter III suggest that those German federal entities which receive more funds from the German *Länderfinanzausgleich*, i.e., from grants either from other *Länder* or from the federal government, may be tempted to be more generous in terms of teacher pay. Holding other relevant variables constant, this may indicate perverse incentives to overspend, as suggested by the fiscal illusion or flypaper effect. Chapter IV, however, shows that the share of own-revenues in local public spending may not always make a difference. In this case, no robust accountability-enhancing effect of higher own-revenue based decentralization on organized crime violence can be discerned.²⁶ Trejo and Ley (2015) argue that higher shares of own revenues can even be conducive to violence as the use of these funds is under less rigorous scrutiny by higher levels of government.

The emerging pattern supports the notion put forward by others that dependence on intergovernmental grants is more likely to generate negative results in terms of efficiency and accountability. The underlying argument is that if spending consists of own-source revenues, local taxpayers generate a strong interest in the adequate application of ‘their’ taxes and are able to match taxes paid with services received. However, as the missing effect of own-revenue-decentralization on organized crime violence suggests, there may be other forces at play, canceling out the positive effect of own-source-revenue based decentralization. In general,

²⁶ The exception is the continuous part of the uncorrelated longitudinal TPM which indicates a negative effect. However, given the econometric problems of the model, I do not consider the evidence sufficient to be considered robust.

however, a key insight is that decentralization research should ascribe a crucial role to different outcomes depending on the nature of fiscal decentralization.

c. Know the ropes

The general decentralization literature tends to look at fiscal decentralization in a generic way, usually assuming that the generated results are relevant across all policy areas. In fact, many decentralization reforms entail the decentralization of various sectors at the same time following the same procedures. In parallel, there are valuable sector-specific discussions going on which are rarely feeding into the general decentralization debate. One important conclusion of this dissertation is that decentralization needs a sector-specific approach, taking account of the specific challenges the provision of a certain public good may encounter when taking place at the local level.

In Chapter II I try to bridge the gap between the health sector specific decentralization discussion and the general decentralization debate on the relationship between decentralization and health spending, outcomes and efficiency. Indeed, while the general decentralization literature is fairly positive about the performance of decentralized health sectors, the health sector specific literature is turning rather sceptical and currently discusses processes of recentralization due to underperformance of sub-central health sectors. Chapter III is a good example for how decentralization reformers can miss the effects a reform element can have on a crucial sector such as education policy. At least based on the information publically available, decentralizing the salaries of public servants was never discussed in relation to the consequences for public schools and educational poverty. It is likely that the reforming actors underestimated the effect their decision had on the German education sector. The analysis in Chapter IV makes clear that thinking together two seemingly unrelated sectors, namely fiscal decentralization and public security, can bring to the fore highly unexpected but plausible insights. The chapter shows that fiscal decentralization must not only be analyzed in a sector-specific but also in a context-specific manner. The context of local corruption and presence of organized crime differs from country to country and will not be relevant to a large number of countries.

Decentralization research must become even more multidisciplinary, bringing together expertise from a wide range of sectors. This means, on the one hand, entering into more in-depth analysis

of specific policy areas, but also breaking with silo-style research, i.e., research only confined to a specific policy area without connecting to the general decentralization literature.

Also, it is important to acknowledge that different sectors confront different decentralization challenges. Decentralizing the health sector needs considerable local capacities not only in terms of healthcare planning and management but also in terms of the management of fiscal resources. Also, coordination with a multitude of different actors and interest groups will consume considerable human resources. Moreover, because the health sector is often ascribed utmost importance in terms of social justice, human development and well-being, inefficiencies in service delivery in these sectors are often seen as being more problematic than inefficiencies in other traditionally decentralized sectors such as public transport or road construction. The same holds for the education sector, although planning, management and human resources issues, albeit still highly complex, may not be as challenging as they are in the health sector. It may be argued, however, that most societies have particular expectations with regard to a level-playing field in terms of educational opportunities, which requires an effective coordination mechanism between the central government and sub-central levels (or, as is the case for Germany, between sub-central levels only) in terms of common educational standards, curricula and teacher training. With regard to public security and local police, the challenges may be different: Although issues of local capacities and investments in capital and technology may be an issue as well, the case of Mexico shows that decentralization reforms should ascribe high importance to counteracting issues of local corruption and ensure that local police adheres to the standards of human rights and rule of law. This also emphasizes the importance to think fiscal decentralization in relation to other dimensions of decentralization, in particular with regard to enhancing the democratic component of local governance (i.e., political decentralization).

In short, in terms of the decentralization of the provision of public or merit goods, an in-depth analysis of the sector-specific challenges is warranted. Some functions which are highly complex and can have severe negative implications for social justice or even the respect of human rights standards should be decentralized only cautiously, if at all. As Weingast (2014) argues, especially in contexts with governance challenges at the local level, decentralization reform should take place in a step-by-step manner and not in one go.

d. The devil is in the detail

The preceding conclusion also implies that there is still a need to know more about the micro-level mechanisms underlying most of the above cited literature. With regard to the dangers of decentralization, many concepts, causal mechanisms and implications remain unclear. The nuanced look at the concept of efficiency or the blending of the general decentralization literature with the discussion of decentralization in the healthcare literature is one attempt to find a middle-ground between a technical discussion on underlying mechanisms and the econometric analysis of potential macro-level effects in Chapter II. The attempt to open the black box and to analyze the way regional inequalities in education in Germany actually can come about is even more explicit in Chapter III. I scrutinize the micro-level mechanism starting with decentralization reform and with federal states making use of the new pay-setting competences and introducing variation in teacher pay levels which, in turn, explains substantial variation in educational outcomes. This may have led to increased inequalities at the macro level. Chapter IV provides an in-depth discussion of a novel argument, as I present a causal chain ranging from fiscal decentralization to local corruption, criminal market diversification, violent competition and spillovers of violence. While this causal chain obviously needs more theoretical and empirical discussion, the attempt is to lay the foundations for a more detailed and technical discussion on the dangers of decentralization in contexts of local capture and prevalence of organized crime. In a nutshell, opening the black box on macro-level effects requires a good and detailed knowledge of the specific subject at hand. The devil is in the detail.

e. All options on the table

International donor organizations, policy advisors and scholars continue to promote decentralization reforms around the world. Countries in West and Central Africa, in Latin America and in the Middle East are in the process of decentralizing important functions to lower levels of government – oftentimes accompanied and encouraged by external actors.

Without a doubt, the underlying rationale is not always confined to the efficiency-promise of fiscal decentralization but has more fundamental justifications such as enhancing democratic governance and preserving and protecting the rights of minority groups. However, the discussion

about ‘decentralizing or not’ has become a matter of conviction. For many, it is an ‘eat or die’ issue.

The underlying conclusion of this doctoral thesis is that the option of (re)centralization must be put back on the table by decentralization experts and decision makers. Chapter II shows that even the most advanced economies are struggling hard with ensuring an efficient functioning of decentralized health sectors, ultimately engaging into processes of recentralization. It is by no means far-fetched to assume that if countries like Norway or Ireland experience disadvantages in full health sector decentralization, countries in severe disarray like Iraq, where decentralization is promoted by international donor organizations (see World Bank, 2016), encounter even more fundamental challenges with regard to weak local administrative and management capacities, budget limitations and accountability.

Of course, (re)centralization debates are not confined to the health sector. For example, the coalition agreement between the current grand coalition in Germany foresees to revoke the ‘ban on cooperation’ in the education sector, i.e., the agreement that the federal government would not interfere with the cultural sovereignty of the *Länder* to determine their education policy, in order to enable investments of the federal government in the education sector. The general opinion seems to be that self-coordination among the federal states is not enough to ensure adequate and equal standards of education. Also, in Mexico, the centralization of command over local police forces in order to exert better control, to sanction misconduct and to develop a properly trained police force has been a major issue in the national discourse on public security. This centralization process has encountered severe opposition from criminal organizations and, for example, led to the assassination of a mayor in the federal state of Morelos because she supported the centralization reform (Excelsior, 2016).

Hence, in order to find the optimal institutional arrangement for the provision of a public good, all options must be on the table. This also includes considering to recentralize previously decentralized competences, even if this means that the advocates behind the ‘decentralization buzz’ need to admit that they were wrong.

REFERENCES

- Alkire, S. (2002). Dimensions of Human Development. *World Development*, 30(2), 181–205.
- Allers, M., & Elhorst, J. P. (2005). Tax Mimicking and Yardstick Competition Among Local Governments in the Netherlands. *International Tax and Public Finance*, 12(4), 493–513.
- Altunbaş, Y., & Thornton, J. (2012). Fiscal Decentralization and Governance. *Public Finance Review*, 40(1), 66–85.
- Anselin, L., & Bera, A. (1998). Spatial dependence in linear regression models with an introduction to spatial econometrics. *Statistics Textbooks and Monographs*, 155, 237–290.
- Asthana, A. N. (2012). Decentralisation and Corruption Revisited: Evidence From a Natural Experiment. *Public Administration and Development*, 32(1), 27–37.
- Bahl, R. W., & Linn, J. (1992). *Urban Public Finance in Developing Countries*. Oxford: Oxford University Press.
- Bardhan, P. (1997). Corruption and Development: A Review of Issues. *Journal of Economic Literature*, 35(3), 1320–1346.
- Bardhan, P., & Mookherjee, D. (2000). Capture and Governance at Local and National Levels. *The American Economic Review*, 90(2), 135–139.
- Bel, G., & Warner, M. E. (2016). Factors explaining inter-municipal cooperation in service delivery: a meta-regression analysis. *Journal of Economic Policy Reform*, 19(2), 91–115.
- Besley, T., & Case, A. (1995). Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits. *The Quarterly Journal of Economics*, 110(3), 769–798.
- Besley, T., & Ghatak, M. (2003). Incentives, Choice, and Accountability in the Provision of Public Services. *Oxford Review of Economic Policy*, 19(2), 235–249.
- Blair, H. (2000). Participation and Accountability at the Periphery: Democratic Local Governance in Six Countries. *World Development*, 28(1), 21–39.
- Blom-Hansen, J., Houlberg, K., Serritzlew, S., & Treisman, D. (2016). Jurisdiction Size and Local Government Policy Expenditure: Assessing the Effect of Municipal Amalgamation. *American Political Science Review*, 110(4), 812–831.
- Bohn, H., & Inman, R. P. (1996). Balanced-budget rules and public deficits: evidence from the U.S. states. *Carnegie-Rochester Conference Series on Public Policy*, 45, 13–76.
- Brennan, G., & Buchanan, J. (1980). *The power to tax: Analytic foundations of a fiscal constitution*. Cambridge: Cambridge University Press.

- Breton, A. (1987). Towards a theory of competitive federalism. *Villa Colombella Papers on Federalism*, 3(1–2), 263–329.
- Busemeyer, M. R. (2008). The Impact of Fiscal Decentralisation on Education and Other Types of Spending. *Swiss Political Science Review*, 14(3), 451–481.
- Canaleta, C. G., Pascual Arzoz, P., & Rapun Garate, M. (2004). Regional Economic Disparities and Decentralisation. *Urban Studies*, 41(1), 71–94.
- Channa, A., & Faguet, J.-P. (2016). Decentralization of Health and Education in Developing Countries: A Quality-Adjusted Review of the Empirical Literature. *The World Bank Research Observer*, 31(2), 199–241.
- Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2(6), 429–444.
- Courant, P. N., Gramlich, E. M., & Rubinfeld, D. L. (1979). The Stimulative Effects of Intergovernmental Grants: Or Why Money Sticks Where it Hits. In P. Mieszkowski & W. H. Oakland (Eds.), *Fiscal Federalism and Grants-in-Aid* (pp. 5–21). Washington: The Urban Institute.
- Cumberland, J. (1981). Efficiency and Equity in Interregional Environmental Management. *Review of Regional Studies*, 2(1), 1–9.
- De Vries, M. S. (2000). The rise and fall of decentralization: A comparative analysis of arguments and practices in European countries. *European Journal of Political Research*, 38(2), 193–224.
- Díaz-Cayeros, A., Magaloni, B., & Ruiz-Euler, A. (2014). Traditional Governance, Citizen Engagement, and Local Public Goods: Evidence from Mexico. *Decentralization and Governance*, 53(Supplement C), 80–93.
- Dubois, H. F. W., & Fattore, G. (2009). Definitions and Typologies in Public Administration Research: The Case of Decentralization. *International Journal of Public Administration*, 32(8), 704–727.
- Excelsior. (2016, December 19). Caso cerrado, asesinato de exalcaldesa de Temixco. *Excelsior* (19/12/2016). Retrieved from <http://www.excelsior.com.mx/nacional/2016/12/19/1135176>
- Fan, C. S., Lin, C., & Treisman, D. (2009). Political decentralization and corruption: Evidence from around the world. *Journal of Public Economics*, 93(1), 14–34.

- Fukuda-Parr, S. (2003). The Human Development Paradigm: Operationalizing Sen's Ideas on Capabilities. *Feminist Economics*, 9(2–3), 301–317.
- Goodspeed, T. J. (2002). Bailouts in a Federation. *International Tax and Public Finance*, 9(4), 409–421.
- Hines, J. R. (2000). What is benefit taxation? *Journal of Public Economics*, 75(3), 483–492.
- Hines, J. R., Jr., & Thaler, R. H. (1995). Anomalies: The Flypaper Effect. *The Journal of Economic Perspectives*, 9(4), 217–226.
- Hood, C. (1991). A public management for all seasons? *Public Administration*, 69(1), 3–19.
- Inman, R. P., & Rubinfeld, D. L. (1996). Designing tax policy in federalist economies: An overview. *ISPE Conference on Tax Reforms and Tax Harmonization: Public Choice versus Public Finance*, 60(3), 307–334.
- Inman, R. P., & Rubinfeld, D. L. (1997). Rethinking Federalism. *The Journal of Economic Perspectives*, 11(4), 43–64.
- Ivanyna, M., & Shah, A. (2011). Decentralization and Corruption: New Cross-Country Evidence. *Environment and Planning C: Government and Policy*, 29(2), 344–362.
- Keating, M. (1998). *The New Regionalism in Western Europe*. Northampton: Edward Elgar.
- Kornai, J., Maskin, E., & Roland, G. (2003). Understanding the Soft Budget Constraint. *Journal of Economic Literature*, 41(4), 1095–1136.
- Kunce, M., & Shogren, J. F. (2007). Destructive interjurisdictional competition: Firm, capital and labor mobility in a model of direct emission control. *Ecological Economics*, 60(3), 543–549.
- Kyriacou, A. P., Muinelo-Gallo, L., & Roca-Sagalés, O. (2015). Fiscal decentralization and regional disparities: The importance of good governance. *Papers in Regional Science*, 94(1), 89–107.
- Kyriacou, A. P., & Roca-Sagalés, O. (2011). Fiscal decentralization and government quality in the OECD. *Economics Letters*, 111(3), 191–193.
- Lambsdorff, J. G. (2007). 1 Causes and consequences of corruption: What do we know from a cross-section of countries? In S. Rose-Ackerman (Ed.), *International Handbook on the Economics of Corruption* (pp. 3–52). Massachusetts: Edward Elgar.
- Le Breton, M., & Weber, S. (2003). The Art of Making Everybody Happy: How to Prevent a Secession. *IMF Staff Papers*, 50(3), 403–435.

- Lessmann, C. (2012). Regional Inequality and Decentralization: An Empirical Analysis. *Environment and Planning A*, 44(6), 1363–1388.
- Letelier, L. (2005). Explaining Fiscal Decentralization. *Public Finance Review*, 33(2), 155–183.
- Litvack, J., Ahmad, J., & Bird, R. M. (1998). *Rethinking Decentralization in Developing Countries*. Washington D.C.: World Bank.
- Martinez-Vazquez, J., Lago-Peñas, S., & Sacchi, A. (2017). The Impact of Fiscal Decentralization: A Survey. *Journal of Economic Surveys*, 31(4), 1095–1129.
- Martinez-Vazquez, J., & Timofeev, A. (2010). Choosing between Centralized and Decentralized Models of Tax Administration. *International Journal of Public Administration*, 33(12–13), 601–619.
- Musgrave, R. (1959). *The Theory of Public Finance*. New York: McGraw-Hill.
- Neudorfer, B., & Neudorfer, N. S. (2015). Decentralization and Political Corruption: Disaggregating Regional Authority. *Publius: The Journal of Federalism*, 45(1), 24–50.
- Oates, W. E. (1968). The Theory of Public Finance in a Federal System. *The Canadian Journal of Economics*, 1(1), 37–54.
- Oates, W. E. (1972). *Fiscal federalism*. New York: Harcourt Brace Jovanovich.
- Oates, W. E. (1985). Searching for Leviathan: An Empirical Study. *The American Economic Review*, 75(4), 748–757.
- Oates, W. E. (1993). Fiscal decentralization and economic development. *National Tax Journal*, XLVI, 237–243.
- Oates, W. E. (1999). An Essay on Fiscal Federalism. *Journal of Economic Literature*, 37, 1120–1149.
- Oates, W. E. (2005). Toward A Second-Generation Theory of Fiscal Federalism. *International Tax and Public Finance*, 12, 349–373.
- Obinger, H., Castles, F., & Leibfried, S. (2004). Introduction: federalism and the welfare state. In H. Obinger, S. Leibfried, & F. Castles (Eds.), *Federalism and the Welfare State* (pp. 1–48). Cambridge: Cambridge University Press.
- OECD. (2017). *How's Life? 2017 Measuring Well-Being*. Paris: Organization for Economic Cooperation and Development.
- Olson, M., Jr. (1969). The Principle of 'Fiscal Equivalence': The Division of Responsibilities among Different Levels of Government. *The American Economic Review*, 59(2), 479–487.

- Ostrom, E. (1990). *Governing the Commons*. Cambridge: Cambridge University Press.
- Ostrom, V., Tiebout, C. M., & Warren, R. (1961). The Organization of Government in Metropolitan Areas: A Theoretical Inquiry. *The American Political Science Review*, 55(4), 831–842.
- Philp, M. (2006). Corruption Definition and Measurement. In C. Sampford, A. Shacklock, C. Connors, & F. Galtung (Eds.), *Measuring Corruption*. Hampshire: Ashgate.
- Pierson, P. (1995). Fragmented Welfare States: Federal Institutions and the Development of Social Policy. *Governance*, 8(4), 449–478.
- Prud'homme, R. (1995). The Dangers of Decentralization. *The World Bank Research Observer*, 10(2), 201–220.
- Qian, Y., & Weingast, B. R. (1997). Federalism as a Commitment to Preserving Market Incentives. *The Journal of Economic Perspectives*, 11(4), 83–92.
- Rodden, J. (2002). The Dilemma of Fiscal Federalism: Grants and Fiscal Performance around the World. *American Journal of Political Science*, 46(3), 670–687.
- Rodden, J. (2003). Reviving Leviathan: Fiscal Federalism and the Growth of Government. *International Organization*, 57(04), 695–729.
- Rodríguez, V. E. (1993). The Politics of Decentralisation in Mexico: From Municipio Libre to Solidaridad. *Bulletin of Latin American Research*, 12(2), 133–145.
- Rodríguez-Pose, A., & Ezcurra, R. (2010). Does decentralization matter for regional disparities? A cross-country analysis. *Journal of Economic Geography*, 10(5), 619–644.
- Rodríguez-Pose, A., & Gill, N. (2005). On the 'economic dividend' of devolution. *Regional Studies*, 39(4), 405–420.
- Rodríguez-Pose, A., & Krøijer, A. (2009). Fiscal Decentralization and Economic Growth in Central and Eastern Europe. *Growth and Change*, 40(3), 387–417.
- Rondinelli, D. A., McCullough, J. S., & Johnson, R. W. (1989). Analysing Decentralization Policies in Developing Countries: a Political-Economy Framework. *Development and Change*, 20(1), 57–87.
- Rondinelli, D. A., Nellis, J. R., & Cheema, G. S. (1983). Decentralization in Developing Countries: A Review of Recent Experience. *World Bank Staff Working Papers*, 581.
- Salmon, P. (1987). Decentralisation as an Incentive Scheme. *Oxford Review of Economic Policy*, 3(2), 24–43.

- Saltman, R. B., Bankauskaite, V., & Vrangbaek, K. (Eds.). (2007). *Decentralization in health care*. Open University Press.
- Samuelson, P. A. (1954). The Pure Theory of Public Expenditure. *Review of Economics and Statistics*, 36, 387–389.
- Samuelson, P. A. (1955). Diagrammatic Exposition of a Theory of Public Expenditure. *The Review of Economics and Statistics*, 37(4), 350–356.
- Schneider, A. (2003). Decentralization: Conceptualization and Measurement. *Studies in Comparative International Development*, 38(3), 32–56.
- Shankar, R., & Shah, A. (2003). Bridging the Economic Divide Within Countries: A Scorecard on the Performance of Regional Policies in Reducing Regional Income Disparities. *World Development*, 31(8), 1421–1441.
- Stegarescu, D. (2005). Public Sector Decentralisation: Measurement Concepts and International Trends. *Fiscal Studies*, 26(3), 301–333.
- Tanzi, V. (1996). Fiscal Federalism and Decentralisation: A Review of Some Efficiency and Macroeconomic Aspects. In *Annual World Bank Conference on Development Economics 1995* (pp. 295–315). Washington D.C.
- Tiebout, C. M. (1956). A Pure Theory of Local Expenditures. *Journal of Political Economy*, 64(5), 416–424.
- Treisman, D. (2006). Explaining Fiscal Decentralisation: Geography, Colonial History, Economic Development and Political Institutions. *Commonwealth & Comparative Politics*, 44(3), 289–325.
- Treisman, D. (2007). What Have We Learned About the Causes of Corruption from Ten Years of Cross-National Empirical Research? *Annual Review of Political Science*, 10(1), 211–244.
- Trejo, G., & Ley, S. (2015). Municipios bajo fuego (1995-2014). *Nexos*, February.
- Warren, M. E. (2004). What Does Corruption Mean in a Democracy? *American Journal of Political Science*, 48(2), 328–343.
- Weingast, B. R. (1995). The Economic Role of Political Institutions: Market-Preserving Federalism and Economic Development. *Journal of Law and Economic Organization*, 11(1), 1–31.
- Weingast, B. R. (2014). Second Generation Fiscal Federalism: Political Aspects of Decentralization and Economic Development. *Decentralization and Governance*, 53(Supplement C), 14–25.

World Bank. (2016). *Decentralization and subnational service delivery in Iraq: status and way forward* (No. AUS17063). Washington D.C.: World Bank.

Zhang, X. (2006). Fiscal decentralization and political centralization in China: Implications for growth and inequality. *Analyzing the Socioeconomic Consequences of Rising Inequality in China*, 34(4), 713–726.

CHAPTER II

MORE WITH LESS? FISCAL DECENTRALIZATION, PUBLIC HEALTH SPENDING AND HEALTH SECTOR PERFORMANCE

Helge Arends

Abstract

Decentralisation is considered a panacea for deficient public sector performance by many. However, recent trends of health sector recentralisation in several OECD countries suggest the opposite. Taking on a cross-country perspective, I examine two hypotheses, namely that decentralisation leads to an increase in public health spending (H1) and to poor health sector outcomes (H2). The evidence I present suggests that decentralising spending tends to lead to larger public health sectors and to poorer health sector outcomes. However, decentralising tax authority has no effect on the size of the health sector and may actually have a positive effect on health sector performance. The broader lesson is that while general fiscal decentralisation research tends to imply that its conclusions are valid for all policy areas in a similar way, sector-specific insights can reveal a more nuanced view on the consequences of fiscal decentralisation.

Published in: *Swiss Political Science Review*, 23(2), 144–174.

Available at: <https://onlinelibrary.wiley.com/doi/full/10.1111/spsr.12242>

<https://doi.org/10.1111/spsr.12242>

CHAPTER III

EQUAL LIVING CONDITIONS VS. CULTURAL SOVEREIGNTY? FEDERALISM REFORM, EDUCATIONAL POVERTY AND SPATIAL INEQUALITIES IN GERMANY

Helge Arends

Abstract

By focusing on the relevance of Germany's first fiscal federalism reform of 2005 for the education sector, I investigate how two key constitutional principles, namely the principle of equal living conditions across regions and the principle of cultural sovereignty of the states, relate to each other. In a first step, I investigate the determinants of the newly decentralized competences to determine teachers' salaries and the impact on educational poverty. In a second step, I discuss whether these new sub-central competences have led to an increase in spatial educational inequalities. The results indicate that federal states make use of the new competences in a rational manner. Higher teacher pay, in turn, has a significant and conducive effect on the outcome of the federal states' education sectors. There is some evidence that this has led to increasing spatial inequalities; however, the evidence is not unambiguous.

Published in: *Publius: The Journal of Federalism*, 47(4), 673–706.

Available at: <https://academic.oup.com/publius/article-abstract/47/4/673/3076130>

<https://doi.org/10.1093/publius/pjw042>

CHAPTER IV

DECENTRALIZATION AND DEATH

Helge Arends

Abstract

Fiscal decentralization is considered to promote the efficiency of public service delivery. However, some have pointed to the risk of collusion and local capture. I develop and test the argument that criminal organizations capture local governments as they consider local governments' resources an attractive income source ultimately leading to an increase in organized crime violence. I do this by regressing organized crime violence on local spending in Mexican municipalities in 2010 and over the period 1995-2010. I find a significant relationship between local spending and the intensity of organized crime violence: higher local spending per capita is strongly related to increased homicides rates, conditional on them being positive. Local spending, however, does not determine the probability of organized crime violence taking place in the first place. Moreover, I find significantly higher homicide rates in municipalities that are surrounded by neighbors with higher local public spending, indicating spillovers of violence through higher local public spending. The results suggest that caution should be exercised when initiating decentralization reforms in the context of local capture and organized crime violence. The findings break new ground on a largely ignored topic in decentralization research, namely the relationship between fiscal decentralization, local capture and organized crime violence.

Keywords: Fiscal decentralization; Organized crime; Local capture; Violence; Latin America; Mexico

1. Introduction

Organized crime infiltration of the public sector can be considered a major threat to democracy in many countries around the world (Shelley, 1995). Especially in large and diverse countries suffering from structural presence of organized crime, central government efforts to contain criminal activities reach their limits quickly. Criminal activities can flourish with local mafias often growing to the size of global enterprises. As a consequence, municipal governments are frequently under siege by criminal organizations which exert pressure to facilitate illegal activities within their jurisdiction. In fact, municipal governments may increasingly be considered an attractive source of income themselves (Pinotti, 2015b).

In such a setting, the relationship between fiscal decentralization and criminal activities is of high relevance. Is fiscal decentralization changing the incentive structure for criminal organizations at the local level? I look at one aspect of this question as I develop and empirically examine the argument that criminal organizations see local governments' resources as a source of income and enter into violent competition with each other. I analyze the relationship between local spending and organized crime violence in Mexican municipalities in 2010 as well as over the period 1995-2010.

The evidence supports the argument that higher local spending per capita is related to increased homicide rates, conditional on them being positive. Local spending, however, does not seem to be relevant for the probability of violence taking place in the first place. I also find evidence supporting a spillover effect of spending on violence. The broader insight is that in countries suffering from a strong presence of organized crime, core public sector reforms such as the promotion of fiscal decentralization must take account of contextual factors and possibly changed incentive structures for both local politicians and local pressure groups. This study breaks new

ground on the so far largely ignored relationship between fiscal decentralization and organized crime.

2. Decentralization and organized crime violence

Over the past decades, fiscal decentralization reform, here defined as the transfer of revenue mobilization and expenditure functions from central to sub-national levels (Litvack, Ahmad, & Bird, 1998, p. 14), has been brought forward with quite some enthusiasm. Compared to centralized planning of public service provision, decentralization theory promises a considerable informational advantage in terms of the preferences of consumers of a public good (Oates, 1968). Many expect local jurisdictions to enter into competition for an ‘optimal’ number of residents by offering an ‘ideal’ bundle of local public services (Tiebout, 1956). Others see decentralization as a means to promote innovation as local jurisdictions serve as ‘laboratories of experimentation’ and solutions would be picked up by other jurisdictions once proven effective (Leibfried, Castles, & Obinger, 2004, pp. 340–343). While the merits of decentralization can be observed in various contexts (Martinez-Vazquez, Lago-Peñas, & Sacchi, 2017), decentralization sceptics stress that in particular in developing country contexts, there are considerable ‘dangers of decentralization’ (Prud’homme, 1995). These include weak administrative capacities, inefficiencies due to uncompensated spillovers (Tanzi, 1996), increasing regional disparities (Arends, 2017a) and increased corruption and collusion (Neudorfer & Neudorfer, 2015).

The argument I develop refers to the latter thematic area as it deals with one specific but unexplored aspect of the relationship between fiscal decentralization and local capture, namely with the relationship between fiscal decentralization and organized crime violence. In a nutshell, I argue that in specific circumstances of local capture through criminal organizations, increasing fiscal resources at the local level can trigger turf battles between criminal organizations in order

to gain and maintain access to these public funds.¹ The argument adds a context-specific potential downside to the discussion on the dangers of decentralization.

I present the argument in two parts. I start with discussing the context for which I claim the argument holds. I continue by analyzing the assumed causal mechanism between increased fiscal decentralization and increased organized crime violence.

2.1 Context: decentralization in environments of local capture and crime

I assume a context of state capture by criminal organizations at the local level. State, or in this case, local capture can be considered a special case of corruption. While many types of corruption² are initiated by the public servant, state capture is usually driven by a third party as it involves the exertion of illicit influence of a powerful elite on the rules of the game of governmental affairs in order to ensure some kind of preferential treatment (Kaufmann, 2004). Here, I consider the third part to consist of criminal organizations, i.e., groups engaging in extreme violence and corruption (Van Dijk, 2007, p. 40).

Green and Ward (2004, p. 88) argue that criminal organizations that exercise the state capturing are characterized by their clandestine character, by taking on the role of a shadow state where the state is particularly weak and by functioning as enterprises. As these organizations unite the resources of a large number of individuals, they accumulate economic, military and political power and engage in ‘criminal industries’ such as drug trafficking or money laundering (Phillips, 2015). The interest for criminal organizations to engage in capturing local governments is therefore mainly to ensure the functioning of these industries in an uninterrupted manner. Also, there is strong evidence supporting the notion that criminal organizations flourish mostly in contexts of high impunity and deficient law enforcement and criminal justice (Van Dijk, 2007, p. 46) because the probabilities of apprehension and prosecution are low and punishment is mild.

Thus, in contexts of local capture by criminal organizations, the deterrent effect of police and judiciaries is low.

What is more, I adapt the argument of Manning and Redlinger (1977) who argue that for criminal groups, the focus lies on corrupting enforcement officers at lower levels of the command chain, because influencing higher levels of an institution implies using substantially more resources which are often not available in illegal operations. Analogously, I assume that because local politicians and officials are less powerful and easier to access by local pressure groups than higher-level officials, they find themselves on the ‘invitational edge of corruption’ (Manning & Redlinger, 1977) as well. Thus, criminal organizations are particularly interested in focusing their capturing activities on the local level.

In fact, in decentralization research, the effect of fiscal decentralization on local accountability is subject to intense debate. The argument is that a decentralization-induced physical closeness between those who pay the taxes and those who decide on how taxes are being spent would enhance accountability through various causal channels.³ In contrast, sceptics argue that decentralization increases corruption because a higher level of intimacy between local actors enables a collusive environment with powerful local interest groups exerting pressure on local officials to ensure a particular gain (Bardhan & Mookherjee, 2000, p. 135; Hernández-Trillo & Jarillo-Rabling, 2008). The empirical literature provides a mixed picture with regard to the presence and direction of the effect of decentralization on corruption (see Neudorfer & Neudorfer, 2015). Irrespective of whether local capture is promoted through decentralization, there is little doubt that local capture is of key concern in countries suffering from a structural presence of criminal groups. These usually exert considerable influence over local public officials, who are considered to be easier to control than central government officials (see Buscaglia & van Dijk, 2003; Pinotti, 2015a).⁴

The techniques applied to gain and sustain local capture are diverse and range from bribing, intimidation and open violence against public officials (Lessing, 2015) to vote buying or illicit financing of campaigns. Once local capture has become more sustained and systemic, i.e., once governmental actions have become entirely subordinate to the interests of criminal organizations, monetary transactions or single threats to public servants become less important. The manipulation of governmental power takes place through a more complex system of relationship and exchanges of favors (Philp, 2006, p. 49).⁵ Clearly, for local capture to succeed, I assume that local mechanisms to enhance local accountability such as local elections, media or civil society but also sufficient administrative and auditing capacities of local governments are not in place or do not function properly (Fisman & Gatti, 2002; Treisman, 2002).

In short, the following mechanism is understood to take place in an enabling environment characterized by a strong presence of organized crime, deficient rule of law and weak local accountability, ultimately leading to capture of local institutions. I assume that these conditions are determined exogenously, i.e., by factors such as geography, history or decentralization-unrelated political factors. However, it is acknowledged that decentralization itself may increase or decrease the extent of corruption at the local level. I will take a closer look at the specific argument in the next section.

2.2 Mechanism: decentralization and organized crime violence

Glaeser and Saks (2006) and Goel and Nelson (1998) argue that large governments bring along many opportunities for corrupt actors to extract rents. Undoubtedly, fiscal decentralization regularly implies a substantial increase in local government funds, making local government bigger, oftentimes even to a degree that it overburdens local financial management and auditing systems (Hernández-Trillo & Jarillo-Rabling, 2008, p. 1547). In fact, since central government

oversight over local spending is usually weaker in decentralized contexts (Altunbaş & Thornton, 2012, p. 67) increasing local public funds may become even more interesting to rent-seeking elites.

Hence, in the above-mentioned context of local capture, I argue that fiscal resources at the local level function as a ‘pull factor’ (Morselli, Turcotte, & Tenti, 2011) for criminal organizations looking for new income sources. I assume that this is especially the case when main business operations, in particular those related to drug trafficking, become more risky through increased government prosecution or harsh competition from other criminal groups (‘push factors’) (Magaloni, Matanock, Romero, & Díaz-Cayeros, 2015, p. 4).

However, in relation to the discussion on the accountability-enhancing effect of fiscal decentralization referred to above, it is often assumed that horizontal accountability is enhanced when decentralization is designed the right way. When local services are financed through transfers from the central government, taxpayers would have difficulties following the causal chain leading from taxes paid to the central government to the quality of local services received (‘fiscal illusion’) (Rodden, 2003). In fact, many argue that local governments financed by local taxes and fees spend public resources more efficiently (Torgler & Werner, 2005). Taxpayers and voters are able to make a direct link between the amount of taxes paid and the value received in the form of quality local services (Arends, 2017b, p. 146). In this vein, I assume that while grant-based fiscal decentralization does not help much in reducing local capture through criminal organizations, own-source-revenue based fiscal decentralization should increase local accountability, work against local capture and thus decrease organized crime violence.

Consequently, a first part of the proposed mechanism implies that fiscal decentralization leads to an increase of available – and easily accessible – public funds at the local level. Especially when central government oversight is weak, local absorption capacity is limited, and local revenues are

financed through intergovernmental transfers, is it likely that incentives for criminal organizations to extract rents from local governments are present.

The second part of the proposed mechanism holds that as criminal organizations diversify their activities into the business of extorting rents from local governments, ‘turf wars’ become more frequent and intense as criminal organizations seek a monopoly of access to local funds in a particular region and try to establish this by means of violence (Green & Ward, 2004, p. 86). Turf wars, i.e., violent confrontations between criminal groups for a market or territory, are usually considered the main reason for the high degree of violence which accompanies criminal industries (Duran-Martinez, 2015; Goldstein, 1985): in the absence of legal mediation, violence is used to solve disputes, regulate markets and enforce contracts. This is why Volkov (2002) defines criminal organizations as ‘violent entrepreneurs’.

Turf wars have a strong territorial dimension, as has been stressed in research on local drug markets (Friman, 2009; Reuter, 2009). Following the presented argument, increased local resources would transform municipalities into hot spots of violence (Sherman, Gartin, & Buerger, 1989). At the same time, it is unlikely that violence stops at a locality’s border. On the contrary, assuming that the effect of local spending upon violence is relevant, it is important to take account of spillover effects with increased local funds in one jurisdiction causing organized crime violence in neighboring jurisdictions. Clearly, this argument relates to the extensive literature on uncompensated interjurisdictional spillovers of decentralized service provision (Brueckner, 2003).

Little systematic evidence exists with regard to the reaction of criminal organizations to increased local funds. Most of it comes from the Italian context. Acconcia, Corsetti, and Simonelli (2014, p. 2191) note that in Italy, the interaction between co-opted public institutions and decentralization-induced increases in public resources at the local level caused a tremendous expansion of

criminal organizations' profits.⁶ In particular, public works programs managed by local administrations have become one of the most profitable sources for Italian mafias.⁷ With regard to the effect of decentralization on violence, some evidence comes from the context of the civil war in Colombia: *guerrilla* and paramilitary groups increasingly threatened local governments in order to appropriate local government funds (Dávila, 2009, pp. 53–54; Sánchez & Chacón, 2005). After a series of decentralization reforms beginning in the 1980s, which endowed local governments with discretion over significantly more funds, these groups started fighting for control over municipalities leading to an increase in violence (Sánchez & Chacón, 2005). However, these findings have never been discussed in the context of the larger body of literature dealing with decentralization and the determinants of crime respectively.

To sum up, I argue that in particular in countries with a strong presence of organized crime, weak local governance structures and low deterrence, decentralizing fiscal responsibilities creates or extends illicit markets. The local level is of special interest to criminal groups because public servants are easier to corrupt and oversight by higher-levels of government and the public is weaker. As violent entrepreneurs, competing criminal organizations enter into turf battles which increase the overall level of violence. I assume that turf battles are especially prevalent when accountability relationships are weakened through fiscal illusion, i.e., when the bulk of public funds emanates from transfers from higher levels of government. A higher share of own-source revenue in total local public funds is considered to increase accountability, decrease local capture and thus decrease organized crime violence.

3. Mexico: Decentralization, organized crime and violence

Frequent reports of local capture, a strong presence of organized crime and past decentralization reforms render Mexico an interesting case to investigate. With regard to the context, organized

crime has a long history in the Mexican regions, mainly determined by the country's closeness to the United States drug market. In addition, the growth of drug cartels was enabled by high levels of impunity and a general ineffectiveness of the criminal justice system (Heinle, Molzahn, & Shirk, 2015, p. 5).

Consequently, capture of the, at the time of writing, 2457 municipal governments by criminal organizations is a well documented phenomenon (Aguirre Ochoa & Errera Torres, 2016; Rios, 2015, p. 660). Kruijt (2011, p. 23) holds that criminal organizations are present in or exert significant influence over around 50 percent of municipal governments. Galilea, Letelier, and Ross (2011, p. 225) cite evidence suggesting that in 2010, 195 municipal administrations were entirely controlled by criminal groups, and that 1536 municipal governments were under their significant influence.

There is solid evidence supporting the notion that local politicians and officials are proactively engaging in corruption and collusion (Aguirre Ochoa & Errera Torres, 2016, p. 662). Due to historically strong patron-client relationships, mayors of the Institutional Revolutionary Party (PRI) are seen to be most deeply involved in collusion with local pressure groups (Cantú & Desposato, 2012, p. 13). Oversight bodies controlled by civil society are usually ineffective and rarely established in the first place (Auditoría Superior de la Federación, 2013; Rowland, 2001), and the impossibility to re-elect local officials is seen to hamper electoral accountability (Mendoza & Martínez-Vazquez, 2000, p. 170).

In effect, organized crime capture of local governments and local police has taken on a prominent position in the public debate in Mexico. Most visibly has the nexus between local government and organized crime been discussed immediately after the enforced disappearance of 43 students in the city of Iguala, which was the result of a coordinated action between the city's mayor, the

municipal police force and one or various criminal groups in September 2014 (Aguirre Ochoa & Errera Torres, 2016, p. 658).

In terms of fiscal decentralization, over the past four decades, Mexico has experienced a number of decentralization reforms (Salazar, 2007). In the wake of these reforms, the role of the municipalities became gradually more important, in particular as they were enabled to, amongst others, levy property tax and local fees and also take on the provision of key public services, such as water access, sanitation, roads and public safety (Moreno-Jaimes, 2008, p. 31). In addition to enhanced fiscal powers, in 1998, the municipalities' role was strengthened by the creation of formula-based earmarked federal funds (*'aportaciones'*) for the municipal governments. These aimed at enhancing local investment in physical and social infrastructure (Salazar, 2007, p. 72)⁸, ultimately complementing unconditional transfers from the tax-sharing scheme (*'participaciones'*) (Sour, 2013, p. 167).

Clearly, in spite of municipal spending being rather low when compared to other OECD countries,⁹ decentralization reforms have caused a substantial increase in funds available to local governments. Calculating the average per capita municipal spending confirms this assumption: whereas in 1995, municipalities spent around 900 Mexican pesos per capita per year (at 2010 prices, based on data from the Mexican national statistical institute *Instituto Nacional de Estadística y Geografía* (INEGI)), this value increased to around 3600 Mexican pesos in 2010. As can be seen from table one, on average, around 83 and 86 percent of municipal revenues came from intergovernmental transfers in 2010 and 2015 respectively. The remaining approximately 15 percent of revenues came from the property tax and from charges for local public services (around nine percent), debt (around three to five percent) and other revenues (around two percent).

TABLE 1 THE STRUCTURE OF REVENUES HERE

The dependence of municipal governments on increasingly earmarked intergovernmental transfers has been criticized for decreasing the accountability relationship between municipal leaders and their citizens. They would limit the fiscal space, ultimately curtailing the ability of municipalities to adequately respond to local needs (Aguirre Ochoa & Errera Torres, 2016).

At the same time, various observers have expressed their concerns about the quality of local financial management: Public procurement is considered to take place in a non-transparent manner (Auditoría Superior de la Federación, 2013, p. 34). Funds from different sources have often been found to be lumped together in one municipal bank account, increasing the risk of irregularities. Only a few municipal governments adequately report on the use of federal funds (Auditoría Superior de la Federación, 2013; Salazar, 2007, p. 74),¹⁰ implying that the federal government has only minimal oversight over spending decisions at the local level (Hernández-Trillo & Jarillo-Rabling, 2008). Sub-national governments have been accused of not allocating the public resources in the interest of their constituencies (Salazar, 2007, p. 70).

However, can it be assumed that decentralization reforms combined with weak horizontal and vertical accountability structures render local public funds an incentive for rent-seeking? Locks (2015) hints at a recent transformation of Mexican criminal organizations' business model. A direct confrontation between police, army and criminal organizations following the 'war on drugs' initiated by President Calderón (2006-2012) from the National Action Party (PAN), led to a decrease in profits from drug trafficking and caused a violent confrontation between drug cartels themselves. As a consequence, many (fragmented) organizations diversified activities from the risky area of international drug trafficking to less risky local criminal activities, such as human trafficking, kidnapping and extortion. Between 2007 and 2012, crime rates increased by

150 percent, while the incidence of extortion of companies or citizens increased by 1250 percent (Locks, 2015, p. 67).¹¹

There is evidence that extortion by criminal organizations increasingly targets local governments. Trejo and Ley (2015) argue that violence against public officials is significantly higher in municipalities which mobilize higher levels of own-source revenues and exert a higher degree of fiscal autonomy. They hold that in the context of a disintegration of drug-cartels, smaller criminal groups direct their activities towards infiltrating local governments to access public funds. Criminal groups would concentrate their activities on those municipalities with high levels of income from local taxes because the whereabouts of these funds do not have to be reported to the federal level (Aguirre Ochoa & Errera Torres, 2016, p. 664; Trejo & Ley, 2016, p. 46) – an observation that runs counter to the above stated argument that own-source local revenues decrease organized crime presence. This will be discussed further below.

Mexican newspapers have covered collusion between municipal governments and criminal groups as well. For example, after having successfully influenced municipal elections in the federal state of Michoacán in 2011, the leader of the powerful *Caballeros Templarios* is said to have personally called a large number of mayors to hand over large parts of their budgets. He demanded 30 percent of the budget reserved for public works, 20 percent of the salaries reserved for municipal staff and the awarding of public contracts to companies that are connected to his organization (Trejo & Ley, 2015). In 2013, the newspaper *Milenio* cited confidential documents revealing that the Mexican government estimated the monthly income of the *Templarios* from extorting municipal governments at one million US dollars (Milenio 2013). This behavior is considered a generalized issue, with four out of ten mayors under pressure to provide criminal groups with access to public funds, as was stated at the Conference of Mexican Municipalities in

2013 (Sin Embargo Editors, 2013). Thus, there are indications that fiscal decentralization and increasing local public funds create a lucrative market for criminal organizations in Mexico.

With regard to organized crime violence, Rios (2013) identifies turf battles between criminal groups as a major factor for exploding organized crime violence. While for various decades, strong patron-client relationships between criminal organizations, municipal police and local politicians ensured that criminal groups could operate with impunity and without having to resort to much violence (Bardhan, 1997, p. 1329; Rios, 2013), the transition of power from the hegemonic PRI to the new incoming governments from other parties at various governmental levels caused an outburst of organized crime violence. This holds particularly true from the mid 2000s onwards. As figure one indicates, the Mexican homicide rate started to rise again with the ‘war on drugs’, initiated during the term of President Calderón. The rate fell with PRI President Peña Nieto taking office in 2012, who, instead of seeking open confrontation with Mexican criminal organizations, focused on leadership decapitation to destabilize drug cartels. In the medium run, this strategy has, however, caused the fragmentation of large cartels into smaller criminal groups which are especially prone to engaging into turf battles (Beittel, 2017).¹² This explains the increase in homicide rates in 2016 and 2017 as reported by INEGI.

FIGURE 1 THE EVOLUTION OF HOMICIDE RATES HERE

Organized crime violence is regionally concentrated. According to data from INEGI, around 42 percent of municipalities were ‘murder-free’ in 2010. Mainly, but not exclusively, violence accompanies the major drug trafficking routes in the northwest, northeast and the Pacific coast. It is particularly severe in states bordering the US, i.e., Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, and Tamaulipas (Heinle et al., 2015, pp. 12–13).

FIGURE 2 REGIONAL DISTRIBUTION OF ORGANIZED CRIME HOMICIDES HERE

A first hint at the relationship between local spending and violence can be obtained from visual inspection: The two choropleth maps presented in figure two show the regional distribution of homicides presumably related to organized crime activities per 1000 inhabitants as provided by the Mexican National Security Council (upper part of the figure) and local municipal spending in 1000 Mexican pesos per inhabitant (bottom part) in 2010 as provided by INEGI. They suggest a positive relationship between local spending and violence (correlation: 0.19). However, omitted variable bias is likely to be an issue here. For example, the spatial distributions of both variables coincide with major drug trafficking routes. Large cities not only display a higher degree of local spending per capita – through, e.g., more sophisticated infrastructural needs and a stronger fiscal base – but also face more severe organized crime violence. These and other potentially confounding factors will have to be taken into account.

4. Empirical analysis

4.1 Method

The following econometric analysis starts with a cross-sectional design for 2010, a year when criminal organizations are assumed to have increasingly diversified into extortion and a year for which an exceptionally broad range of data on the determinants of organized crime is available. That year, Mexico consisted of 2456 municipalities and 31 federal states and the Federal District of Mexico City. 556 municipalities are excluded due to data limitations, including the 16 local governments of the Federal District of Mexico. I then continue with a panel analysis, in order to analyze decentralization as a dynamic concept and to control for omitted effects common across

all municipalities during the time under investigation. The time-dimension consists of the years 1995, 2000, 2005 and 2010 which are the years for which data on population size and other demographic variables are available from the quinquennial censuses.

The two dependent variables under investigation, the homicides attributed to organized crime and the homicides irrespective of the type of author are semicontinuous dependent variables as they consist of two components: a portion of municipalities with zero murders, i.e., ‘murder-free’ municipalities, and a portion of municipalities with continuously distributed positive homicide rates. The two components are denominated binary and continuous part respectively (Olsen & Schafer, 2001). Since the share of zeros in this sample is of such magnitude to possibly bias the results if a single-index regression model were estimated (Smith, Maciejewski, & Olsen, 2018, p. 9), the subsequent regression analysis follows the logic of a two-part model (TPM) (Duan, Manning, Morris, & Newhouse, 1983).¹³ The variables will be analyzed in two steps: the first part of the model provides results on the probability of municipalities to experience organized crime violence (OCV) given a vector of explanatory variables. The second part presents evidence on the linear relationship between the continuous part of the OCV variable and the independent variables. I thus look at a sub-set of the population of municipalities.¹⁴ The binary part is also referred to as the occurrence or participation variable, while the continuous part is referred to as the intensity variable (Farewell, Long, Tom, Yiu, & Su, 2017). With regard to the cross-sectional analysis, I will look at the binary part of the model by estimating a logit regression, taking on the following form:

$$\text{Logit}\{\text{Pr}(\text{OCVBIN}_i = 1 \mid \text{LS}_i, \text{OR}_i, \mathbf{X}_i, \mathbf{S}_i)\} = \beta_1 + \beta_2 \text{LS}_i + \beta_3 \text{OR}_i + \beta_4 \mathbf{X}_i + \beta_5 \mathbf{S}_i \quad (1)$$

OCVBIN represents a binary response variable indicating whether organized crime violence has occurred or not, LS and OR are the variables of interest, i.e., the amount of local spending per 1000 inhabitants, and the share of own-source local revenue in total revenue. \mathbf{X} reflects a set of control variables at the municipal level. \mathbf{S} is a set of dummy variables identifying the federal state a municipality is located in. In fact, in a large and diverse country such as Mexico, I consider it adequate to hold the unique characteristics of the federal states constant. Subscript i identifies a specific municipality. Standard errors are clustered according to the federal state. Analogously, I estimate a log-linear part

$$\ln(\text{OCVCONT}_i) = \alpha + \beta_1 \text{LS}_i + \beta_2 \text{OR}_i + \beta_3 \mathbf{X}_i + \beta_4 \mathbf{S}_i + \epsilon_i \quad (2)$$

using Ordinary Least Squares (OLS) estimation with OCVCONT reflecting the conditional continuous part of the above-mentioned homicide rates. Since homicide rates are right-skewed, I log-transformed the dependent variables. ϵ_i reflects the residual. Again, standard errors are clustered according to the federal state a municipality belongs to.

The cross-sectional analysis looks at decentralization in a static manner. In fact, 2010 was a peak-year of violence and could thus be subject to spurious correlation. This is why I also look at the impact of fiscal decentralization on organized crime violence through a cross-sectional time-series lens. I estimate an uncorrelated TPM for longitudinal data (Smith et al., 2018):

$$\begin{aligned} \text{Logit}\{\text{Pr}(\text{OCVBIN}_{it}=1 | \text{LS}_{it}, \text{OR}_{it}, \mathbf{X}_{it}, \mathbf{S}_i, \mathbf{T}_t, \zeta_i)\} = \\ \beta_1 + \beta_2 \text{LS}_{it} + \beta_3 \text{OR}_{it} + \beta_4 \mathbf{X}_{it} + \beta_5 \mathbf{S}_i + \beta_6 \mathbf{T}_t + \zeta_i \end{aligned} \quad (3)$$

ζ is the municipality-specific random intercept. Time dummies (\mathbf{T}) control for common trends. The subscripts identify the municipality i at a given year t (1995, 2000, 2005 or 2010). Accordingly, the continuous part is:

$$\ln(\text{OCVCONT}_{it}) = \beta_1 + \beta_2 \text{LS}_{it} + \beta_3 \text{OR}_{it} + \beta_4 \mathbf{X}_{it} + \beta_5 \mathbf{S}_i + \beta_6 \mathbf{T}_t + \xi_{it} \quad (4)$$

Here, the error term ξ is divided into a municipality- and time-variant element. For the intensity model, standard errors reflect heteroscedasticity-corrected Huber/White sandwich estimators which cannot be calculated for the logit specification. I assume that the two components are not correlated over time (Farewell et al., 2017).

Note that the dependent variable reflects the general homicide rates because data on organized crime related homicides are not available for the panel under investigation. Also, due to data limitations, the vector of explanatory variables \mathbf{X} is substantially smaller than the one for the cross-sectional estimation.

The separation of the two dependent variables into a participation and an intensity part provides the opportunity to investigate whether the effects of the variables of interest differ with regard to the participation of a municipality in organized crime violence and the intensity of violence. Note, however, that the theoretical discussion above does not say anything about this distinction, which is why I assume the same theoretical relationships for both parts and include the identical set of exogenous variables in both parts of the model.

4.2 Variables

As mentioned, I use two variables to approximate organized crime violence: First, the number of deaths attributed to violent competition per 1000 inhabitants of a municipality. This is a unique dataset which has been developed by the Mexican National Security Council from 2006 until 2011. A death was considered connected to criminal activities when an institution related to public security such as the attorney general's office stated that the death *could* have been related to organized crime violence (Phillips, 2015, p. 330; Rios, 2013, p. 144). Second, I analyze the official homicide rate which does not distinguish between homicides related to organized or individual crime but which has generally been applied as a proxy for the presence of criminal organizations (Pinotti, 2015b).¹⁵

The first independent variable of interest is the amount of local spending (LS) per capita and year in 1000 Mexican pesos, equaling around USD 79 in 2010. In order to analyze a possible accountability-enhancing effect of local revenue mobilization, I also computed the share of own-source revenues in total municipal revenues (OR).¹⁶

The set of control variables at the municipal level (**X**) contains the following predictors for the cross-sectional analysis: Since the presence of organized crime violence can lead to increased investment in local public security and increase the level of local spending, implying the risk of reverse causality, I control for local public security resources. First, I include the local security spending per capita in 1000 Mexican pesos. Data for this variable are only available for 56 percent of the municipalities included in the regression analysis. Therefore, I interpolated values for the remainder of the municipalities in order to keep such a large number of observations from dropping out.¹⁷ Second, I use the number of local police per 1000 inhabitants. However, the police variable could also identify a deterrence effect for criminal organizations to get engaged in violence (Fajnzylber, Lederman, & Loayza, 2002, p. 1329). The direction for the effect could go both ways.

I control for other key variables, usually considered to be associated with violence. I include the local Gini coefficient and the local Human Development Index (HDI) – both divided by 10 so that the effects relate to an increase by 0.1 points of the Gini and HDI coefficient respectively. Relative and absolute deprivation can be considered a cause for frustration and anger and cause violence (Neumayer, 2003, p. 623). Also, the HDI may proxy a lack of employment opportunities, motivating inhabitants to get active in the illegal economy.

In addition, I control for demographic variables. The number of female-headed households as a share of total households proxies disruption of traditional family structures, a variable that is considered to lead to increased levels of violence (Villarreal, 2002). The average household size is considered important, with larger households leading to higher homicide rates as victims are oftentimes related to the offender (Neumayer, 2003). Urban areas, which are considered to be more violent (Buonanno & Montolio, 2008, p. 91), are controlled for by including a measure of population density. Picking up the share of males aged between 15 and 29 years and the number of males per 100 females responds to the finding that in particular young men are considered to engage in criminal activities (Marselli & Vannini, 1997, p. 98). I include the share of indigenous population because indigenous municipalities are said to be characterized by a higher level of social control, preventing violence from happening (Villarreal, 2002, p. 484). Two variables control for the notion that small municipalities may be characterized by a low level of administrative capacities, public service delivery quality and are more prone to local capture, which could lead to increased levels of violent competition. First, I control for the number of a municipality's inhabitants (in 10000s). Second, a categorical variable ranging from 0 to 3 with every integer indicating the respective quartile a municipality is located in is computed. I introduce this second variable because it may be reasonable to assume that there are *groups* of municipalities in terms of population size that 'share the same fate' in terms of violence.

I introduce a proxy for electoral competition because it has been argued that electoral competition disrupts patron-client relationships between hegemonic parties and criminal organizations, leading to a loss of social control and increased violence (Villarreal, 2002). I calculate the index for the effective number of parties developed by Laakso and Taagepera (1979), which can be interpreted as the number of ‘relevant’ parties that participate in a local election, ascribing a higher weight to parties that concentrate a higher share of the votes.¹⁸ Finally, I include a dummy variable identifying those municipalities that are close to the major drug trafficking routes, i.e., located in those federal states which share the border either with the US or with the Pacific coast. Note that various control variables drop out for the longitudinal TPM due to data limitations. I extrapolated those variables for which only one panel was missing, which is the case for the share of female-headed households, household size and the share of indigenous inhabitants, which did not have observations for 1995. In the longitudinal analysis, I add dummies for the respective state a municipality is located in, so that state-specific omitted characteristics remain controlled for. The year 1995 is the time period omitted from the set of time dummies. Sources and summary statistics for 2010 can be found in the appendix.

4.3 Results

Table two presents the results for the TPM for the cross-sectional analysis for the year 2010.¹⁹

TABLE 2 TWO-PART MODEL HERE

Looking at the organized crime homicide rate first, the results suggest that local municipal spending per capita does not increase the *probability of being struck* by turf battles, i.e., is insignificant with regard to the participation effect. However, it seems relevant for the *intensity* of

turf battles, i.e., the continuous part. The more local public funds are available at the local level, the higher the municipal homicide rates, conditional on them being positive. When local spending increases by 1000 Mexican pesos per capita, local homicide rates increase by 11.76 percent. Own-revenue mobilization does neither have a significant effect on participation in nor on the intensity of turf battles.

A look at the control variables suggests that local security spending and local police do not change the odds of remaining ‘murder-free’ and do not have an effect on the intensity of violence. Also, while inequality is not relevant, the level of human development seems to increase the level of homicide rates, conditional on them being positive. An increase of the HDI by 0.1 points decreases the organized crime homicide rate by 14.8 percent.

While, as expected, a larger share of female-headed households increases the probability of violence to occur, a larger average household size seems to decrease it: an increase of the size of a household by one person decreases the odds of turf-battles by 46 percent – although the effect is only significant at the ten percent significance level. A larger share of young males and a generally stronger presence of males as compared to females make organized crime violence more probable as well. However, no significant intensity effect can be discerned for all of these variables.

As anticipated, municipalities with a high share of indigenous inhabitants display a significantly lower probability of organized crime violence. Unsurprisingly, municipalities with larger populations are more likely to experience organized crime violence, as the continuous and the categorical population size variables suggest. However, the homicide rates in larger municipalities tend to be lower, conditional on them being positive. Passing from a smaller-size municipality to a larger-size municipality decreases the homicide rate by 34 percent. Surprisingly, in this specification, being located close to the Pacific coast or the US does not increase the

probability to engage in turf battles. However, these municipalities display an exponentially higher organized crime homicide rate than those municipalities located in other areas, conditionally on homicide rates being positive.

Pseudo R^2 and R^2 suggest that the models have substantial explanatory power. However, in particular with regard to the binary part, a considerable amount of variation of violence remains unexplained.

A glance at the general homicide rate model reveals a similar effect of local spending on violence. While there is no impact on the participation effect, an increase in local public spending by 1000 Mexican pesos per capita – which would mean an increase of spending of around 3.5 million USD for an average municipality of 45000 inhabitants – may increase the homicide rate by 12.5 percent.

A deterrent effect of local police may now be discerned, with one additional local police officer per 1000 inhabitants decreasing the odds of violence from occurring by four percent. However, police continue to be ineffective in diminishing the level of homicide rates, conditional on them being positive. Now, a higher level of human development seems to reduce both the probability of occurrence of any violence and the level of homicide rates. A larger portion of males in comparison to females increases the probability of participation in and the intensity of violence. On the contrary, higher shares of indigenous population in municipalities seem to be robustly diminishing the occurrence and the intensity of violence. A ten-percentage point increase in the share of indigenous inhabitants may decrease the level of homicide rates by four percent.

Population size is relevant in this specification as well. However, with regard to violence intensity, the continuous population variable is now significantly positive while the categorical variable is significantly negative – a contradiction that needs further investigation. Also, now, electoral competition significantly reduces the level of homicide rates, conditional on them being

positive. Finally, being located along the major drug trafficking routes dramatically increases the odds of experiencing turf battles and fosters their intensity. The shares of explained variation are slightly below those of the specification related to organized crime homicide rates.

In summary, the results suggest a significant and robust positive relationship between the level of local public spending and the intensity of (organized crime) violence in Mexican municipalities in 2010. However, no significant participation effect of local spending can be identified. Moreover, a higher own-revenue share does not seem to decrease or increase violence. Note that the inclusion of state dummies controls for state-specific characteristics. Bootstrapping the standard errors with 1000 replications does not change the results substantially.

The uncorrelated longitudinal two-part model is provided in table three.

TABLE 3 UNCORRELATED TPM HERE

The first logit specification confirms a possible irrelevance of the level of local spending on the occurrence of violence in a specific locality. Also, the effects of the control variables are quite similar to the cross-sectional general homicides specification in terms of direction and significance level, although household size and population density are now significant at the ten percent significance level. Bearing in mind the large sample size, these effects should not be overemphasized. Also, the effect of the share of young males in total males shifts towards the negative. From a historic point of view, it seems to have reduced the odds of experiencing murder.²⁰

Also, historically, the odds of having a positive homicide rate are eighteen times higher when located in a state bordering the Pacific coast or the US. The year dummies confirm the time trend presented in figure one, with the significantly lower probability of a municipality in 2000

experiencing violence than a municipality in 1995. In 2005, the effect is weaker and only significant at the ten percent significance level. In 2010, the effect turns positive (while becoming insignificant). Specification two (just as specification four) includes interaction terms between local spending per capita and the respective year dummy. It becomes clear that while the overall effect is insignificant as suggested by specification one, the effect upon homicide rates of spending per capita was significantly higher in 2000, 2005 and 2010 respectively than it was in 1995, with the interaction effect turning gradually stronger over time.

Looking at specification three, again, an increase in local public spending by 1000 Mexican pesos per capita increases the homicide rate by 11.7 percent, conditional on it being positive. In contrast to the cross-sectional TPM, an increase of the share of own-source revenue by one percentage point significantly decreases the level of homicide rates by 2.5 percent.

With regard to the control variables, the results confirm those obtained in the TPM, although t-values are substantially higher, which is not surprising given the substantial increase in observations. Note, however, that the effect of household size and the share of young males in total males suggest a negative relationship with regard to levels of homicide rates. The model supports the results from the cross-sectional model that electoral competition decreases violence. The year dummies confirm the trend of increasing homicide rates over time.²¹ In addition, a look at the spending-year interactions in specification four suggests that violent competition for local public funds may indeed be a fairly recent phenomenon, with only the interaction term for 2010 being highly significant. Again, bootstrapping the results does not change the conclusions in a meaningful way.

However, with regard to this type of longitudinal TPM, it must be emphasized that the assumption of uncorrelated random effects is strong. Indeed, it is likely that in a specific municipality the odds of violence at one point in time are correlated with the level of the

homicide rate at another point in time (Su, Tom, & Farewell, 2009). Also, the estimates represent different sub-samples at different points in time – depending on whether they experienced positive homicide rates, making it difficult to interpret the effects as causal relations in a strict way. I opted for this simple uncorrelated model since correlated TPM (Smith et al., 2018, p. 10) remain computationally challenging and difficult to interpret. Thus, the above-presented panel analysis should be interpreted with caution and serves as supportive evidence on the relationship between local spending and organized crime violence identified by means of the cross-sectional analysis.

4.4 Model extension: spillovers of violence

A key issue in decentralization research is the potential presence of interjurisdictional spillovers and how these can be internalized in order to ensure the efficiency of the provision of local public goods (Olson, 1969). While this debate usually revolves around effects of specific local services such as economic development or clean rivers and their beneficial effect on neighboring localities which do not bear the cost of service provision, the question if fiscal decentralization also leads to uncompensated ‘spillovers of violence’ is worth investigating in more detail.

Spatial econometrics model spillovers through the introduction of a spatial lag of a variable, i.e., the weighted average of values on a variable over neighboring municipalities (Drukker, Peng, & Prucha, 2013, pp. 242–243). Several methods to model spillovers exist, differing with regard to whether the spatial lag resembles the lag of the dependent variable, of the error term or of the independent variable (see Anselin, 1988; Anselin & Bera, 1998).²² In what follows, I present the results of a spatial lag of X (SLX) model, which consists of aggregating the distance weighted average of the value of a certain independent variable, in this case local public spending in

neighboring localities, to the benchmark continuous models²³ presented above (Halleck Vega & Elhorst, 2015).

I estimate

$$\ln(\text{OCVCONT}_i) = \alpha + \beta_1 \text{LSN}_i + \beta_2 \text{W*LSN}_i + \beta_3 \text{OR}_i + \beta_4 \mathbf{X}_i + \beta_5 \mathbf{S}_i + \epsilon_i \quad (5)$$

and

$$\begin{aligned} \ln(\text{OCVCONT}_{it}) = \\ \beta_1 + \beta_2 \text{LS}_{it} + \beta_3 \text{W*LSN}_{it} + \beta_4 \text{OR}_{it} + \beta_5 \mathbf{X}_{it} + \beta_6 \mathbf{S}_i + \beta_7 \mathbf{T}_t + \xi_{it} \end{aligned} \quad (6)$$

with W*LSN resembling an average of local spending in neighboring (LSN) municipalities weighted by means of the spatial weights matrix W.²⁴ The spatial weights I used to construct W are of binary nature, coded one if the neighboring municipal center is within a certain range and coded zero if this is not the case. W is a row-normalized operation which can be interpreted as averaging of neighboring values (Elhorst, 2014, p. 12). I look at the spatial lag at different distances, ranging from 50 to 200 kilometers.

Before proceeding to the regression results, I plot log-transformed positive homicide rates against the spatial lag of local spending, here weighted according to the inverse distance from the respective municipality (for demonstrative purposes with a distance decay parameter of one). Following the logic of a Moran's scatterplot (Anselin, Cohen, Cook, Gorr, & Tita, 2000, p. 232), variables are standardized so that they have a mean of zero and a standard deviation of one.

FIGURE 3 RELATIONSHIP HOMICIDES AND LAG OF SPENDING HERE (PRINT: BW)

A look at the quadrants in figure three suggests that there is some kind of spatial pattern, with a concentration of municipalities with low homicide rates being surrounded by neighbors with low local spending (lower right quadrant) and municipalities with high homicide rates surrounded by municipalities with high local spending (upper right quadrant). There is, however, a substantial concentration of municipalities with high homicide rates being surrounded by municipalities with lower local spending (upper left quadrant). Nonetheless, in general, the relationship between homicide rates and the spatial lag of local spending is positive.

The SLX-results are presented in table four.

TABLE 4 A SPATIAL LAG OF X MODEL FOR VIOLENT SPILLOVERS HERE

The results show that spatial dependence is likely to be an issue. Both models indicate that increases in the neighbor's local public spending significantly lead to increases in the own homicide rates, conditional on them being positive. However, the results also suggest that violent spillovers are limited to a certain distance. The cross-sectional analysis indicates that, in 2010, increases in local spending only had a highly significant impact if these happened in neighboring municipalities within a range of 100 kilometers. The longitudinal view on decentralization indicates that the effect holds for municipalities that are 175 kilometers apart. At these threshold distances, the models suggest that an increase of the weighted spending in neighboring municipalities by 1000 Mexican pesos increases homicide rates by 9.1 and 8.6 percent respectively, which can be considered a substantial spillover effect of decentralization. I also include a specification based on a power functional type of inverse distance weighted matrix (IDW) putting stronger weights on those municipalities closer to the municipality under investigation. In contrast to the lag used in figure three, the distance decay parameter is power

two. These specifications confirm that spillovers are more severe in closer neighboring municipalities.

In short, this extension of the benchmark model indicates that the effect of increased local spending on organized crime violence is not limited to a municipality's boundaries. Municipalities seem to be subject to violent spillovers caused when local public funds in neighboring municipalities are high.

4.5 Discussion

As exposed above, Mexico is a case where the contextual conditions for the assumed mechanism to be at work exist: a strong presence of organized crime, severe governance challenges at the local level, a weak deterrent effect of the justice system and police and weak horizontal and vertical accountability relationships provide for an enabling environment for local capture and thus for the mechanism to be relevant. The econometric analyses provide ground for various key insights as well as modifications to the theoretical argument.

First and foremost, the data support the argument that the more resources municipalities manage, the more violently criminal organizations behave. There are reasons to believe that criminal organizations compete for access to local funds. This evidence confirms the observation by Trejo and Ley (2015) that organized criminal groups increasingly put local governments under pressure and consider local public funds an important source of profit. However, the empirical part suggests that the theoretical argument should be modified. The probability of violence occurring and the intensity of violence seem to be two different things. Local spending may not be relevant enough to cause the outbreak of organized crime violence. Yet, it seems to affect the rate of violence once a municipality is already suffering from organized crime violence. The argument should be amended accordingly. Public resources may be attractive enough to intensify battles

which are already going on for other reasons. However, caution should be exercised as the distinction between participation and intensity was introduced on methodological grounds. The TPM introduces a threshold between the zeros and the positive homicide rates which may not be justified on behavioral grounds, in particular if homicide rates reflect a rather arbitrary occurrence of day-to-day violence. However, with the vast majority of homicides being organized crime related, I consider it adequate to assume that the data reflect a strategic reasoning that can be understood as an ‘informed decision’ by criminal organizations to *participate* in turf battles. The evidence is supported by looking at homicides that are explicitly and exclusively organized crime related.

Second, the hypothesis that a higher share of local own-source revenue increases accountability and makes local capture and thus violence less likely cannot be unambiguously accepted or rejected on empirical grounds. The cross-sectional analysis does not yield any evidence that would support a positive or negative effect. The longitudinal analysis finds a significant intensity-reducing effect. The latter finding may suggest that, from a historical point of view, own-source revenue has indeed increased local accountability, decreased the incidence of local capture and thus contained the intensity of violence. In general, the issue of local revenue generation and violence is a complex one as there may be several forces at work determining the relationship between organized crime presence, local capture and own-source revenue generation. For example, high pressure from criminal groups may decrease incentives for local governments to generate their own revenues as they would have to hand them directly to criminal organizations anyway. However, it may also be the case that in order to respond to the demands of local gangs, and enabled by a weak central governmental oversight over the use of own-source revenues, municipalities make use of their competences to raise local taxes and fees in a more efficient

manner. These arguments imply a feedback loop from violence to local revenue generation that should be examined further by means of qualitative research.

Third, part of the argument is that criminal organizations diversify into extorting local governments once other crime industries such as drug trafficking or kidnapping become riskier due to higher competition from other cartels or from more confrontational law enforcement. This assumption is supported by looking at the year-spending interaction effects in the longitudinal TPM, with the effect becoming gradually stronger and more significant over time. This finding is in accordance with the observation made by Locks (2015) that criminal groups have recently become interested in income from extortion. However, for the reasons above, it must be kept in mind that the uncorrelated longitudinal TPM should be interpreted with caution.

Fourth, both thematic areas, fiscal decentralization (Allers and Elhorst, 2005) and crime (Anselin et al., 2000), have a strong geographic dimension which makes the relationship between the two a formidable subject to investigate via methods of spatial analysis. In fact, the SLX models presented above hint at a significant spatial effect of increased local public spending, supporting the argument that local public spending contributes to specific municipalities becoming hot spots of violence with a considerable spillover effect.

Fifth, as the cross-sectional TPM suggests, there is merely a scant indication that local police forces and spending on public security have an effect on organized crime violence. This potentially lacking effect of Mexican local police in containing organized crime violence supports observations made by others (Azaola, 2012, p. 20; Freeman, 2006, p. 16). The finding is complemented by the weak effect of public security spending on organized crime violence, as suggested by Guerrero-Gutiérrez (2011) who looked at state security spending.

Finally, it must be noted that the results above are to be understood as first indicative evidence supporting the argument presented. The general risks econometric analyses imply, especially with

regard to confounding causation with correlation, also apply to this paper. In particular with regard to potential reverse causality, i.e., that the presence of organized crime, proxied through organized crime violence, causes higher spending levels, cannot entirely be ruled out. Notwithstanding, the bulk of local revenue stems from formula-based intergovernmental transfers (Salazar, 2007, p. 72) which are not related to the local public security situation and tend to be independent of the local administration's decisions. Also, local security spending and police forces are held constant. I thus consider reverse causality a minor risk.

5. Conclusion

This is the first quantitative analysis of the relationship between fiscal decentralization and organized crime violence. It sheds light on a new topic of decentralization research. The key argument holds that in the context of a strong presence of organized crime and weak local accountability relationships, more fiscal decentralization can fuel existing turf battles between criminal groups and thus increase violence. The findings suggest that local public funds are still not important enough to criminal organizations so that they would lead to the *outbreak* of violence. It seems that fiscal decentralization is rather fanning the fire of already existing battles between criminal groups.

How do these results relate to the key areas of debate in the general decentralization literature? The core promise of decentralization theory is a substantial increase in service delivery efficiency (Oates, 2005). However, the above presented argument suggests that in contexts of local capture through organized crime, decentralization *as such* can be a danger to one of the most basic public services delivered, namely public security. The argument should provoke a debate on the general adequacy of decentralization in these contexts.

The issue of if and how decentralization can counteract local capture is subject to intense debate (Martinez-Vazquez et al., 2017). Decentralization enthusiasts hold that accountability is enhanced through decentralization (Salmon, 1987; Seabright, 1996). Sceptics argue that in particular in developing countries, local elites can more easily capture local politicians, especially when local oversight mechanisms and media are weak (Bardhan & Mookherjee, 2006). In this article, local capture was assumed to be exogenous. The question whether decentralization decreases or increases local capture could not be exhaustively answered, although a distinction between the effect of intergovernmental transfers and own-source revenues was introduced. While there are strong indications that weak accountability is an issue at the Mexican local level (Hernández-Trillo & Jarillo-Rabling, 2008), the role of decentralization with regard to capture and the alleged stronger prevalence of capture at the local level, as compared to state and federal levels, needs further research. In the Mexican case, there are some expectations that the new possibility of reelection of local public officials and the implied prospective of an additional term in office makes local leaders more accountable. Also, the problematic turn-over of local staff would decrease significantly, increasing the level of local professionalization (Bardhan, 1997, pp. 1338–1339). Indeed, the political-electoral dimension of decentralization is likely to be an important factor in improving local accountability. This is supported by the finding presented above that local electoral competition decreases violence.

In addition, the general decentralization literature has recently initiated a discussion on recentralization since local governments have been accused of being overburdened with managing a technology-centered sector such as public health (see Saltman, 2008). My results suggest that the decentralized security sector may be overburdened, too. In fact, a legislative bill to centralize control over municipal police forces, as is currently being discussed in the Mexican congress, has the potential to prevent local forces from colluding with local gangs. Instead, a

unified career plan and centrally managed resources could lead to a more professionalized and accountable police force which could decrease violence. This demonstrates that centralizing certain public services which are especially prone to corrupt practices can be an option.

The discussion about uncompensated spillovers from decentralization takes on a prominent position in decentralization research, with many fearing that local jurisdictions free-ride and benefit from local service provision in neighboring localities without paying for it (Oates, 1999, p. 1126). As a solution, decentralization scholars propose to internalize these spillovers by finding the ideal area size for a specific local service to be delivered without spillovers ('fiscal equivalence') (Olson, 1969) between local governments either by government cooperation or amalgamation (Blom-Hansen, Houlberg, Serritzlew, & Treisman, 2016) or by establishing a fiscal transfer scheme that compensates those municipalities suffering from free-riders. Clearly, the mechanism identified here, i.e., spillovers of violence through fiscal decentralization *as such* is a more complicated issue as the presence of local public funds themselves may be the problem. This renders a block-grant-based fiscal transfer scheme problematic. A solution could be the promotion of a transfer scheme based on earmarked funds only dedicated to professionalizing local public security structures – as already exists on a fairly small scale in Mexico – or ensuring the cooperation between municipalities affected by spillovers of violence so as to find an ideal scope for effective service delivery in public security.

The findings are likely to be relevant for countries experiencing local capture through criminal organizations such as Colombia, Brazil, Venezuela and various Central American countries (Nagle, 2003) amongst others, but also for more advanced economies as the case of Italy exemplified. The results suggest that, as these countries think about further decentralization, a cautious approach should be adopted. Weingast (2014) argues that especially in contexts where democratic institutions do not (yet) guarantee a behavior of local officials that is directed at the

welfare of their constituency, decentralization should not take place in ‘one great leap’ but rather follow a sequential path. Indeed, it seems reasonable to first ensure that existing accountability mechanisms be enhanced. Then, the decentralization of fiscal responsibilities should be considered. Therefore, the general insight is that in these types of countries, when thinking about fiscal decentralization reform, it is important to assess the consequences of a possible interaction between decentralization and local context. In the case of Mexico, the interaction between a context of local capture and local public funds may have led to a deterioration of one of the most basic of all public services, namely the protection of physical integrity.

Appendix

APPENDIX HERE

References

- Acconcia, A., Corsetti, G., & Simonelli, S. (2014). Mafia and Public Spending: Evidence on the Fiscal Multiplier from a Quasi-Experiment. *American Economic Review*, *104*(7), 2185–2209.
- Aguirre Ochoa, J., & Errera Torres, H. A. (2016). Local democracy, crime and violence in Mexico: The case of Apatzingán, Michoacán. *Política Criminal*, *11*, 656–674.
- Allers, M., & Elhorst, J. P. (2005). Tax Mimicking and Yardstick Competition Among Local Governments in the Netherlands. *International Tax and Public Finance*, *12*(4), 493–513.
- Altunbaş, Y., & Thornton, J. (2012). Fiscal Decentralization and Governance. *Public Finance Review*, *40*(1), 66–85.
- Anselin, L. (1988). *Spatial Econometrics: Methods and Models*. Dordrecht: Kluwer Academic Publishers.
- Anselin, L., & Bera, A. (1998). Spatial dependence in linear regression models with an introduction to spatial econometrics. *Statistics Textbooks and Monographs*, *155*, 237–290.
- Anselin, L., Cohen, J., Cook, D., Gorr, W., & Tita, G. (2000). Spatial analyses of crime. *Criminal Justice*, *4*(2), 213–262.
- Arends, H. (2017a). Equal Living Conditions vs. Cultural Sovereignty? Federalism Reform, Educational Poverty and Spatial Inequalities in Germany. *Publius: The Journal of Federalism*, *47*(4), 673–706.
- Arends, H. (2017b). More with less? Fiscal decentralisation, public health spending and health sector performance. *Swiss Political Science Review*, *23*(2), 144–174.
- Auditoría Superior de la Federación. (2013). *Diagnóstico sobre la opacidad en el gasto federalizado*.
- Azaola, E. (2012). La violencia de hoy, las violencias de siempre. *Desacatos*, *40*, 13–32.

- Bardhan, P. (1997). Corruption and Development: A Review of Issues. *Journal of Economic Literature*, 35(3), 1320–1346.
- Bardhan, P., & Mookherjee, D. (2000). Capture and Governance at Local and National Levels. *The American Economic Review*, 90(2), 135–139.
- Bardhan, P., & Mookherjee, D. (2006). Decentralisation and Accountability in Infrastructure Delivery in Developing Countries. *The Economic Journal*, 116(January), 101–127.
- Becker, G. S. (1968). Crime and Punishment: an Economic Approach. *The Journal of Political Economy*, 76(2), 169–217.
- Beittel, J. (2017). *Mexico: Organized Crime and Drug Trafficking Organizations* (Congressional Research Service Report). Washington D.C.: United States Congress.
- Blom-Hansen, J., Houlberg, K., Serritzlew, S., & Treisman, D. (2016). Jurisdiction Size and Local Government Policy Expenditure: Assessing the Effect of Municipal Amalgamation. *American Political Science Review*, 110(4), 812–831.
- Brueckner, J. K. (2003). Strategic Interaction Among Governments: An Overview of Empirical Studies. *International Regional Science Review*, 26(2), 175–188.
- Buonanno, P., & Montolio, D. (2008). Identifying the socio-economic and demographic determinants of crime across Spanish provinces. *International Review of Law and Economics*, 28(2), 89–97.
- Buscaglia, E., & van Dijk, J. (2003). Controlling Organized Crime And Corruption In The Public Sector. *Forum on Crime and Society*, 3(1/2), 3–34.
- Cantú, F., & Desposato, S. (2012). The New Federalism of Mexico's Party System. *Journal of Politics in Latin America*, 4(2), 3–38.
- Daniele, G., & Geys, B. (2015). Organised Crime, Institutions and Political Quality: Empirical Evidence from Italian Municipalities. *The Economic Journal*, 125(586), F233–F255.

- Dávila, J. D. (2009). Being a mayor: the view from four Colombian cities. *Environment and Urbanization*, 21(1), 37–57.
- Drukker, D. M., Peng, H., & Prucha, I. (2013). Creating and managing spatial-weighting matrices with the `spmat` command. *The Stata Journal*, 13(2), 246–286.
- Duan, N., Manning, W. G., Morris, C. N., & Newhouse, J. P. (1983). A Comparison of Alternative Models for the Demand for Medical Care. *Journal of Business & Economic Statistics*, 1(2), 115–126.
- Duran-Martinez, A. (2015). To Kill and Tell? State Power, Criminal Competition, and Drug Violence. *Journal of Conflict Resolution*, 59(8), 1377–1402.
- Ehrlich, I. (1973). Participation in Illegitimate Activities: A Theoretical and Empirical Investigation. *Journal of Political Economy*, 81(3), 521–565.
- Elhorst, J. P. (2014). *Spatial Econometrics*. Berlin, Heidelberg: Springer.
- Fajnzylber, P., Lederman, D., & Loayza, N. (2002). What causes violent crime? *European Economic Review*, 46(7), 1323–1357.
- Farewell, V. T., Long, D., Tom, B., Yiu, S., & Su, L. (2017). Two-Part and Related Regression Models for Longitudinal Data. *Annual Review of Statistics and Its Application*, 4, 283–315.
- Fisman, R., & Gatti, R. (2002). Decentralization and corruption: evidence across countries. *Journal of Public Economics*, 83(3), 325–345.
- Freeman, L. (2006). *State of Siege: Drug-Related Violence and Corruption in Mexico* (WOLA Special Report). WOLA.
- Friman, H. R. (2009). Drug markets and the selective use of violence. *Crime, Law and Social Change*, 52(3), 285–295.

- Galilea, S., Letelier, L., & Ross, K. (2011). *Descentralización de servicios esenciales. Los casos de Brasil, Chile, Colombia, Costa Rica y México en salud, educación, residuos, seguridad y fomento*. Santiago de Chile: United Nations.
- Glaeser, E. L., & Saks, R. E. (2006). Corruption in America. *Journal of Public Economics*, 90(6), 1053–1072.
- Goel, R. K., & Nelson, M. A. (1998). Corruption and government size: A disaggregated analysis. *Public Choice*, 97(1), 107–120.
- Goldstein, P. J. (1985). The Drugs/Violence Nexus: A Tripartite Conceptual Framework. *Journal of Drug Issues*, 15(4), 493–506.
- Green, P., & Ward, T. (2004). *State crime: governments, violence and corruption*. London: Pluto Press.
- Guerrero-Gutiérrez, E. (2011). *Security, Drugs, and Violence in Mexico: A Survey*. Mexico City: North American Forum.
- Halleck Vega, S., & Elhorst, J. P. (2015). The SLX Model. *Journal of Regional Science*, 55(3), 339–363.
- Heckman, J. (1979). Sample selection bias as a specification error. *Econometrica*, 47, 153–161.
- Heinle, K., Molzahn, C., & Shirk, D. A. (2015). *Drug Violence in Mexico. Data Analysis Through 2014* (Special report). San Diego: University of San Diego.
- Hellman, J. S., Jones, G., & Kaufmann, D. (2003). Seize the state, seize the day: state capture and influence in transition economies. *Journal of Comparative Economics*, 31(4), 751–773.
- Hernández-Trillo, F., & Jarillo-Rabling, B. (2008). Is Local Beautiful? Fiscal Decentralization in Mexico. *World Development*, 36(9), 1547–1558.
- Hiskey, J. T., & Goodman, G. L. (2011). The Participation Paradox of Indigenous Autonomy in Mexico. *Latin American Politics and Society*, 53(2), 61–86.

- Kaufmann, D. (2004). Governance redux: the empirical challenge. In X. Sala-i-Martin (Ed.), *The global competitiveness report 2003-2004* (Vol. Oxford University Press). New York.
- Kruijt, D. (2011). *Drogas, Democracia y Seguridad*. Netherlands Institute for Multiparty Democracy.
- Laakso, M., & Taagepera, R. (1979). 'Effective' Number of Parties. *Comparative Political Studies*, 12(1), 3–27.
- Leibfried, S., Castles, F., & Obinger, H. (2004). 'Old' and 'new politics' in federal welfare states. In H. Obinger, S. Leibfried, & F. Castles (Eds.), *Federalism and the Welfare State* (pp. 307–355). Cambridge: Cambridge University Press.
- Lessing, B. (2015). Logics of Violence in Criminal War. *Journal of Conflict Resolution*, 59(8), 1486–1516.
- Leung, S. F., & Yu, S. (1996). On the choice between sample selection and two-part models. *Journal of Econometrics*, 72(1), 197–229.
- Litvack, J., Ahmad, J., & Bird, R. M. (1998). *Rethinking Decentralization in Developing Countries*. Washington D.C.: World Bank.
- Locks, B. (2015). Extortion in Mexico: Why Mexico's Pain Won't End with the War on Drugs. *Yale Journal of International Affairs*, 10, 67–83.
- Magaloni, B., Matanock, A. M., Romero, V., & Díaz-Cayeros, A. (2015). Living in Fear: The Dynamics of Extortion in Mexico's Criminal Insurgency. *Stanford Center for International Development Working Paper*, 557.
- Manning, P. K., & Redlinger, L. J. (1977). Invitational Edges of Corruption. In P. Rock (Ed.), *Politics and Drugs* (pp. 279–310). New Jersey: Transaction Publishers.
- Marselli, R., & Vannini, M. (1997). Estimating a crime equation in the presence of organized crime: Evidence from Italy. *Annual EALE Conference*, 17(1), 89–113.

- Martinez-Vazquez, J., Lago-Peñas, S., & Sacchi, A. (2017). The Impact of Fiscal Decentralization: A Survey. *Journal of Economic Surveys*, 31(4), 1095–1129.
- Mendoza, E. C., & Martínez-Vazquez, J. (2000). Assignment of spending responsibilities and service delivery. In M. Giugale & S. B. Webb (Eds.), *Achievements and challenges of fiscal decentralization: lessons from Mexico* (pp. 139–176). Washington D.C.: World Bank Publications.
- Milenio. (2013, June 11). Ganancias de ‘Templarios’ superan 970 mdp al año. *Milenio*. Retrieved from http://www.milenio.com/policia/Ganancias-Templarios-superan-mdp-ano_14_185521447.html
- Moreno-Jaimes, C. (2008). *Democracia electoral y calidad gubernativa: el desempeño de los gobiernos municipales en México*. Tlaquepaque: Universidad Jesuita de Guadalajara.
- Morselli, C., Turcotte, M., & Tenti, V. (2011). The mobility of criminal groups. *Global Crime*, 12(3), 165–188.
- Nagle, L. E. (2003). The Challenge of Fighting Global Organized Crime in Latin America Latin America: Views on Contemporary Issues in the Region. *Fordham International Law Journal*, 26, 1649–1715.
- Neudorfer, B., & Neudorfer, N. S. (2015). Decentralization and Political Corruption: Disaggregating Regional Authority. *Publius: The Journal of Federalism*, 45(1), 24–50.
- Neumayer, E. (2003). Good Policy Can Lower Violent Crime: Evidence from a Cross-National Panel of Homicide Rates, 1980–97. *Journal of Peace Research*, 40(6), 619–640.
- Oates, W. E. (1968). The Theory of Public Finance in a Federal System. *The Canadian Journal of Economics*, 1(1), 37–54.
- Oates, W. E. (1999). An Essay on Fiscal Federalism. *Journal of Economic Literature*, 37, 1120–1149.

- Oates, W. E. (2005). Toward A Second-Generation Theory of Fiscal Federalism. *International Tax and Public Finance*, 12, 349–373.
- Olsen, M. K., & Schafer, J. L. (2001). A Two-Part Random-Effects Model for Semicontinuous Longitudinal Data. *Journal of the American Statistical Association*, 96(454), 730–745.
- Olson, M., Jr. (1969). The Principle of ‘Fiscal Equivalence’: The Division of Responsibilities among Different Levels of Government. *The American Economic Review*, 59(2), 479–487.
- Paoli, L. (2004). Italian Organised Crime: Mafia Associations and Criminal Enterprises. *Global Crime*, 6(1), 19–31.
- Phillips, B. J. (2015). How Does Leadership Decapitation Affect Violence? The Case of Drug Trafficking Organizations in Mexico. *The Journal of Politics*, 77(2), 324–336.
- Philp, M. (2006). Corruption Definition and Measurement. In C. Sampford, A. Shacklock, C. Connors, & F. Galtung (Eds.), *Measuring Corruption*. Hampshire: Ashgate.
- Pinotti, P. (2015a). The Causes and Consequences of Organised Crime: Preliminary Evidence Across Countries. *The Economic Journal*, 125(586), F158–F174.
- Pinotti, P. (2015b). The Economic Costs of Organised Crime: Evidence from Southern Italy. *The Economic Journal*, 125(586), F203–F232.
- Prud’homme, R. (1995). The Dangers of Decentralization. *The World Bank Research Observer*, 10(2), 201–220.
- Reuter, P. (2009). Systemic violence in drug markets. *Crime, Law and Social Change*, 52(3), 275–284.
- Rios, V. (2013). Why did Mexico become so violent? A self-reinforcing violent equilibrium caused by competition and enforcement. *Trends in Organized Crime*, 16(2), 138–155.

- Rios, V. (2015). How Government Coordination Controlled Organized Crime. *Journal of Conflict Resolution*, 59(8), 1433–1454.
- Rodden, J. (2003). Reviving Leviathan: Fiscal Federalism and the Growth of Government. *International Organization*, 57(04), 695–729.
- Rodríguez-Pose, A., & Gill, N. (2005). On the ‘economic dividend’ of devolution. *Regional Studies*, 39(4), 405–420.
- Rowland, A. M. (2001). Population as a Determinant of Local Outcomes under Decentralization: Illustrations from Small Municipalities in Bolivia and Mexico. *World Development*, 29(8), 1373–1389.
- Salazar, J. G. (2007). Decentralisation, Politics and Service Delivery in Mexico. *IDS Bulletin*, 38(1), 70–76.
- Salmon, P. (1987). Decentralisation as an Incentive Scheme. *Oxford Review of Economic Policy*, 3(2), 24–43.
- Saltman, R. B. (2008). Decentralization, re-centralization and future European health policy. *European Journal of Public Health*, 18(2), 104–106.
- Sánchez, F., & Chacón, M. (2005). Conflict, State and Decentralisation: From Social Progress to Armed Dispute for Local Control, 1974-2002. *LSE Crisis States Programme Working Paper*, 70.
- Seabright, P. (1996). Accountability and decentralisation in government: An incomplete contracts model. *The Domain of the State*, 40(1), 61–89.
- Shelley, L. I. (1995). Transnational Organized Crime: An Imminent Threat to the Nation-State? *Journal of International Affairs*, 48(2), 463–489.
- Sherman, L., Gartin, P., & Buerger, M. (1989). Hot Spots of Predatory Crime: Routine Activities and the Criminology of Place. *Criminology*, 27(1), 27–56.

- Sin Embargo Editors. (2013, November 13). La extorsión generalizada alcanza a los alcaldes; ya no es asunto de ciudadanos, comerciantes y agricultores. *Sin Embargo*. Retrieved from <http://www.sinembargo.mx/16-11-2013/815191>
- Smith, V. A., Maciejewski, M. L., & Olsen, M. K. (2018). Modeling Semicontinuous Longitudinal Expenditures: A Practical Guide. *Health Services Research*, 1–23.
- Sour, L. (2013). The Flypaper Effect in Mexican Local Governments. *Estudios Económicos*, 28(1(55)), 165–186.
- Su, L., Tom, B. D. M., & Farewell, V. T. (2009). Bias in 2-part mixed models for longitudinal semicontinuous data. *Biostatistics*, 10(2), 374–389.
- Tanzi, V. (1996). Fiscal Federalism and Decentralisation: A Review of Some Efficiency and Macroeconomic Aspects. In *Annual World Bank Conference on Development Economics 1995* (pp. 295–315). Washington D.C.
- Tiebout, C. M. (1956). A Pure Theory of Local Expenditures. *Journal of Political Economy*, 64(5), 416–424.
- Torgler, B., & Werner, J. (2005). Tax morale and fiscal autonomy: Evidence from Germany. *Public Finance and Management*, 5(4), 423–452.
- Treisman, D. (2002). Decentralisation and the quality of government. *UCLA Manuscript*.
- Trejo, G., & Ley, S. (2015). Municipios bajo fuego (1995-2014). *Nexos*, February.
- Trejo, G., & Ley, S. (2016). Federalismo, drogas y violencia. *Política Y Gobierno*, 23(1), 11–56.
- Van Dijk, J. (2007). Mafia markers: assessing organized crime and its impact upon societies. *Trends in Organized Crime*, 10(4), 39–56.
- Villarreal, A. (2002). Political Competition and Violence in Mexico: Hierarchical Social Control in Local Patronage Structures. *American Sociological Review*, 67(4), 477–498.

Volkov, V. (2002). *Violent Entrepreneurs: The Use of Force in the Making of Russian Capitalism*. Ithaca: Cornell University Press.

Weingast, B. R. (2014). Second Generation Fiscal Federalism: Political Aspects of Decentralization and Economic Development. *Decentralization and Governance*, 53(Supplement C), 14–25.

¹ The basic assumptions of the model are closely related to the economic model of crime as developed by Becker (1968) and Ehrlich (1973) which frames the delinquent as a utility maximizer who has to decide between engaging into illegal or legal activities on the basis of a cost-benefit analysis.

² Corruption can be defined as a situation when a public servant acts against the rules of public office, and thus against the public interest, and in order to benefit a third party. This third party rewards the public servant for the benefit to which it would otherwise not have obtained access (Philp, 2006, p. 45).

³ It is argued that, compared to fiscal centralization, a shorter distance between local politicians and their constituencies implies that taxpayers, who usually are also voters, exert stronger oversight and demand more transparency (Rodríguez-Pose & Gill, 2005, p. 409). Also, interregional competition and the ability of citizens to compare their government's performance with that of other local governments, i.e., 'yardstick competition,' would improve local accountability and avoid collusion and corruption (Martinez-Vazquez, Lago-Peñas, & Sacchi, 2017, p. 1116).

⁴ Therefore, the question, whether this weakness of local institutions is actually decentralization-induced will not be dealt with. I refer the reader to Martinez-Vazquez et al. (2017) and Neudorfer & Neudorfer (2015) for an overview of the discussion.

⁵ Using the language from the capture-economy research (Hellman, Jones, & Kaufmann, 2003), 'captor organizations', which rely on private payments to officials to obtain preferential treatment, transform into 'influential organizations', i.e., criminal organizations that are so powerful that governmental structures obey also in the absence of immediate personal gain.

⁶ Already in 1987, it was estimated that one fifth of organized crime profits came from public investment (Pinotti, 2015b) which caused the Italian government to tighten anti-mafia measures in the early 1990s, including the ability to dissolve infiltrated local administrations (Acconcia, Corsetti, & Simonelli, 2014, p. 2191).

⁷ Enabled by weak institutional frameworks for crisis management at the local level, the Camorra extracted rents from large amounts of public funds invested after the earthquake of 1980 in Basilicata by infiltrating local public procurement processes. More recently, organizations such as Cosa Nostra and 'Ndrangheta have concentrated on manipulating the allocation of public funds from local governments to contractors (Daniele & Geys, 2015; Paoli, 2004; Pinotti, 2015b). Such government infiltration may have consequences for the broader community: Marselli and Vannini (1997) cite evidence that the number of public works led to a significant increase of the regional crime rate over the period 1980-1989.

⁸ These earmarked transfers consist of three funds. One fund is supposed to strengthen the municipalities' administrative structures and is being disbursed according to population size (Moreno-Jaimes, 2008, p. 121). Another fund is supposed to enhance the social infrastructure such as basic education and health infrastructure, housing and productive rural infrastructure and is being allocated according to the local poverty rate (Salazar, 2007, p. 73). A third and smaller fund, covering only around 240 municipalities characterized by high levels of crime, aims at professionalizing local police and law enforcement institutions (Auditoría Superior de la Federación, 2013, p. 114).

⁹ OECD data show that while Mexico's central government spending resembles more or less the OECD average (between 55 and 53 percent), it spends above-average at the state level (between 37 and 40 percent) and below-average at the municipal level (between seven and eight percent).

¹⁰ In 2012, the federal government received the required information at the level of federal funds from between 20 to 30 percent of the municipal governments only (Auditoría Superior de la Federación, 2013, p. 37).

¹¹ Among the larger criminal organizations, the *Zetas* are most often associated with extortion. Also, some younger cartels such as the *Familia Michoacana* and the *Caballeros Templarios* are involved in the extortion industry. At the same time, many other middle- and small-sized criminal organizations are engaged in these kind of activities (Locks, 2015, p. 71).

¹² From 2006 until 2011, the period of escalating homicide rates, the number of organizations involved in drug-trafficking and related activities grew from five in 2007 to over 50 in 2011 (Trejo & Ley, 2016, p. 28).

¹³ The logic of a two-part model applies since the zeros in the data reflect 'true zeros', i.e., they are self-representing zeros and do not proxy negative or missing responses (Olsen & Schafer, 2001). Alternative models such as the Heckman selection model (see Heckman, 1979) would estimate an *unconditional* violence-equation estimating the level of violence all municipalities would have if all of them had experienced violence. However, since we know that

those municipalities characterized by zeros were indeed murder-free, I am interested in analyzing the true zeros separately (Duan, Manning, Morris, & Newhouse, 1983, p. 119). Also, the Heckman model is not adequate because there is no theoretical reason to include exclusion restrictions (Leung & Yu, 1996).

¹⁴ This part is usually referred to as the *conditional* dimension, as only those municipalities are included that have experienced violence ($(\Phi(\text{OCV}|\text{OCV} > 0, \mathbf{x}))$).

¹⁵ I investigate both dependent variables mainly for one reason: the database related to homicides attributed to organized crime is based on the opinion of a public official that the crime *could* have been related to a criminal group, although, at a later stage, the criminal investigation may come to the conclusion that the homicide is not organized crime related. In fact, the number of homicides reported to be related to turf battles between criminal organizations *exceeds* the official number of homicides that took place in 2010 in 154 municipalities. Since it cannot be determined whether this discrepancy is because a public official hastily labeled a death an organized crime related homicide or because homicides are underreported in INEGI's statistics, I consider it adequate to present the results for both dependent variables for the cross-sectional regressions. As mentioned, for the panel analysis, sufficient data are only available for the official general homicide rate.

¹⁶ INEGI provides a detailed dataset on municipal revenues and spending. Here, for the own-source-revenue variable, I added revenues from taxes, user-fees, surcharges, extra charges to finance public works, utilization rights and social security contributions.

¹⁷ I predicted security spending for the missing values on the basis of the relationship between overall municipal spending and local security spending in the municipalities for which data are available.

¹⁸ Note that, in Oaxaca, 418 municipalities consisting of mainly indigenous groups elected their local leaders according to their local traditions and customs (*'usos y costumbres'*) in 2010. Although introducing *usos y costumbres* gives indigenous populations a high degree of autonomy and respects the diversity of the Mexican population, Hiskey and Goodman (2011) argue that these electoral regimes have isolated many municipalities from electoral competition and discouraged participation in local affairs. Moreover, the traditional election procedures do not comprise the principle of a secret ballot. In order to keep these municipalities in the sample, and being conscious of the fact that this is an unavoidable, simplification for practical reasons, I ascribe a value of one to these municipalities denoting the presence of, effectively, one party in local elections.

¹⁹ Note that in the case of a log-transformed dependent variable, the effect resembles Δy in percent when x changes by 1 unit. The percentage change was computed as follows: $\% \Delta y = 100 * (e^{\beta_i} - 1)$.

²⁰ Instead of identifying young males ready to engage in criminal activities, this variable may proxy those municipalities with more (legal) employment opportunities which keeps younger generations at home and away from criminal organizations instead of pushing them towards emigration.

²¹ Keep in mind that the dummy for 2010 is significantly negative even though homicide rates were substantially higher than they were in 1995 because, in this case, several other relevant variables are being held constant.

²² The former two models have received substantial attention in the theoretical literature because their computation is characterized by a high level of sophistication. Yet, less attention has been paid to the more straightforward and in many cases more applicable spatial lag of X model (Halleck Vega & Elhorst, 2015).

²³ I also computed the SLX for the cross-sectional and longitudinal logit regressions. The cross-sectional logit rejects spatial dependence throughout all distances, which is in line with the insignificant direct effect identified above. With regard to the longitudinal logit, there seems to be a significant participation effect of the spatial lag of spending when looking at the distances of 75 kilometers and 100 kilometers as well as from 200 kilometers on. This non-linear effect is difficult to explain on the basis of the contagious effect of increased spending in neighboring municipalities and can likely be explained by other factors. The results are not presented but are available upon request.

²⁴ Note that the dependent variable is the general homicide rate. In fact, results are similar when the organized crime homicide rate is subject to scrutiny.

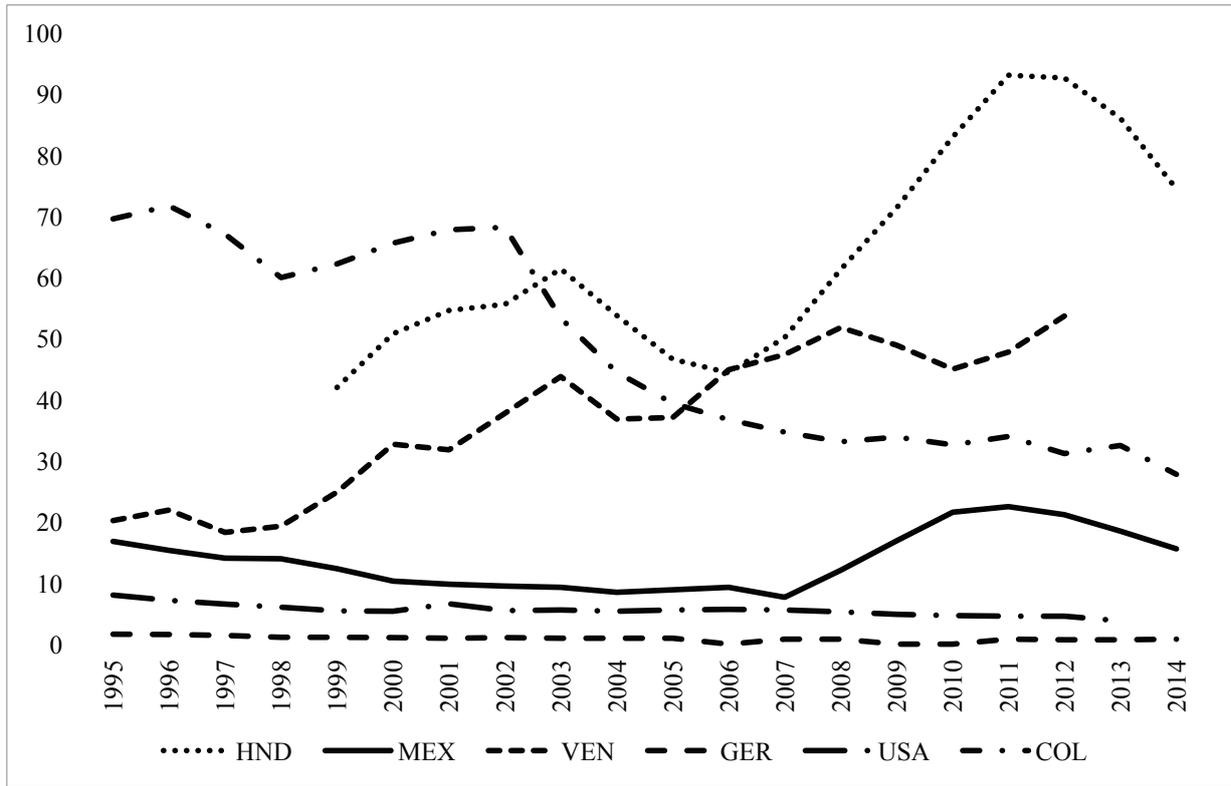


Figure 1: The evolution of intentional homicide rates in a selected group of countries; data source: World Development Indicators database

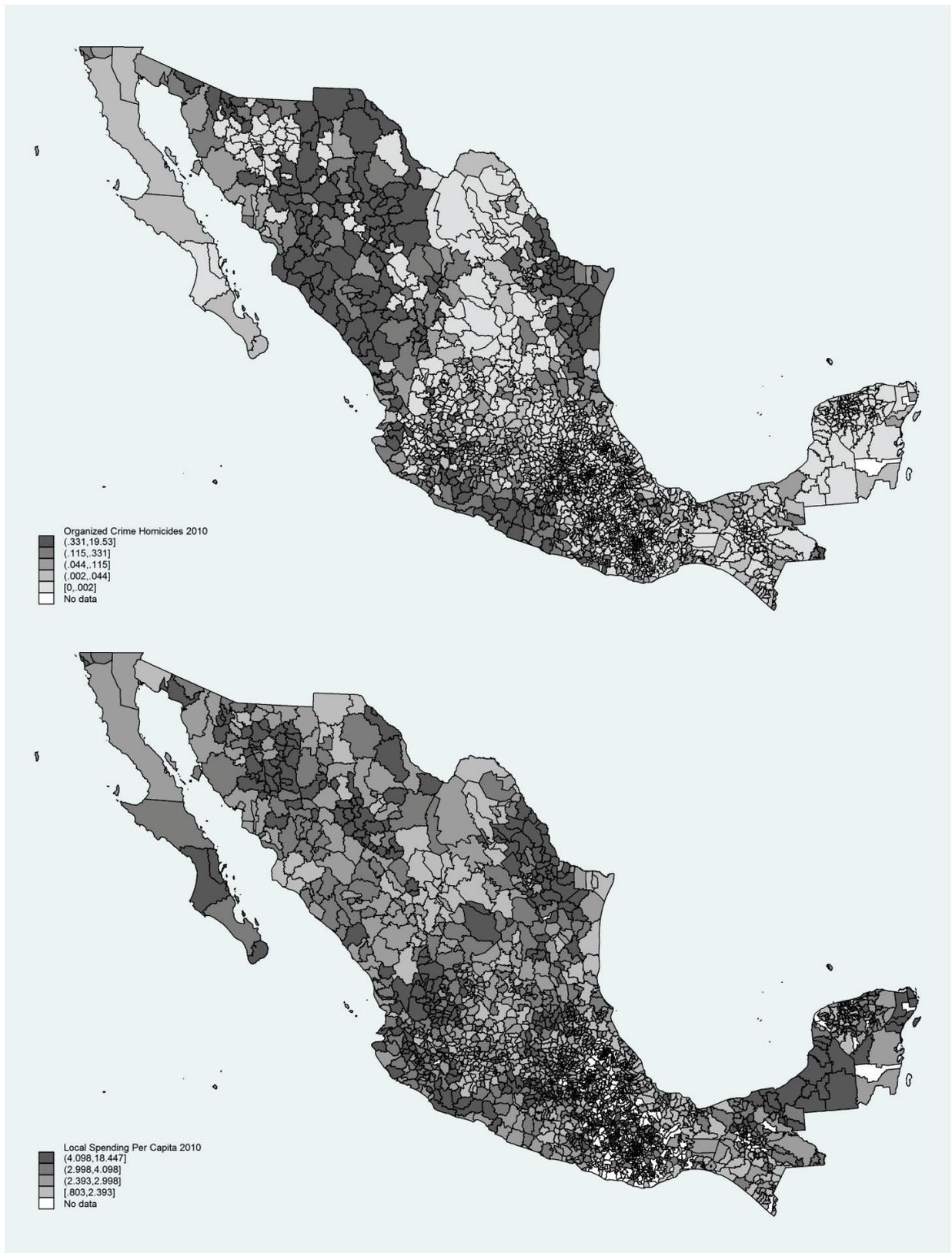


Figure 2: Regional distribution of organized crime homicide rates and local spending per capita in 2010

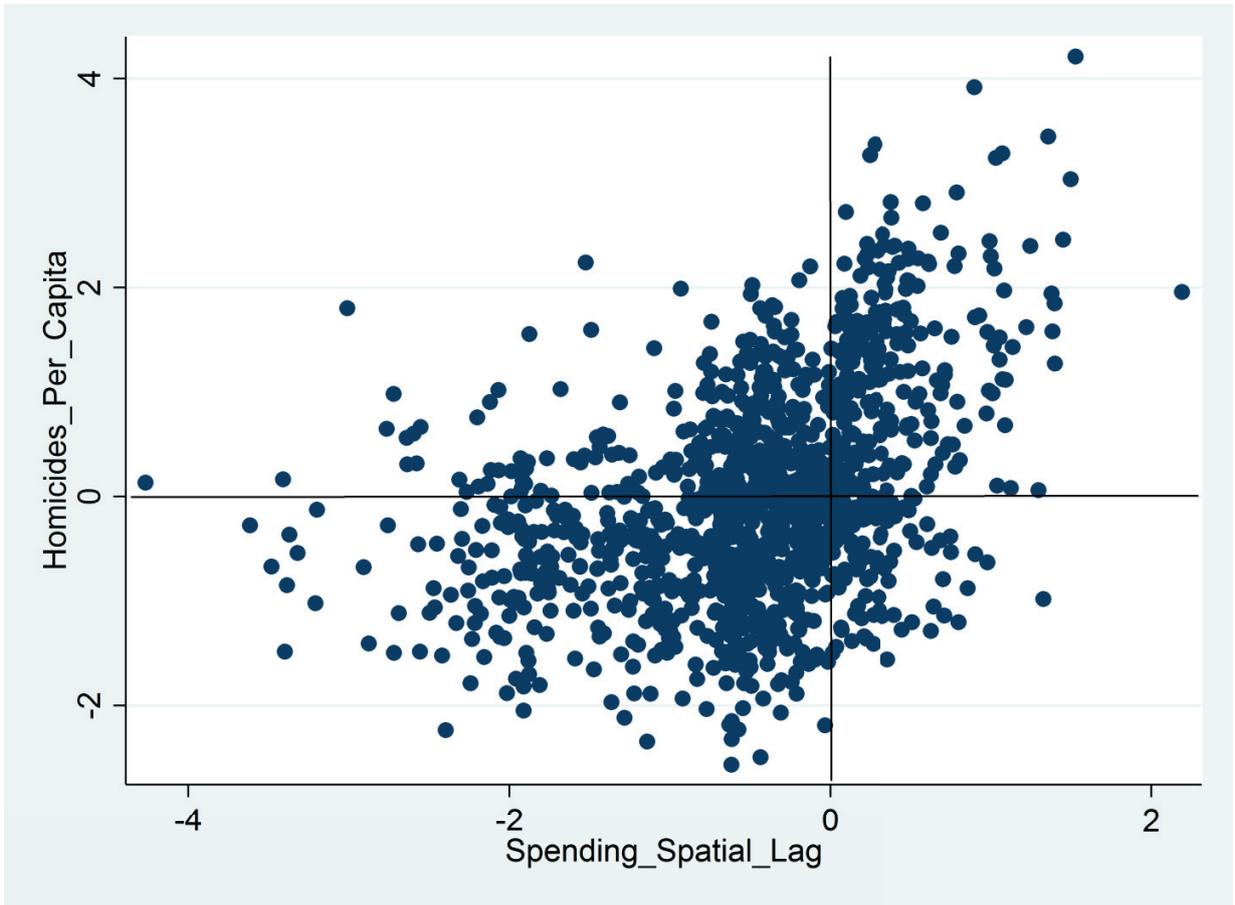


Figure 3: The relationship between homicide rates and the spatial lag of local spending

Table 1: Structure of revenues and expenditures of Mexican municipalities; data source: INEGI

Revenue (mean shares)			Expenditure (mean shares)		
	2010	2015		2010	2015
Own revenue	8.7%	8.6%	Current exp.	54.5%	55.3%
Intergovernmental transfers	83.4%	85.8%	Capital exp.	38.6%	37.4%
Debt	5.0%	3.1%	Other exp.	7.0%	7.3%
Other sources	2.8%	2.5%			
N	2114	1899	N	2114	1899

Table 2: A cross-sectional two-part model of the effect of fiscal decentralization on organized crime violence (2010); * - significant at 10 %; ** significant at 5 %; z-values in parentheses; logit reported as odds ratios; cont. effect reflects percentage change of dep. variable; clustered standard errors (cluster variable: federal states)

	Two-part model			
	Org. crime homicides		All homicides	
	Binary part	Cont. part	Binary part	Cont. part
Local spending	1.0474 (0.61)	11.7576** (2.82)	0.9988 (-0.02)	12.5018** (3.16)
Own-revenue share	1.139 (0.83)	-2.6605 (-0.64)	0.945 (-0.53)	-1.9555 (-0.71)
Local security spending	0.996 (-0.19)	-1.6628 (-1.00)	1.003 (0.10)	-0.6309 (-0.57)
Local police	0.981 (-1.40)	-0.8452 (-0.53)	0.961** (-3.47)	0.8193 (0.95)
Inequality	1.389 (1.19)	-9.2796 (-0.91)	1.186 (0.69)	-2.3905 (-0.35)
Human Development	0.797 (-1.14)	-14.7768** (-2.14)	0.728** (-2.87)	-22.3193** (-2.35)
Share of female-headed households	1.038** (2.00)	1.8787 (1.08)	1.042** (2.55)	3.7889** (4.23)
Household size	0.540* (-1.67)	-19.6736 (-1.40)	1.056 (0.30)	-6.1524 (-0.50)
Population density	0.996 (-0.17)	-0.0027 (-0.01)	1.025 (0.79)	-0.1688 (-0.36)
Young males	1.079* (1.87)	-3.9218 (-1.23)	0.988 (-0.37)	-1.6738 (-1.01)
Males per females	1.045** (2.16)	1.0839 (1.29)	1.025** (1.95)	2.3833** (2.84)
Indigenous population	0.988** (-3.54)	-0.6474 (-1.49)	0.993** (-3.82)	-0.4428** (-2.80)
Population	1.181** (6.61)	-0.1193 (-0.45)	1.416** (5.58)	0.4101** (2.44)
Municipality size	2.063** (5.01)	-34.2362** (-3.27)	2.359** (6.41)	-23.8944** (-4.36)
Electoral competition	0.978 (-0.22)	-4.8989 (-0.92)	1.021 (0.25)	-6.6115** (-1.95)
US or pacific border	1.318 (0.83)	373.4012** (10.23)	5.761** (4.72)	224.9409** (11.42)
Federal state dummies	x	x	x	x
Pseudo R2	0.418		0.391	
R2		0.646		0.614
Number of municipalities	1874	715	1866	1147

Table 3: Uncorrelated longitudinal TPM for the effect of fiscal decentralization on organized crime violence between 1995-2010; * - significant at 10 %; ** significant at 5 %; z-/t-values in parentheses; logit reported as odds ratios; cont. effect reflects percentage change of dep. variable; heteroscedasticity-corrected standard errors (cont. part)

	Uncorrelated longitudinal TPM			
	binary part		cont. part	
	(1)	(2)	(3)	(4)
Local spending	0.973 (-0.99)	0.736** (-3.43)	11.667** (7.42)	4.802 (1.24)
Own-source revenue share	1.055 (1.36)	1.040 (0.98)	-2.549** (-2.19)	-2.733** (-2.33)
Human Development	0.579** (-8.16)	0.582** (-8.04)	-21.381** (-8.80)	-21.170** (-8.66)
Share of female-headed households	1.037** (4.40)	1.037** (4.35)	1.382** (4.08)	1.382** (4.07)
Household size	1.160* (1.70)	1.111 (1.19)	-10.980** (-3.04)	-11.649** (-3.21)
Population density	0.976* (-1.79)	0.976* (-1.81)	-0.228 (-1.36)	-0.230 (-1.40)
Young males	0.973* (-1.84)	0.977 (-1.54)	-2.539** (-4.09)	-2.433** (-3.88)
Males per females	1.037** (4.64)	1.035** (4.32)	2.083** (6.79)	1.979** (6.38)
Indigenous population	0.994** (-4.63)	0.994** (-4.65)	-0.410** (-6.88)	-0.413** (-6.83)
Population	1.652** (9.07)	1.658** (9.15)	0.529** (4.76)	0.533** (4.84)
Municipality size	2.270** (9.47)	2.186** (8.98)	-28.174** (-17.35)	-28.840** (-17.84)
Electoral competition	1.065 (1.15)	1.063 (1.12)	-5.790** (-3.30)	-5.644** (-3.22)
US or pacific border	18.136** (5.19)	17.644** (5.12)	98.829** (4.54)	98.551** (4.56)
2000	0.770** (-2.60)	0.668** (-2.91)	-31.324** (-11.66)	-26.615** (-6.71)
2005	0.790* (-1.85)	0.759 (-1.55)	-41.209** (-11.53)	-44.841** (-9.86)
2010	1.179 (1.11)	0.711* (-1.84)	-19.191** (-3.56)	-28.640** (-4.11)
2000* spending	-	1.229** (2.28)	-	-1.724 (-0.49)
2005* spending	-	1.208** (2.09)	-	6.552* (1.83)
2010* spending	-	1.396** (3.81)	-	8.513** (1.99)
Federal state dummies	x	x	x	x
R2	-	-	0.50	0.51
Number of observations	8186	8186	4801	4801

Table 4: SLX model for spillovers of violence; * - significant at 10 %; ** significant at 5 %; t-values in parentheses; effect reflects percentage change of dep. variable; clustered standard errors (cluster variable: federal states) for 2010, heteroscedasticity-corrected standard errors for 1995-2010

SLX model (cont. part)									
	Binary weights								IDW
	25 km	50 km	75 km	100 km	125 km	150 km	175 km	200 km	
2010									
Local spending	9.421** (2.21)	10.190** (2.93)	11.407** (3.10)	12.154** (3.12)	12.189** (2.99)	12.373** (3.08)	12.458** (3.15)	12.483** (3.17)	12.554** (3.17)
Neighbors' weighted spending	8.795** (5.22)	12.202** (4.35)	11.150** (2.88)	9.120** (2.13)	7.915* (1.75)	6.722 (1.42)	6.445 (1.01)	5.178 (0.49)	1.554** (8.25)
Control variables	x	x	x	x	x	x	x	x	x
Number of municipalities	969	1116	1137	1143	1144	1147	1147	1147	1147
1995-2010									
Local spending	10.818** (6.10)	9.904** (6.57)	10.142** (6.58)	10.768** (6.85)	10.797** (6.73)	11.142** (7.04)	11.189** (7.12)	11.349** (7.23)	11.683** (7.43)
Neighbors' weighted spending	4.599** (2.86)	7.546** (3.81)	8.864** (3.78)	8.257** (3.19)	7.888** (2.86)	6.840** (2.44)	8.599** (2.38)	6.525 (1.56)	1.235** (7.38)
Control variables	x	x	x	x	x	x	x	x	x
Number of municipalities	4126	4677	4755	4779	4789	4801	4801	4801	4801

Appendix: Variable definitions, sources and summary statistics

Variable	Source	Mean	Std. dev.	N
OCVBIN - all homicides	Instituto Nacional de Geografía y Estadísticas (INEGI), SIMBAD database	0.58	-	2456
ln(OCVCONT) - all homicides (capita)	INEGI SIMBAD databse	-1.77	1.16	1431
OCVBIN - org. crime homicides	Consejo Nacional de Seguridad Pública	0.34	-	2456
ln(OCVCONT) - org. crime homicides (capita)	Consejo Nacional de Seguridad Pública	-2.09	1.48	837
Local spending (capita)	INEGI SIMBAD databse	3.61	2.09	2114
Local Spending spatial lag (binary, 150 km)	INEGI SIMBAD databse	3.62	0.93	2110
Local Spending spatial lag (IDW)	INEGI SIMBAD databse	0.56	2.83	2113
Own-source revenue share	INEGI SIMBAD databse	0.87	0.98	2114
Local security spending (capita)	INEGI Censo Nacional de Gobierno 2011	3.62	2.66	2114
Local police (capita)	INEGI Censo Nacional de Gobierno 2011	4.17	6.95	2156
Inequality	Consejo Nacional de Evaluación de la Políticas de Desarrollo Social (CONEVAL)	4.12	0.39	2454
Human Development	INEGI SIMBAD databse	8.19	0.63	2456
Share of female-headed households	INEGI SIMBAD databse	22.24	5.31	2456
Household size	INEGI SIMBAD databse	4.05	0.51	2456
Population density	INEGI, various databases	2.80	11.78	2454
Young males	INEGI SIMBAD databse	25.33	2.63	2456
Males per females	INEGI SIMBAD databse	95.59	6.57	2456
Indigenous population	Comisión Nacional para el Desarrollo de los Pueblos Indígenas (CDI)	25.25	35.67	2456
Population	INEGI Simbad databse	4.57	13.28	2456
Municipality size	INEGI SIMBAD databse	2.53	1.12	2456
Electoral competition	Centro de Investigación para el Desarrollo en México (CIDAC, http://cidac.org/), Electoral Institutes of the States	2.58	1.07	2456

Declaration

I declare that this thesis, which I submit to the University of Bremen for examination in consideration of the award of the doctoral degree Dr. rer. pol., is my own personal effort and has not been elaborated by means of unauthorized support. I took reasonable care to ensure that the work is original and does not breach copyright law. It has not been taken from other sources except where such work has been cited and acknowledged within the text.

Mexico City, 15 April 2018

Helge Arends