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Erklärungen

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3. Power and Port Dependence	Prof. Dr. Jennifer Pedussel Wu

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Erklärung gem. § 4 Abs. 2

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QGIS 3.8.3
Microsoft Office 2016
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Python beautifulsoup 4 4.12.2
Google Suite

Auf dieser Grundlage habe ich die Arbeit selbstständig verfasst.

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Chapters

Dissertation Abstracts

2. Politics and Path Dependence:
The Persistent Effects of Soviet Military Installations in Contemporary Germany

Prior to the reunification with West Germany in 1990, the East German state had been home to over three hundred Soviet military installations. By 1994, all of these properties had been vacated and only a shell of the once expansive military apparatus remained. This study uses a matching strategy to identify the extent to which this institutional and cultural shock still shapes the contemporary electorate of eastern Germany. Records of secret police informants are also used to estimate the effects of varying municipal preconditions on contemporary political preferences. Voting outcomes in municipalities with varying proximity to former Soviet military installations and state surveillance support the hypothesis of retrospective voting—a decision behavior that reflects mental associations of candidates with historical events, rather than their current policy agendas.

A formerly occupied municipality whose land was repurposed for non-military use after reunification is predicted to have a favorable bias toward left parties and a negative bias toward right parties. This effect decays as the distance from a treated municipality increases and is magnified in the case of parties with populist agendas. Alternatively, the density of state surveillance has a negative effect on support for the modern left wing successors to former East German leadership and a positive effect on the support for an emergent far right party. These findings provide credible evidence of retrospective voting behavior, electoral punishment and the persistence of place-based policies.

3. Power and Port Dependence:
Estimating the Effect of China's Belt and Road Initiative on Maritime Trade

Although the Belt and Road Initiative (BRI) was announced by the People's Republic of China in 2013, its foundation has been under development for over 15 years. The Go Out Policy, officially introduced in 1999, paved the way for relationships that would later become the BRI. The initiative has two primary components, the Silk Road Economic Belt (SREB) and the 21st Century Maritime Silk Road (MSR).

The effects of these efforts are thought to be relatively large as more than 100 countries have signed memorandums joining the network. This paper provides insight into long run effects of these relationships and whether variation in the type of agreement leads to variation in member outcomes. We examine completed port projects and an extended MSR, composed of all ports that are owned, or operated by Chinese firms, to determine how different types of Belt and Road relationships affect bilateral trade flows.

This paper examines the effect of these institutional arrangements using a structural gravity model and assumes the observed effects of operating contracts arise from a savings in transaction costs. Although both port contracts and completed port projects have a recognizable influence on bilateral trade with China, other agreements such contract construction and port ownership do not have the same persistent effects on trade flows. We find that the operation of foreign port terminals by Chinese SAEs modify trade for host countries toward China such that trade is diverted away from alternative trade partners.

4. Culture and Debt Dependence:
A Comparison of Institutional Factors Affecting Private Debt in Western Countries

This paper estimates the effects of factors affecting private credit growth in advanced Western economies and uses established cultural clusters as treatment groups to explore the effects of varying institutional conditions on these relationships. The provision of private credit and the political economy of public debt are considered under varying institutional conditions. Measures are assigned to one of four institutional levels 1) embeddedness which consists of informal institutions such as cultural norms, 2) the institutional environment composed of formal rules of economic order, 3) governance of resources, and 4) allocation of resources via the mechanisms shaped by the layers above. The research design identifies that lagged level differences in social spending are capable of predicting changes in private sector credit growth and that controlling for the capital account absorbs the relationship between public and private debt. Results also indicate that these relationships, as well as other factors affecting private sector growth, vary among the defined country groups.

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Kurzfassungen von Dissertationen

2. Politics and Path Dependence: The Persistent Effects of Soviet Military Installations in Contemporary Germany

Vor der Wiedervereinigung mit Westdeutschland im Jahr 1990 befanden sich in Ostdeutschland über dreihundert sowjetische Militäreinrichtungen. Bis 1994 wurden alle diese Liegenschaften geräumt, und es blieb nur noch ein Rest des einst weitläufigen Militärapparats übrig. In dieser Studie wird eine Matching-Strategie angewandt, um zu ermitteln, inwieweit dieser institutionelle und kulturelle Schock die heutige Wählerschaft in Ostdeutschland noch immer prägt. Zusätzlich werden Aufzeichnungen von Informanten der Geheimpolizei herangezogen, um die Auswirkungen unterschiedlicher kommunaler Voraussetzungen auf die heutigen politischen Präferenzen einzuschätzen. Die Wahlergebnisse in Gemeinden mit unterschiedlicher Nähe zu ehemaligen sowjetischen Militäreinrichtungen und staatlicher Überwachung stützen die Hypothese des retrospektiven Wahlverhaltens—ein Entscheidungsverhalten, das die mentalen Assoziationen der Kandidaten mit historischen Ereignissen widerspiegelt und nicht ihre aktuellen politischen Ziele.

Für eine ehemals besetzte Gemeinde, deren Land nach der Wiedervereinigung für nicht-militärische Zwecke umgewidmet wurde, wird eine positive Tendenz zu linken Parteien und eine negative Tendenz zu rechten Parteien vorhergesagt. Dieser Effekt nimmt mit zunehmender Entfernung von einer behandelten Gemeinde ab und wird im Falle von Parteien mit populistischen Programmen noch verstärkt. Alternativ hat die Dichte der staatlichen Überwachung einen negativen Effekt auf die Unterstützung für die modernen linken Nachfolger der ehemaligen ostdeutschen Führung und einen positiven Effekt auf die Unterstützung für eine aufstrebende rechtsextreme Partei. Diese Ergebnisse liefern glaubwürdige Belege für rückwirkendes Wahlverhalten, Wahlbestrafung und die Persistenz ortsbezogener Politik.

3. Power and Port Dependence: Estimating the Effect of China's Belt and Road Initiative on Maritime Trade

Obwohl die Neue Seidenstraße (Belt and Road Initiative, BRI) von der Volksrepublik China im Jahr 2013 angekündigt wurde, befindet sich ihre Grundlage bereits seit über 15 Jahren in der Entwicklung. Die 1999 offiziell eingeführte 'Go Out Policy' ebnete den Weg für die Beziehungen, aus denen später die BRI werden sollte. Die Initiative besteht aus zwei Hauptkomponenten: dem Seidenstraßen- und Wirtschaftsgürtel (Silk Road Economic Belt, SREB) und der Maritimen Seidenstraße des 21. Jahrhunderts (Maritime Silk Road, MSR). Die Auswirkungen dieser Bemühungen werden als relativ groß eingeschätzt, da mehr als 100 Länder Memoranda zum Beitritt des Netzwerks unterzeichnet haben.

Dieses Papier bietet Einblicke in die langfristigen Auswirkungen dieser Beziehungen und fragt danach, ob Unterschiede in der Art der Vereinbarung zu unterschiedlichen Ergebnissen bei den Mitgliedern führen. Wir untersuchen abgeschlossene Hafenprojekte und eine erweiterte MSR, die sich aus allen Häfen zusammensetzt, die sich im Besitz chinesischer Unternehmen befinden oder von diesen betrieben werden, um festzustellen, wie sich verschiedene Arten von Beziehungen zwischen Gürtel und Straße auf bilaterale Handelsströme auswirken.

Die Auswirkungen dieser institutionellen Vereinbarungen werden mit Hilfe eines strukturellen Gravitationsmodells untersucht. Es wird davon ausgegangen, dass die beobachteten Auswirkungen von Betreiberverträgen auf eine Einsparung von Transaktionskosten zurückzuführen sind. Obwohl sowohl Hafenverträge als auch abgeschlossene Hafenprojekte einen erkennbaren Einfluss auf den bilateralen Handel mit China haben, haben andere Vereinbarungen wie Vertragsbau und Hafeneigentum nicht die gleichen anhaltenden Auswirkungen auf die Handelsströme. Wir stellen fest, dass der Betrieb ausländischer Hafenterminals durch chinesische SAEs den Handel für die betroffenen Länder in Richtung China so verändert, dass der Handel von alternativen Handelspartnern abgelenkt wird.

4. Culture and Debt Dependence: A Comparison of Institutional Factors Affecting Private Debt in Western Countries

Dieses Papier bewertet die Auswirkungen von Faktoren, die das Wachstum privater Kredite in fortgeschrittenen westlichen Volkswirtschaften beeinflussen, und verwendet etablierte kulturelle Cluster als Gruppen mit verschiedenen Ansätzen, um die Auswirkungen unterschiedlicher institutioneller Bedingungen auf diese Beziehungen zu untersuchen. Die Bereitstellung von Privatkrediten und die politische Ökonomie der Staatsverschuldung werden unter verschiedenen institutionellen Bedingungen betrachtet. Die Maßnahmen werden einer von vier institutionellen Ebenen zugeordnet: 1) die Einbettung, die aus informellen Institutionen wie kulturellen Normen besteht, 2) das institutionelle Umfeld, das sich aus formellen Regeln der Wirtschaftsordnung zusammensetzt, 3) die Steuerung von Ressourcen und 4) die Zuweisung von Ressourcen über die Mechanismen, die von den oben genannten Ebenen geprägt sind. Das Forschungsdesign zeigt, dass verzögerte Unterschiede in den Sozialausgaben in der Lage sind, Veränderungen im Kreditwachstum des privaten Sektors vorherzusagen, und dass die Kontrolle des Kapitalkontos die Beziehung zwischen öffentlicher und privater Verschuldung absorbiert. Die Ergebnisse zeigen auch, dass diese Beziehungen sowie andere Faktoren, die das Wachstum des privaten Sektors beeinflussen, zwischen den definierten Ländergruppen variieren.

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I. Institutions and Behavior

An Introduction to Central Themes

1. Introduction

A study of red deer in the Bohemian Forest in Central Europe identified that even after a quarter century, the animals were still not crossing Cold War borders that once existed between West Germany and the Czech Republic. Although the electric fences are no longer present and the deer living at the time are no longer living today, the shocks are still shaping behavior (Heurich et al., 2015). Our behavior is also shaped by forces we can no longer see, however the shocks are generally less explicit. Over time, institutional environments consisting of formal rules on property, polity, judiciary and bureaucracy have been redrawn through transactions and conflict, leaving behind a patchwork of influences with varying degrees of persistence (Williamson, 2000). This dissertation includes three essays that demonstrate persistent effects of institutions on behavior under varying conditions and at varying levels of analysis.

Changing institutions can have a profound and lasting effect on individuals and societies and other times are lost to history. Our choices are shaped by a complex system of beliefs, both conscious and subconscious, responding to embedded hierarchies and rules; moreover, many decisions are made subconsciously before our conscious mind becomes aware of them (Soon et al., 2008). Reward systems and punishments also shape decision-making processes, and these experiences are influenced by the institutions, culture, and relationships within a given society at a given time. Additionally, power dynamics are an important factor to consider, as institutions can be used for repression and maintaining power, status, and wealth; however, they also promote freedom and emancipation (Moe, 2005; North, 1990).

Estimating the profound effect of institutions on human behavior is an emerging and interdisciplinary science. Williamson (2000) laid the groundwork for the contemporary state of the field by summarizing its foundations and providing a comprehensive framework for continued contributions (see Figure C.1.1 in Appendix C). Substantial progress has been made since then, as pragmatic ideas have permeated neighboring disciplines, and the methods used in identification strategies have become more rigorous. Over the past twenty years, a number of advancements have deepened our understanding of the long-term and short-term effects of institutional constellations on human behavior.

Although institutions have emerged as a conventional explanation for variation from model predictions, measuring their effects can be difficult. A common practice is to represent institutions as a wedge that can be estimated by calibrating a model with novel data. For

instance Gourinchas and Jeanne use wedges to calibrate the neoclassical growth model with investment and saving distortions assigned to institutional variation among developing countries (2013). The wedges are calibrated to match the observed data and then evaluated to determine the effects on capital flows. This empirical strategy attempts to identify institutional variation as a reason for differences from constrained theoretical models with predefined conditions; however this approach has its limitations.

Additionally, game theory and contest functions are used to model decisions under different institutional conditions; however, few models have been developed to explicitly explain institutions themselves. As a result, many of the studies on the effects of institutions consist of creative natural experiments developed to measure the presence and significance of distortions. The broad scope of assessing how formal and informal institutions shape behavior offers close ties to other disciplines. The research often borrows from other economic schools of thought and includes contributions from psychology, neurology, political science, sociology, anthropology, management science and economic history (Dimmelmeier, Heussner and Elsner, 2018). By employing multi-method approaches and drawing upon insights from various disciplines, we can deepen our understanding of decision-making processes, the role of institutions, and the contextual factors that influence behavior at both individual and collective levels.

The research designs in subsequent chapters demonstrate empirical approaches to comparative institutional analysis. Each essay identifies changes to unique institutional settings with distinct governance structures or contractual agreements, to provide the conditions for meaningful comparison. The central themes include persistence, path dependence, formal and informal rules, transaction costs, social order and embeddedness, in the broader context of both short-run and long-run time continuum. Once the institutional settings are established, identification strategies are employed to estimate the effects of variation on decision making and economic outcomes. The following sections outline central themes of this research and provide an overview of subsequent chapters. First, section 2 describes the influence of institutional economics on the development of the research designs. Then, section 3 discusses the merits of applied empirical research and the methods employed in the studies. This dissertation has been developed to contribute to a deeper understanding of institutional preconditions and the effects they have on political and economic behavior. By addressing these paradigms, we enhance our understanding of human behavior and the intricate relationship between institutions, decision-making, and outcomes.

2. Institutional Economics

Our individual choices are governed by a complex system of inconsistent and incomplete information as well as a vast network of incentives and constraints. Given the complexity of these relationships it takes a complete spectrum of lenses to develop an informed picture. General assumptions that stay consistent across those lenses are that individuals, with a natural propensity to organize, create rules of order that shape the creation, distribution, exchange and ownership of value in our societies and that these relationships are limited by bounded rationality and asymmetric information. Since every person has a unique vector of beliefs, everyone will have a slightly different perception of the rules (Williamson, 1979).

As a discipline, institutional economics does not rely heavily on deductive-nomological approaches as is common in other fields of economics. Rather, researchers often begin by identifying behaviors or institutions they would like to explain; and thereafter, attempt to determine the extent to which institutions can predict variations in outcomes. Ronald Coase, Harold Demsetz, Douglas North, Elinor Ostrom and Oliver Williamson are frequently credited with establishing the central paradigms of the contemporary field; however, adjacent research from organizational economics, development economics, economic history and management science have also heavily influenced its direction. There is no general institutional theory or institutional synthesis as of yet, but rather a focus on attaining a more complete picture of the complex reality of socioeconomic organization. The relative emphasis on empirical work often relies on an inductive approach supported by instrumental disciplines such as cliometrics, econometrics, behavioral economics, experimental economics, game theory and applied research methods (Berumen, 2017).

As with most economic disciplines, institutional economics is interested in understanding the provision of value via various mechanisms; however, what makes the field unique is the special attention to social order, customs, practices and instincts. Although these areas of research are quite different, they are bound by the common assumption that humans are social beings; moreover, that we derive preferences from social context and that those interactions are not restricted to markets, but extend to personal, political, professional and social relationships. As the field has developed, both long-arc phenomena, such as the emergence of economic systems, and short-run maximizing behavior have been considered in the research (Dimmelmeier, Heussner and Elsner, 2018).

Given that trade agreements are among the most expansive institutions, it makes sense that trade literature has also made significant progress in modeling and estimating the effects of large institutional agreements. Most recently, structural gravity models have emerged to rival computable general equilibrium models as the workhorses of trade agreement analysis (Nilsson, 2018). Other forms of institutional analysis focus on transaction costs and governance structures. The effect of different governance structures on economic performance is most often identified using natural experiments. For instance, comparative institutional analysis involves comparing different institutional settings and observing how variations in governance structures impact transaction costs, contractual arrangements, and economic efficiency (Williamson, 1996).

Institutional Economics is often interested in perspective. Some of the most influential publications have been surveys of ideas, typologies, or definitions, rather than models of behavior. Often the objective is to document the evolution of institutional theory, take stock of new findings and advocate strategies for more rigorous analysis. North (1990; 1991), as both an economic historian and primary benefactor of new institutionalism, can be credited with summarizing the contemporary themes in institutional analysis, and is often cited in theoretical and empirical papers, despite not being either. The theme of the literature assumes institutions are the rules and individuals are the players. The underlying assumption being institutional differences can explain the varied performance of economies over time and jurisdiction. A primary claim is that when conditions reflect intermittent transactions, asymmetric information and a large number of players, cooperation is difficult to sustain;

therefore, institutions shape behavior to achieve lower cost transacting. This is accomplished by establishing constraints that structure political, economic and social interaction.

Perspectives diverge at understanding the origin of institutions and their heterogeneous nature. Hall and Taylor (1996) outline three institutional perspectives; 1) Rational choice institutionalism, given its propensity for focusing on aspects of human behavior involving strategic calculation; 2) The cultural approach, that refers to an understanding of human behavior that can be rational, but is inclined to adhere to familiar patterns, in so that, institutions can be traced to cultural roots; and 3) Historical institutionalism, the nexus of these perspectives. Given that institutional analysis is often inductive in nature, it makes sense to take stock of theories capable of explaining incentive structures in a society. Papers outlining the state-of-the-art are pivotal in synthesizing divergent approaches within a field and contextualize the assumptions being made. These are the antecedents to developing new approaches for analysis.

Chapters 2 - 4 investigate the effects of changing institutions on voting decisions, consumption decisions and financial decisions, respectively. These essays contribute to literature on international and institutional economics; specifically, to the practice of comparative institutional analysis. Although the subjects of investigation may vary at a superficial level, the lens used for analysis is focused on identifying varying incentives and constraints and then estimating their lasting effect on decision making behavior. In each chapter an institutional landscape is identified by first establishing the area of analysis and then specifying nested areas of jurisdiction to be used in the research design. In Chapter 2, the area of analysis is former East Germany and the areas of jurisdiction are contemporary counties and municipalities that exist within its prior boundaries. In Chapter 3, the area of analysis is the whole world and the areas of jurisdiction are countries and ports terminals. In Chapter 4, the area of analysis is sixteen advanced western economies and the areas of jurisdiction are cultural clusters and countries. Once the landscape is defined, data on decisions made within the specified areas of jurisdiction is collected to investigate the effects of changing institutional constellations on behavior.

3. The Merits of Applied Research

An institutional landscape consists of individuals bound by common objectives and who are anchored by a political geography (Coase, 1988). As described by North (1990), these individual players are governed by the rules of their game, as they navigate its rewards and punishments to achieve intended outcomes. Arenas of time can be specified on both the long-arc of culture, as explored by Acemoglu et al. (2002; 2004) and Alesina and Guillano (2015), and on the short-run of continuous transactions, as pioneered by Williamson (1996; 2000). In developing a broader sense of forces affecting coordination, Hollingsworth and Boyer (1997) define two specific issues. The first is the institutional mechanisms by which economic activity is coordinated; the second, is how these coordinating mechanisms are both shaped by and are shapers of the systems they govern. In other words, an ever evolving set of rules is being shaped by the strategies of players. A number of methods, practices and findings have been instrumental in shaping this lens as well as a deeper understanding of how institutions shape economic behavior and outcomes.

In contemporary economics, projects often require an established theory and focus heavily on multivariate linear regressions to make predictions in assumption vacuums. This makes it difficult for new theories to emerge. Singleton et al. (1999) describes the goal of science to develop theory; however, if researchers begin to accept theories of choice as fact and focus only on confirmation of those theories using selective analysis or wedges to explain away variation, it can lead to stagnation in the best case and harmful policies in the worst. It is important for interdisciplinary applied research projects to develop in social sciences. If academic research is the process and knowledge is the product it can only benefit from cross-functional, interdisciplinary and pluralistic collaboration. The question of whether to avoid emic research to continue a career of etic scholarship is often unnecessarily constrained. One could argue applied research is the primary input for the production of knowledge; whereas theory is the primary output (Walsh, 2007; Tushman and O'Reilly, 2007; Reed et al., 1993).

The common theme underlying the characterization of research, as described by Davis (1971), is that 'interesting' is defined by what seems one way is actually another. The thesis of this work is that the key to an interesting theory is the element of surprise and the rhetorical methodology of consensus creation. In short the theory must produce a new way of looking at things that challenges relevant assumptions or confirms assumptions that are under attack. Unfortunately, if this is always the case, a relentless pursuit for the truth will be abandoned for the relentless pursuit of the interesting. In a world where there is bias toward novelty, we risk developing an absurd collection of the counterintuitive, rather than a reflection of the order of things. McGrath (1982), identifies that we live in a world of trade-offs. The primary trade-offs in question are the intrusiveness of the research and the breadth of its applications. Within this framework research can be generalizable, precise or reflect real world conditions, but it cannot be all three.

Not all presentations of predictive data need to be grounded in theory to be informative. Atheoretical phenomenon is a precursor to theory and although Bacharach (1989) makes reference to ancient astronomers in a reductive tone, it was their predictions that led us to navigate the world and uncover the theories that explain the universe. Mook (1983) makes the point that a preoccupation with external validity could prevent relevant knowledge from surfacing with respect to unique settings. The question of whether something can be generalized, is not a requirement to generate knowledge. Vanhove and Harms (2015) describes the process of triangulation to increase confidence in our generalizations; while pointing to method bias as a more relevant concern. Sechrest and Sadini (1995) further the argument for a cluster of methods to paint the most representative interpretation of reality. The authors reinforce the common theme that triangulation of plural methods yields the highest probability of uncovering real world trends. There are always trade-offs and over generalization of research can dismiss differences in the settings.

The challenge in evaluating theories of new institutionalism or new institutional economics exists in attempting to understand the nuances of behavioral phenomenon. The field has developed more of a complex set of methodological principles rather than an underpinning of modeled behavior. Findings are published as part of the knowledge production process, and despite shortcomings advance our understanding of human behavior. Acemoglu and Johnson (2004) developed a ground breaking approach to measure the predictive qualities of property

rights institutions in contrast to contracting institutions. The reported outcomes of their analysis suggest that property rights have a larger effect on current economic outcomes than contract enforcement. Despite the relevance and stature of this work, there are still some issues with the approach. In an attempt to unbundle institutions, the authors bundle all former English or French colonies into a single colonial experience. Also, issues can be raised with the variables selected to represent contracting institutions; as an index of legal formalism for bounced checks, coupled with the processes and complexity of collecting an unpaid commercial debt, are suboptimal measures of efficiency. A process can include many steps, but be efficient; whereas, a process with few steps can be expensive and time consuming in a corrupt bureaucracy.

Williamson (2010) runs into similar issues; liberties are taken in the construction of boundaries for formal institutions and cultural constructs are accepted as measures of informal institutions. He acknowledges a feedback loop; however, trust, respect, self-determination and obedience are often functions of formal constraints in a culture. The presence of those elements in societies with weaker formal institutions, during a short period of time, do provide a convincing argument for generalization; however, the arbitrary and inconsistent measures for weak and strong institutions appear to not represent balanced percentiles. The validity of claims being made will vary given the scope of the research; therefore, it is important to clarify the scope of the knowledge being produced and not overstate claims being made. McGrath (1982) states, "*methodological discussions should not waste time arguing about which is the right strategy….such discussions might better engage in questions of how best to combine multiple strategies (not within one study, but over studies within a program) so that information can be gained about a given problem by multiple means that do not share the same weaknesses.*"

Although there will always be weaknesses in empirical research designs, the impact of the findings reported by Acemoglu and Johnson (2004) is extraordinary and their continued research, as well as the research of Williamson (1979; 1985; 1996; 2000; 2010), has heavily influenced the approaches described in the following chapters. Valuable research consists of new arguments, stylized facts and patterns or relationships that help us better understand phenomena. An overcommitment to modeling overlooks applied empirical research that can be instrumental in uncovering a new understanding of the world (Hambrick, 2007).

The identification strategies in Chapters 2 - 4 have been developed to answer a common question. Are there recognizable institutional changes that predict differences in behavior? To answer this question, novel data has been collected on three settings: *1) Former East Germany; 2: Whole World; and 3) Western Economies*. In each of these settings an empirical toolkit is applied to quasi-experimental research designs to estimate the effects of variations on the geographies of path dependence, transaction costs and cultural preferences. Three longitudinal panel datasets assign geographic properties to institutional variation. In each setting decision makers are grouped by location properties to determine whether unique institutional differences in those locations form biases, while controlling for unobservables.

In the first analysis, voters are grouped by those choosing to live in municipalities that once hosted Soviet military installations and those living the furthest away, to determine if proximity to the treatment predicts a bias in behavior. The voters are also grouped into

categories assigned to intensities of surveillance during the period of occupation. The groups are then assessed to determine if there is identifiable bias for left or right populism. Methods employed include the use of intermediate variables, the testing for joint effects, comparative analysis of constrained models, average treatment effects estimations, matching and extended parallel trends analysis. To reduce the risks of endogeneity municipalities are matched on a variety of features that would affect voting. Although there are weaknesses to this identification strategy, the results offer clear evidence of a bias among the identified groups, even after the addition of a new political party. Despite the exact mechanism being difficult to pin down, these findings provide clear evidence of a path dependence among municipalities that experienced similar histories.

In the second setting, country pairs are grouped into networks that depend on relationships with Chinese State Affiliated Enterprises (SAEs). A structural gravity model is used to control for geographic proximity as well as other unobservables. Controlling for country, country pair and year fixed effects identifies trade biases among in-group and non-group members. The evidence suggests varying contract conditions for in-group port locations have dramatic effects on world trade flows. These findings are further investigated using lagged and lead variables to control for reverse causality and identify persistent effects. An income tolerance analysis is then used to validate the results. Again, the mechanism is theoretical, this time in consideration of transaction costs; however, the observable effects are significant and robust.

In the final setting, borrowers are grouped by predefined cultural clusters to determine whether cultural differences have an effect on factors affecting private sector credit growth. A replication establishes precedence for the research and a theoretical framework introduced by Williamson (2000) outlines institutional levels of analysis. A model is developed that investigates several factors known to affect private sector credit growth, then using a number of detrending exercises, level differences in social expenditure are used to predict changes in private debt. Next, observations are constrained to country groups to determine whether in-group differences affect borrowing behavior. The procedure employs several robustness checks to detrend estimations and determine the validity of the observed effects. These include a lagged dependent variable, first differenced controls and an Arellano and Bond estimation. Group effects are also confirmed with combined linear estimates.

II. Politics and Path Dependence

The Persistent Effects of Soviet Military Installations in Contemporary Germany

1. Introduction

The reunification of East Germany with West Germany in 1990 marked the end of a forty-five year occupation and the abandonment of Soviet military bases. The apparatus that supported over 500,000 people, 2.6 million tons of equipment and 341 military installations, was emptied over the course of four years (Atkinson, 1994). In addition to this, there was unprecedented institutional change, property redistribution and outmigration, as nearly a quarter of the residents moved to the West (Bangel et al., 2019). The research design takes advantage of this complex economic and social history, as well as recent changes to the German political spectrum, to demonstrate path dependence in political preferences.

This paper is motivated by further insight into overestimations; both the overestimation of the 'communist-effect' described by Becker et al. (2020), and the overestimation of economic insecurity in predicting populist support, as discussed in Margalit (2019). The conceptual framework adopts approaches from recent studies that have successfully identified persistent within-country variation from former East or West German policies (Avdeenko, 2018; Lichter et al. 2022; Ehrlich and Seidel, 2018). Details of military sites and secret police densities in former East German municipalities are used to investigate assumptions regarding the effects of varying conditions before and after reunification.

The research design focuses on the abrupt withdrawal of military apparatus and considers the redistribution of property after reunification a place-based policy. Although not everyone had the resources for mobility, the incentives to stay or move would have varied depending on a person's status and connections. This paper assumes the preconditions leading to whether or not a person was a beneficiary of redistribution were embedded into the pre-reunification social strata and mobility varied depending on their status prior to reunification. This paper also assumes that individuals would have self-selected into the regions that had the greatest cost-benefit nexus after reunification and that the added value of converted military assets would provide more reasons to self-select into these regions.

The study provides further context to findings reported in Avdeenko (2018). In her paper, retrospective voting is presented as a behavior, whereby members of an electorate either approve or disapprove of a party based on their perception of the past (even more so than the messages of prospective candidates). To demonstrate this the author assigns regions in former East Germany, along what was once the border between East and West Germany, to a

treatment group and estimates the effect of this collective past experience on voter preferences. Outcomes suggest that Die Linke, a party recognized as the modern successor to former East German leadership, regularly underperforms in these regions. This pattern is interpreted by the author as long lasting electoral punishment in response to decades of hostile conditions along the border.

Can other hostile conditions confirm this effect? Can variation in contemporary political preferences also be explained by proximity to heavy state surveillance? The voting outcomes in regions with the highest density of secret police informants can provide further evidence of the electoral punishment observed in Avdeenko (2018). Does living in a municipality of a former Soviet military installation also have a predictable bias? A matching strategy is employed to estimate the predicted bias in voting behavior in formerly occupied municipalities, using the size and location of decommissioned installations. Proximity to a municipality that hosted a Soviet military installation predicts a significant bias for left parties, an effect that decays as the distance from the base increases and magnifies as the size of the base increases. Moreover, as the distance from the base increases, so does the distinguishable bias for right parties. As the evidence materializes, more complex questions arise—does the purpose, or estimated size of the installation affect these results?—are the effects the same if the modern German military still uses the site?—what are the mechanisms that could lead to this distribution?

There is no dispute that contemporary attitudes and behaviors in East Germany are shaped by long-term exposure to communist institutions, but it would be naive to assume these forces were equally distributed. The quasi-experimental research design investigates the decommissioning of Soviet military installations between 1990 - 1994, and investigates the density of surveillance, and subsequent self selection into these regions, to explain variation in contemporary support for political parties in eastern Germany. A three stage empirical strategy exploits information on the density of secret police and the rise of a new political party to address challenges in assigning a treatment effect to formerly occupied municipalities without data from prior to Soviet departure.

The findings support the hypothesis that a significant portion of voters contemplate their preferences based on past experience, or perceived associations with the past; moreover, that these relationships exist at the municipal level despite the extraordinary migration out of eastern Germany, both during and after reunification. This is convincing evidence that the regions themselves (institutions, infrastructure and informal networks) possess a persistent collective memory that shapes the preferences of modern municipalities through the forces that lead to retention and abandonment. The Soviet military installations also appear to have shaped the distribution of East German secret police informants, but the bias around decomissioned bases for left parties is consistent even when matched on the density of surveillance. On the other hand, regions with higher surveillance densities predict a greater support for the right wing anti-establishment party, and less support for the successors to the East German regime. Although a high density of state surveillance has a predictably negative effect on voting outcomes for Die Linke, there is a significant increase in municipalities that hosted Soviet installations. This indicates that there is more than just an adverse legacy of Soviet oppression in these regions and identifies the presence of a channel leading to more support for the modern political successors of the regime.

Although the primary function of the identification strategy is to investigate persistent effects of historic forces, the topic of modern populism is unavoidable. In 2013, an emerging right wing populist party known as the AfD (Alternative für Deutschland), gained enough support to effectively change the political landscape of Germany. This sudden change in the political spectrum offers a practical channel to observe whether or not there is a differential response to the new party in treated and untreated municipalities. A difference in support for the new party in treated municipalities implies that a regional propensity for either right or left populism can be partially explained by institutional and cultural path dependence, rather than the contemporary economic conditions.

The research design makes a case for assigning the persistent bias in formerly occupied municipalities to self selection into favorable regions. The outcomes also offer some insight into the kinds of economic and social preconditions that fostered global gains by far right parties between 2010 - 2020. The outcomes are comparable to adjacent research investigating the long-run effects of military occupation and withdrawal, persistent effects of place-based policy, retrospective voting behavior, the rise of populism and the use of the former GDR (German Democratic Republic) as a natural experiment. The project establishes a contextual link between the findings of Lichter et al. (2021), Avdeenko, (2018) and Ehrlich and Seidel (2018) as well as provides context to results reported in Hälbig et al. (2019).

2. Motivation

The research design has been developed to establish a deeper understanding of the regional variation within what was once the GDR and reduce the proposed upward bias of East to West analysis by comparing East to East. Often research will attempt to estimate the effects of communist policies to illustrate how the exposure to these forces have persistent effects on contemporary attitudes such as in Alesina et. al, (2007), Brosig-Koch et. al, (2011), Redding and Sturm (2008), Kronthaler (2005), or Lenhart (2018). These papers use East and West Germany as a natural experiment to contrast the autocratic East Germany, dominated by a repressive surveillance state, to a free and democratic West Germany. Although there is some truth to their diagnosis, the 'natural experiment' may be overestimating effects. In the same sense, regional variation within what was once East Germany may better explain choices for left-right politics.

This project also offers valuable insight into localized effects of the Soviet military withdrawal, long after departure. Due to irreconcilable economic records from the GDR, a majority of research estimating the effects of base closures on their regional surroundings addresses former US installations in western Germany, or domestic base closures within the United States (Dardia et. al, 1996; Hooker and Knetter, 2001; Lee, 2016; Sorenson and Stenberg, 2015). Cunningham and Klemmer, (1995) observe that the original drawdown of US troops in the mid 1990s did not affect the German economy as a whole; however, substantial socioeconomic distress was observed in adjacent communities. Although Paloyo et. al (2010) reports only marginal long-term impacts of these events, Moore and Spitz-Oener, (2012) identify persistent negative effects on local unemployment. These studies establish a precedence of persistent effects observed in regions with base closures after withdrawal.

The Soviet military withdrawal and subsequent redistribution of property developed under vastly different circumstances than the reductions in force observed in western Germany; therefore, the findings can offer insights into varying circumstances. Results can also offer context to more recent events, such as the withdrawal of Russian military bases from Georgia (Sokov, 2005; Kakachia, 2008), the recent withdrawal of US troops from Afghanistan and the ongoing occupation in regions of Ukraine by Russian forces.

2.1 Path Dependence and Persistence

Although path dependence does not make an outcome inevitable, it does make some outcomes more probable for groups with a common experience (North, 1990; Sewell, 1996). Path dependence can be short-term (one or two business cycles), long-term (one or two generations), or embedded (multigenerational); the magnitude of the effect can change over time, and may vary for different groups (Williamson, 2000; Granovetter, 2002; Nunn, 2014). Available records of Soviet era institutions provide a unique opportunity to investigate whether historic forces still shape behavior and how long they persist.

The effects of interventions can vary depending on competing forces in a timeline; therefore, within-group variation can be used to identify differences in expected values of an observed global effect. Whether these effects persist, or in some cases reverse, varies depending on the setting and the timeline; moreover, findings from within-group analysis can vary from global analysis. Nunn (2014) provides the example of Huillery (2011), who identifies persistence of positive economic performance among former colonial satellites in a global analysis; whereas, Acemoglu et al. (2002) performs a within-group analysis and documents a deterioration of economic performance among the most prosperous former colonies. In this case what appeared to be a positive global effect deteriorates into a negative effect when the analysis is restricted to within-group.

Becker et al. (2020) use within-group analysis to illustrate the overestimation of the stated effects of the GDR (and their Soviet sponsors) on contemporary eastern Germany. The authors demonstrate that even prior to WWII, people in eastern Germany were more likely to be working class, vote for the communist party, and experience female labor-force participation; additionally, they were less likely to be self-employed or to attend church. As these differences are expected to persist over time, they likely introduce an upward bias in estimated effects of communist exposure on left-leaning political preferences.

Despite the fact that reunification was unfavorable to many East Germans, there were individuals who benefited from constellations of distribution both before and after reunification. At the time of reunification, preconditions for mobility and the redistribution of endowments are assumed to have been embedded into social strata that had developed during the period of occupation (see Figures A.3.6 and A.3.7 in Appendix A). When transfers were redirected to East Germany as described by Ehrlich and Seidel (2018), it is also assumed that the infrastructure in and around former bases would be targeted for redevelopment funds and that those that benefited would stay in the region.

Better record keeping in West Germany allowed Ehrlich and Seidel (2018) to explore similar themes to those presented in Avdeenko (2018), but from the other side of the border. The papers are similar in that they both use the border region as the treatment group; however,

Ehrlich and Seidel (2018) exploit former subsidies provided to cities along the West German border to identify the persistent effect of a place-based policy. The transfer program began in 1971 and included all those municipalities in former West Germany that were adjacent to the East German and Czechoslovakian border. The treatment group is not interesting because of the transfers it received, but rather the abrupt end to the program as a result of reunification; afterwhich, transfers were redirected to East Germany. Regions that received subsidies that later ended, were able to maintain a higher tax base and continue public investment long after the program had stopped. The reasons cited for this persistence include agglomeration effects and infrastructure; however, the life expectancy of roads and buildings are cited to be approximately 30 years and predict the observable effects should decay over time. In light of these findings, this paper investigates the abrupt end to the Soviet occupation and the reorganization of the population after reunification, providing a unique setting to investigate variation in electoral punishment.

2.2 Retrospective Voting and Civic Capital

One of the advantages to using retrospective voting behavior as a channel for analysis, is that both economic conditions and social influences are reflected in decisions of an electorate. Avdeenko (2018), argues that new policies might not be enough to overcome feelings from negative life experiences, even decades later. According to this research a primary mechanism driving retrospective voting behavior, in the former GDR, is negative associations with the former ruling party (Socialist Unity Party or SED). The author makes a convincing case for the argument that the greater the repression in a region under the SED, the less regional support you will find for their modern successors (Die Linke); however, this research does not address regions with a bias for support.

Lichter et al. (2021) also focuses on repression as a primary mechanism for explaining regional variation, but instead investigates the long-run effects of government surveillance on civic capital. The authors operationalize the number of informal secret police (Stasi) informants to evaluate its influence on factors of interpersonal trust that can fortify or erode trust in strangers, reciprocal behavior, political engagement, the intention to attend elections and general political interest. A higher density of surveillance is a reliable predictor of both lower levels of trust in present day German institutions, and persistent negative effects on the political participation of affected individuals.

This paper bridges these two findings together in a joint study of retrospective voting behavior and repression from state surveillance. The confirmed net effect of government Stasi density is a helpful tool for evaluating the effects of the decomissioned bases. Additionally, given the ubiquitous nature of state surveillance in the former GDR it is possible to use its presence as an intermediate variable, to both measure the joint-effects of intersecting forces and control for endogeneity. As it is a direct channel for repression, it can confirm the findings presented by Avdeenko (2018), while also offering a measure for comparison to estimate bias in municipalities with abandoned bases; moreover, it extends the area of analysis from the border region, to include all of former East Germany (see Figure A.3.2 in Appendix A).

2.3 Economic Insecurity and Right Wing Populism

There is substantial evidence that party identification forms early in a person's life; moreover it is largely resilient to temporary events and remains stable over time (Margalit, 2019; Green et al., 2002). Although outcomes of elections may be tipped by short term economic shocks it is more probable that social identity can explain affinities toward a range of economic and political preferences. There is a stated desire in the literature to untangle the short run economic forces from the long run cultural forces affecting demand for populist candidates.

Global advances by populist parties have inspired a renaissance of research interested in understanding the economic preconditions that allow populists to gain ground. The studies range from cliometric studies investigating US populism at the turn of the 20th century (Eichengreen et. al, 2017), to a range of studies looking into the rise of right wing populism in the modern era (Bugaric, 2019; Cayla, 2019; Havertz, 2018; Otjes et. al, 2017; Runje, 2018; Storz and Bernauer, 2018). Despite being a contested landscape, there is convincing evidence that economic conditions foster the wins and losses of populist candidates. Kersting (2019) on the other hand identifies four primary drivers of populism; trade shocks, economic crisis, immigration shocks and cultural change.

Margalit (2019) makes a case that populist sentiment is always bubbling below the surface; therefore, the significance assigned to economic insecurity is overstated. The author makes an important distinction regarding outcome significance, in that although economic performance can contribute significantly to the outcomes of an election, it may not fully explain the demand for right wing populist candidates. Despite advances in identification strategies, the factors most often considered to be drivers of populism do not explain the recent success of right wing populists when compared to left wing equivalents.

Although populism in the 21st century has been heavily associated with right wing candidates, populism can be represented by any political leaning. Generally, it is understood to be support for anti-elite, anti-status-quo policies that often focus on working individuals. A 2017 EEAG CESifo report details growing complexity in the analysis of populism; the report attempts to draw a line between the political rhetoric of candidates, from the behavior of parties and the electorate; moreover, it points out that the parties or politicians that appear to be populist, often prefer to avoid that label (Bertola et al., 2017).

As with any emerging field there will be challenges to identifying the nature of these constructs. Also the changing fortunes of time lead to inconsistent time series for analysis. For instance, prior to Donald Trump's entrance onto the political stage, it would have been difficult to label the US Republican Party modern populists; nevertheless, the Republican brand is currently associated with populism on a global scale and may be for some time. Kersting (2019) points out that despite the use of rigorous identification strategies, the varying definitions of populism among literature spheres prevent a general consensus on accepted measures. Acemoglu et. al (2013) uses an economic definition that positions populism as a left wing convention. In contrast, Rodrik (2018) adopts a more inclusive cultural definition that positions populism as an anti-establishment ideology, capable of manifesting itself at any point along the political spectrum. Neither of these approaches have produced convincing outcomes.

Inglehart and Norris (2016) are among the growing literature that attempts to find causal relationships between varying preconditions and political outcomes along the political spectrum. The authors classify around 300 parties using a political compass with left or right economic values along the x-axis and populist or liberal cosmopolitan orientations on y-axis (see Figure A.3.1 in Appendix A). One of the drawbacks to this model is that it overlooks the left and right social positions of these political parties. For instance, although the model labels both the National Democratic Party (NPD) and the AfD as populist parties, it identifies the NPD as left of center; which is slightly misleading considering the NPD self identifies as a right wing party. The procedure also identifies Die Linke as trending further toward liberal cosmopolitanism than the CDU (Christian Democratic Union), the largest conservative party in the country. Although there are some drawbacks from over simplification, it does incorporate a varying spectrum of populism, which is a useful innovation.

The research design for this paper adopts a transferable interpretation of populism. Rather than focus on perceived party attributes, this paper considers which parties would have a greater probability of attracting anti-establishment followers with anti-globalism, anti-elitism and pro-citizen, or pro-working-class positions. By identifying parties that appeal to these followers, the parties with populist agendas emerge from both sides of the political spectrum. In this case of contemporary Germany, left-populism is represented by Die Linke and right-populism is represented by the AfD.

3. Methodology

The purpose of this research is to further the understanding of historic forces shaping contemporary political preferences. The hypothesis is that a significant portion of the propensity to vote for far right or far left parties can be explained by regional variation in the incentives and repression that extend from the Soviet era. By comparing East municipalities to East municipalities it provides a clearer picture of variation in the institutional and cultural forces affecting the elasticity of support for left and right parties in former East Germany. This is an important distinction to make as prior research is generally interested in East-West paradigms. The research design has also been developed to confirm the electoral punishment hypothesis of Avdeenko (2018), using the constellation of Stasi repression observed by Lichter et al. (2021) and the associated reduction in support for left parties.

Distinct regional variation in the number of Soviet military structures and units provides the necessary conditions for a matching strategy that estimates whether the size of these installations has a measurable effect on contemporary political engagement. The research design uses modern municipal voting records to investigate whether proximity to former Soviet military installations and the density of former Stasi informants can predict biases in contemporary voting behavior. The persistent effects of Soviet base closures are identified using the size, location and status of installations. Observations contain information about Soviet military installations captured in surveys from 1989 - 1994. Measures of infrastructure and troop densities estimate differences in installation size across municipalities and provide an additional source of exogenous variation.

3.1 Description of Data

Voting records (2009; 2013; 2017; by municipality), attained via DESTATIS (2021), were standardized for municipality changes during the period of analysis; these observations were then joined with geocoded Soviet military installation data curated by a joint project between the German-Russian Museum Berlin-Karlshorst, the Center for Military History and Social Sciences of the Bundeswehr (ZMSBw) Potsdam and the German Historical Institute (DHI) Moscow. This data contains coordinates of the installations as well as the estimated number of structures and divisions recorded at sites from three separate sources that compiled data between 1989 and 1994 (Deutsch-Russische Museum Berlin-Karlshorst, 2008). The sites are identified as decommissioned or active depending on their current status and infrastructure estimates are confirmed with tertiary data (Sperrgebiet, 2021).

Of the 341 Soviet installations, only 46 are currently in use by the modern German military and variation among in-use installations and abandoned installations acts as a further control. The breadth of this occupation provides a larger geographic sample than studies using the border region as a treatment group and a greater variation than county-level data (see Figure A.3.2 in Appendix A). If there were more than one installation reported in a municipality, the largest of the installations was used as a parent and smaller observations were collapsed into a single municipality; this provides the necessary conditions for municipality-level analysis. Of the over 2000 contemporary municipalities in former East Germany, 209 unique records emerged as having been occupied by a Soviet installation. Once formerly occupied and non-occupied municipalities are identified, historical records of informal secret police (Stasi) informants and voting data from 1933 are joined from Lichter et al. (2021).

In addition to general data for each municipality (size, population, population density), categorical variables are developed using percentile distributions of troop levels, recorded infrastructure, Stasi informant density and distance to installation (see Figure A.1). Composite variables are then constructed using the categorical variables for troop levels and recorded infrastructure to identify the unique effects of installation size (see Figure A.3.3 in Appendix A). In the case of distance from formerly occupied municipalities, the percentile distributions represent close [1-10 km], far [11-20 km] and furthest [>20 km] distances. All non-occupied municipalities are identified by the distance of their border, to the border of the closest municipality with an installation. Observations in the 90th percentile and above are used to represent a robust treatment; whereas the 50th to 90th percentile are used to represent above average exposure. Observations up until the 50th percentile are considered below average exposure. These three categories are also used to develop occupation and secret police density classes (high, medium, low)(see Figure A.1).

The data is restricted to modern municipalities that existed within the borders of the former GDR and control variables are converted to a logarithmic scale in consideration of non-linear trends and scalability issues. Given the undependable nature of economic records from the GDR, municipal voting records made available after 2009 and county voting records made available after 1994 offer the best chance of understanding to what extent regional preferences are still being shaped by events from the past.

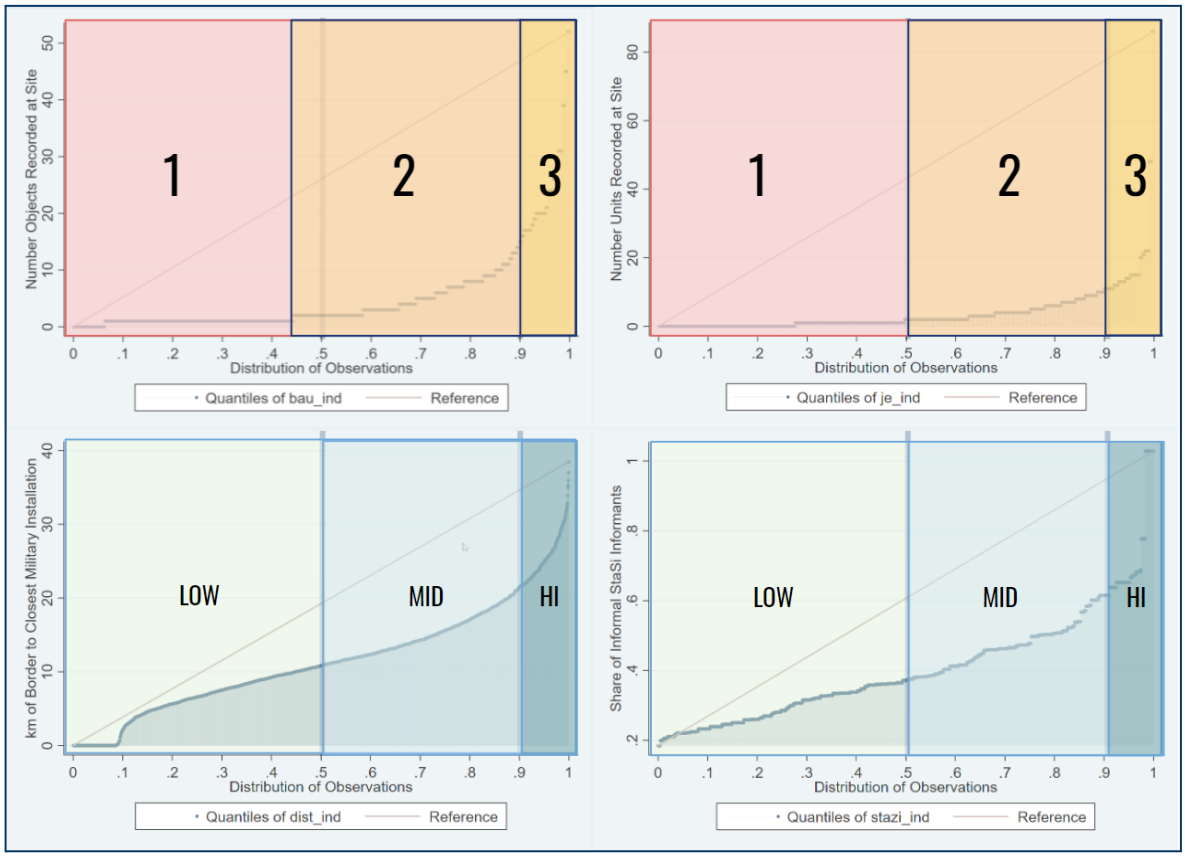

Figure 2.1 - Distribution of Observations for Categorical Variables

3.2 Identification Strategy

A first order analysis estimates the predicted effects of a treated municipality on contemporary voting behavior under varying conditions. A matching strategy is then employed to control for regional economic advantages implied by varying degrees of strategic military importance. Modern municipalities that were once occupied are matched with municipalities that were furthest from the occupation. Both exact matching and Mahalanobis matching are employed to compare within-group municipalities of the same size and designation (city, suburban or rural) and to estimate the average treatment effects of varying installation attributes. This means only rural regions are compared to rural regions and cities are compared to cities, even when employing nearest neighbor matching. The time invariance of these effects are then investigated using an adaptation of difference-in-discontinuity design that combines the before AfD (2009) and after AfD (2017) election results, with the observed effects in once occupied municipalities, to determine if the addition of a new party has varying effects in treated and untreated municipalities. This approach estimates the success of existing political parties in the years after the rise of the AfD, marginal to having once hosted a Soviet military installation. In this case, no effect is a strong signal that retrospective voting behavior is shaping a significant portion of voter preferences and that biases are unaffected by the addition of a new party. Additional robustness checks include a replication of the first order analysis using extended county level data, a Rosenbaum bounds sensitivity analysis for matches and an analysis of parallel trends assumptions (see Table A.1.1 in Appendix A).

3.2.1 First Order Analysis

The first order analysis is performed in three stages. Municipal level data is available for years 2009 - 2017 and county level data is available for years 1994 - 2021. To begin, dummies for a general occupation (a record of more than one building, or division of troops) and a dense occupation (a record of 3 or more buildings and, or division of troops) are regressed independently on both municipal and country level data (see Figure A.3.3 in Appendix A). This procedure establishes the observed effect of a general occupation on contemporary voting behavior; moreover, it identifies that increasing the installation size will increase the magnitude of the predicted effect when compared to non-occupied municipalities.

$$percentage\ vote\ share_{ikt} = \boldsymbol{\alpha} + \mathbb{1}(general\ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.1)$$

$$percentage\ vote\ share_{ikt} = \boldsymbol{\alpha} + \mathbb{1}(dense\ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.2)$$

The next step in the first order analysis introduces categorical variables for Stasi density to identify the effects of increasing surveillance intensity and to improve model specificity. Consistent with Lichter et al. (2021), an additional vector of historical control variables from 1933 (voter turnout and share of votes for the far left and far right parties at the time) are also added to further control for endogeneity. There is enough variation among Soviet occupied municipalities, within districts, to generate robust results; therefore, spatial discontinuity is unnecessary for this specific analysis.

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(general\ occupation)_i + \sum_j \mathbb{1}(stasi)_i + \mathbf{Z}_{it} + \mathbf{Z}_{i33} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.3)$$

The third stage of the analysis replaces the occupation dummies with categorical distance dummies to determine whether or not the effects diminish the further away you get from a base. Observing a consistent high Stasi density coefficient from one model to the next also acts as a robustness check against model dependence. Because the districts had no legislative power and the boundaries created by them had no social preconditions, the central district policies of the Stasi provide a novel control for interpreting the regional variations that are observable (for instance proximity to a Soviet military installation).

$$percentage\ vote\ share_{ikt} = \alpha + \sum_j \mathbb{1}(distance_j)_i + \sum_j \mathbb{1}(stasi)_i + \mathbf{Z}_{it} + \mathbf{Z}_{i33} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.4)$$

The last step of the first order analysis is to determine whether the observed bias originates in municipalities with abandoned installations, rather than in locations where they are still in use. This provides further evidence against the argument that it is preconditions in regions where bases were built driving the observed effects. If there is a stronger effect in municipalities that decomissioned installations, than in municipalities that maintained contemporary active bases, it can be assumed that observed biases are associated with conditions in the municipalities that experienced a closure.

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(closure)_i + [\mathbb{1}(gen)_i \times \sum_j \mathbb{1}(stasi)_i] + \mathbf{Z}_{it} + \mathbf{Z}_{i33} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.5)$$

3.2.2 Matching and Average Treatment Effects

How can we know if the observed effects in municipalities with decommissioned Soviet installations is as a result of institutional conditions created by the withdrawal of troops and not the effect of other forces that attracted the installations to those locations and made them among those that were to be decommissioned? In the case of military installations, it cannot be assumed the treatment was assigned at random. Also, it is assumed that the locations of bases currently being used by the modern Germany military (as well as those that were decommissioned), were not assigned at random. By matching municipalities on Stasi density indicators (low, med, high) and municipality classification indicators (city, suburb, countryside), the experiment controls for regional strategic importance and an observable relationship between base locations and Stasi density.

Although municipalities directly occupied by Soviets were in part determined by the locations of existing bases from former regimes, over 100 of the 351 outposts were added in places where no military apparatus had existed before. Some were built on the sites of historic bases, others were built on top of Nazi bases; whereas, others were built during the period of Soviet occupation. Moreover, a location for a military installation would be selected because of a non-uniform weighting of proximities to vulnerabilities, geographic features (water, mines and natural barriers), former military apparatus, desired production capital and other key resources that provide a randomized sample of attributes. Given the broad nature of strategic purposes, social conditions in these municipalities would be random and conditioned to nonuniform strategic features.

When a research design uses a municipality border as a cut-off, it raises uncertainties around channels that would lead to observed discontinuities between areas of jurisdiction; moreover, people tend to sort along the border, or borders are redrawn in ways that end up leading to important policy differences between neighboring regions. It is for this reason the matching strategy samples from a population of non-neighbors, in common years. These matches are then validated using a Rosenbaum bounds sensitivity analysis.

It is assumed a pre-existing base in municipality i would influence the positioning of a new base in municipality j — for instance if i and j are neighbors it may be less likely for a new outpost to be built in j (unless it was an extension of the installation in i); however, the preconditions regarding political preferences in municipalities with pre-existing bases and municipalities without bases would have been different when Soviet forces moved in. Despite the small possibility that uncoordinated efforts over a hundred years, across multiple regimes, with varying political motives, selected locations for bases, with varying strategic importance, in such a way that support for the left would continually diminish as the distance from these locations increased, the results are interpreted to assume no interference.

Of the originally documented 250 formerly occupied municipalities 77 observations contained the necessary data for exact matching using Stasi density as an indicator. They were then matched with the 764 municipalities that are at least 20 km from the border of an occupied municipality. Observations that could not be matched are pruned from the exact matching procedure but included when assumptions are relaxed using nearest neighbor matching. As pruning can discard information, a robustness check relaxes the exact matching criteria so

that all 207 treated municipalities can be matched from a sample of 2,146 untreated municipalities. The procedure uses Mahalanobis distance matches to identify control municipalities using voter participation, average income, population density and Stasi density figures while still controlling for city, suburb or countryside.

Average treatment effects are estimated for every distance category and every year to determine the robustness of the results and verify the observed effects decay in observations closest to the installations. The matching strategy was employed to reduce the probability of conflating regional attributes that would lead to the placement of a base, with the observed effects in municipalities with decommissioned military installations. This procedure reduces imbalance, model dependence and bias of estimated treatment effects. Exact matches are identified using Stasi density indicators (low, med, high) and municipality class indicators (city, suburb, countryside). Nearest neighbor matches are identified among these matched municipalities using voter participation, average income and population density figures.

The potential outcomes framework outlined in equation 2.6 denotes the treatment, $O_i = 1$ (*Occupied*), as having once hosted a Soviet military installation that has been decommissioned and $O_i = 0$ as control municipalities at least 20 km away. This reduces the potential outcomes of municipality i to $y_i(\vec{o}) = y_i(o_i)$, either having voted in a municipality that hosted a former Soviet military installation or having voted in a municipality that does not meet criteria. So that the implied causal effect of the treatment is, where $y(1)$ denotes the additional support a contemporary party received in municipalities that were once occupied by Soviet forces and $y(0)$ denotes the expected support for a contemporary party in municipalities that did not receive that treatment (Hirano et al., 2003; King and Nielsen, 2019; Wooldrige, 2019).

The potential outcomes for municipality i are described as:

$$Y_i\,(Vote\ Share),\ O_i\,(1 = treated,\ 0 = control) \tag{2.6.A}$$
$$X_i\,(matching\ variables),\ Z_i(vector\ of\ controls)$$
$$Sample\ Average\ Treatment\ Effects\ \ (O_i = 0 \approx O_j = 0)\ where\ (Z_i \approx Z_j)(X_i = X_j)$$

$$O_i = 1 \ldots\ km = 0 \tag{2.6.B}$$
$$O_i = 0 \ldots\ km \geq 20$$

$$Dist_{ij} = \sqrt{(Z_i - Z_j)'\ \sum^{-1}\ (Z_i - Z_j)}\ if\ X_i = X_j \tag{2.6.C}$$
$$Dist_{ij} = \infty\ if\ X_i \neq X_j$$

$$\tau^{ATE} = \frac{1}{N}\sum_i^n \tau_i = \frac{1}{N}\sum_i^n (y_i(1) - y_i(0)) \tag{2.6.D}$$
$$Y_i = y_i(O_i) = O_i y_i(1) + (1 - O_i) y_i(1)$$
$$\tau^{ATE} \approx (\vec{O}, \vec{Y}) = \frac{1}{n_1(\vec{O})}\sum_i^n (O_i Y_i) - \frac{1}{n_0(\vec{O})}\sum_i^n (1 - O_i) Y_i$$
$$\tau^{ATE} \approx \frac{1}{N}\sum_i^n ((y_i(1) - \frac{1}{M}\sum_j^m (y_i(0)) - (y_i(0) - \frac{1}{M}\sum_i^m y_i(1))) \tag{2.6}$$

3.2.3 A Discontinuity in Time

The rise of the AfD in 2013 presents a natural discontinuity in time that can be employed to identify time invariance of observed treatment effects. The procedure combines two sources of variation (the before and after the emergence of a sizable new political party in 2013 and a discontinuous Soviet military presence in some municipalities after reunification). So long as sorting and other policies are fully observed by 2009, interacting a treatment from the past with year dummies in 2013 and 2017, under year fixed effects assumptions, will indicate whether the addition of the AfD to the political spectrum had a significant impact on the observed effects of the abandoned installations on voting behavior.

Assigning a treatment effect to the year of the shock can determine how much it affected the observed relationships in treated and untreated municipalities when compared to the prior election (2009). The general principles of this approach were adopted to control for time effects, and level differences between municipalities with abandoned bases and non-occupied municipalities. The approach treats the abandonment of the base and subsequent redistribution of property, as a temporary place-based policy and adapts the framework outlined in Grembi et al. (2016), to conform to data limitations.

The potential outcomes for municipality i are described as:

$$Y_{it} = f_t(D_i) + \gamma(D_i)\mathbb{1}(D_i \geq 0) + \tau(D_i)\mathbb{1}(D_i \geq 0)\mathbb{1}(t = 1) + \varepsilon_{it} \quad \textbf{(2.7.A)}$$

Where $\tau(D_i)$ is the effect of having once hosted a Soviet military installation, $\gamma(D_i)$ represents the vector of time invariant attributes at the municipality border which could be due to unrelated policies or sorting, and $f_t(D_i)$, represents the untreated location-specific component that can vary across time. The continuous nature of $f_1(D)$ assumes that no other systematic policy changes, unrelated to the abandoned installations, happen between 2009 and 2017 that would cause a difference in municipalities that once hosted military bases when compared to those that did not. Additionally, it assumes social preconditions to be fully developed in the pre-AfD period. Because this is true $\gamma(D_i)$ cancels out and the uniform differences between municipality $i(1)$ and municipality $j(0)$, during the specified time period, can be attributable to the treatment.

$$\tau = y(1) - y(0) = (f(1)(D_i) - f(0)(D_i)) + \tau(D_i)\mathbb{1}(D_i \geq 0) + (\varepsilon_{i1} - \varepsilon_{i0}) \quad \textbf{(2.7.B)}$$

The estimator is constructed from the short panel that uses the municipal level election data from three subsequent federal elections, in which the estimated treatment effect is averaged across all distances from a municipality border; this robustness check verifies the effect of the decomissioned base on support for left populism, while also estimating the effect of a new populist party on this relationship (Butts, 2021). The model outlined in equation 2.7 controls for base closures, Stasi density, contemporary economic conditions and voter participation, as well as historic voting behavior to establish whether the addition of a new political party affects the relationships observed in prior estimations.

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(closed)_i + \sum_j \mathbb{1}(stasi)_i \times \mathbb{1}(AFD)_t + (\mathbf{Z}_{it} + \mathbf{Z}_{i33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad \textbf{(2.7)}$$

4. Findings

The findings indicate locations that hosted former Soviet bases experience persistent biases in contemporary voting behavior and that the effect becomes larger in the presence of larger installations. The results also provide evidence that these voting biases are unaffected by the addition of a new political party that earned over a quarter of the total votes within the observed area by 2017. Additionally, coefficients are consistent when intermediate and historical control variables are added to the model. Estimates show that municipalities with decommissioned installations predict a favorable bias for left parties (Die Linke, SPD and Greens). Results also indicate that the magnitude of the effect decreases the smaller it is and the further a municipality is from an installation; moreover, as the distance increases from an installation, so does the favorable bias toward right parties (AfD, CDU and FDP). The findings imply that in some way Soviet era incentives and repression are still shaping the preferences of contemporary voters in eastern Germany and that those forces are not equally distributed.

4.1 Identification of Trends

Although the reunification process began in 1990, the boundaries of East and West Germany are still observable in regional voting preferences for most parties. There is also a considerable difference in support for the far left and far right parties when compared to the rest of the country (see Figure 2.2 and Figure 2.3). The outline of former East Germany can be easily identified by relative support for both left and populism. These effects erode for other parties, but the dividing lines are still visible.

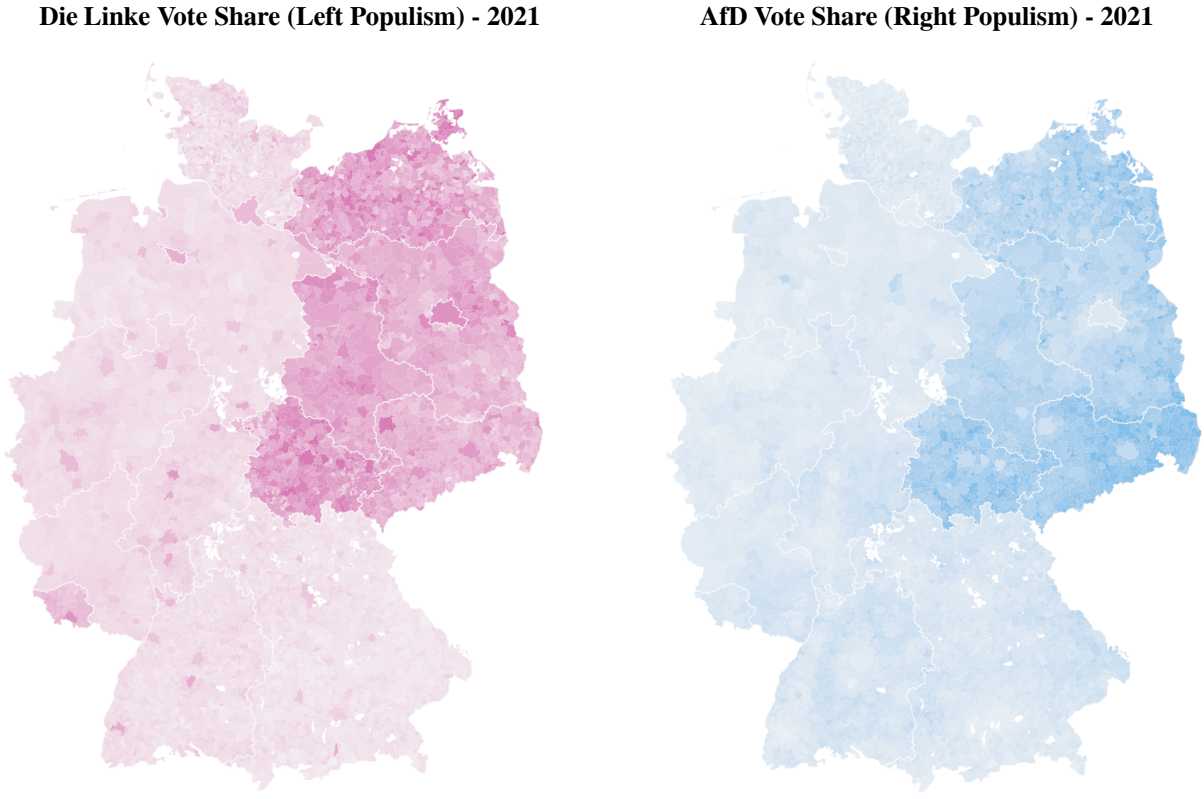

Figure 2.2 - Invisible Boundaries 1 of 2 (Bundesamt für Kartographie und Geodäsie et al., 2021)

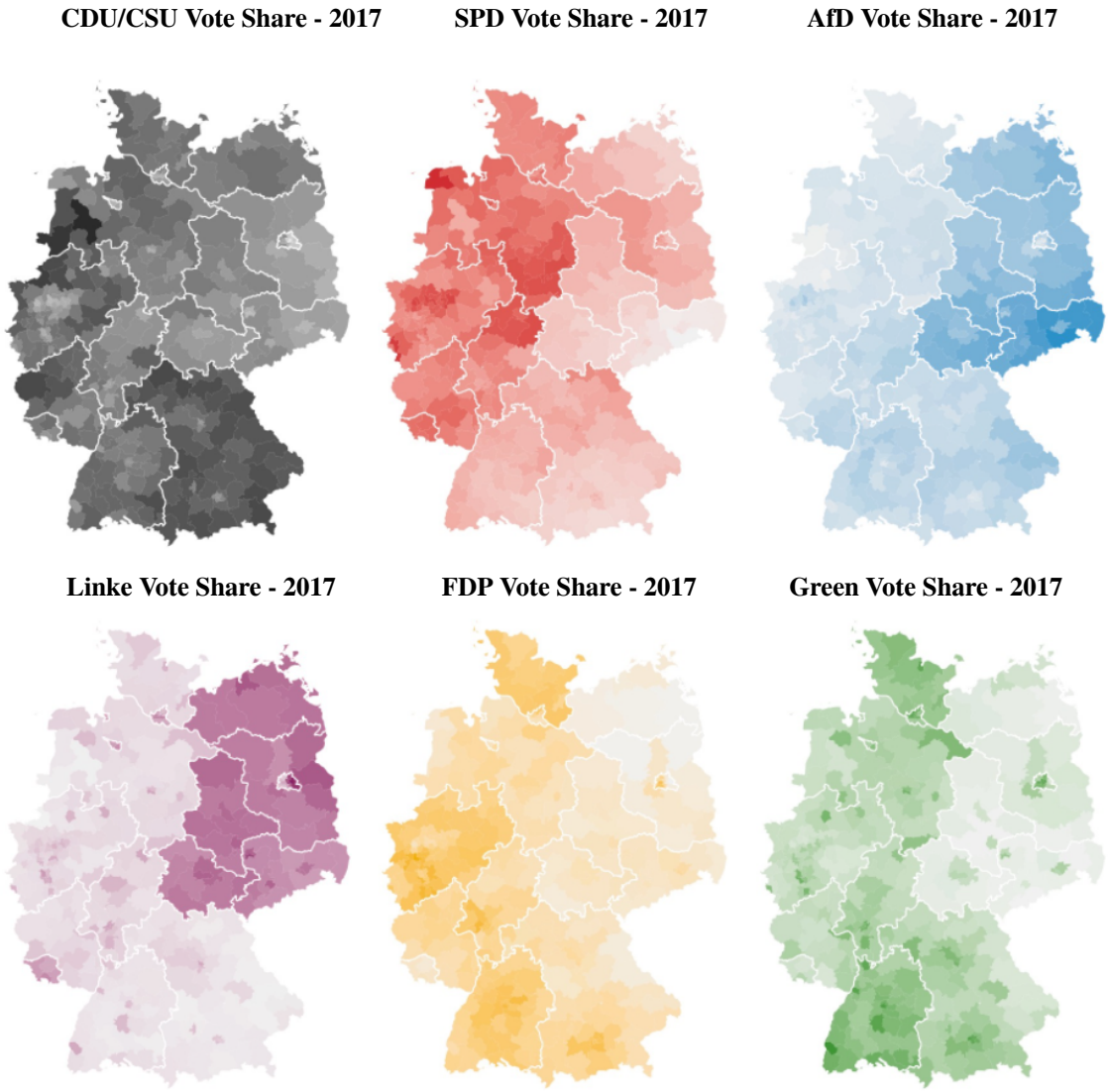

Figure 2.3 - Invisible Boundaries 2 of 2 (Bundesamt für Kartographie und Geodäsie et al., 2021)

The largest parties in the political spectrum are the CDU/CSU on the right and the Social Democratic Party (SPD) on the left. On the far left of the political spectrum is Die Linke (the successor party to former GDR leadership) and on the far right, the AfD (the emergent populist party). The center of the political spectrum is made up of the Greens on the left and the Free Democrats (FDP) on the right. Although the positions of these parties may not always be centrist, their willingness to join coalitions, and hybrid support of measures on both sides of the political spectrum, make them more amenable to the center. The four smaller parties (Die Linke, Greens, FDP and AfD) perform well, and in some places outperform the two largest parties (CDU/CSU and SPD). An event more likely to occur in regions of former East Germany.

One of the challenges to researching regional variation in eastern Germany, is the shortage of reliable economic data from the regions prior to reunification. Because contemporary eastern Germans have a higher propensity to vote for far right and far left parties, it provides a unique opportunity to explore whether variation in preconditions prior to German unification can

predict within-group variation. A visual inspection of the data suggests that formerly occupied municipalities tend to have lower contemporary incomes; however, relative support for right or left populism is inconsistent. This is indicated by clustering of drop lines toward the lower end of the income spectrum. Figure 2.4 illustrates the relative performance of the far left party (Die Linke) and far right party (AfD) in host municipalities compared to non-occupied municipalities (shaded dots represent municipalities with that once hosted bases). Although the AfD often gets a greater percentage of total votes in many of these municipalities the overall performance of Die Linke is stronger in regions that had hosted Soviet military installations relative to those that did not. This can be seen in the cluster of shaded dots at the higher end of the total vote spectrum. Additionally, it appears that this trend is not observable in the AfD data, as shaded dots appear to not be systematic.

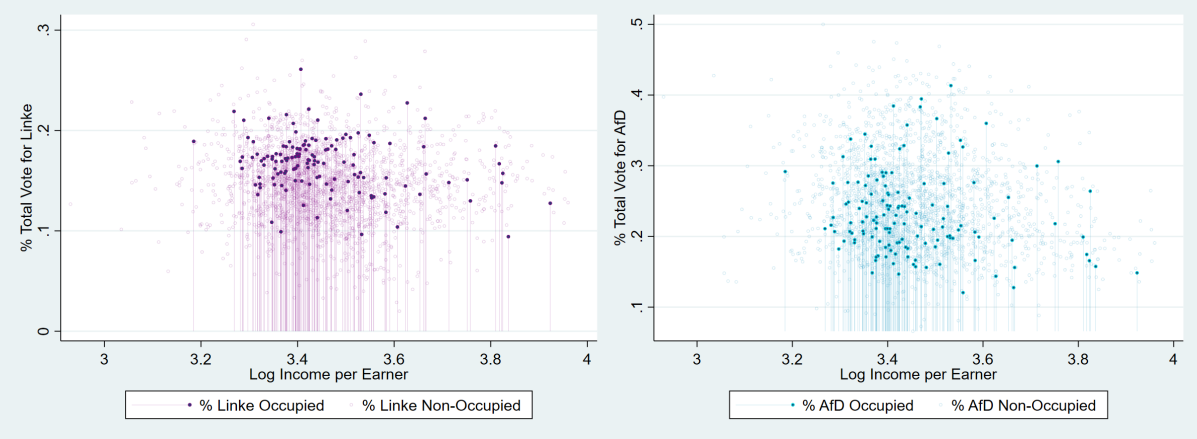

Figure 2.4 - Performance of Linke and AfD in Occupied and Non-Occupied Municipalities (2017)

To investigate further, municipalities were plotted along axes of percentage vote share for both Die Linke and AfD. Figures 2.5 and 2.6 illustrate that although the AfD outperforms Die Linke in many former East German municipalities, there is a negative linear relationship between their success; furthermore, the cluster of shaded treated municipalities in the lower right corner, indicate a bias for the left in these regions. As in Figure 2.4, the once occupied municipalities are highlighted with a drop line. The density of the drop lines on the horizontal axis indicate that the Die Linke performed above average in treated municipalities and that the effect appears magnified in municipalities where there were heavier occupations.

The distribution of observations in Figure 2.6 suggests that voting preferences are less favorable for Die Linke where there were once larger numbers of troops when compared to larger amounts of infrastructure. In this diagram the size of squares and diamonds vary based on the number of divisions and buildings recorded in a specific municipality. The greater density of larger squares in the lower right hand corner implies more support for Die Linke in regions with these features. Despite slight variations in magnitude there is a clear trend of support for Die Linke in the case of both heavy troops and infrastructure. Comparing total votes for Die Linke and the AfD by income, and relative to one another, provides evidence of a bias for left populism in the regions that once hosted large Soviet military installations. It also indicates that on average income is lower in these municipalities. Prior to testing for significance it is clear that there is a greater support for Die Linke in regions that once hosted installations and that the effect is magnified in municipalities with more infrastructure.

Figure 2.5 - Performance of Linke and AfD in Occupied and Heavily Occupied Municipalities (2017)

Figure 2.6 - Performance of Linke and AfD in Heavy Troop and Infrastructure Environments (2017)

For a more graphic illustration of these relationships, the attributes identified by the squares and diamonds in Figure 2.6 are plotted on the maps in Figure 2.7 to illustrate the relative success of far left and far right parties in treated municipalities. The result is an observable inverted relationship between support for the parties. The relative support for both the far left and far right parties appear to be heavily influenced by the locations of Soviet military installations. In many regions, the borders of formerly occupied municipalities render relative islands of support for the Die Linke and vacuums of relative support for the AfD.

In Figure 2.7 lighter regions in the map on left indicate the highest levels of support for Die Linke (LNK) relative to all other municipalities; whereas in the map on the right they indicate the lowest level of support for the AfD. Conversely, the darker regions in the map on the left indicate the lowest levels of support for Die Linke; and on the right, the highest level of support for the AfD. What is not evident in Figures 2.4 - 2.6 is the similarity in relative support for the two parties in most of former East Germany; a trend that is most pronounced in municipalities that hosted Soviet military installations. These patterns, although not as clearly defined, can be identified in the relative performance of the CDU and SPD as well as a composite of all four parties (see Figures A.3.4 and A.3.5 in Appendix A).

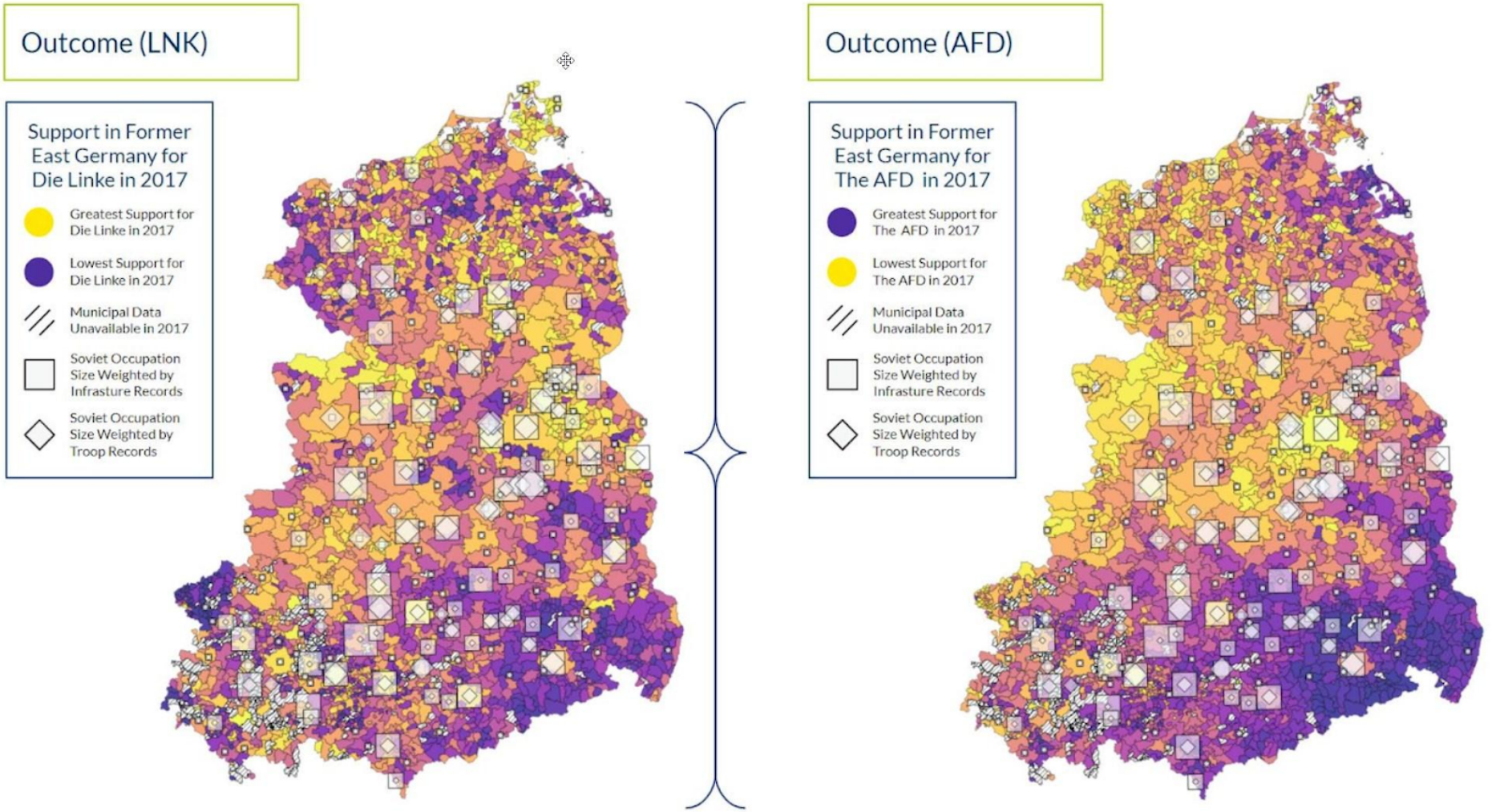

Figure 2.7 - Support for Die Linke and AfD in Regions with Military Installations

As these borders were drawn after reunification, institutional forces in the municipalities would be necessary to preserve such a cutoff. Meaning that without an institutional difference, the borders would not be so conspicuous. Lichter et al. (2021) reported that the artificial nature of GDR districts prevented them from having a recognizable cultural impact on their populations. Districts had no legislative powers, only the power to implement and enforce measures prescribed by central authorities. A primary objective of this system was to disrupt any political and economic influence of prior governments and alliances.

In total the Stasi employed over 1% of the entire population. The Ministry for State Security—or Ministerium für Staatssicherheit (Stasi) was formalized as an institution shortly after the formation of the GDR. The general purpose of the organization was to suppress opposition and preserve the power of the regime. Lichter et al. (2021) points out that Stasi density was administered by district authorities and therefore varies at the county-level. Figure 2.8 illustrates the distribution of municipalities with decomissioned bases or, respectively, distance to the nearest formerly occupied municipality (horizontal axis) and the level of Stasi density (vertical axis). The data reveals an inverse relationship between the number of informants and a proximity to Soviet forces. Over 60% of the municipalities with Soviet occupations reported below average Stasi Density and of the ~150 municipalities that were over 30 km away from a military installation 25% of them had the highest Stasi Density. Compared to around 1% in and around the occupations and 10% and 12% at other distances. Although there was a clear separation between the occupied and the occupier in East Germany, it appears there was some level of coordination between forces.

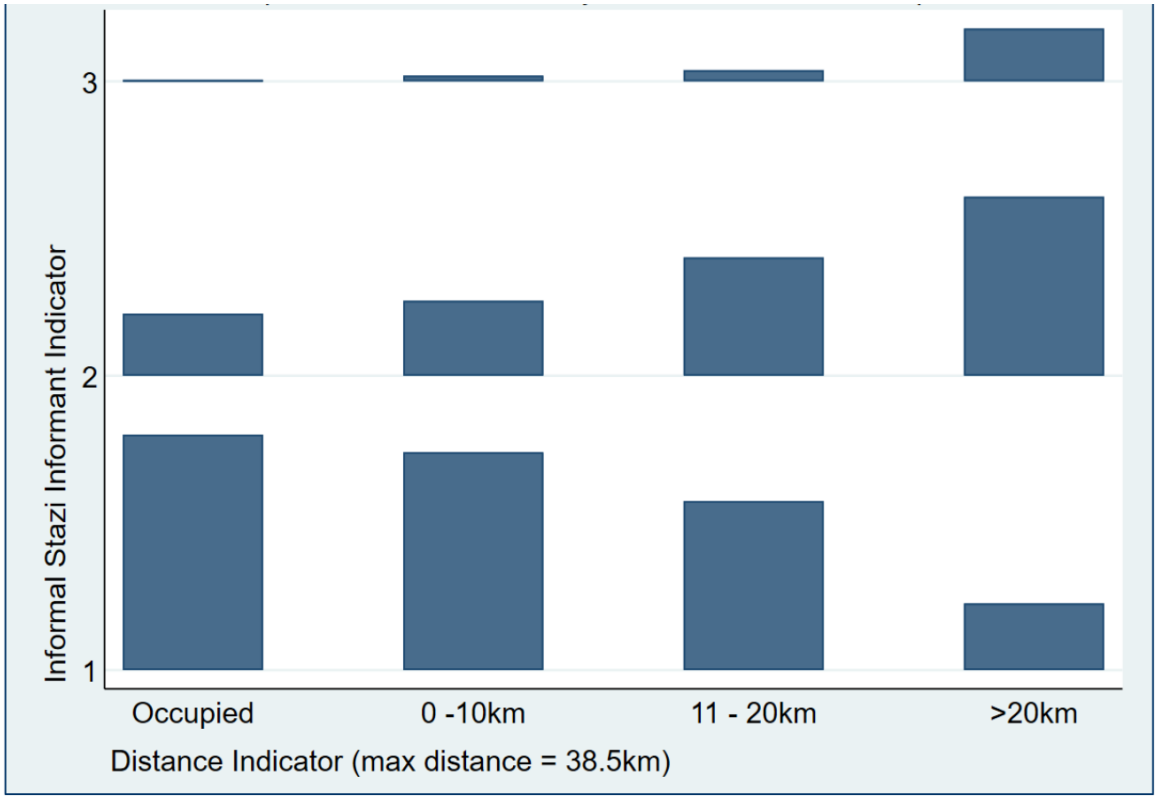

Figure 2.8 - Relationship Between Soviet Occupation Density and Stasi Density

4.2 Estimation of Effects

The first order analysis, matching strategy and series of robustness exercises test for the significance of these relationships while Stasi density is used to control for regional variation. The research design identifies the unique effects of treated municipalities when compared to control municipalities that are at least 20 km away. The first order analysis provides the necessary evidence to conclude that having once hosted a Soviet military installation, that is now decomissioned, predicts left leaning preferences, and that being furthest from those municipalities, predicts right leaning preferences. Independently estimating the effects of active and decomissioned bases identifies that the entirety of this effect is derived from those municipalities whose military installations were decommissioned after Soviet departure. It also establishes that there is a unique relationship between Stasi density and voting preferences for the far left and far right party in Germany.

Table 2.1 illustrates the effects of the general occupation dummy, controlling for population density, average income per capita and voter turnout (municipality controls), under state and year fixed-effects assumptions. Table 2.2 indicates that the magnitude of these effects increase in the case of larger installations; moreover, the effect doubles in the case of the AfD and the Greens. Given that the Greens only receive between 3 - 5% of the votes in any given year, the 1.8% increase in their total percentage of votes amounts to 40 - 55% more votes in these regions. These outcomes confirm the relationships identified in Figures 2.4 - 2.7 are significant while controlling for a number of unobservables.

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(general\ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.1)$$

	LNK	SPD	GRN	FDP	CDU	AFD
General Occupation	0.014***	0.008***	0.007***	-0.003***	-0.020***	-0.008***
Dummy	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Municipality Controls	✣	✣	✣	✣	✣	✣
State Effects	✣	✣	✣	✣	✣	✣
Year Effects	✣	✣	✣	✣	✣	✣
Overall R-sq	0.582	0.447	0.214	0.707	0.470	0.818
groups	2211	2210	2209	2211	2211	2211
Observations	6508	6509	6448	6472	6512	4356

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0.01$

Table 2.1 - Municipal Federal Election (2009 - 17) (General Occupation)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(dense\ \ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.2)$$

	LNK	SPD	GRN	FDP	CDU	AFD
Heavy Occupation	0.015***	0.011***	0.018***	-0.002	-0.027***	-0.016***
Dummy	(0.005)	(0.003)	(0.004)	(0.002)	(0.005)	(0.004)
Municipality Controls	✣	✣	✣	✣	✣	✣
State Effects	✣	✣	✣	✣	✣	✣
Year Effects	✣	✣	✣	✣	✣	✣
Overall R-sq	0.582	0.447	0.214	0.707	0.470	0.818
groups	2211	2210	2209	2211	2211	2211
Observations	6508	6509	6448	6472	6512	4356

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0.01$

Table 2.2 - Municipal Federal Election (2009 - 17) (Dense Occupation)

Table 2.3 reports the average bias for each political party using low Stasi density as a base. A negative coefficient on heavy Stasi density implies that bias for Die Linke around former bases erodes in municipalities that had higher rates of surveillance. Another important finding is that higher rates of surveillance also predict a greater support for the emergent far right party. This provides further support for the findings of Lichter et al. (2022) and Avdeenko (2018), in that greater repression in regions with higher Stasi densities predict lower support for the successor party to East German leadership (e.g. electoral punishment). These estimates control for further unobservables by adding historic records of Nazi party vote share, Communist party vote share and voter turnout from 1933. Stasi density dummies are also used to act as a kind of county level fixed effect. Due to changes in municipality codes, the constrained regressions lose roughly 850 of the 2150 observations per year; however, results stay consistent with the larger sample.

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(general\ occupation)_i + \sum_j \mathbb{1}(stasi)_i + (\mathbf{Z}_{it} + \mathbf{Z}_{i33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.3)$$

	LNK	SPD	GRN	FDP	CDU	AFD
General Occupation	0.014***	0.006**	0.003**	-0.003***	-0.019***	-0.004
Dummy	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
StaSi Density	-0.001	-0.001	-0.002**	-0.000	-0.002	0.000
n=50th - 90th percentile	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
StaSi Density	-0.008**	-0.001	0.000	0.001	-0.011**	0.017***
n >90th percentile	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.003)
Municipality Controls	✣	✣	✣	✣	✣	✣
Historical Controls	✣	✣	✣	✣	✣	✣
State Effects	✣	✣	✣	✣	✣	✣
Year Effects	✣	✣	✣	✣	✣	✣
Overall R-sq	0.63	0.50	0.22	0.747	0.549	0.838
groups	1384	1383	1382	1384	1384	1384
Observations	4064	4064	4031	4049	4067	2724

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table 2.3 - Municipal Federal Election (2009- 2017) (Occupation, Stasi Density and Historic Controls)

Table 2.4 demonstrates the effect proximity to an installation has on non-occupied municipalities. In this estimation the municipalities that hosted Soviet installations are used as the base, so results can be interpreted as the average effects of a minimum distance from a treated municipality, in regions with low Stasi density. As the model is further constrained, the relationships identified in Figure 2.7 remain significant.

The findings indicate the further away from a formerly occupied municipality, the greater the percentage of votes for right parties and the lower the probability of support for left parties. Geographically, the military installations predict a concentration of support that decays radially the further away you get from center. The gradual increase in magnitude of the effect, as the distance is increased, implies there is systematic decay. Evidence for this can also be seen in regional support for the SPD and the CDU, as well as support for left or right parties in general (see Figure A.3.4 and A.3.5 in Appendix A). The next step of the analysis separates the effect of active bases from decomissioned installations to confirm the effect is in those municipalities that were occupied by Soviet forces and then later abandoned.

$$percentage\ vote\ share_{ikt} = \alpha + \sum_{j} \mathbb{1}(distance)_{j_i} + \sum_{j} \mathbb{1}(stasi)_i + (\mathbf{Z}_{it} + \mathbf{Z}_{it33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.4)$$

	LNK	SPD	GRN	FDP	CDU	AFD
1 - 10 km to Base	-0.011***	-0.005**	-0.001	0.003***	0.012***	0.004
	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
10 - 20 km to Base	-0.012***	-0.007***	-0.003**	0.002**	0.022***	0.002
	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
n > 20 km to Base	-0.019***	-0.020***	-0.008***	0.002	0.036***	0.009**
	(0.004)	(0.004)	(0.001)	(0.002)	(0.006)	(0.004)
StaSi Density	-0.000	0.000	-0.001*	-0.000	-0.002	-0.000
n=50th - 90th pctl	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
StaSi Density	-0.008**	0.001	0.001	0.001	-0.012***	0.017***
n >90th pctl	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.003)
Municipality Controls	✣	✣	✣	✣	✣	✣
Historical Controls	✣	✣	✣	✣	✣	✣
State Effects	✣	✣	✣	✣	✣	✣
Year Effects	✣	✣	✣	✣	✣	✣
Overall R-sq	0.63	0.50	0.22	0.747	0.549	0.838
groups	1384	1383	1382	1384	1384	1384
Observations	4064	4064	4031	4049	4067	2724

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table 2.4 - Municipal Federal Election (2009 - 2017) (Distance Classes with Stasi and Historic Controls)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(closure)_i + [\mathbb{1}(gen)_i \times \sum_{j} \mathbb{1}(stasi)_i] + z + \mathbf{Z}_{i33} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.5)$$

	LNK	SPD	GRN	FDP	CDU	AFD
Decommissioned	0.014***	0.004	0.003*	-0.002*	-0.019***	-0.004
Dummy	(0.004)	(0.003)	(0.002)	(0.001)	(0.004)	(0.005)
Active BW	0.014	-0.003	0.003	-0.004*	-0.020***	0.005
Dummy	(0.009)	(0.009)	(0.003)	(0.002)	(0.006)	(0.007)
StaSi Density	-0.001	-0.002	-0.002**	-0.000	-0.002	0.000
n=50th - 90th pctl	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
StaSi Density	-0.009**	-0.001	0.000	0.001	-0.011**	0.018***
n >90th pctl	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.003)
Interaction	-0.001	0.008	-0.000	-0.001	0.001	-0.002
Occupied*Mid StaSi	(0.005)	(0.005)	(0.002)	(0.002)	(0.006)	(0.006)
Interaction	0.025***	-0.002	-0.007***	-0.003	0.007	-0.016**
Occupied*Hi StaSi	(0.006)	(0.005)	(0.002)	(0.002)	(0.007)	(0.006)
Municipality Controls	✣	✣	✣	✣	✣	✣
Historical Controls	✣	✣	✣	✣	✣	✣
State Effects	✣	✣	✣	✣	✣	✣
Year Effects	✣	✣	✣	✣	✣	✣
Overall R-sq	0.63	0.50	0.22	0.747	0.549	0.838
groups	1384	1383	1382	1384	1384	1384
Observations	4064	4064	4031	4049	4067	2724

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table 2.5 - Municipal Federal Election (2009 - 17)(Decommissioned with Joint Stasi and Historic Controls)

Table 2.5 identifies the joint effects of decomissioned bases and Stasi density as well as the effects of bases that remain active under the command of the contemporary Germany military. Although there are slight changes in the magnitude of effects the results remain consistent. Die Linke can expect a 1.4% bias of total votes in their favor. This amounts to a 5 - 10% difference in the percentage of votes they receive in any given election. The 0.4% bias for the SPD only amounts to a difference of 2 - 3% in total votes; however, the 0.3% bias for the Greens still makes a difference of anywhere from 6 - 10% in their total percentage of votes.

Coefficients from regions with the highest Stasi density are also consistent with earlier estimates. In these regions, the successor party to the SED receives anywhere from 2 - 5% (-0.9%) less votes. An interesting finding from this procedure is that in municipalities that were once occupied, a high Stasi density predicts a 3.4% increase in the total percentage of votes for Die Linke when compared to non-occupied municipalities. This means that unlike other municipalities in the former GDR with high Stasi density, those regions that supported the largest Soviet military installations can expect 12 - 23% more votes for Die Linke. The estimations also predict that the AfD can expect a higher turnout in regions with greater surveillance; however, this bias erodes in the regions with decomissioned bases.

Tables 2.6 and 2.7 identify the average treatment effects of having once hosted a former Soviet military installation on contemporary left wing voting preferences, when compared to control municipalities that are at least 20 km from the border of a formerly occupied municipality. Table 2.6 demonstrates consistent treatment effects under exact matching constraints. It also confirms the relationship is being driven by the decommissioned bases, as observed in the first order analysis, the magnitude of the effect increases when the model is constrained to decomissioned installations.

$$\tau^{ATE} \approx \frac{1}{N}\sum_{i}^{n}((y_i(1) - \frac{1}{M}\sum_{j}^{m}(y_i(0)) - (y_i(0) - \frac{1}{M}\sum_{i}^{m} y_i(1))) \quad (2.6)$$

	Year	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
LEFT WING	2017	0.042***	0.047***	0.100***	0.098***	0.100***	0.078***	0.016***
	2013	0.083***	0.085***	0.132***	0.134***	0.132***	0.128***	0.089***
	2009	0.114***	0.121***	0.131***	0.129***	0.131***	0.127***	0.059***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Estimator: *Nearest-neighbor matching (Population Density, Average Income, Voter Participation and Stasi Density Class), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table 2.6 - ATE of Occupation Size and Status on Political Leaning (2009 - 17)(Nearest Neighbor)

	km to Control Municipality	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
LEFT WING	2017	0.061***	0.063***	0.065***	0.058***	0.065***	0.057***	0.076***
	2013	0.108***	0.108***	0.073*	0.070*	0.073*	0.070*	0.069***
	2009	0.118***	0.121***	0.082**	0.081**	0.082**	0.079**	0.113***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Exact match: *Municipality class (City, Suburb or Countryside) and StaSi Density Class (<50th, 50th – 90th, >90th pctl)*
Estimator: *Nearest-neighbor matching (Population Density, Average Income and Voter Participation), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table 2.7 - ATE of Occupation Size and Status on Political Leaning (2009 - 17)(Exact Matching)

Table 2.7 provides estimates of the average treatment effects of a general occupation, dense occupation, heavy occupation, heavy troops and heavy infrastructure in consecutive elections under relaxed assumptions. The results remain consistent; again, there is a larger effect in municipalities that hosted larger installations. Dense installations (of 3 or more buildings or divisions) and heavy installations (over 10 divisions or 15 buildings) increase the magnitude of effect. In elections with 5 or 6 parties the left can expect over 10% more of the total vote in regions that were once heavily occupied when controlling for further unobservables under average treatment effects and matching assumptions. All the estimations using exact matches and the relaxed criteria can be found in Appendix A.2.

$$\tau^{ATE} \approx \frac{1}{N}\sum_{i}^{n}\left((y_i(1) - \frac{1}{M}\sum_{j}^{m}(y_i(0)) - (y_i(0) - \frac{1}{M}\sum_{i}^{m} y_i(1))\right) \quad (2.6)$$

Party	Year	General	Decom General	Active General	Dense	Decom Dense	Heavy Troops	Heavy Building
AFD	2017	-0.005	-0.011	0.198***	-0.100***	-0.102***	-0.085***	-0.023*
	2013	-0.009***	-0.010***	0.027*	-0.023***	-0.023***	-0.021***	-0.027***
	2009							
CDU	2017	-0.053***	-0.051***	-0.094***	-0.002	-0.002	-0.004	-0.045***
	2013	-0.079***	-0.080***	0.050	-0.083***	-0.085***	-0.085***	-0.059***
	2009	-0.104***	-0.107***	0.090	-0.089***	-0.088***	-0.089***	-0.057**
FDP	2017	0.005*	0.004	0.023***	0.004	0.004	0.011***	0.016**
	2013	0.002	0.002	0.006	0.001	0.001	0.001	0.007**
	2009	-0.011**	-0.011***	0.065***	-0.022***	-0.022***	-0.022***	-0.005
GRN	2017	0.002	0.002	-0.015***	0.010***	0.011***	0.013***	-0.002
	2013	0.002	0.002	-0.017***	0.004	0.005	0.006**	-0.010
	2009	0.010***	0.009***	-0.010	0.010***	0.010***	0.010***	-0.001
SPD	2017	0.037***	0.041***	-0.065*	0.082***	0.085***	0.067***	0.043***
	2013	0.059***	0.061***	-0.090**	0.092***	0.095***	0.088***	0.061***
	2009	0.082***	0.085***	-0.076	0.098***	0.098***	0.095***	0.033
LNK	2017	0.014***	0.015***	-0.063***	0.020***	0.019***	0.009**	0.022**
	2013	0.034***	0.034***	-0.009	0.043***	0.041***	0.043***	0.044***
	2009	0.027***	0.028***	-0.069***	0.022**	0.022**	0.023**	0.036***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Estimator: *Nearest-neighbor matching* (*Population Density, Average Income, Voter Participation and Stasi Density Class), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table 2.8 - ATE of Occupation Size and Status on Percent of Total Votes (2009 - 17)(Nearest Neighbor)

Party	Year	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
AFD	2017	-0.001	-0.005	0.179***	-0.063***	-0.061***	0.208***	-0.063***	-0.062***
	2013	-0.011***	-0.011***	0.050***	-0.017***	-0.018***	-0.099***	-0.017***	-0.018***
	2009								
CDU	2017	-0.067***	-0.063***	-0.040**	-0.021	-0.016	0.119***	-0.021	-0.014
	2013	-0.091***	-0.090***	0.092**	-0.053	-0.047	0.552***	-0.053	-0.047
	2009	-0.110***	-0.111***	0.049	-0.058*	-0.056*	0.515***	-0.058*	-0.053*
FDP	2017	0.005**	0.005**	0.046***	0.016**	0.015**	0.167***	0.016**	0.015**
	2013	0.003*	0.003*	0.010	0.003	0.003	0.050***	0.003	0.003
	2009	-0.006	-0.008*	0.087***	-0.009	-0.010	0.112***	-0.009	-0.010
GRN	2017	0.001	0.001	-0.003	0.002	0.001	-0.025***	0.002	0.000
	2013	0.004**	0.003	-0.019***	0.001	0.000	-0.012***	0.001	-0.000
	2009	0.012***	0.012***	0.010	0.005**	0.005**	-0.034***	0.005**	0.004**
SPD	2017	0.043***	0.045***	-0.112***	0.037**	0.033**	-0.094***	0.037**	0.033**
	2013	0.077***	0.079***	-0.158***	0.044	0.043	-0.183***	0.044	0.042
	2009	0.085***	0.088***	-0.105**	0.048	0.048	-0.234***	0.048	0.046
LNK	2017	0.018***	0.018***	-0.087***	0.026***	0.024***	-0.295***	0.026***	0.024***
	2013	0.028***	0.028***	-0.034	0.032**	0.031**	-0.313***	0.032**	0.032**
	2009	0.022**	0.022	-0.073***	0.029***	0.029***	-0.191***	0.029***	0.029***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Exact match: *Municipality class (City, Suburb or Countryside) and StaSi Density Class (<50th, 50th – 90th, >90th pctl)*
Estimator: *Nearest-neighbor matching* (*Population Density, Average Income and Voter Participation), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table 2.9 - ATE of Occupation Size and Status on Percent of Votes (2009 - 17)(Exact)

Tables 2.8 and 2.9 offer a comprehensive analysis of the measurable difference in party performance between those municipalities that once hosted a Soviet military installation and those that were the furthest away. The signs and magnitudes of the coefficients indicate that living in a municipality that decommissioned an installation predicts a significant variation in support for all major parties. An inverse relationship can be observed between the effects of an active military base and those of decommissioned Soviet installations. On average the AfD earned 25% of the total vote in 2017, so the bias of nearly 20% more votes in municipalities with active military bases is quite sizable. Another interesting finding is the increasing magnitude in effect observed between heavy troop densities and the AfD. It implies that municipalities that hosted large amounts of troops won, on average, 8.5% less total votes for the far right. In 2017 this amounts to a 35% difference in treated and control municipalities.

The results in Tables 2.8 and 2.9 indicate favorable bias for the successors to East German leadership in regions that decomissioned Soviet military installations. The results from the first order analysis are confirmed under much stricter conditions and show that when matched to control municipalities, the observable effect increases. The estimated treatment effects of a general occupation, a dense occupation and a heavy occupation also confirm that as the size of the installation increases so does the magnitude of the effect for all parties.

There is a chance that there is an omitted variable that would incentivize former non-left leaning regimes to build bases in places that would be favorable to future left parties, and that the over 100 new bases built during the Soviet era were then also strategically positioned in regions with favorable conditions for left leaning support, but that phenomenon would not explain the preference for far right parties in municipalities that currently host active bases. Even in the case that an unobserved force cultivated or attracted left leaning political preferences in locations where bases would later be decomissioned, or deterred them in places furthest from the bases, the results provide clear evidence of path dependence and retrospective voting behavior.

Regional trends indicate it is probable the presence of military bases affected the density of Stasi informants; however, the effect of decomissioned installations are still observable when the matching strategy controls for variation in Stasi density. Based on the evidence, another explanation for the observed relationship could be that if Stasi density was shaped by proximity to Soviet installations, the conditions could have insulated residents from excessive repression. In this case the observed effect would be that of electoral punishment, centered in points furthest away from the bases. Although this is a possibility, it is not supported by the evidence that joint effects of high Stasi density and decomissioned bases are positive and significant.

Given the limitations to the span of analysis in the municipal dataset, parallel trends assumptions are tested using county level data from 1994 - 2017. The graphs in Figure 2.9 offer evidence of a decaying support for left parties in treated municipalities prior to a reversal in 2013. A parallel trends sensitivity analysis identifies that although the reversal of trends begins in 2009, 2013 is the identifiable shock (see Figures A.1.1 and A.1.2 in Appendix A). The procedure fixes a treatment effect to the year the AfD emerged and tests for parallel trends assumptions (Rambachan et al., 2023). Despite the observable convergence there are only a few instances when observations do not pass (see Table A.1.2 in Appendix A).

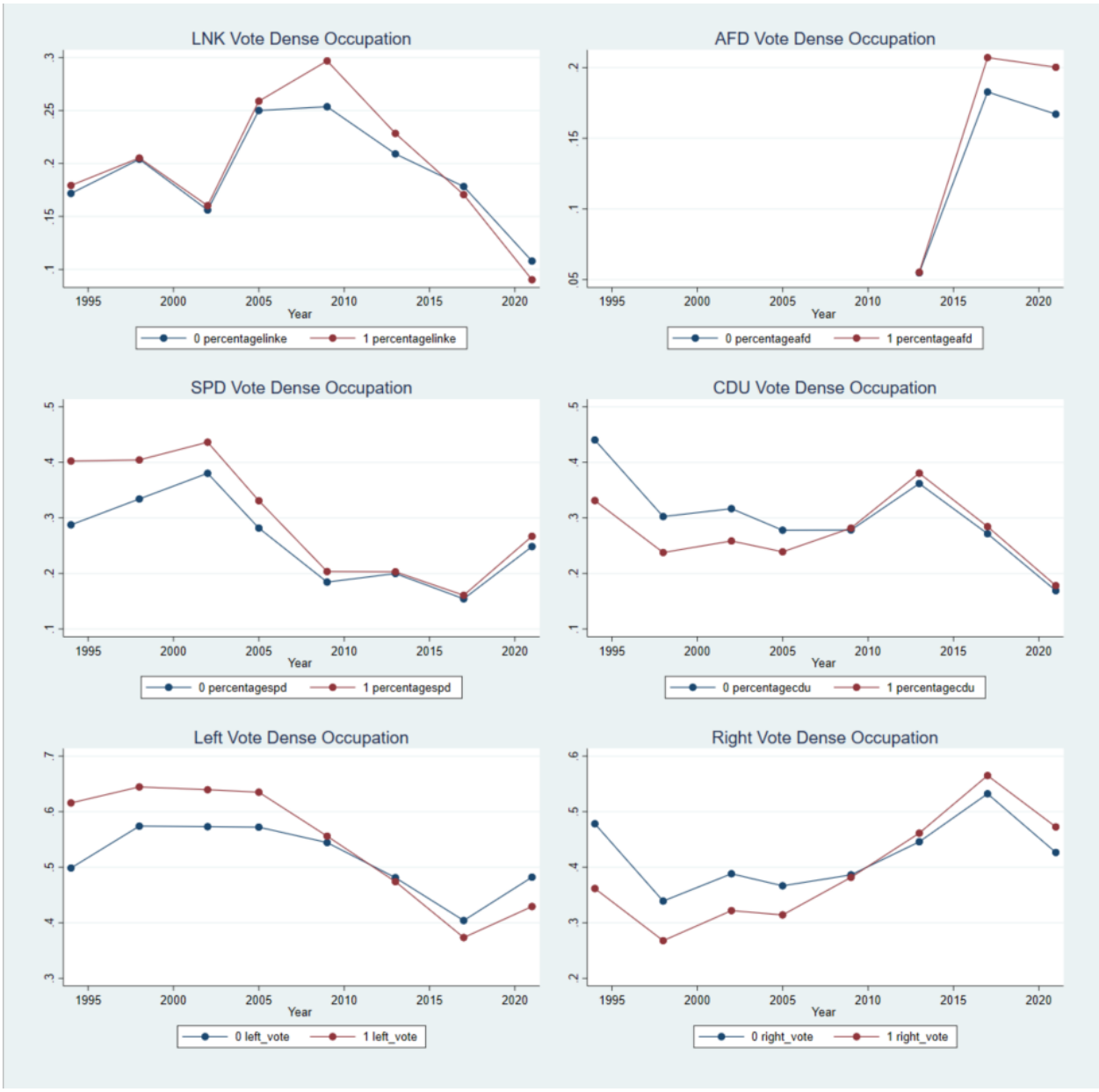

Figure 2.9 - Percentage Votes for Left and Right Parties in Treated and Untreated Counties

The presence of parallel trends makes it possible to assign a treatment effect to the rise of the AfD in a procedure that borrows conceptually from difference-in-discontinuity design. The specification expands on the parallel trends sensitivity analysis to identify whether the observed biases are time invariant in the presence of a shock. The model estimates variation in the success of pre-existing political parties, after the emergence of a new political party, marginal to living in a municipality that once hosted a Soviet military installation; in other words, whether the addition of the AfD affected the bias observed in the first order analysis and the matching exercise. The results indicate that the favorable bias for left parties is unaffected by the introduction of the new party in 2013. Insignificant coefficients on joint year effects for Die Linke and the Greens in 2013 and 2017 are evidence of a shock resistant time invariant effect; however, the joint effects make a difference for the SPD in 2017.

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(closed)_i + \sum_j \mathbb{1}(stasi)_i \times \mathbb{1}(AFD)_t + (\mathbf{Z}_{it} + \mathbf{Z}_{i33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.7)$$

	LNK 09|13	LNK 09|17	SPD 09|13	SPD 09|17	GRN 09|13	GRN 09|17	FDP 09|13	FDP 09|17	CDU 09|13	CDU 09|17
Year	-0.055***	-0.110***	-0.008***	-0.033***	-0.014***	-0.020***	-0.086***	-0.049***	0.093***	-0.033***
Dummy	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
Decommissioned	0.015***	0.016***	0.005	0.009**	0.004*	0.003	-0.006***	-0.005***	-0.023***	-0.022***
Dummy	(0.005)	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)
Interaction	-0.001	-0.005	-0.002	-0.012***	-0.001	0.000	0.007***	0.004*	0.004	0.016**
(Occupied x Year)	(0.003)	(0.004)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.006)
StaSi Density	-0.000	-0.001	-0.001	-0.002	-0.002**	-0.002*	-0.001	0.000	-0.002	-0.002
n=50th - 90th percentile	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
StaSi Density	-0.008**	-0.009***	-0.003	-0.001	-0.000	0.001	0.002	0.003	-0.006	-0.012***
n >90th percentile	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.004)
Interaction	0.002	0.000	0.006	0.009*	0.000	0.000	-0.001	-0.003	-0.001	-0.001
Occupied*Mid StaSi	(0.006)	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)	(0.006)
Interaction	0.031***	0.024***	-0.009	-0.001	-0.007***	-0.009***	0.002	-0.004	-0.003	0.008
Occupied*Hi StaSi	(0.007)	(0.006)	(0.005)	(0.005)	(0.003)	(0.002)	(0.002)	(0.003)	(0.007)	(0.007)
Municipality Controls	✣	✣	✣	✣	✣	✣	✣	✣	✣	✣
Historical Controls	✣	✣	✣	✣	✣	✣	✣	✣	✣	✣
Overall R-sq	0.426	0.712	0.489	0.489	0.188	0.244	0.809	0.498	0.545	0.245
groups	1328	1334	1327	1334	1324	1331	1328	1335	1328	1335
observations	2620	2594	2619	2595	2600	2575	2604	3074	2621	2597

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0.01$

Table 2.10 - Differential Response to the Addition of the New Party on Decomissioned Bases (2009-17)

Table 2.10 illustrates the bias in municipalities that decommissioned bases on each political party using the first election prior to the introduction of AfD as a base year. All parties lost a significant number of votes to the AfD; however, Die Linke gets 1.5% more votes in regions that decomissioned bases with low Stasi densities compared to other low Stasi density municipalities; this is consistent with all prior findings. These results also indicate the bias for support for Die Linke and the Greens is unaffected; whereas, it appears that the SPD, the FDP and the CDU were all affected by the addition of the new party by 2017. This is further evidence the relationship is as a result of retrospective voting preferences, as Die Linke has the greatest connection to the past.

Additionally, there is a 3.9% bias for Die Linke in formerly occupied regions with high Stasi when compared to other high Stasi municipalities that were not occupied. Meaning the electoral punishment observed in control municipalities, is no longer observed in municipalities that decomissioned Soviet installations. The total partial effects estimates for treated municipalities with a high Stasi density indicate that on average Die Linke gets 4.6% more votes compared to untreated municipalities with a low Stasi density, a difference of between 15-30% of total votes earned by the party in any given year. Despite having a negative effect on support for Die Linke, a high number of Stasi informants predicts a sizable increase of total votes for the party in municipalities that hosted installations.

5. Discussion

The abrupt withdrawal of an occupying military force provides the conditions for a unique natural experiment that demonstrates path dependence in formerly occupied regions. The results of the first order analysis signal the presence of a relationship, then the matching strategy estimates the average treatment effects in each election year against control municipalities, and the adapted difference-in-discontinuity design is used to provide evidence of time invariant trends.

Although there are a number of plausible explanations for the mechanism, it is clear that there is a bias in municipalities that hosted Soviet military installations, that were then decomissioned after reunification. Records indicating that installations were hosted on both new and historic sites over a 100 year timeline limit the possibility that they were built in locations that already supported the left. Also, variability in strategic needs limits the possibility that features of a municipality naturally bias the populations to support the left, and that installations are then built in those locations, because of those features. An endogenous unobserved confounding variable would have to both increase support for the left and have an effect on the size of the installation. This feature would also have to support a natural cutoff and decay radially as you moved further away. The improbability of this constellation is convincing evidence that the bias originates in municipalities that hosted Soviet military installations and that the mechanism is directly related to the installation.

Decomissioned bases predict a significant bias for left parties and a time invariant effect in the case of Die Linke. Stasi density also has a predictable effect on voting outcomes; however, the effects of Stasi density changes in treated municipalities. This offers some evidence of favorable conditions for insiders and supports the argument for an institutional mechanism. The negative relationships between Stasi density and proximity to Soviet installations also implies some kind of coordination between entities often believed to operate completely independently of one another. There is a chance that the interaction between these forces is shaping the observed bias; however, further research is necessary to untangle their effects.

It appears plausible that Soviet installations were overt threats that had a strong influence on regional populations. It is also plausible that Soviet intelligence operatives were embedded into the regions around the bases and engaged in influence campaigns in the same way Stasi operatives did. This would explain the absence of heavy Stasi around the bases, as there would be less need for surveillance in municipalities that had their own security. The invasive nature of Stasi repression explains the increase in support for an anti-establishment party in the regions furthest from the bases and highest in Stasi density, it also supports the electoral punishment hypothesis proposed Avdeenko (2018); wherein, there is poorer performance of the Die Linke in regions with the greatest surveillance.

An interesting finding is that the AfD was not as successful in municipalities with larger installations; moreover, support was strongest in regions furthest away and with the highest Stasi density. Additionally, the support for right populism is higher in and around the active German military bases; this could be a possible indication that support is high among current service members, or a reaction to such a prominent state presence. At this point it is unclear whether the effects from heavy troops are a result of the additional infrastructure required to house troops or a cultural effect attributable to proximity. Die Linke experiences a greater marginal success in regions with larger infrastructure densities, indicating a greater support in treated municipalities. The effect of heavy infrastructure transfers in these municipalities appears to decay over the time period predicted by Ehrlich and Seidel (2018), this is evidence in support of a quasi-place based policy.

These outcomes suggests that abandoned installations act as a kind of place-based subsidy in that the beneficiaries of transferred assets and regional reconstruction efforts at these sites are assumed to have also been beneficiaries of the former SED, as people with the means to

leave and no benefit of staying are expected to have self-selected out of these regions (see Figures A.3.6 and A.3.7 in Appendix A). The assumption being that after reunification, mobile individuals without incentives to stay, moved to new municipalities as soon as they could. Those beneficiaries that stayed behind, would have then benefited from the property transfers and place-based reconstruction policies.

It is assumed that although these municipalities, on average, have lower incomes, life in and around the larger installations may have been moderately better, given the infrastructure advantages associated with a military presence. It could also be that the place-based advantage of former military installations provided greater access to public goods, allowing them to maintain a higher quality of life. Moreover, the associated infrastructure, and opportunities from that infrastructure, would have been fortified by agglomeration effects (Ehrlich and Seidel, 2018). Another reasonable explanation could be that lower incomes in and around the abandoned installations, as a result of less economic activity, created resentment for the contemporary leadership and residents considered themselves worse off as a result of the conditions of reunification. The decay over time could account for improving conditions as economic activity improved after redevelopment efforts took effect. Although this explanation is possible, it is not supported by the time invariance of the effect in treated municipalities.

The research design set out to better understand in-group variation in voting behavior in municipalities located within the boundaries of former East Germany. Although there is a greater support for Die Linke in these regions, there is also greater support for the AfD. The decomissioned military bases provide a source of exogenous variation to estimate differences in contemporary political preferences and Stasi density provides a control for repression. Despite challenges in solving the endogeneity puzzle, it is possible to confirm that the effects of the Soviet military occupation and Stasi density in the former GDR were not equally distributed. Regions with higher densities of Stasi informants see less support for Die Linke and a greater support for the new right populist party. Although economic insecurity is a confirmed predictor of support for populism these results indicate that regional variation can affect support for one side of the political spectrum the another. This is evidence of an embeddedness, or path dependence, that reaches beyond the immediate experiences of the contemporary electorate and confirms the presence of persistent forces from the past (Avdeenko, 2018; Granovetter, 2002; Williamson, 2000).

6. Conclusion

Results provide significant evidence that hosting a Soviet military installation, in the former GDR, predicts a substantial difference in the political preferences of municipalities, both before and after the addition of a new party to the political spectrum. The long-term effect of this quasi place-based policy on retrospective voting behavior is identified using the size and location of decommissioned Soviet military installations. This research adds to systematic empirical evidence documenting the effects of prolonged exposure to disruptive institutional forces in former East Germany. The methods offer evidence into varying mechanisms of path dependence and provide confirmation of retrospective voting behavior.

Preconditions shaped by varying influence campaigns would have affected whether or not people self-selected into a region after reunification. Beneficiaries appear to have stayed in formerly occupied municipalities after base closures and continue to support the successor party to the SED. In addition to this, the general benefits from reconstruction efforts and agglomeration effects in the formerly occupied regions would explain why those furthest from the treatment would have had more elastic preferences, even if they experienced the same level of Stasi repression. Avdeenko (2018), reported that findings from the individual level data were not confirmed using available aggregate voting data and explains this phenomenon is as a result of the changing composition of the electorate over time. Another explanation for this would be that the decaying effect was unobservable because there is not enough county level variation along the former border. It appears extending the observation area to include all of former East Germany, and estimating the effects at a municipal level, offers enough variation to provide persistent evidence of retrospective voting behavior.

A vote is a form of consumption behavior that can be influenced by both economic and social conditions; therefore, in the absence of historic economic data, evidence of retrospective voting behavior, in contemporary elections, can demonstrate the persistence of institutional and cultural path dependence. The concept of retrospective voting is compatible with short-term electoral response analysis, as the electorate is composed of individuals that react to contemporary issues and specific policies, as well as those with less elastic preferences. Both of these groups are detectable in a general sample of population data. This project does not intend to present conclusive evidence regarding the emergence of modern populism, only to offer evidence that recent economic events may not be as significant as is often purported. Although economic insecurity plays a role in the demand for populist candidates it appears a voter choice will be heavily influenced by preconditions shaped by a proximity to incentives and repression in the past.

III. Power and Port Dependence

Estimating the Effect of China's Belt and Road Initiative on Maritime Trade Using a Structural Gravity Model

1. Introduction

The Belt and Road Initiative (BRI) comprises two parts: the Silk Road Economic Belt (SREB) and the 21st-Century Maritime Silk Road (MSR). The Chinese government has communicated that their aim for these projects is to promote the connectivity of continents and their adjacent seas, establish and strengthen partnerships among the countries, set up multi-tiered and composite connectivity networks, and realize diversified, independent, balanced and sustainable development (Chinese Ministry of Foreign Affairs, 2017). Additional claims include the capacity to enhance cultural exchanges and mutual learning among the peoples of relevant countries. In addition to these features, the MSR has also been sold domestically as an initiative that will help to ensure the security of transport via sea routes (Swaine, 2015; Fallon, 2015). Although this project cannot demonstrate the validity of these claims, it does provide evidence of changes to world trade flows as a result of these agreements.

Prior to the first announcements of the BRI, the Go Out Policy had been playing a central part in China's economic development strategy. Between 1999 - 2005, Chinese enterprises invested over 35 billion dollars to establish footholds in international markets. In 2006 the plan was recalibrated and introduced again as the Going Global Strategy. China's Central Committee of the Chinese Communist Party (CCP) stated that the recalibrated plan was designed to strengthen the management of overseas, Chinese-funded enterprises and mitigate risks. Chinese State Affiliated Enterprises (CSAEs) were encouraged to carry out overseas resources development cooperation, promote the diversification of imports and ensure the stability of resource supplies (General Office of the State Council, 2006). By the time the BRI was formally announced by Xi Jin Ping, CSAEs had already acquired either partial ownership or terminal operating agreements at ports in 14 countries (in order of agreement: *United Kingdom, Argentina, Pakistan, Belgium, Malta, Poland, Spain, Egypt, Angola, United States, Greece, Sweden, Nigeria, Sri Lanka and Togo*), thus providing a solid backbone to what would become the MSR (Wu et al, 2022).

According to state reports, the BRI has several important high level objectives that will help it achieve its goals; however, the primary interest is to reduce transportation costs (Djankov and Miner, 2016). Additional stated objectives include: *1) find outlets for Chinese firms (particularly in construction overseas); 2) achieve international stature (especially for the RenMinBi (RMB)); 3) secure commodity supply chains; and 4) aid in the development of the*

participating countries demand for Chinese goods and services (Djankov, 2016). Although stated objectives of the trade network also include connectivity, partnerships, composite networks, and diversified sustainable development, there are no explicit benefits for host countries included in the plan.

These objectives have subsequently been evaluated and debated in a number of journals since the BRI was announced. Cao and Alon (2020) evaluate this literature using bibliometric data to identify research clusters that concern the BRI between 2013 - 2019. Their empirical review of the academic literature reveals a number of important gaps in the research. The authors note that within the years analyzed, there had not yet been a high-quality publication of a peer-reviewed analysis of the BRI. They also point out a gap exists in the exploration of port investment cooperation and its results. In this paper, we contribute to this research gap by analyzing the effects of completed infrastructure projects and varying port contracts on exports, imports and total trade volumes with China, other network members and the Rest of World (RoW). Specifically we concentrate on an extended MSR (which includes non-memorandum countries where CSAEs own ports or have terminal contracts) and variations in levels of control. The following analysis has been developed to determine whether China's growing influence over ports is recognizable in the trade flows of host economies. We also identify how this growing influence of ports affects global trade with China. In particular, we implement a newly developed bilateral dataset (BLOCS) to separately identify the effects of port acquisitions and operating agreements on bilateral trade using four measures of trade (Wu et al, 2022). Controlling for country specific unobservables, we find large positive effects of Chinese SAE port operation on bilateral trade with China. Estimates also suggest operating port terminals may also improve the strategic position of China in these trade relationships by diverting trade from other trade partners.

This paper contributes to the literature on trade regimes and trade costs by identifying the economic effects of China's growing influence over ports on bilateral trade flows. Beyond this essential inquiry and substantial addition to the trade literature, we make three additional contributions. First, we contribute a novel dataset with the capability of estimating the effects of varying institutional constellations along the MSR; consequently, this offers the conditions to separately identify whether ownership, terminal operating contracts and infrastructure projects are different in terms of their global trade effects.

Second, this paper contributes to the empirical literature on international trade policy and application of structural gravity models (Yotov, 2022). The model is specified with respect to varying degrees of port control, to estimate the effects of assumed reductions in transportation and other transaction costs on bilateral trade, before and after such investment is made. Using a structural gravity model and incorporating a new and unique database, we are able to provide policy recommendations as well as directions for future research. We subsequently find that the varying degrees of port control have different outcomes with respect to bilateral trade with China and that completed port projects, as defined below, temporarily increase trade with the RoW.

Third, this paper contributes to the expanding literature on the BRI. Typical papers concerned with the MSR, or the BRI in general, are often concentrated on geo-political aspects or coordination between industry and government in the context of international competition. In

particular, there has been limited empirical research capable of contributing to economics literature. In the next section we explain our motivation and examine the surrounding literature on the BRI, especially with respect to the MSR and influence of ports by Chinese SAEs. Following this, section 3 introduces the methodology and results are presented in section 4 before we offer a discussion in section 5 and conclude our findings in section 6.

2. Motivation

Chinese authorities have attempted to portray the BRI in a positive manner; however, there has been criticism that the state-led nature of the project leads to a crowding out of non-Chinese firms (Ferchen, 2021, p.249). The resulting 'state versus market' debate fails to account for the role of informal actors and behavior when making the claim that Chinese-led foreign policies form the basis of a new development model. To function as a new development model the trade network would need to benefit host countries as much as it benefits China. At this moment it is still undetermined as to whether the benefits outweigh the risks. This paper is motivated by the desire to understand whether this new model of interconnectivity produces the expected reduction in total economic costs to members of its maritime trade network.

The debut of the BRI in 2013 precipitated a number of articles concerning the Chinese trade strategy and further investigations into the empirical assessments of both the MSR and the SREB. Zhang (2018) characterizes the BRI as China's geo-economic strategy to strengthen domestic "economic development and global status by promoting regional integration and fostering a more inclusive international system" (p.3). He further argues that the BRI is a cornerstone of China's international strategy, and its strategic goal "to keep developing and become a truly great power with international recognition" (p.6). An important feature of this plan is the focus on domestic development. We examine the implications of this while concentrating on the effects of the extended MSR and the influence of ports by Chinese SAEs.

The research design is an applied analysis of the assumed effects of reduced trade costs that controls for various prior estimation biases associated with gravity models. The contemporary structural gravity model accounts for prior estimation challenges and is underpinned by the fundamentals of international trade theory (e.g., Yotov (2022) for a more complete overview). With respect to the BRI, there have only been a few examples of empirical investigations using gravity models. To complement and contribute to this literature, we apply a structural gravity model to better understand the effects of this maritime trade network and how it might increase or decrease trade with China as well as with other trade partners.

Baniya et al. (2019) use a gravity model to estimate the improvement in bilateral time savings on trade patterns. They find that the potential effects of reducing trade times along the BRI are large, increasing trade flows between participating countries between 2.8 percent and 11 percent. They also find that deeper trade agreements would magnify this impact and result in an increase in total exports of around 12 percent. This result highlights the potential complementary nature of trade cooperation and infrastructure cooperation.

Kohl (2019) uses the structural gravity approach to compare the impact of infrastructure investment in the BRI to that of FTA formation on supply-chain trade. The author identifies asymmetric benefits from the infrastructure development; however, he estimates larger reductions in trade costs from the BRI when compared to the creation of traditional FTAs. More recently, Saeed et al (2021) uses a gravity model to examine the potential effects of Chinese maritime networks on bilateral trade movements. Using 128 trading partners, they show that maritime network connectivity brought about by the BRI reduces the number of required transshipments, which enhances efficiency, thus reducing trade costs for the member countries.

Our project employs a novel dataset of 60 port contracts and infrastructure project investments to estimate the effects of these interventions on bilateral trade flows over a 20 year period using 4 measures of trade for robustness. The database also contains comprehensive observations on trade between all partners during the period of analysis (1999 - 2019). We separately identify the effects of a preferential trade agreement and the extended MSR trade network to evaluate similarities and test for interdependencies. We then separately identify the effects of terminal operating contracts and infrastructure investment to investigate their differences and look for evidence of their complementary nature.

2.1 Literature Review

Until this point, academic literature addressing the BRI has focused on three main venues. First, there are those articles that concentrate on overall effects of the investment into the BRI on varying economic conditions. Second, is literature related to trade costs; and finally, literature that examines the MSR in relation to institutional or policy oriented challenges for China and its trading partners. In this section we review key points from these discussions as well as the theoretical foundations for the effects we expect to observe. This includes literature on both the reduction of traditional trade costs as well as a Coasian interpretation of transaction costs. Discussions on contemporary policy issues are also included to contextualize the findings reported later in the paper.

2.1.1 Trade and Investment Literature

This literature is generally empirical in nature and provides some stylized facts concerning Foreign Direct Investment (FDI) in the BRI as well as some resulting consequences for the participating countries, especially concerning the effects of transportation costs. Generally these papers are looking to confirm the narrative that the connectivity gained via infrastructure development enhances cross-border cooperation and that the harmonization of standards reduces total economic costs; therefore, the observed economic effects in host countries are considered a success of the program. The World Bank (2019) finds that the new infrastructure can close important productivity gaps; as trade in the BRI member economies is estimated to be 30% below potential while FDI is estimated to be below potential by 70%. This is a popular research cluster as most of the Chinese investment along the BRI is considered FDI and it can have positive effects on GDP, employment, growth etc. FDI along the BRI is measured by authors such as Chen and Lin (2018), Boffa (2018), and Li et al. (2021). In general, these authors find positive effects from participating in the BRI as a result of trade linkages and improved transportation networks.

These effects are primarily related to the second cluster of trade and investment literature, that of trade costs. Trade costs are therefore an important fixture of international trade literature and especially important when shipping is involved since costs associated with processing imports can be particularly high. Trade costs exist along all international trade stages, of which transport infrastructure is often the most costly component (Moise and le Bris, 2013). The World Bank (2019) estimates that border delays can be 40 times higher for low-productivity countries while reducing travel impediments could result in trade increases of 5.2% and a reduction of total travel time by 12%. The question is with whom?

De Soyres et al (2020) investigate the impact of the BRI transport infrastructure on shipment times and trade costs. They find, unsurprisingly, that the increased infrastructure results in large gains to the participating countries and trade costs generally decline. For de Soyres et al (2020), time is an important dimension to the measurement of trade costs, as are uncertainty and infrastructure risk. These factors are considered in the development of our identification strategy. The broad network of infrastructure projects are expected to increase capacity and efficiency, thus reducing trade costs.

Operational and cross-border interactions, especially those to do with compliance regulations, resulting in significant trade cost increases, can be reduced with trade facilitation policies. In the case of this research, operating the ports of international trade partners is considered a trade facilitation policy, thus it is expected to reduce these costs for the host country with the operator. This may have a relation to port operations privatization and Duvallet et al. (2023) find that the increased port traffic is biased toward the Chinese vessels. The question is whether or not there are also reduced costs with other network partners. Delays due to document inspection and other such cross-border operational issues can be eliminated to the extent that, according to Carbello et al (2021), it would be comparable to removing the average worldwide applied tariff of about 6%. Martincus et al. (2010) examine information via export promotion institutions as an important contributor to increasing export regimes. This implies the interconnectivity benefits from port terminal operation contracts are expected to be biased toward the port operator and that other members of the network may not yield the same marginal benefit.

We therefore hypothesize that port terminal contracts indirectly reduce trade costs between China and its trade partners when their international ports have operating agreements with CSAEs. The assumption is that the transaction costs of trade diminish when operating a foreign port terminal in such a manner that it increases trade with the operator. Further research is necessary to identify the specific mechanism of transmission; however, whether the agreements result in trade creation or diversion is identifiable in our empirical analysis. We also expect investment in port infrastructure to reduce more traditional trade costs, as defined in the micro-economic literature, and that these differences will be reflected in trade with other members and the RoW.

2.1.2 Policy Oriented Challenges

The last stream of literature examines the BRI in relation to structural or other economic changes for China and its trading partners. Johnston (2021) has argued that the BRI is a response to the structural economic and demographic changes in China and that the

investments in the MSR, specifically those in the Indian Ocean, are in line with these principles. ASEAN partners are divided between MSR (maritime) and SREB (land) participants and of the two groups, maritime ASEAN (Cambodia, Lao, Myanmar, Thailand, and Vietnam) are reportedly more critical of Chinese endeavors, although the infrastructure investments have been generally well received (de Lombaerde et al 2022; Loc 2020).

Generally speaking, this literature focuses on the geopolitical aspects of the BRI and is more focused on the political economy of the initiative rather than its international economic consequences. The full effects of allowing state affiliated enterprises to form an international trade network through foreign host countries is still unknown. Are these relationships similar to Bilateral Investment Treaties (BITS)? Does the network function like a Preferential Trade Agreement (PTA)? Does it affect trade with other trade partners? These are not esoteric questions, as Germany recently got approval from regulatory bodies for COSCO, a state-owned Chinese shipping magnate, to take a 35 percent stake in one of their three port terminals. The Port of Hamburg has made the statement that, "If you see the Chinese terminal investment worldwide, you can absolutely say it's a normal procedure. They have huge investments in Rotterdam. They have huge investments in Antwerp." (Lau, 2022).

Figures 3.1 and 3.2 use BLOCS and MERICS data to illustrate the research terrain for this project (Wu et al, 2022; MERICS, 2018). The countries in white are countries where Chinese SAEs either own or operate ports; whereas, countries along the darkened sea regions are considered adjacent to the MSR. Although the official path of the MSR is confined to the Eastern Hemisphere, it is clear that maritime trade is a global business for Chinese SAEs. One would assume there are geopolitical constraints to extending the MSR brand to North and South America; however, for the purpose of this paper, all global port investments are considered a part of an extended MSR. Conceptually, the official MSR acts as a main channel and all ports with institutional affiliations to China are considered tributaries. In this analysis it is important to investigate the comprehensive network of port terminal agreements, rather than only where they are reported to be an official addition to the MSR.

Figure 3.1 also illustrates that the primary estuary of the MSR runs into the Mediterranean and makes landfall in South Eastern Europe. The intended path of the MSR then enters the north sea by passing through central Europe; therefore, Germany appears to be an ideal strategic investment. Cameron et al. (2021) showed that the untapped export potential of the BRI is found in the Central and Eastern European (CEE) countries, principally in Poland, Austria, and Czechia. While already close to the CEE countries due to the 2012 cooperation platform (17+1), these countries and the Mediterranean region are welcoming of the investment potential from participating in the BRI. As the official MSR runs directly through central Europe it is not surprising to find infrastructure investment in this region (in order of agreement: *Poland, Kazakhstan)* (Wu et al. 2022). Although Kazakhstan's maritime trade is limited by access to the endorheic Caspian Sea, shipping canals provide limited access via the Black Sea and Baltic Seas. Many of the current BRI countries were first members of the Shanghai Cooperation Organization (SCO); an early development following the end of the cold war. The supranational cooperation has been an important conduit for the Eurasian Economic Union countries, as China remains their most important trading partner (De Lombaerde et al. 2022; EAEU).

Figure 3.1 - Countries Where Chinese Enterprises Own or Operate Ports and the Official MSR 1 of 2

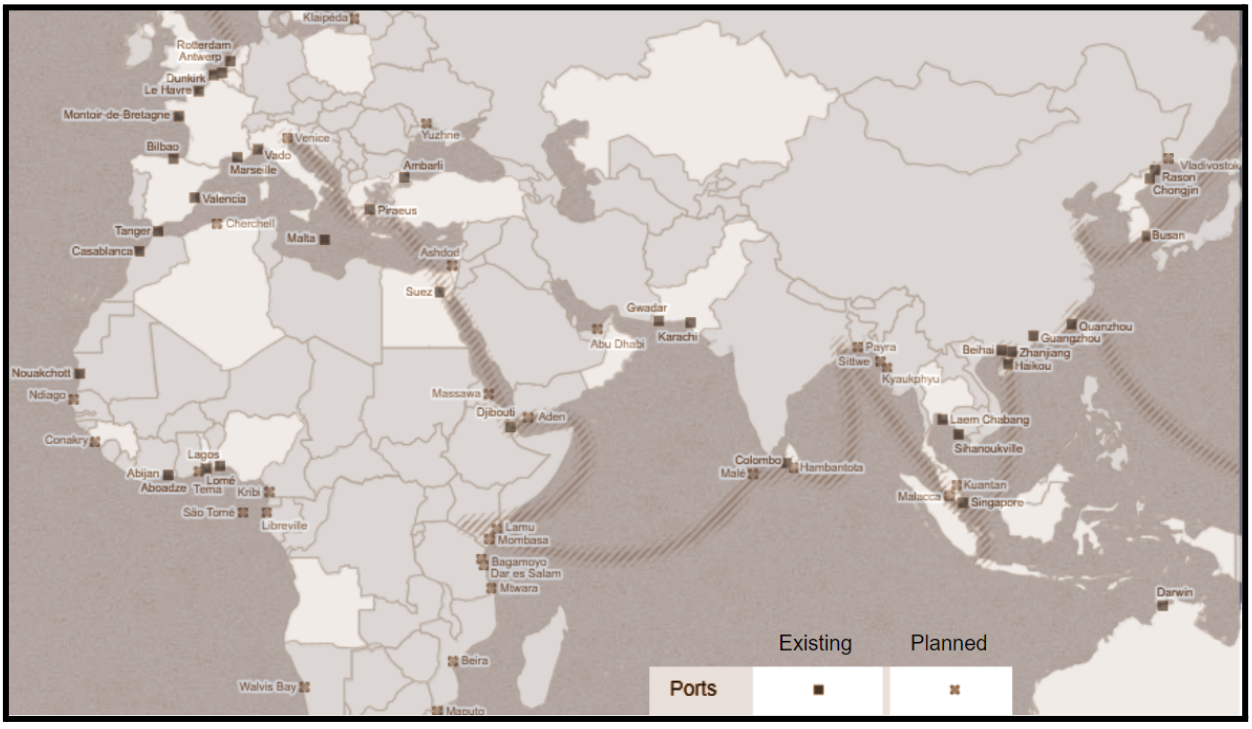

Figure 3.2 - Countries Where Chinese Enterprises Own or Operate Ports and the Official MSR 2 of 2
(Author rendition; Wu et al, 2022; MERICS, 2019)

NOTE: Figure 3.1 and 3.2 reflect data reported in Table 3.1 in section 3.1 of this paper. The dark line in both Figure 3.1 and 3.2 represent the official MSR as defined by China's CPC. The countries highlighted in white represent trade partners that have a port contract or have completed an infrastructure development project with a Chinese SAE. The official MSR is highlighted by the box with the white dashed border. It is important to note that while the official MSR is contained to the Eastern Hemisphere, there are a significant number of port agreements made in the Western Hemisphere. Figure 3.2 uses solid and partially filled boxes to differentiate planned partnerships and infrastructure development projects from those that are already developed.

Beyond this, the Mediterranean region is the most geopolitically advantageous investment. China has focused on cultivating access to its MSR through Mediterranean port agreements for over 20 years. Chinese interests have acquired the ownership of, or operating agreements for, ports in 9 Mediterranean countries as of 2021 (in order of agreement: *Malta, Spain, Egypt, Greece, France, Israel, Turkey, Algeria and Italy*) (Wu et al. 2022). Countries such as Greece, Hungary, Italy, and Poland have shown a willingness to pursue non-standard EU policies. Although when contrasted with other EU investments from Western Europe, the overall Chinese investment amounts remain comparatively small.

Between 2002 - 2017, China also proposed and executed many RFI programs in African countries. The RFI model relies on (African) government pledges of future yields from resources to reimburse the loan used to finance development of infrastructure. It is argued that the main advantage of the concept is that the government is able to build infrastructure earlier than it would otherwise be possible (Lin and Wang, 2016). The BRI vision takes advantage of rising demand from developing countries to build infrastructure, in their attempt to foster connectivity with markets in China and Europe. This in turn fosters Chinese economic development and security, specifically in the context of maritime interests. It is expected the nature of these contracts will have different effects from those that offer terminal control to Chinese SAEs. Figure 3.2 also illustrates that some ports considered a part of the MSR are not owned or operated by Chinese SAEs; however, they were targets for resource financed infrastructure (RFI) projects. China has clear plans for the MSR, the darker shaded ports have a record of investment, whereas lightly shaded ports are being negotiated at the moment (MERICS, 2019).

The plan is being sold as a universal win for all stakeholders; although it is probable there will be losses in some cases. Some of the countries where ports are operated have unresolved problems with Chinese debt (Sri Lanka) or other creditors (Greece). Due to the importance of Pakistan's unique geographic position, it had received billions of dollars to build efficient infrastructure; however, political violence has prevented Gwadar from emerging as the major trade and energy supply hub envisioned earlier in the initiative (Dorsey, 2017).

2.2 Transaction Costs

In addition to expected reductions in time and hard costs that come along with new infrastructure and maritime connectivity, it is expected there would also be a significant reduction in transaction costs of trade if a partner's state affiliated enterprises were able to operate the ports in countries that it trades with. We hypothesize that the extended MSR reduces the uncertainty of transactions and lowers the costs associated with forming, controlling and enforcing contracts between trade partners. Although transaction costs are generally time costs associated with derisking agreements they are often seen in the real costs of insurance, legal, financial, travel and surveillance costs; as well as the time required to procure those services (Wink et al, 2011). This time can also be reflected in ease of doing business and familiar contract conditions.

A common theme in transaction cost literature is that institutional arrangements lead to system growth and stability. Coase (1960) defined transaction costs as information acquisition costs; however this can be expanded to the costs of reducing uncertainty. Arrow (1969)

defined transaction costs as the costs of an economy's operating system. According to Williamson (1979), this includes the costs that come from the creation, operation, maintenance and modification of agreements; moreover, he identified that guaranteed property rights protect investments and reduce the costs associated with agreements. For the purpose of this analysis transaction costs are defined as costs of coming to an agreement, including the cost of research and information exchange; this is in addition to negotiation, decision-making, managing and enforcement costs (Wink et al, 2011).

While to date, transaction and institutional trade costs have not been specifically investigated in relation to the BRI, Lee et al (2016) perform a comprehensive examination of the MSR literature that identifies research trends and applied methods through 2016. They find several main topics; those that apply to this paper are connectivity, transport, specific routes, and cross-border networks. Blanchard (2021) continues in this vein of research and recommends that a concentration on the MSR and its implementation issues requires further investigation.

In the trade literature, transaction costs have been examined in the context of networks and production chains. In this respect, we approach Costinot et al. (2013) who study global supply chains. Their model nonetheless differs from standard models in that in-house production costs are proportional to the number of tasks performed. Heterogeneity in outcomes is driven not by the trade-off between transaction costs and diminishing returns to management but rather by an intrinsic heterogeneity associated with differing productivity levels across countries with and without contracts. Our identification strategy assumes differing throughput levels across countries with varying network agreements. For the purposes of this paper we differentiate between three types of port contract and a completed port project. It is predicted greater amounts of hierarchical control over operations will lead to greater differences in throughput.

Williamson (1979) also distinguished between differences in transaction settings; for instance, self-interested or opportunistic transactions are made with respect to their net utility gain (the transaction takes place if it is beneficial enough for both parties). Obedient transactions take place in cases where one party has commanding authority. This allows the dominant party to offer positive incentives for compliance. In this case agents can be forced by a dominant partner, or potential partner, to disclose all relevant information for the transaction prior to concluding it, this is also a way to reduce transaction costs; however, the economic benefits are bound to be biased toward the dominant partner. Although there are exceptions, China is presumably the dominant partner in many of these agreements. Obedient relationships that lead to positive economic outcomes have high switching costs and can lead to institutional lock-in. Although there are some drawbacks to this type of relationship, obedient transactions can create value by reducing the total costs of cooperation.

Geopolitical agreements tend to already have higher transaction costs and do not have to be explicit or formal; they can often rest on memorandums or verbal commitments (North, 1990). Even when they are explicit, they are often formulated with vague enforcement conditions in the event of worse case scenarios. There is an absence of price mechanism and effective third party enforcement in geopolitical agreements. This implies that the most powerful party of the contract has an advantage in deciding its terms and in making institutional adjustments to lower costs of transactions (Caballero and Soto-Onate, 2016). If

regions China has targeted as partners along the MSR are unstable or less powerful; it makes it easier to dictate the terms of agreement both before and after it has been signed. It can also be assumed that political action would be exchanged for favorable agreements and that noncompliance slows the process.

With respect to this paper, focus has been placed on the interpretation of transaction costs as the hard costs that expand productive capabilities rather than assumptions about human behavior. The behavior of the Chinese government is framed as an actor with incentives to reduce costs of contract development, management and enforcement along preferred shipping routes. The assumption is that Chinese SAEs are interested in reducing costs for domestic producers of all kinds amid increasing export competition and less interested in reducing costs for their trade partners. Given these assumptions it would be surprising if the extended MSR did not lead to more cross border transactions between China and their host countries as the amount of control increased.

3. Methodology

The identification strategy estimates the effects of varying institutional conditions between Chinese SAEs and large international ports on in and out of network trade flows. Our expectation is that the network of port contracts and infrastructure projects is insufficient as a replacement for broader and deeper institutional collaboration and that the effects of the extended MSR will favor Chinese interests. A series of structural gravity estimations address the potential endogeneity of varying MSR contracts, test for reverse causality, predict anticipatory effects and identify the total effects of these institutional agreements over a 12 year period. Specifically, this methodology has been developed to provide further insight into the persistent effects of varying contract conditions among members of a trade network; moreover, it differentiates these effects from those of a preferential trade agreement, to better understand the outcomes in the context of an ever evolving international landscape.

The purpose of the research design is to investigate whether the varying circumstances of being a member of the MSR trade network, reduce trade costs among participants. An increase in trade throughput in countries with a greater saturation of network partners would be evidence that trade costs were somehow reduced. The network is assessed in the standard Vinerian sense of a policy instrument capable of generating trade creation or trade diversion (Viner, 1950; Krugman et al., 2022). Our hypothesis is that the effects of membership in this trade network will differ from the effects of membership in a preferential trade agreement and moreover, that the predicted effects will vary depending on the nature of the contractual agreement. In addition, the characteristics of trade agreements matter; we therefore expect that the effects of a trade network, with shallower institutional integration among member countries, will be less persistent and unequally distributed among members (Wu, 2006).

The type of contract and level of institutional control is also predicted to be a determinant factor of whether being a member of the trade network leads to trade creation or diversion. As the level of control increases, the resulting reduction in the transaction costs of doing business with Chinese firms should lead to an increase in trade with China; whereas, investments in port construction should increase trade with the RoW. Using the structural gravity model as a foundation for analysis controls for the size and distance between trading

pairs, while providing reliable estimates on the effect of policy changes. The flexible structure allows for the integration of BLOCS data to estimate the predicted effects of Chinese SAE port contracts and completed infrastructure development projects on bilateral trade between members of the extended MSR, with China, and with the RoW.

3.1 Data

The BLOCS database includes a MSR addendum with detailed information on Chinese port activities such as acquisitions, operating agreements and construction projects (including the reported value of the completed investment). The data is derived from a number of public sources, testimonies, state level announcements and existing databases that were cross referenced to provide a comprehensive estimation of port investment and terminal control within the period of analysis. At least two news sources outside official Chinese state announcements were used to corroborate the observations (Wu et al., 2022). During the period examined, Chinese SAEs had realized investments in the ports of 60 countries; however, at the time of writing this draft the number is closer to 74 when you count those that are works in progress or recently signed. Over a 20 year period the combined data amounts to over 200,000 observations of country pair transactions.

The agreements are first divided into 2 categories: *1) port contracts; and 2) port projects.* These are not mutually exclusive categories as many operating agreements include construction projects and Chinese SAEs can own and operate the same port; however, each country has its own unique constellation of contracts and construction agreements. This paper then identifies three types of Chinese SAE port contract, with increasing magnitudes of control: *1) ownership (partial ownership of the port itself); 2) partial operation (partial ownership of a company or companies that have acquired terminal operating agreements in the country); and 3) all terminals (partial ownership of a company or companies that operate all terminals in a host country)*(Table 3.1). According to the research design, ownership and operating agreements are considered a form of controlling interest, whereas port projects are considered infrastructure investments. This distinction makes it possible to separately identify the effect of an infrastructure project and compare it to that of controlling interest. Additionally, it makes it possible to investigate whether there are complementary effects.

This study employs bilateral observations that begin 1999 and end 2019. As recommended by Yotov et al (2016), the 20 year period was lagged to analyze bilateral country pairs, in non-consecutive years. The BLOCS database provided exports (FOB) and imports (CIF) from the Direction of Trade Statistics (DOTS) data as well as aggregate trade data from both the World Trade Flows (WTF) and Bilateral Product Trade Flows (BACI) databases. Traditional Gravity Characteristics data from CEPII were also included in robustness checks that estimate less constrained models (Wu et al., 2022). The Preferential Trade Agreement (PTA) dummy from Mario Larch's Regional Trade Agreements Database (Egger and Larch, 2008) was introduced to separately identify and control for the joint effects of port influence and membership in PTA. Using four measures of international trade for the analysis provides contextual analysis on relationships with imports, exports and total trade between pairs. Employing both the WTF and BACI estimates of total trade offers an additional level of robustness to the findings.

Country	All	TOC	Own	Signed Yr	Project mm	Finished Yr
Algeria	-	x	-	2016	-	-
Angola	-	x	-	2016	-	-
Argentina	-	x	-	2001	-	-
Australia	x	x	x	2015	-	-
Bahamas	-	-	-	-	39	2016
Belgium	-	x	x	2004	-	-
Brazil	x	x	x	2018	-	-
Brunei	-	x	-	2017	-	-
Cambodia	-	-	-	-	28	2018
Cameroon	-	-	-	-	568	2014
Chile	-	-	-	-	44	2015
Côte d'Ivoire	-	-	-	-	993	2019
Croatia	-	-	-	-	33	2016
Djibouti	-	-	x	2013	185	2017
Egypt	x	x	-	2007	x	2011
Equatorial Guinea	-	-	-	-	352	2014
France	-	-	x	2013	-	-
Greece	-	x	x	2009	-	-
Guinea	x	x	-	2014	853	2017
Indonesia	x	x	-	2019	-	-
Israel	x	x	-	2015	-	-
Italy	-	-	x	2016	-	-
Jamaica	-	x	-	2015	-	-
Kazakhstan	-	-	x	2015	-	-
Kenya	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-
Malaysia	x	x	-	2016	370	2018
Malta	x	x	-	2004	-	-
Mauritania	-	-	-	-	288	2014
Mexico	x	x	-	2014	45	2016
Mozambique	-	-	-	-	151	2018
Myanmar	-	-	-	-	x	2015
Namibia	-	-	-	-	385	2019
Netherlands	-	-	x	2016	-	-
Nigeria	-	x	x	2010	154	2021
North Korea	-	x	-	2010	-	-
Oman	x	x	-	2016	-	-
Pakistan	x	x	-	2013	-	-

Table 3.1.A - The Extended MSR (Wu et al., 2022)

Country	All	TOC	Own	Signed Yr	Project mm	Finished Yr
Panama	-	-	x	2016	-	-
Peru	-	-	x	2019	-	-
Philippines	-	-	-		780	2019
Poland	-	x	-	2005	-	-
Qatar	-	-	-		-	-
Russia	-	-	-		13250	2019
Sao Tome and Principe	-	-	-		800	2018
Saudi Arabia	-	-	-		1688	2014
Singapore	-	x	-	2016	-	-
South Korea	-	-	x	2015	-	-
Spain	-	x	x	2005	x	2008
Sri Lanka	-	x	-	2007	-	-
Sudan	-	-	-		x	2018
Sweden	-	x	-	2009	-	-
Thailand	-	-	-		112	2019
Togo	x	x	-	2012	-	-
Turkey	-	-	x	2015	-	-
Ukraine	-	-	-		226	2018
United Kingdom	x	x	x	1994	-	-
United States	-	x	-	2008	106	2014
Venezuela	-	-	-		520	2015
Vietnam	-	-	-		664	2015

Table 3.1.B - The Extended MSR (Wu et al., 2022)

NOTE: Table 3.1 distinguishes between controlling interest and investment projects completed between 1999-2019. The dates of controlling interest are identified by the first contract for the first interest, even if the interest has grown after initial signing. The dates of construction projects are identified by their completion date; moreover, only completed construction projects are used in the analysis. Some completed construction projects do not have values, as their details were not reported and could not be verified; these are indicated by an 'x' in the same way that controlling interests are. As was the case with controlling interest, the date of the first completed project is used even if the total value of all completed projects includes later developments. 'All' refers to countries whose port terminals are all run by firms with Chinese SAE interest and is a subset of the terminal operating agreement dummy variable (TOC). These variables are used in the analysis to separately identify the effects of having a controlling interest in all terminals compared to only a portion of the terminals. The investment column reports investment in millions and is accompanied by a dummy identified by the year the project was complete.

The treatment for a *port contract* (MSR_{ij}=1), denotes a county in which China has a decision making interest in a port or port terminal operating firm. This variable is represented by the triangles with drop lines in Figure 3.3. A visual inspection of the data reveals that countries with port contracts tend to have higher total trade with China than those that do not. To better understand this relationship, dummies for *port ownership* (MSR_own_{ij}) and *terminal operating contract* (MSR_toc_{ij}) are used to separately identify the effects of Chinese interest in ports and interest in the companies that operate them. To identify whether the observed effects of MSR_toc_{ij} can be attributed to Chinese interests, ports partially operated by Chinese enterprises and ports being completely operated by Chinese enterprises, are also separately identified using a dummy for *all terminal control* (MSR_atc_{ij}) and *partial terminal control* (MSR_ptc_{ij}).

Figure 3.3 - Total Trade With China Between Non-MSR Partners and MSR Partners

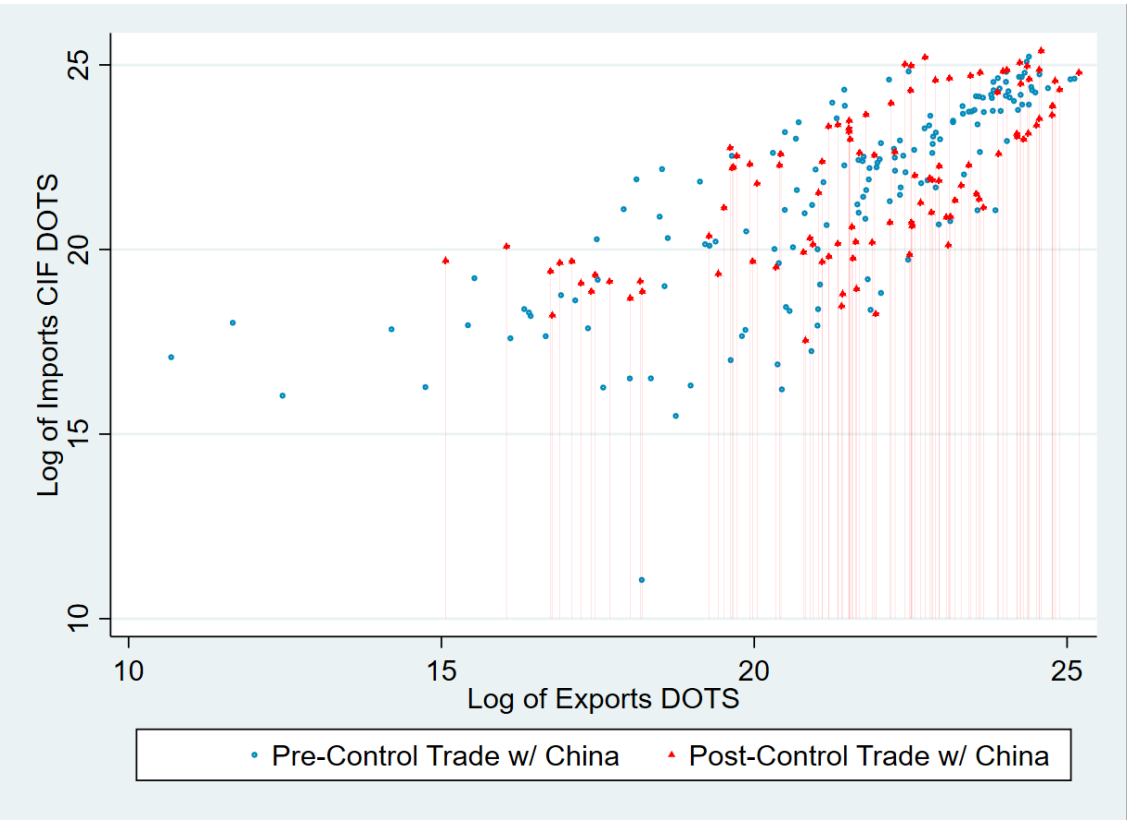

Figure 3.4 - Total Trade Between Pairs (Pre and Post CSAE Port Control)

Figure 3.4 identifies total trade with China, both pretreatment (circles) and after signing agreements (triangles with drop lines) for those observations where MSR_atc$_{ij}$=1. The results indicate that after an agreement is signed where all terminals are eventually operated in part by Chinese SAEs, there is a greater amount of trade with China than recorded prior. The research design identifies whether these are statistically significant effects when controlling for time effects and other confounding factors.

An infrastructure project dummy, indicating the year a *port project* (MSR_pro$_{ij}$) was completed, and the logged *value of investment* (MSR_inv$_{ij}$) are used to determine if infrastructure projects have a measurable effect on bilateral trade flows with China and whether or not the size of that project matters. Reductions in trade costs from completed projects should be observable in trade flows with the RoW. Both lead and lagged variables were generated to check for reverse causality as well as anticipatory and long-run effects.

Given that adjustments from port operations would be more sudden than those of trade agreements, 2 year lags were selected for non-consecutive years; however, 4 year, 5 year and 6 year lagged datasets were used to investigate sensitivity and model dependence as robustness checks. Additionally, income groups were used in a tolerance analysis to determine whether the results were sensitive to a country's development status (see Tables B.1 and B.2 in Appendix B). Similar results are observed in all tolerance exercises; therefore, it can be assumed that income differences do not significantly affect the outcomes.

3.2 Model

A generic structural gravity model has been modified to assess the effects of port influence on trade. In this model $X_{ij,t}$ denotes nominal trade flows at non-consecutive year t, the term $\pi_{i,t}$ denotes the set of time-varying source-country dummies, $X_{j,t}$ denotes the set of destination-country dummies, and μ_{ij} denotes the set of country-pair fixed effects. These variables control for outward resistances, inward resistances and unobservables.

$$X_{ij,t} = exp\left[\pi_{i,t} + X_{j,t} + \mu_{ij} + \eta 1 BTP_{ij,t} + \eta 2 NES_{i,t} \times INTL_{ij} + \eta 3 NIP_{j,t} \times INTL_{ij}\right] \times \varepsilon_{ij,t} \quad (3.1)$$

In addition to these controls BTP (Bilateral Trade Policy) denotes the time-varying bilateral determinants of trade, in this case, it is participation in the MSR trade network via signed port agreement. When estimating the effects of a *port contract* dummy MSR$_{ij}$=1, the interaction term NESxINTL (Non-Discriminatory Export Support x Trade Pair Dummy) that identifies the effects of non-discriminatory export support such as subsidies and the second interaction term NIPx INT (Non-Discriminatory Import Protect x Trade Pair Dummy) that identifies non-discriminatory import protection policies such as MFN tariffs are dropped from the model as data on domestic trades flows was not available for all partners. Without domestic trade flows these effects are absorbed by country, year and country pair fixed effects; standard errors are then clustered by country pair as illustrated in equation 3.2.

$$X_{ij,t} = exp\left[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \boldsymbol{\beta}_1 MSR\_n_{ij,t}\right] \times \varepsilon_{ij,t} \quad (3.2)$$

This theoretically consistent model is used as a foundation to estimate the effects of Chinese influence on international ports and controls for potential endogeneity using similar strategies

to those recommended for RTAs. In this specification all internal trade costs are set to one and all international fixed effects (μ_{ij}, $j \neq i$) are estimated relative to the intra-national fixed effect (μ_{ij})(Anderson and van Wincoop, 2003; Yotov et al, 2022). The specification is estimated using a pseudo poisson maximum likelihood (PPML) estimator and uses pair fixed effects to absorb trade costs. The coefficient $\boldsymbol{\beta}_1$ identifies the predicted effects of varying Chinese port contracts and completed infrastructure projects on trade with China, partners in the trade network and the RoW by changing the sample of trade partners.

To determine whether the observed effects complement existing trade agreements and to account for the partial effects of such agreements on total trade, we separately identify their effects and estimate whether they are jointly significant. As suggested by Baniya et al (2020), this further investigates whether PTAs are complemented by the extended MSR trade network and controls for endogeneity between the two institutional constellations. We also estimate the total and partial effects of port control and a completed port project. This is denoted by the interaction between $\boldsymbol{\beta}_1 MSR\_n_{ij}$ and $\boldsymbol{\beta}_1 MSR\_m_{ij}$ in equation 3.4

$$X_{ij,t} = exp\left[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \boldsymbol{\beta}_1 MSR\_n_{ij,t} + \boldsymbol{\beta}_2 PTA_{ij,t} + \boldsymbol{\beta}_3 (MSR\_n_{ij,t} * PTA_{ij,t})\right] \times \varepsilon_{ij,t} \quad (3.3)$$

$$X_{ij,t} = exp\left[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \boldsymbol{\beta}_1 MSR\_n_{ij,t} + \boldsymbol{\beta}_2 MSR\_m_{ij,t} + \boldsymbol{\beta}_3 (MSR\_n_{ij,t} * MSR\_m_{ij,t})\right] \times \varepsilon_{ij,t} \quad (3.4)$$

The robustness of these results are then tested with lead and lagged variables to account for the possibility of reverse causality as well as anticipatory, long-run and non-linear effects. If port control or investment is exogenous to trade flows in the years prior to the agreement, $\boldsymbol{\beta}_1$ and $\boldsymbol{\beta}_2$ will be insignificant in equation 3.5, or otherwise signify a pre-existing relationship.

$$X_{ij,t} = exp\left[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \boldsymbol{\beta}_1 MSR_{ij,t} + \boldsymbol{\beta}_2 MSR_{ij,t+4} + \boldsymbol{\beta}_3 MSR_{ij,t+6}\right] \times \varepsilon_{ij,t} \quad (3.5)$$

To control for non-linear effects and identify whether these effects remain significant in the long-run, lagged variables are included on non-consecutive years up to 12 years (see equation 3.6). A linear combination of the coefficients is then estimated and tested for significance to predict the overall total effect of Chinese port control during the period of analysis, while controlling for other unobservables.

$$X_{ij,t} = exp\left[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \boldsymbol{\beta}_1 MSR_{ij,t} + \boldsymbol{\beta}_2 MSR_{ij,t-4} + \boldsymbol{\beta}_3 MSR_{ij,t-6} + \boldsymbol{\beta}_6 MSR_{ij,t-12}\right] \times \varepsilon_{ij,t} \quad (3.6)$$

Did Chinese SAEs target partners that already had higher trade volumes with China? Or, were projects completed at ports where Chinese firms were already doing a lot of business? Using this procedure properly accounts for possible reverse causality between existing trade with China to assess the exogeneity of project contracts or completed projects. Are there non-linear effects? Or, do the effects change over time? The lagged variable experiment can identify non-monotonic relationships and phasing-in effects and the linear combination of estimates can assess whether the overall effect is persistent and significant.

All available global country pairs are examined using the structural gravity model and fixed effects assumptions are used to estimate the predicted effects of varying types of port contracts on bilateral trade. The following estimations answer a series of questions that build on one another to provide a comprehensive analysis of the extended MSR. This stage-gate

method allows for a detailed analysis capable of illustrating the unique effects of a port contract and a port project on international trade flows. The specified models, outlined in equations 3.2 - 3.6 are applied to six trade partner groupings to estimate the effects on in-network and out-of-network trade partners: *1) all trade partners; 2) all trade partners excluding China; 3) members of the trade network; 4) members of the trade network excluding China; 5) Rest of World excluding China; and 6) bilateral trade with China.* The series of estimations begins with a benchmark gravity estimation then tests for reverse causality, phasing-in and non-linear effects. The experiments are combined to complete a thorough exploratory analysis of the overall effects of varying institutional conditions on bilateral trade. The estimates created by the model report the average effects of all common agreements on trade among members or selected trade partners.

4. Results

Our research indicates that investment projects, property acquisitions and operating agreements for port terminals by Chinese SAEs are not equivalent events. This indicates that not all participation in the trade network is created equal. Meaningful and significant results are expanded to include a complete analysis of anticipatory and persistent effects. As the level of control increases as shown by contractual agreements, trade increases with China and away from the RoW (including other members of the trade network). This differs from the effects of completed port projects; where, as the level of investment increases, so does trade with the rest of the world (excluding other members of the trade network) and with China (at least temporarily). Thus, the level of investment and institutional cooperations negotiated by China within the MSR and its network make a difference in bilateral trade between partners.

4.1 Comparing Trade Agreements to Trade Networks

Prior to estimating the joint effects, PTAs are examined individually to contrast with the observed effects of a port contract with Chinese SAEs. As shown in Table 3.2.A, PTAs are the expected sign. When countries sign a trade agreement as measured by Larch's Regional Trade Agreements Database (Egger and Larch, 2008), trade is expected to be created. We see that this does in fact occur, strongly for exports, less so for imports.

Do countries along the MSR trade network with port contracts trade more among themselves in the same way members of a trade agreement do when total economic costs are reduced? The short answer is no; we find that a port contract does not predict an increase in trade between other members of the network. Table 3.2.A indicates that there are no increases in trade between network partners that have ownership or operating contracts with Chinese SAEs; this implies that there is no significant reduction in costs between these partners. Next, Table 3.2.B then answers the question as to whether or not overall trade increases for members with port contracts. There is no measurable effect on overall trade for members of the trade network regardless of whether or not China is included in the estimation. These results seem to indicate that the interconnectivity of the trade network created by controlling interests and operating contracts does not reduce traditional trade costs.

Trade among PTA Members and Trade between Countries with Port Contracts								**(3.2.A)**
	EXPORTS DOTS	**IMPORTS DOTS**	**WTF TRADE**	**BACI TRADE**	**EXPORTS DOTS**	**IMPORTS DOTS**	**WTF TRADE**	**BACI TRADE**
PTA Dummy	0.064**	0.063*	0.046	0.057**				
MSR Dummy					-0.009	-0.021	-0.020	0.014
All Trade after Signing a Port Contract (Including and Excluding China)								**(3.2.B)**
MSR All Trade	0.015	0.032	-0.004	0.020				
All No China					-0.024	-0.005	-0.020	-0.031
All Trade after Completing a Port Project (Including and Excluding China)								**(3.2.C)**
Project All Trade	0.058	0.124***	0.078**	0.120*				
All No China					0.018	0.035	0.031	-0.061
Trade with China among Countries with Completed Port Projects								**(3.2.D)**
Project Only China	0.009	0.026	-0.003	0.103**				
Log Investment					-0.003	0.005	-0.002	0.014*
Trade with China after Completing a Port Project (Log Investment in Millions)								**(3.2.E)**
Log Investment	0.003	0.017	0.004	0.033***	-0.000	0.008	-0.002	0.016**
INV_LEAD.4	0.004	0.008*	0.006	0.017**				
INV_LEAD.6	0.009	0.019***	0.009	0.029***				
INV_LAG.4					-0.012	-0.011	0.000	-0.016*
INV_LAG.6					0.000	0.000	0.000	0.000
INV_LAG.8					0.000	0.000	0.000	0.000
INV_LAG.10					0.000	0.000	0.000	0.000
INV_LAG.12					0.000	0.000	0.000	0.000
Total Effect	-	-	-	-	-0.012	-0.003	-0.002	0.001
rmse	0.238	0.244	0.242	0.285	0.238	0.245	0.242	0.285
N	232702	260392	238918	207563	232702	260392	238918	207563

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 3.2 - Trade Between Countries with Port Contract and Trade with China

NOTE: Tables 3.2-3.5 report the 'Total Effect' as a linear combination of estimates from lagged dummies over a 12 year period. The lag and lead variables are created from the variables of interest in bold. Each sub-table (A - E) represents a single experiment that compares two unique specifications. All models are specified using a PPML estimator and estimations are generated with export and import data from DOTS and total trade data from WTF and BACI. Results are not estimated in consideration of intra-national trade effects as domestic trade data is not available for all countries during the period of analysis. This implies there may be a slight upward bias to the estimations from globalization.

As discussed in the literature review and methodology sections, BRI infrastructure is often credited as the main reason for trade cost reduction. The most common argument found among existing literature is that costs attributed to travel would be reduced by better and more efficient infrastructure. Tables 3.2.C - 3.2.E show the expected effects of a completed infrastructure project on trade with all countries, and on trade with China, using dummies in the year of completion. The lagged model then estimates the expected increase in total trade with China using the log of investment in millions. The results reported in Table 3.2.C predict that total trade with the RoW including China will increase for countries that complete a trade project and that the observed effect becomes insignificant when excluding China; thereafter, Tables 3.2.D and 3.2.E are used to report the estimated effect of a completed project on bilateral trade with only China.

These results indicate that, on average, the completion of a construction project will increase total trade with China by a little over 10.5% ([exp(0.103) - 1] × 100) and that for every 1% increase in the investment there is a potential that total trade with China would increase by about 1.6% ([exp(0.016) - 1] × 100). A possible explanation as to the reason why this relationship is not evident in the DOTS or WTF data, is that BACI removes estimated transport and insurance rates from import values. This potentially accounts for the importance of construction and investment, as the removal of the freight costs could lead to a greater significance of the total trade variable.

Results of the lead and lag analysis suggest that the increases in trade with China may be from project requirements rather than a reduction in trade costs, as the effects are significant prior to completion and turn negative four years after completion. The linear combination of estimates is insignificant meaning there is little evidence of persistence and the marginal increase to trade from project investment does not continue after the project is complete. This is an unexpected result as gains from trade are considered to be a primary motivation for large maritime infrastructure projects. Despite this unfavorable outcome, there is evidence of temporary increases to total trade during the time of construction and this comes with the potential of generating a positive economic shock in host economies.

4.2 Comparing Varying Levels of Control

In order to further investigate the difference between port projects and port contracts we examine the difference between ownership of the port itself and port terminal operating contracts; moreover, we determine whether there is a difference between partial terminal operating contracts and all terminal operating contracts. It is expected that as the capacity to exert operational control increases so will the observed effect. Ownership and operational control are used as varying proxies for travel time and transaction cost reduction. Trade costs can be reduced through many means; for instance, a reduction of uncertainty in transit, integration of paperwork and other transit documentation, as well as other freight time aspects. Baniya et al (2019) find that travel time is significant although they were unable to establish which part of the BRI system contributed most to that finding.

Here, we find that the operation of the port terminal contributes more to total trade with China and is a more significant venture than investment in ownership of the port or contract construction projects. Table 3.3.A illustrates that operating control of a port terminal is significant while a controlling interest in the port itself is not. This is an indication that trade cost reduction is being facilitated by operational control rather than the control of operating costs by port owners. The results of Table 3.3.A indicate that the expected effect of an agreement that gives controlling interest to a Chinese SAE, is an increase in total trade with China of about 21% ([exp(0.194) - 1] × 100) and that exports to China are expected to increase at a greater rate than imports. To get a clearer picture of how much of this increase in trade is coming from port control we separately identify the effects of ports being partially operated by Chinese SAEs and trade partners where Chinese SAEs have operating contracts in all ports. Table 3.3.B indicates that indeed controlling interest in all port operations is likely to be more significant and result in higher levels of trade with China than partial operation.

Trade with China after Ownership Contract and Terminal Operation Contract **(3.3.A)**

	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE
Ownership	0.019	0.041	0.030	0.038				
Operation					0.176***	0.113**	0.053	0.194***

Trade with China after Terminal Operation Contract (Partial and All Terminals) **(3.3.B)**

Partial Operation	0.119**	0.029	0.009	0.131**				
All Terminals					0.223***	0.198***	0.128***	0.195***

Trade with China after Signing a Terminal Operating Contract **(3.3.C)**

Partial Operation	0.131***	0.042	0.021	0.129**	0.119***	0.056	0.032	0.091
PART_LEAD.4	0.047**	0.054***	0.020	-0.031				
PART_LEAD.6	0.017	0.025	0.049	0.008				
PART_LAG.4					0.038	-0.008	-0.002	0.096
PART_LAG.6					-0.029	0.001	-0.039	0.003
PART_LAG.8					-0.017	-0.054**	-0.030	-0.037
PART_LAG.10					-0.022	-0.025	-0.021	0.002
PART_LAG.12					-0.045	-0.066	-0.090	-0.026
Total Effect					0.043	-0.096	-0.150	0.130

Trade with China after a Terminal Operating Contract in All Terminals **(3.3.D)**

All Terminals	0.247***	0.241***	0.171***	0.226***	0.221***	0.198***	0.129***	0.198***
ALL_LEAD.4	0.112**	0.094***	0.120***	0.097***				
ALL_LEAD.6	-0.037	0.033	0.027	-0.000				
ALL_LAG.4					0.074*	0.019	-0.021	-0.012
ALL_LAG.6					-0.048	-0.020	0.005	-0.054
ALL_LAG.8					0.124***	0.020	0.063**	0.101***
ALL_LAG.10					0.068**	0.059*	0.068*	0.057*
ALL_LAG.12					0.126	0.034	-0.014	0.007
Total Effect	-	-	-	-	0.566***	0.311***	0.230*	0.298**
rmse	0.238	0.244	0.242	0.285	0.238	0.245	0.242	0.285
N	232702	260392	238918	207563	232702	260392	238918	207563

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 3.3 - Trade with China after Ownership and Operating Agreements

It is assumed that partial operations do not result in the requisite transaction cost savings as that of control in all port operations. This is evidence that many of the observed effects of the BRI may come from the cost reductions of uniform process optimization and ease of doing business rather than investments in infrastructure. It is clear after estimating the effects, both in terms of infrastructure investment, controlling interest and operational control, the greatest effect is seen in operational control and that the magnitude of this effect increases when the amount of control increases. In cases where a Chinese SAE has a controlling interest in all of a country's ports, total trade with China can be expected to increase anywhere from 26% ([exp(0.230) - 1] × 100) to 35% ([exp(0.298) - 1] × 100)(Table 3.3.D). Both exports and imports to and from China will increase after a contract has been signed, although the total effect on exports to China is expected to be much higher during the period of analysis — 76% ([exp(0.566) - 1] × 100) for exports compared to 36% ([exp(0.566) - 1] × 100) for imports (Table 3.3.D). This implies that Chinese firms bring in more goods than they send to the host countries after the operating agreements are signed and is evidence that a large extent of the cost savings will be experienced by the Chinese.

Consistent with practices identified in Yotov et al. (2016) and Yotov et al. (2022), estimates for both all terminal control (MSR_atc_{ij}) and partial terminal control (MSR_ptc_{ij}) were tested for reverse causality and the existence of persistent effects. The robustness of these results are identified in the persistence and significance of the observed total effect reported in the results. Table 3.3.C implies that the partial operation of ports does have some anticipatory effects; however, the long-term effects are insignificant. These results suggest that the effect of a terminal operating contract observed in Table 3.3.A is being driven by those contracts with a greater amount of control. In the case of partial operation it may not be possible to distinguish between confounding effects.

Table 3.3.D reports the estimated effects of having all port terminals operated by firms in which a Chinese SAE has a controlling interest. As was the case with the initial estimate these results are consistent and significant in all datasets. Anticipatory effects follow the same pattern as was observed in partial port operation; however, the absence of significance 6 years prior indicates that the contracts were exogenous to existing trade flows prior to the commencement of contract negotiations. A lower magnitude of significance 4 years prior can be expected given these contracts take up to 10 years to negotiate and insiders will begin to take advantage of the institutional alignment prior to its formalization. This phasing in analysis offers details into the lead time on agreements. In the case of all terminal control, the total effect on bilateral trade is positive and significant. Similarity in coefficients from the unlagged estimates imply that the findings are robust.

These results seem to indicate that prior to the operating agreement there is anticipatory trade with China and that there are lasting effects on total trade with China after the contract has been signed. From these results one can infer that participation in a port contract with China will reduce total economic costs of trade with China. As predicted by accepted trade literature this increases total trade with China and can have positive economic effects; however, the length and nature of these agreements may also improve the strategic position of China in these trade relationships and come with long run consequences. We now further investigate the differences between port operating contracts and port investment projects in terms of in-network trade and with the RoW.

4.3 Comparing Port Contracts to Port Projects

At this point the results of the analysis have provided evidence that being a member of the trade network has varying results depending on the nature of the contract. We have found that members of the trade network with port contracts can expect increases in trade with China, but only if the contract includes operating control; moreover, the greater the control over the port the greater the expected effect. We have also found that port projects increase overall trade for host countries, but that it is not persistent. Going forward the research design evaluates trade among other trade partners to get a better idea of whether these effects are a result of trade creation or trade diversion. What happens to trade with countries that are not China?—or other countries that are also within the trade network?

Trade diversion occurs when an international agreement shifts trade away from one country toward a new institutional partner; whereas, trade creation occurs when new trade that would not have existed otherwise is generated as a result of the new institutional conditions.

Although pricing data would be necessary to confirm whether China was shifting trade away from low cost providers, we can assess in-network trade flows and trade with the RoW to get an idea of how being a part of the trade network is affecting trade with other partners.

To begin we compare the effects of port contracts and port projects on trade between trade network partners, excluding China (MSR_noCN_{ij}). As reported in Table 3.2, trade among members with port contracts *including* China is unaffected and the same is true overall for trade for host countries; whereas, port projects significantly increase all trade *including* China, but not when China is *excluded*. Restricting the analysis to investigate the effects of being a part of the tradework, excluding China, provides a clearer picture of how the port contracts and port projects affect trade between the network members.

Trade between Countries with Port Contracts or Completed Projects (Excluding China) **(3.4.A)**

	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE
MSR No China	-0.057***	-0.067***	-0.042**	-0.050*				
Project No China					-0.081**	-0.112***	-0.063**	-0.037

Trade between Countries with Port Contracts (Excluding China) **(3.4.B)**

MSR No China	-0.076***	-0.070***	-0.050**	-0.053	-0.055***	-0.057***	-0.039**	-0.051*
noCN_LEAD.4	-0.023	-0.042***	-0.032**	-0.044*				
noCN_LEAD.6	-0.026	-0.030*	-0.016	-0.024				
noCN_LAG.4					-0.016	-0.023	-0.028	-0.011
noCN_LAG.6					-0.016	-0.044***	0.009	-0.017
noCN_LAG.8					0.001	0.025*	0.001	-0.009
noCN_LAG.10					-0.022	-0.025*	-0.008	-0.051**
noCN_LAG.12					-0.018	0.000	-0.031	0.007
Total Effect	-	-	-	-	-0.127***	-0.123***	-0.095*	-0.13**

Trade between Countries with Completed Port Projects (Excluding China) **(3.4.C)**

Project No China	0.111***	0.074*	0.062	0.060	-0.087***	-0.113***	-0.076***	-0.074**
noCN_LEAD.4	-0.053**	-0.079***	-0.065***	-0.031				
noCN_LEAD.6	-0.049*	-0.035	-0.051**	-0.070**				
noCN_LAG.4					0.009	-0.009	0.186***	0.222***
noCN_LAG.6					0.120**	0.128***	-0.032	-0.092
noCN_LAG.8					-0.091**	-0.084*	-0.068	-0.110**
noCN_LAG.10					0.035	0.037	0.000	-0.020
noCN_LAG.12					0.000	0.000	0.000	0.000
Total Effect	-	-	-	-	-0.015	-0.041	0.009	-0.074
rmse	0.238	0.244	0.242	0.285	0.238	0.245	0.242	0.285
N	232702	260392	238918	207563	232702	260392	238918	207563

$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 3.4 - Trade with Between Network Partners

Table 3.4.A shows that $MSR_{ij}\_noCN_{ij}$=1 is significant for port contracts and project contracts, but the inconsistent signs on the lagged and lead coefficients or project contracts in Table 3.4.C implies the results are inconsistent. The results for port contracts appear to be robust, although the anticipatory effects are a bit too strong to rule out reverse causality completely. This could also be a result of port contracts being issued among already existing trade networks. Despite these shortcomings, there is enough evidence to determine that the host countries of Chinese SAE terminal agreements do not benefit from reduced trade costs

between one another and after the agreement trade less with each other than before. Unless these partner countries are the natural low cost provider for exports to China, the observed effects on bilateral trade with China in the previous section are presumably not from trade creation or beneficial trade diversion, although further research is required to verify the latter.

In this context, operation of a country's port terminals by firms with Chinese SAE interest does not create new trade with China, rather trade is modified. The negative and significant coefficients on trade among network partners, excluding China, is evidence that trade is being diverted from other countries in the network toward China. These partners trade less with each other than prior to the agreement. This can have adverse economic effects if the trade is diverted away from low-cost providers.

Although the results for port projects are also somewhat unreliable, they offer more evidence that gains from trade may be related to project requirements. The negative sign on the lead variables can be interpreted as low trade between network partners prior to completing the project, with a sudden burst of activity in the years surrounding the completion of the project. There are positive effects among trade partners in the 4 years after completion, but they eventually turn negative and the total effects are insignificant. This is further evidence that trade created from the port projects is temporary in nature during the period of this analysis.

The final step in this procedure is to estimate the effects of a port contract and project contract on trade with the RoW. The estimates in Table 3.5 report the all terminal operating agreements dummy given it had the largest and most persistent effect. MSR_row_{ij} is used to estimate the effects of trade network participation with countries that are not members of the network and also not China. If participation in the trade network reduces trade costs for its members then trade with the Rest of World should also be positive or unaffected.

The negative effect of MSR_row_{ij} (MSR_atc_{ij} x MSR_row_{ij}) on all terminal contracts predicts that trade outside the network is expected to decrease. The total effect of this change is significant for exports in the long run. A member of the MSR trade network that allows Chinese SAEs to operate terminals in all of its ports is expected to see a 19% ([exp(0.175) - 1] $\times$ 100) reduction of its exports to the rest of world over the 12 year period. On the contrary, there are no significant long run effects of completed infrastructure projects. This is further evidence that Chinese trade thus increases at the expense of trade diversion; additionally, the magnitude of exports being higher and more consistently significant means that these effects are being driven more by China buying than by China selling.

Agreeing to and completing an infrastructure development project predicts a temporary increase in all trade, trade with the RoW and trade with China. The surprising finding is that these positive effects are neither persistent with China or with the RoW. The results in Table 3.5.C are neither persistent, or robust. Inconsistent signs on coefficient values in the lag and lead analysis reveal a steadily decreasing effect during project duration. The absence of lagged or total effects during the 12 years after project completion indicates these effects are temporary. This is evidence that increases in trade are not a result of sustainable reductions in trade costs and could be the result of project requirements or anticipatory effects. To better understand the robustness of this outcome, future analysis can estimate variation in completed infrastructure projects.

Trade with RoW (Excluding China) after All Terminals Contract and Port Project **(3.5.A)**

	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE
All Terminals RoW	-0.110***	-0.131***	-0.082***	-0.080**				
Project RoW					0.050**	0.074***	0.050**	-0.013

Trade with RoW (Excluding China) after and Before a Port Contract **(3.5.B)**

All Terminals RoW	-0.079	-0.097**	-0.089**	0.000	-0.106***	-0.134***	-0.084***	-0.091**
RoW_LEAD.4	-0.079***	-0.024	-0.065**	-0.054*				
RoW_LEAD.6	0.054	-0.028	-0.017	0.020				
RoW_LAG.4					0.004	0.020	0.067*	0.081*
RoW_LAG.6					0.074	0.025	0.006	0.072*
RoW_LAG.8					-0.078**	-0.018	-0.018	-0.042
RoW_LAG.10					-0.034	-0.030	-0.038	-0.025
RoW_LAG.12					-0.034	0.040	0.007	0.041
Total Effect	-	-	-	-	-0.175*	-0.097	-0.062	0.036

Trade with RoW (Excluding China) after and Before a Port Project **(3.5.C)**

Project RoW	-0.131***	-0.095***	-0.094***	-0.055	0.051**	0.066***	0.059***	0.003
RoW_LEAD.4	0.012	0.035*	0.035*	-0.011				
RoW_LEAD.6	0.002	-0.016	0.001	-0.058*				
RoW_LAG.4					0.012	0.042*	-0.152***	-0.131***
RoW_LAG.6					-0.126***	-0.118**	0.043	0.064
RoW_LAG.8					0.063*	0.058	0.040	0.078*
RoW_LAG.10					-0.019	-0.032	0.000	0.030
RoW_LAG.12					0.000	0.000	0.000	0.000
Total Effect	-	-	-	-	-0.019	0.016	-0.010	0.044
rmse	0.238	0.244	0.242	0.285	0.238	0.245	0.242	0.285
N	232702	260392	238918	207563	232702	260392	238918	207563

*$p < 0.10$, **$p < 0.05$, ***$p < 0.0$

Table 3.5 - Trade with Rest of World Excluding China

Tables 3.2 - 3.5 outline a series of experiments designed to identify the unique effects of varying participation in the extended MSR trade network, controlling for a variety of fixed effects assumptions. These results indicate that signing an operating contract for terminal control predicts an increase in trade with China and a decrease in trade with the RoW. Because trade with all trade partners is unaffected, we can plausibly infer this is as a result of trade diversion and not trade creation. We can also infer that port infrastructure projects offer positive short run economic incentives, but do not generate sustainable trade.

4.4 Complementarity of Preferential Trade Agreements and Trade Networks

Since Viner (1950), we have examined trade integration in terms of trade creation and trade diversion, usually with respect to trade volumes. In the Vinerian context, PTAs are thought to smooth institutional differences between participating countries. Recent research in this field has indicated that deeper agreements have greater institutional cooperation than more shallow agreements, often signed between developing countries. As such, the cost savings of PTAs has been quantified as significant (Matoo et al 2020). As the extended MSR is hypothesized to reduce transaction costs, we examine whether its effects complement those of PTA membership and the completion of an infrastructure project (Table 3.6).

Joint Effects of Trade among PTA and Trade between Countries with Port Contracts				**(3.6.A)**
	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE
MSR Dummy	0.007	-0.001	-0.011	0.056*
PTA Dummy	0.069***	0.070**	0.049	0.062**
MSR_{ij}*PTA_{ij}	-0.034	-0.042	-0.021	-0.071*
Joint Effects of Trade between Countries with Port Contracts and Completed Projects				**(3.6.B)**
MSR Dummy	-0.005	-0.014	-0.016	0.016
Project Dummy	-0.023	-0.005	-0.01	0.051
MSR_{ij}*MSR_pro_{ij}	-0.046	-0.088*	-0.051	-0.042
Joint Effects of Trade among PTA and Trade between Countries with Completed Projects				**(3.6.C)**
Project Dummy	-0.059*	-0.066**	-0.058**	0.079**
PTA Dummy	0.062**	0.062*	0.044	0.058**
MSR_pro_{ij}*PTA_{ij}	0.020	0.005	0.050	-0.080
Joint Effects of Trade among PTA and Trade between Countries with All Terminal Contracts				**(3.6.D)**
All Terminals	-0.241**	-0.179	-0.236*	-0.249*
PTA Dummy	0.063**	0.063*	0.045	0.056**
MSR_atc_{ij}*PTA_{ij}	0.158	0.192	0.249	0.188
Joint Effects of Trade between Countries with All Terminal Contracts and Completed Projects				**(3.6.E)**
All Terminals	-0.105	-0.039	-0.037	-0.053
Project Dummy	-0.055*	-0.068**	-0.049*	0.043
MSR_atc_{ij}*MSR_pro_{ij}	-0.025	0.105	0.064	-0.188**
Joint Effects of Trade among PTA and Trade with China After an All Terminals Contract				**(3.6.F)**
All Terminals only China	0.261***	0.237***	0.109***	0.226***
PTA Dummy	0.056**	0.056	0.042	0.047*
MSR_atc_{ij}*PTA_{ij}	-0.093	-0.098	0.017	-0.077
Joint Effects of Trade with China After an All Terminals Contract and a Completed Project				**(3.6.G)**
All Terminals only China	0.233***	0.219***	0.119***	0.225***
Project Dummy only China	0.007	0.026	-0.008	0.135**
MSR_atc_{ij}*MSR_pro_{ij}	-0.041	-0.078	0.052	-0.209***
rmse	0.238	0.244	0.242	0.285
N	232702	260392	238918	207563

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 3.6 - Joint Effects of PTAs and Agreements

NOTE: Table 3.6 reports the partial and total partial effects of varying interactions. Each sub-table (A - G) represents a single estimation of joint effects controlling for all additional fixed effects from prior estimations. All models are specified using a PPML estimator and estimations are generated with export and import data from DOTS and total trade data from WTF and BACI. Results are not estimated in consideration of intra-national trade effects as domestic trade data is not available for all countries during the period of analysis. This implies there may be a slight upward bias to the estimations from globalization.

When including China in the trade network and controlling for membership in the same PTA, the BACI data predicts an increase to total trade; however, when both partners are members of the extended MSR and the same PTA, these trade gains are lost and net effect is slightly negative (Table 3.6.A). This brings into question the propositions from several authors that the BRI has the capacity to as a regional trade agreement (e.g., Baniya et al, 2019). The extended MSR seems to function as an investment mechanism more similar to a BIT that operates outside the jurisdiction of PTAs and leads to significant increases in bilateral trade flows with China. This is further evidence costs savings tend to be on the side of China

Another interesting finding is that the relationship between operational control and infrastructure development is also negative. The results reported in Table 3.6.B and 3.6.E indicate that the total effect of the interaction between an operating contract and a completed construction project is expected to be negative if significant at all. Table 3.6.G provides evidence that this is even the case when estimating bilateral trade with China. The only relationship where the combined net effect does not turn negative are in those ports where operating contracts have been secured for all terminals. This is further evidence that trade increases from port contracts and completed projects originate from different mechanisms and are separate non-complementary events.

The results in Table 3.6 can be interpreted as an absence of evidence for a number of claims regarding the complementary nature of increased interconnectivity and infrastructure development with preferential trade agreements and other network agreements. The most robust results remain significant under all conditions and are consistent with prior estimations. This means that being a part of the same PTA has little to no effect on expected increases in bilateral trade with China after allowing Chinese SAEs to run your port. It also means that allowing Chinese SAEs to complete a maritime infrastructure development project may provide a positive temporary economic shock from increased trade with China and the RoW, but the effects on gains in bilateral trade with China from terminal control are non-complementary and will reduce the overall effect.

This would mean that theoretically, when ignoring the geo-political and financial implications, the way in which port contracts and completed port projects could complement one another would be to allow Chinese SAEs to operate all port terminals, but negotiate regular maritime infrastructure development projects that diversify import and export partners. A new infrastructure project, completed every 4 - 6 years at a port operated by Chinese SAEs, would be predicted to have a slight net positive increase in total trade with China among the expected increases in total trade with the RoW during project construction. Given the evidence, this would offer the best chance at a combined institutional constellation capable of sustainable net positive effects on total trade. Although this does not account for the unintended lock-in effects that would come with the long term contracts.

5. Discussion

The emergence of Regional Integration Agreements (RIA) after the Uruguay Round GATT Agreements illustrate the desire for areas of cooperation and coordination between specific partners to achieve favorable trade and institutional benefits. In many respects the emergence of RIAs was a direct reaction to the strengthening of the World Trade Organization and the emergence of a global governance regime (Wu, 2005). The primary difference between those agreements and the MSR trade network, is that China has the strategic upper hand in a number of negotiations where they claim to be primus inter pares. Although China is cooperating with partners to achieve favorable trade outcomes, the evidence suggests that these relations have more in common with a network of BITs than PTAs in the classic sense. The other interesting finding is that being a member of the trade network does not increase trade with other members.

The research outlined in this paper addresses larger institutional questions for policy development. There are still a lot of open questions about how an economy can benefit by participating in this maritime trade network and what risks might be involved. It appears the most plausible answer is that joining China's maritime trade network makes it easier to do business with Chinese SAEs and Chinese firms in general. Host economies are expected to see positive effects from these relationships in terms of welfare gains from greater trade, increased commerce and cheaper goods, but it appears to be at the expense of institutional lock-in and a loss of diversity in trade partners.

The log of investment in millions provides evidence that the larger the investment the greater the increase in trade with China. As the level of investment increases so does trade with China; however, these results appear to be temporary; whereas, the effects of terminal operating contracts appear to be persistent. Trade gains from infrastructure projects come from either the RoW or China and fade away or turn negative over time. If these agreements were to reduce average trade costs to all trade partners or trade between network partners, the standard trade effect should be reflected and thus, trade should increase to all partners after the project is complete.

Decisions on investment are often not solely connected to materials access and interest rates; uncertainty regarding ease of doing business, and future stability, are often threats to long-term investment in international markets. By providing physical and institutional infrastructure, China is cultivating a constellation of resources that supports its own export industry. This is evidenced by the more pronounced effects on exports in the analysis.

Along with the hard costs associated with time and infrastructure improvements, transaction costs are also important in trade relationships. The stated objectives of the BRI include: *1) policy coordination; 2) facilities connectivity; 3) unimpeded trade; 4) financial integration; and 5) people to people bonds.* These are also conditions required to reduce transaction costs reflected in fees, commissions, translators, import duties, etc., and therefore the gains from trade from operating contracts are hypothesized to be both transactional and institutional in nature. Countries along the extended MSR can transact relatively easily with Chinese firms and negotiate across common standards and practices; this sets the initial transaction costs of participants below that of what international markets can offer alone (Lin and Wang, 2016). The increase in magnitude from a general ownership agreement to that of an operating contract in all terminals illustrates that as the level of control increases so does trade with China. Members of the trade network are expected to increase their trade with China as total economic costs are reduced between the bilateral pairs.

It is often argued that through joint economic development and becoming economically dependent on one another, countries reduce the risk of conflict. It would be too ambitious to present the claim that China is indeed giving the world a different and unique model of international development; however, their unique financing and contract innovations have certainly modified conditions in global markets. The network of Chinese SAEs act as a quasi supranational organization seeking to establish a global footprint. This paper does not examine the geopolitical aspects of this attenuation.

The results found in this paper suggest caution when deciding to sign port agreements, particularly those that grant long term operational control of ports to Chinese SAEs. Furthermore, participant countries should show caution when considering the long term nature of MSR agreements. Funding is certainly used as a strategy by China to attract countries with favorable geographical positions that may be experiencing domestic problems. The ideology that economic growth leads to the reduction of such problems is appealing; however, if countries rush to sign a deal with China as long as it promises large capital flows, they engender the risk of becoming dependent on the Chinese not only financially, but institutionally, in the long-run.

Results of the income tolerance analysis reported in Appendix B point to a comprehensive story that is not dependent on development status. Constraining the relationship to income percentiles grouped by GDP per capita does not change the overall effects. Countries outside the IQR experience the greatest magnitude of effects, but they are consistent and within the ranges reported for other income percentiles.

This paper thus provides novel exploratory research and insight into the effects of the extended MSR in context of the Chinese BRI. Our findings are significant both statistically and economically. Future research should focus on whether there are important price differences for Chinese shippers in the ports where operations are controlled by Chinese state owned firms. There is also an opportunity to gain a better understanding of the effects of contract construction as these projects mature. The current network of Chinese SAEs operating ports worldwide took over 20 years to develop, whereas the RFI construction projects are just beginning to have an effect. Our results indicate that trade with China is expected to increase with increased investment, but that this may only be a temporary shock.

6.0 Conclusion

This paper contributes to the expanding literature on the BRI through an examination of port contracts and resulting reductions in transaction costs. China has been shown to seek methods to reduce transaction costs with existing trade partners in order to remain competitive in an evolving global economy. Williamson (1979) and others have established that the requirements for transaction cost reduction can be transferred to structural cost reductions leading to economic growth among, and between, partners.

As China's global infrastructure project continues to expand, evidence suggests it will reshape world trade patterns. The last 20 years provides a window of analysis to better understand what that might look like moving forward. The results from this paper indicate that not all agreements are created equal and that participating in something like a preferential trade network is not an equivalent event to participating in a preferential trade agreement. Benefits from participating in the trade network are not equally distributed and the expected outcomes vary depending on the nature of participation. It is true that members of the trade network can experience positive economic returns from participation; however, these rely on an interdependency with China.

The greater control Chinese firms have over a host country's ports, the greater the effects on total trade with China. The reduction of both hard trade costs and transaction costs has been forged by over two decades of diplomatic groundwork and unprecedented economic

cooperation with partners. It would make sense for China to use its position to increase worldwide competitiveness of its exports as well as use its networks as preferred shipping routes to import goods; therefore, it would need a strong incentive not to do so. This is consistent with the original objectives of the Going Global Strategy, which included promoting the diversification of imports and ensuring the stability of international resource supplies (General Office of the State Council, 2006). Whether exports increase due to the decrease in traditional trade costs or transaction costs, particularly associated with transit costs, is evident in the outcome of our empirical analysis.

Actual cost reductions in transport costs via cross-border infrastructures and standards, tariffs costs as a result of favorable policies, cost of information search and policy enforcement costs promote a vision of unified economic growth. Although consumer welfare and profit cannot be assumed as the sole motivator of a state, China has an incentive to benefit from the investment outcomes and fits the criteria for opportunistic behavior. China has organized a system of agreements where both market and non-market transaction costs are and will be much lower than those of its partners. There appears to be short term benefits for members, but it is unknown what will happen to the constellation in the face of long term challenges as the agreements and partnerships reach their maturity.

Our results indicate that the trade network does benefit partners by being able to trade with China at a reduced cost; however, it is unclear how the redirection of trade flows away from other partners will affect host countries in the long run. In the best case scenario any trade diversion would be beneficial to members of the network because the total economics costs to trade with China are closer to the RoW; however, in real terms an undiversified supply chain is a national security risk and the more a country becomes dependent on an another country for economic success, the less agency there is in making economic decisions (Krugman et al., 2022).

The results imply that variations in influence created by China's MSR initiative are recognizable in measurable ways. The overall findings of this paper are that total trade with China increases as a result of the maritime partnerships. The mechanism of total trade is however biased toward exports which increase primarily as a result of port operations by Chinese SAEs i.e., a redirection of exports toward China in countries where they have the greatest control over the shipping terminals. As we are able to separately identify the effects of port acquisition and control of port operations, we find that the effects of port terminal contracts on global trade are significant. While evident in the empirical analysis, it appears that the conditions divert trade from other partners toward China rather than creating a new network of distributed growth. Further research into the exact mechanisms of the transaction cost transmission and pricing data are necessary to confirm whether China is actually operating port terminals in the countries of low cost producers or if a reduction in transaction costs with China is diverting trade away from other low cost trade partners.

It became evident during the COVID-19 pandemic that the BRI is transforming from an infrastructure-led project, infusing positive levels of macroeconomic growth to the Chinese economy through government expenditures abroad, to a more political one where soft and hard power are increasingly central in Chinese foreign policy, especially in developing countries (Freymann and Garcia-Herrero, 2022). From this perspective a cautious strategy

would be to sell shares in a port to encourage spillover effects from Chinese SAE specialization and investment, while being aware that terminal contracts divert trade away from other partners. The real challenge for policy makers is how to mitigate the potential adverse effects of these economic interdependencies in a geo-politically unstable world. These ambiguities create the motivation for further investigation into whether the pursuits of the BRI, a project of such magnitude, both in financial and geographical terms, are being used to advance one sided interests for regional expansion. We encourage additional empirical research of economic aspects of the BRI in order to further evaluate its purported aims.

IV. Culture and Debt Dependence

A Comparison of Institutional Factors Affecting Private Debt in Western Countries

1. Introduction

Prior to the most recent global financial crisis (2007 - 2008), many macroeconomists were convinced of the prevailing theory that the financial position of a household or firm could be described by net wealth alone with no consideration of leverage. Furthermore, the research from this period was primarily focused on politicized public sector balance sheets and did not consider private sector credit a comparable risk (Taylor, 2012; Schularick, 2017). In the wake of the financial crisis, a considerable amount of empirical research has been taking stock of the identifiable trends in private sector debt growth.

The consensus among researchers is that private sector credit growth contains more predictive information regarding the likelihood of a crisis than public sector debt. A simple crisis prediction model for country *i* in year *t*, as a function of changes in private and public debt, identifies overborrowing and financial crises as recurring events, and that during peace times, financial crises typically originate in the private sector; on the other hand, public debt tends to be inversely correlated with financial risk, and crises are more likely to occur when public finances appear good (Jordà et al., 2011; Schularick, 2017). Although there are limitations to natural experiments, especially when employing long run data, these analyses can offer valuable information for policymaking and identify the trends that will lead to future theoretical models. This kind of empirical research can also be used to provide evidence of existing theories that have yet to be modeled.

This paper contributes to this research by replicating an adaptation of Bohn's (1998; 2005) 'model-based sustainability test' introduced by Schularick (2014) and modifying it to investigate trends in private sector credit growth. Moreover, the research design has been developed to provide evidence of relationships between institutional layers proposed by Williamson (2000) and to estimate their effect on these trends (see Figure C.1.1 and C.1.2 in Appendix C). To do this variables are identified at each layer of analysis and estimates are made in consideration of their perceived relationships; these layers include 1) embeddedness which consists of informal institutions such as cultural norms, 2) the institutional environment composed of formal rules of economic order, 3) governance of resources, and 4) allocation of resources via the mechanisms shaped by the layers above.

It is assumed that the higher orders impose constraints on the levels immediately below; therefore, it is expected that the allocation of private debt will vary depending on governance decisions, as well as formal rules of order and that those relationships will vary under different cultural settings (Williamson, 2000). In this case the effects of social expenditure

and current account balances are estimated on private sector credit growth while controlling for formal rules in the institutional environment. Then, instead of only fitting the regression as a continuous function of sample values, the specification is fit on indicators of four cultural clusters, included as a separate covariate. This detrended factor analysis of country groupings estimates the main effect, i.e. the effect of the groups taken as a whole. The significance of these indicators are tested using an estimation of margins and a contrast of parameters to determine their significance. This estimation indicates that the effects of social expenditure and current account balances on private sector credit vary given differences in informal institutions and cultural norms.

The identification strategy offers insight into key findings of the Macrohistory Project and identifies variation attributable to cultural differences in advanced western economies (Jordà et al., 2011). Available data from sixteen countries (*Australia, Belgium, Canada, Denmark, Germany, Finland, France, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United State*s) is estimated first as a continuous function, then as a function of group effects and lastly as continuous interactions of individual country codes. Results indicate a consistent relationship exists between countries that run current account deficits and expanding private sector credit. Although more research is necessary to identify the nuances of this relationship, these findings offer convincing evidence that economies reliant on exports for growth are less susceptible to precarious private sector credit; however when detrended the results tend to vary.

The findings also indicate a negative relationship between social expenditure and private debt among most countries in the sample; however, detrending the time-series confirms the predictive power of an eroding social expenditure, while calling into question the external validity of a relationship between changes in the current account and private sector credit during this time period. These results also confirm that the relationship between public debt and private debt erodes when controlling for both social expenditure and the current account. In both of these cases adjacent coefficients were consistent with the existing cluster of research (Jordà et al., 2011; Obstfeld, 2012; Schularick, 2014; Taylor, 2012).

The most reliable estimates indicate a negative correlation between private debt and social expenditures; whereas the predictive power of the current account appears to vary more depending on the institutional setting. The results provide partial support for claims made by Schularick (2013) and Streek (2011) regarding a possible substitution effect between public and social expenditure, as level differences in social expenditure from the prior period predict a significant and negative relationship with changes in private sector credit. Another claim from this cluster of research is that stagnant real wages among the working classes have contributed to a need to extend more private sector credit to keep up demand. Although there is also partial support for this argument under certain circumstances, there is insufficient evidence to support the external validity of the relationship. On the contrary, results from Nordic European countries lend support to the permanent income hypothesis, in that rising wages coincide with rising private debt.

The results also provide evidence of the relationships proposed by Williamson (2000), when controlling for formal rules and group effects of cultural similarities. This is further

confirmation that institutions matter in the assessment of economic outcomes and that the effectiveness of institutions and governance in shaping those outcomes will be dependent on embedded, informal institutions, customs and norms. Meaning institutions that are effective in one cultural setting, may not be transferable to other cultural settings (Roderick, 2008). This framework also provides the theoretical foundation for the assumed direction of the negative and significant relationship between public and private debt.

Despite extensive applied research, a theoretical foundation for the nature of these relationships is yet to be established. The examination of this complex nexus through the lens of institutional variation provides a compelling channel to investigate interactions between public sector balance sheets and private sector debt as well as the broader economic implications of their relationship. In the next section, recent literature and findings that motivated this research are outlined along with contextual descriptive statistics. Then, section 3 describes the methodology, the variables used in the estimations and their associated layers of the institutional framework. Section 4 then discusses the reported outcomes; and to conclude, sections 5 and 6 discuss the results and their significance.

2. Motivation

Prior to the most recent crisis, macroeconomists generally considered private sector credit growth benign; however, recent literature provides convincing evidence that financial stability risks have almost exclusively come from the expansion of private debt rather than public debt (Jordà et al., 2013; Jordà et al., 2016; Schularick, 2017). Since most crises emerge from the private sector, it is important to identify factors that may affect private sector credit growth and whether or not these relationships are consistent when results are disaggregated. Are the factors affecting private sector credit growth the same under varying cultural settings? Decisions made by both policy makers and individuals are affected by cultural, structural, and political incentives, as well as prevailing marginal conditions. Despite the research emerging on historical trends, no system of institutions is identical and these relationships may differ under different settings. To demonstrate this, estimations are run on all sixteen countries to first estimate the average effects of changes in social expenditure, current account balances and public debt on private sector credit growth. Then, results are disaggregated by predefined cultural clusters to determine whether they remain consistent when controlling for variation in the institutional environment. The framework introduced by Williamson (2000) identifies these four levels of incentives based on their frequency of change and provides the foundation for this analysis (see Figures C.1.1 and C.1.2 in Appendix C).

The way in which an economy approaches and responds to borrowing by the private and public sectors is influenced by a variety of factors, this paper focuses on two in particular. Recent research that demonstrates private sector credit growth as a valid predictor of crisis also explores whether current account imbalances can predict crisis. Although there is strong evidence that current account deficits have coincided with credit booms in some countries (which may have then led to financial crises), broad empirical analysis does not produce a significant correlation (Jordà et al., 2017; Taylor, 2015). The most likely explanation is that many things can lead to a current account deficit, but not all of them will lead to crisis.

Another possible explanation for accelerated private sector credit growth is often referred to as 'Privatized Keynesianism' (Crouch, 2009). The fundamental position of this argument is that social expenditure is sacrificed for the benefit of public balance sheets and the prospect of economic growth from deregulating financial markets. The idea is that rather than governments borrowing money, or introducing bonds to fund the provision of public goods and social programs, individuals are encouraged to access private debt to fill gaps in public spending (Crouch, 2009; Streeck, 2011; Schularick, 2014). This paper explores the merits of this argument with an empirical analysis of changes in private debt and social expenditure across 16 countries between 1980-2016.

Do changes in social expenditure predict changes in private debt? Are there differences in countries that prioritize comprehensive social programs or run current account deficits? It is expected that varying institutional constraints will lead to inconsistent outcomes from similar policies; therefore, a one-size-fits-all approach is incapable of providing contextually relevant answers to complex allocation problems (Rodrik, 2008; Williamson, 2000). Decreases in public spending would be expected to lead to higher private debt loads in countries with comprehensive social programs; however, this may not be a universal paradigm. On the other hand, countries that run large current account deficits may also face higher private debt levels as a result of the need to finance excess consumption (Krugman et al.). As recommended by Taylor (2012), history provides a laboratory to better understand these relationships and their role in the transformation of the private credit system, the emergence of financial crises and macroeconomic performance.

2.1 Historical Context

Advanced economies have evolved into systems with total debt-to-GDP ratios so large, there is no historical rubric for comparison. Taylor (2012) refers to this evolution as 'The Great Leveraging', characterized by the growing importance of credit in modern economies. Loan activity has undergone a significant transformation since the beginning of the 1950s with a sharp increase in mortgage lending during the 1980s. During this period, loans-to-GDP have grown from roughly 0.5 to 1.0, while broad money has remained relatively stable (see Figures C.2.1 and C.2.2 in Appendix C). This trend represents a departure from the previous era, in which levels and changes in both broad money and credit moved together and the ratio of loans to money was relatively stable. Prior to the global financial crisis in 2007, over a period of roughly 60 years, very few advanced economies experienced macroeconomic instability; the exceptions being Nordic Europe, Japan and concurrent US savings and loan crises. Even during these crises the challenges were manageable and consequences were limited. Postwar financial order was characterized by elaborate systems of regulation, supervision and preferences for reduced leverage. The assumption was that fixed exchange rates and capital controls had established a foundation for an immunity to the boom and bust credit cycles of the past (Carlin and Soskice, 2012 p.223).

It was during the late 1970s that policy makers and financial organizations began promoting the idea that deregulation and expanding financial markets was a viable option for combatting rising unemployment and persistent recessions. This initiative was not a complete failure; by the late 1990s the US and UK were experiencing strong growth and declining unemployment.

It appeared that macroeconomic policy regimes had come to defeat volatility (Snowden and Stiglitz, 2011; Taylor, 2012). As memories of former crises faded, skepticism arose with respect to government intervention and markets for financial products opened up. A sense of security grew out of this era that led to unprecedented growth of the financial sector and the expansion of both private and public borrowing.

This period was characterized by the rise of non-monetary liabilities, expansion of bank assets, and increased interbank lending. At the same time, banks were reducing their dependence on secure assets, such as deposits and government-backed securities (see Figures C.2.1 and C.2.2 in Appendix C; Taylor, 2012). This behavior can be organized into two general categories; fashionable management practices and institutional forces. The first explanation implies that the risk tolerance of managers and stakeholders evolved as generational forces eroded collective knowledge regarding the realities of crisis. The alternative explanation relies on the changing landscape of institutional forces, where overconfidence in the systems thought to be capable of managing crises, led to relaxed regulations and an unprecedented period of financial liberalization. At this point it is safe to assume some combination of these forces; wherein, a less risk averse financial sector became less regulated, as it expanded under new generations of management and rapidly advancing technological innovation (Currie and Lagoarde-Segot, 2017).

During this time there was a willingness to extend precarious credit to the private sector in the form of high risk mortgages and unsecured credit. As levels of debt increased among households, macroeconomists tended to be complacent toward the mounting risks (Carlin and Soskice, 2015 p.223). The period of observation is marked by deregulation and, in many cases, reduced dependency on domestic production for growth. Although the growth models for many European countries did not depend on the domestic provision of private credit, export oriented manufacturing still benefited from the purchasing power of more liberal markets. The Great Recession was characterized by a collapse of investment, contractions in credit (despite lower interest rates) and a reduction in current account deficits (Taylor, 2015).

After WWII, sovereign states were the primary borrowers; however, as time has passed, private debts expanded exponentially across all advanced economies. Recent growth in total debt is directly attributable to advancing credit to the private sector. Since 1960, roughly two-thirds of the total increase in bank credit has been directed toward real estate lending (see Figure C.2.2 in Appendix C; Taylor, 2015; Schularick, 2017). This work brings into focus growth in private sector debt, in advanced economies, between 1970-2016. During this period, only one-third of the increase in total debt is due to sovereign debt.

2.2 The Political Economy of Public Debt

Relationships with public and private sector debt are complex, as illustrated by comparing competing institutional strategies. In Japan, the decision not to recapitalize its banks during the crisis in the early 1990s led to the stagnation of aggregate demand. During the same period, Nordic Europe moved to recapitalize banks immediately, as well as to remove toxic assets and excess capacity. In this case, the cultural, institutional, and governmental support of failed credit markets led to a faster recovery, but at the cost of substantial exchange rate depreciation (Carlin and Soskice, 2015, p.216, 224, 256-258).

Each year governments finance their expenditures and also pay interest on outstanding debts. The burden of public debt in an economy can be tied to its relationship with fiscal policy. In addition to stabilization, fiscal policy is used to meet government objectives related to income distribution, resource allocation and the provision of public goods (Carlin and Soskice, 2015 p.506-507). Governments who claim to be willing to sacrifice social expenditure on behalf of a balanced budget are generally more associated with cutting revenue, rather than actual spending, and as a result are prone to experiencing higher public debt-to-GDP ratios. Pressure on policy makers to lean toward austerity, over fiscal stimulus, comes from the desire to preserve the integrity of government finances; however, there is evidence that shows tightening expenditures is a suboptimal response to managing this challenge. Increasing government expenditure, or easing tax burdens can be effective in the context of a balance sheet recession. These strategies can increase aggregate demand, while giving the private sector the space to repair its balance sheets; this is one of the reasons we would expect to see an inverse relationship between public and private debt. If households, banks and governments all attempt to reduce debt at the same time, it can depress aggregate demand making it more difficult for the government to meet its future obligations.

Public debt is likely to rise after a crisis, not before, as governments are required to step in to stabilize economies (Reinhart and Rogoff 2009; Schularick 2014; Schularick, 2017). It is conventional wisdom that budget deficits will rise during recessions and fall during periods of growth. Deficit bias refers to economies that fail to meet this criteria; the result is an upward trend in debt ratios. Under certain conditions, it does not matter whether changes in government spending are financed by revenues or borrowing; however, deficit biases arise when governments prefer to borrow rather than tax (Carlin and Soskice, 2015 p.517-537). Governments that choose

A variety of theories have been developed to explain why some countries are more affected by deficit bias than others; however, the most common explanation is a cultural preference for public goods regardless of changes in revenue. Meaning, differences across countries can be attributed to how the perceived value of public goods (or quasi-public goods), relative to the perceived value of private consumption, shape public policy. Fiscal rules have been developed with the central purpose of keeping public finances sustainable in the medium and long run. The adoption of fiscal rules has the potential of limiting deficit bias by setting limits on spending and public debt-to-GDP ratios, although this is not always the case. The drawback of these rules is that they may prevent stabilization of an economy in a deep recession or during a crisis and they may not have consistent effect under varying conditions.

In addition to the aforementioned research, Azzimonti et al (2014), discusses the premise that government debt can act as a substitute for private debt. The authors identify an important theoretical paradigm to describe the difference between the two. In private borrowing, atomistic agents do not internalize the impact the issuance of debt has on interest rates; whereas governments do.

2.3 The Provision of Private Debt

The private sector consists of loans to both businesses and households. A difference in the distribution of debt to these borrowers is observable in descriptive statistics from countries

with varying positions of the provision of private debt. In the US, household debt-to-GDP rose by only 8% between 1988 and 1998, but grew 29% between 1998-2008. Other countries sometimes identified as 'debt-led demand' economies, such as the United Kingdom (UK) and Spain, also experienced similar growth during this period. Spain's household debt-to-GDP rose from 44% to 88%, while the UK's rose from 69% to 105% during the same time period (Carlin and Soskice, 2015 p.223-224). Also, by the end of this period mortgages, as a percentage of disposable income, rose above 100% in both the US and UK. In comparison, it was only 71% in Germany and only 40% in Italy during this time (Crouch 2009; Cayla, 2013).

It can be argued that indebtedness is a rational decision in a market with greater access to debt. Under stable conditions, the permanent income hypothesis models the consumption of rational, forward thinking agents that make consumption decisions, not on the basis of their current incomes, but on the basis of intertemporal utility maximization (Carlin and Soskice, 2015 p.6-14; Friedman, 1957). Although in theory this sounds plausible, it does not take into account the unintended consequences of an increased money supply for specific purchases. In economies where individuals are allowed to withdraw equity from real estate assets, housing prices will experience accelerated inflation. This phenomenon combined with a relaxation of credit constraints can provide the necessary liquidity to increase consumption without actually increasing productivity (Carlin and Soskice, 2015 p.8). Debelle (2004) considered the growth in household debt to be a response to easing liquidity constraints, lower inflation and lower borrowing rates. It could also be attributed to a reduction in transaction costs due to technological advancements in reporting and underwriting (Currie and Lagoarde-Segot, 2017). A decrease in credit rationing, resulting from deregulation of the financial system, throughout the 1980s, and a decline in interest rates, allowed households to structure their borrowing more efficiently in relation to consumption preferences.

Rapid accumulation of housing credit is also associated with larger current account deficits and where they are largest, they are a symptom of financial instability, imagining a relationship between the two seems plausible, albeit complex (Obstfeld, 2012; Taylor 2012; Taylor, 2015). For instance, a deteriorating current account could rely on debt-led consumption for stability. Or alternatively, it has been proposed that the large current account deficit in the US, prior to the crisis, was an endogenous response to the credit and housing boom (Obstfeld, 2012; Hume and Sentence, 2009; Reinhart and Rogoff, 2009). In the most recent global financial crisis, many countries with large current account deficits suffered and numerous crises have been preceded by current account deficits; however, temporal priority does not imply causality. Research indicates that current account imbalances are not good predictors of financial crisis; although, they are good predictors of increases in private debt. Analysis of the current account is made difficult by its changing relationship with financial markets. In the period before deregulated financial markets (1949-1968), there was a positive correlation between current account surpluses and expanding private debt; however, since the 1980s expanding private debt is more likely to be associated with current account deficits (Obstfeld, 2012; Taylor, 2015).

An easing of lending standards, willingness to borrow and an increase in leverage among private sector debtors are considered to be the impetus of recession and crisis (Pally, 1994; Schularick, 2017). During periods of optimism, access to excess liquidity can boost

consumption and investment; however, in periods of recession deterioration of debt-to-equity ratios and debt-to-income ratios stress the system. These factors leave the private sector more sensitive to shocks and in turn consumption more sensitive to changes in interest rates. In order to moderate the severity of these shocks governments often apply policy measures to housing markets in some form or another.

3. Methodology

The research design has been developed as a joint study of public and private borrowing, as recommended by Jorda et al (2014). The identification strategy has been developed to estimate the effects of varying institutional conditions on the expansion of private credit and whether these relationships are consistent across cultures. The vector of control variables also provides insight into the partial effects of additional factors that can affect the supply and demand for private credit. Prior to developing a new specification, a replication and extension is completed to validate temporal robustness of the findings reported in 'Public and Private Debt: The Historical Record' (Schularick, 2014).

There are three hypotheses at work. The first hypothesis is that decreases in social expenditure lead to increases in private sector credit growth. The second, is that an increased reliance on imports rather than domestic production will also lead to private sector credit growth. The third, is that these relationships as well as additional factors affecting increases in private sector credit will vary under different cultural settings, as predicted by Williamson (2000). It is also expected that controlling for both social expenditure and current account balances will absorb some of the observed effects of public sector debt.

A model is specified to identify whether lagged level differences in social spending or changes to the current account, as a percentage of GDP, serve as reliable predictors to changes in private sector credit. In order to provide greater context to the findings, estimates are made under both random effects and fixed effect assumptions; respectively, a Breusch and Pagan Lagrangian multiplier test and a Hausman test are used to determine the efficiency of the two models (Wooldridge, 2019). If the coefficients are similar, it suggests that the random effects model, which allows for correlation between the independent variables and the error term, is robust. On the other hand, if the coefficients differ significantly, it indicates that the fixed effects model, which assumes no correlation, is more efficient. The approach also controls for year effects and the most robust estimation controls for within country-group year effects; robust standard errors are clustered respectively.

The model accounts for endogeneity beyond year and fixed effects assumptions by including private debt-to-GDP from the previous period as a lagged operator and estimating the vector of control variables in first differences. As a final robustness check an Arellano and Bond estimator is implemented that uses the second lag as an instrument for the first difference (McGovern, 2012). In the final analysis, four cultural clusters are used as treatment groups to disaggregate the findings and estimate the effects of varying institutional constellations on these relationships. The groups are then validated with a linear combination of estimates $\Sigma_i c_i u_i$ where c_i sums to zero. Comparing the outcomes of model variations provides insight into the external validity of observations. The most robust findings are similar in magnitude and consistent across model variations (McGovern, 2012; Wooldridge, 2019).

3.1 Research Design

This research is designed to investigate whether cultural factors affect observed relationships with private debt-to-GDP and to estimate the external validity of the observed average effects. Relationships reported in prior research are disaggregated and estimated under varying conditions to provide evidence on direction and to assess to what extent they are conditional on institutional conditions, or cultural settings. The indicators have been selected to represent layers of social analysis identified by Williamson (2000) and to control for conditions identified in prior empirical analyses.

Both the original study by Schularick (2014) and its replication indicate that countries with larger welfare states predict greater growth in public debt, that public and private debt have an inverse relationship, and that private debt is a greater predictor of crisis. In light of these findings, this identification strategy has been developed to investigate the relationship between private debt and social expenditure while controlling for changes to public debt. The current account is also assumed to be a predictor of private debt growth, as an economy that cannot rely on exports or domestic production for growth, is expected to be more inclined to finance consumption with debt (Carlin and Soskice, 2015 p. 256-258; Taylor, 2015). Although the direction of forces regarding this relationship are still questionable, excluding it would leave the model open to omitted variable bias. The use of lagged variables, detrending exercises and a Hausman test help control for endogeneity; however, more research is necessary to make definitive claims about causality.

3.1.1 Specification

The modified model positions changes in private debt-to-GDP as the dependent variable and social expenditures-to-GDP (from the previous period) as the primary variable of interest (see equation 4.1). In this model s represents the level of social expenditure-to-GDP and the vector of control variables ($\boldsymbol{Z}$) includes change in current account balance-to-GDP, change in public debt-to-GDP, change in real average wages, change in real consumption per capita, inflation fiscal policies and prudential measures. In alignment with prior research, lags on the primary variables of investigation are consistent with Bohn's 'model-based sustainability test' and private debt-to-GDP from the previous period is included in the vector of controls (Bohn, 1998; Bohn, 2005; Schularick, 2014). Policy actions are left contemporaneous as they are not market based transactions and expected to affect outcomes in the period of implementation.

$$\Delta\,(Private\ Debt\,/\,GDP)_{\,i,t} = \rho\ s_{i,t-1} + \beta\ \boldsymbol{Z}_{i,t} + \ \delta t\ Year_t + n_i + \varepsilon_{i,t} \qquad (\mathbf{4.1})$$

To explore whether year level unobservables are correlated to country level observables the model is used to estimate both non-year and year effects under random and fixed effects assumptions; this process also provides information on whether exogenous year level shocks can explain variations. Given this is an investigation into differences among varying Western economies, it is assumed country level factors are relevant. While the random effects procedure can be useful for understanding factors that lead to private sector credit growth in some countries rather than others, it will not identify an unbiased intercept for each country, as not all policy actions are included in the dataset. A Hausman test is used to provide further understanding into within-country and between-country effects. Country level unobservables

are controlled for, assuming they are correlated with country level observables. In both grouped and aggregate panel regressions, the fixed effects model is preferred given the estimation can net out the variance from the individual countries and groups; however, the random effects models are also considered robust according to the outcomes of the Breusch and Pagan Lagrangian multiplier tests.

3.1.2 Disaggregating and Detrending

Once the average effects have been estimated for all sixteen countries, the external validity of these findings are explored using the interaction of cultural groups with the continuous variables from the model. A categorical variable is used to represent country groups, to which factor-variable operators are applied. By forming country groups and then restricting the estimations to group interactions, the model can be used to identify differences in the expected outcomes under varying cultural settings. The validity of the average effect observed among sample countries is demonstrated in the consistency of estimations when controlling for group fixed effects. These groups also provide a setting to determine whether the presence of rules or policies have varying effects among the clusters. The use of the groups are validated using a contrast function and test for variation among a linear combination of estimates.

To gain a better understanding of variation among the countries in the sample, continuous interactions are then run on individual country codes while controlling for year effects. The procedure controls for non-stationarity in individual time-series and provides insight into whether the reported findings demonstrate consistent biases, or are aggregate estimations of more heterogeneous results. A large amount of variation among the detrended coefficients implies the original estimates are less dependable and that observed relationships are affected by other institutional forces.

3.2 Layers of Social Analysis

Data from The Macrohistory Project was appended with observations that correspond to the levels of analysis proposed by Williamson (2000)(Jordà et al., 2011; Schularick, 2014). This procedure provides a theoretical underpinning to investigate the temporal priority of institutional forces and offers empirical evidence of his proposed framework. The social layers of analysis describe a higher order of influence over allocation mechanisms, with embedded informal institutional and cultural norms at the top. To estimate the effects of this hierarchy on observed relationships with private credit, cultural clusters are employed that were established using GLOBE data from 61 countries (Gupta et al. 2002). Government expenditure rules and debt rules enforced between 1980-2012 are added using data provided by Schaechter et al. (2012). A BIS database developed by Shim et al. (2013) is also operationalized to include policy actions on housing markets between 1990-2012; these consist of, fiscal policies related to housing taxes and prudential measures that include reserve requirements, maximum loan-to-value (LTV) ratios and maximum debt-to-income (DTI) requirements for housing loans. Observations on average wages (1990-2016) were sourced from the OECD (2018). The four layers of analysis are identified by unique institutional constellations. Each level is conditioned by humanly devised constraints that

structure political, economic and social interactions. These consist of informal constraints at the embedded level and formal rules in the institutional environment (North, 1990).

3.2.1 Cultural Embeddedness

Cultural groups have been delineated by embedded similarities in how firms do business using GLOBE data. Gupta et al. (2002) use discriminant analysis (LDA) to cluster firms using cultural characteristics, such as language, religion, and social norms. The analysis is not without its limitations as other factors, such as economic and institutional conditions also play a role in shaping behavior. Additionally, the authors acknowledge the challenge of identifying and measuring cultural factors, and the potential for cultural clusters to change over time. Nonetheless, this approach provides a useful tool for identifying cultural factors that are most closely associated with business growth in particular industries and takes into account the role of culture in shaping economic behavior (see Figure C.1.3 in Appendix C).

Countries are grouped by categorical variables developed on the basis of these cultural clusters to disaggregate historical trends reported in Jordà et al (2011) and Schularick (2014). Specifically, sixteen OECD countries from their original studies are grouped into four of the clusters defined by Gupta et al. (2002): 1) *Anglo Economies;* 2) *Nordic Europe;* 3) *Latin Europe;* and 4) *Germanic Europe*. Controlling for group effects allows for a more nuanced analysis of countries with similar embedded informal institutions conditions. The statistical significance of these groups is then validated by contrasting cell means.

The prediction is that rules and governance decisions affecting the provision of private debt produce varying outcomes under varying cultural conditions. Despite some limitations, the groups are robust at the time of analysis and were originally developed at the midpoint of the available time-series. Moreover, cultural arcs are considered to be long run phenomena and radical changes would not be expected during the period of analysis (Williamson, 2000).

Cultural Cluster	Country			
(1) Anglo Group	Australia	Canada	United Kingdom	United States
(2) Nordic Europe Group	Denmark	Finland	Norway	Sweden
(3) Latin Europe Group	France	Italy	Portugal	Spain
(4) Germanic Europe Group	Belgium	Netherlands	Germany	Switzerland

Table 4.1 - Country Groupings by Cultural Cluster (Gupta et al., 2002)

3.2.2 Institutional Environment

North (1990) defines institutions as the rules of the game; therefore, fiscal policies and prudential measures are identified that affect the housing market and availability of private sector debt. In this analysis, the presence of an enforceable expenditure rule or debt rule is denoted by a dummy in country i in year t. Additional rules affecting housing market conditions are represented by a scaled index in which a 0 is denoted in years where no policy changes were recorded, or in cases where the number of loosening and tightening provisions are equal. The scale increases or decreases by the total number of policy actions that affected borrowing conditions during the year. A country that loosens and tightens rules every 5 years

would be expected to see different results than a country that is heavily biased in one direction or another over the twenty year period of analysis.

Fiscal Policy Measures: The presence of an expenditure rule sets a limit on total, primary, or current spending; whereas, the presence of a debt rule sets an explicit target for public debt-to-GDP. In consideration of revenue, housing related tax regulations are included. An example of this would be in the US in 2009, 'The Worker, Homeownership, and Business Assistance Act', introduced a non-first-time homebuyer tax credit for current homeowners who have owned and lived in their previous home for at least five consecutive years. The tax credit is assessed at $6,500 in the year of the purchase (Shim et al., 2013).

Expenditure rules are set in absolute terms, growth rates, or as a percent of GDP. These rules are not directly linked to public debt sustainability objectives, as they do not constrain revenues; however, it is possible they can affect the demand for private credit by limiting social expenditures if there is a heavy reliance on social programs. It would be expected that private debt decreases in the presence of expenditure rules as they are most often implemented during times of crisis. Debt rules are considered more effective in terms of reaching long-term targets; however, there are often short-term adverse effects. Public debt can also be affected by circumstances outside the control of institutional preferences, such as interest rates, or exchange rates. In the case of a private sector credit crisis, or an extended recession, debt rules have the capacity to slow recovery (Carlin and Soskice, 2015 p.236-241; Schaechter et al., 2012).

Prudential Measures: The prudential measures consist of reserve requirements, DTI ratios for borrowers and LTV ratios for lending. This data was taken from the same database as housing related tax regulations; therefore, the same scaled index is used. The database considers changes in various forms of reserve requirement ratios and reserve base. Authorities can also impose maximum LTV ratios or lower existing ones to limit or encourage housing loans. A tightening of these requirements can reduce the risk of potential losses in cases of asset depreciation. Policies pertaining to required DTI ratios are also capable of restricting or expanding the provision of housing credit secured by real estate loans (Shim et al., 2013).

Formal Rules	Variable
Fiscal Policy Measure	Debt Rules
Fiscal Policy Measure	Expenditure Rules
Fiscal Policy Measure	Homeowner Taxation
Prudential Measure	Reserve Requirements
Prudential Measure	Loan to Value Ratio (LTV)
Prudential Measure	Debt to Income Ratio (DTI)

Table 4.2 - Defining Rules (Schaechter et al., 2012; Shim et al., 2013)

3.2.3 Governance of Resources

The third level of analysis focuses on social expenditure and the current account as measures of how governments play the game from year to year. Although it is rare to see sharp changes in either variable, the decisions that affect these features of the economy are often highly

politicized. Also, if private debt is a substitute for public debt, public debt-to-GDP would be expected to have explanatory power, even after controlling for social expenditure, regardless of the direction of the relationship (Azzimonti et al, 2014). These variables are a central focus of the analysis. The purpose being, to investigate claims that as investment in social expenditure decreases, individual agents are inclined to subsidize their needs with private sector credit (Crouch, 2009; Streeck, 2011). Openness of an economy is also considered as an important area of governance related to private sector credit growth. Conditions created by these governance areas can affect the outcomes of policies designed to control private sector credit growth and often determine their effectiveness (Carlin and Soskice, 2015 p.258-259).

Governance Area	Variable
Social Expenditure	Social Expenditure-to-GDP $_{t-1}$
Openness of an Economy	Δ Current Account Balance-to-GDP
Public Debt	Δ Public Debt/GDP

Table 4.3 - Governance of Resources Variables (Jordà, et al., 2011; OECD, 2018)

3.2.4 Continuous Resource Allocation

Private Debt: The dependent variable is measured by change in total loans within an area of jurisdiction to individuals and businesses, also residing in the same area of jurisdiction. It does not account for total loans from or to foreign states. Williamson (2000) refers to continuous allocation of quantities in the market as getting the marginal conditions right, or third order economizing. It is expected that the factors affecting private debt will have varying effects when controlling for second order and first order economizing conditions.

Vector of Controls: Control variables have been included to remain consistent with prior research, as well as mitigate the risk of omitted variable bias. A lagged private debt-to-GDP operator, change in public debt-to-GDP and inflation are drawn directly from '*Public and Private Debt: The Historical Record*' (Schularick, 2014). Changes in real consumption per capita and in real average wages are also included, as they are often cited as potential reasons for the expansion of private sector credit growth and are missing from prior models (OECD, 2018; Debelle, 2004; Crouch, 2009; Palley, 1996; Streeck, 2011). The relationship these indicators have with private debt is expected to vary under varying institutional conditions.

Allocation Area	Variable
Private Debt	Δ Private Debt/GDP
Real Wages	Δ Real Wages
Consumption	Δ Real Consumption Per Capita

Table 4.4 - Allocation of Resources Variables (Schularick, 2014; OECD, 2018)

3.3 Replication and Extension

The procedure for this research is motivated by a long run analysis (1870-2010), by Schularick (2014) that predicts financial crises typically originate in the private sector and that overborrowing is a recurring event. The paper includes a replication of Bohn's 'model-based sustainability test' by Mauro et al. (2013), using a more robust database created for The

Macrohistory Project between 1970-2010. Consistent with this approach, the following research design begins with a replication and then modifies the specification to meet the needs of the identification strategy.

3.3.1 Model

The original paper investigates factors affecting the rise of public debt among a sample of 17 countries *(Australia, Belgium, Canada, Denmark, Finland, France, Germany, Great Britain, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and The United States)*. Control variables include real GDP, inflation, private sector credit-to-GDP, financial crisis, social transfers-to-GDP, strikes and the political leanings of the government at the time. Specifications are then estimated to explore changes in public debt-to-GDP ratios using the vector of explanatory variables. These results also predict the negative relationship between the private credit cycle and public debt during the same period. The estimations for this research are made using equation 4.2.

$$\Delta\,(Public\ Debt\,/\,GDP)_{\,i,t} = \rho\ d_{i,t-1} + \beta\ \boldsymbol{Z}_{i,t} + \delta_t\ Year_t + \varepsilon_{i,t} \tag{4.2}$$

The approach builds on a specification by Bohn (1998; 2005) that examines the relationship between the primary balance and the public debt ratio, controlling for transitory shocks to output and expenditures using an HP filtered trend variable. In his model *pb* represents the primary balance and *d* is the level of debt-to-GDP from the previous time period. A vector of control variables $\boldsymbol{Z}$ is used in addition to controlling for country fixed effect *n*. This sets also the precedence for the lagged variable of interest.

$$pb_{\,i,t} = \rho\ d_{i,t-1} + \beta\ \boldsymbol{Z}_{i,t} + n_i + \varepsilon_{i,t} \tag{4.3}$$

3.3.1 Outcomes

When analyzing the results of the replication, two variables stand out as important drivers of public debt growth; changes in private sector credit growth and social transfers-to-GDP (see Tables C.2.1 - C.2.4 in Appendix C). To validate these findings, the database used for the original paper was supplemented with extended data and results were rerun on a longer timeline (1970-2016) (Schularick, 2014; Jordà et al., 2017). Japan was dropped from the extension, as it was excluded via a dummy variable in the final specifications of the original project. The reason is that Japan's public debt rose by over 200 percentage points during the period of analysis. Constraining the experiment to Western countries provides a foundation for balanced groups and a more level field of analysis.

The outcome of the replication exercise confirmed results of the original study, but with two caveats. Despite running the same code, on the same database and getting the same coefficients, the crisis dummy which was reported as significant did not appear significant in the replication. Further investigation into this discrepancy included dropping variables with no explanatory power (left government and strike) from the analysis and rerunning estimations. In this case the crisis dummy becomes moderately significant again and adjacent coefficients either stay the same, or vary only slightly.

The second issue arises in the replication of the fixed effects model. Despite using robust standard errors in both regressions, there is variation in the reported significance of private debt-to-GDP and public debt-to-GDP. When the data is extended beyond the crisis to 2016, the relationship between public and private debt becomes significant again, as reported in the original study. Although predictions are consistent with the original findings, the sensitivity to change is a sign of model dependence. As a result, crisis is omitted from the research design for this paper and fixed effects as well as year dummies are expected to control for endogenous shocks.

Although there are some validity issues, results of the replication and extension offer evidence of a significant (albeit inconsistent) negative relationship between changes in public debt-to-GDP and changes in private debt-to-GDP, in both the expanded 1980 - 2016 time-series and the 1992 - 2012 estimates. The coefficients remain relatively stable in the extensions, although the magnitude increases slightly and it is still unclear from the model whether there is a predictable direction to the relationship. The research design has been developed to further explore these outcomes as well as the external validity of these results (see Tables C.2.1 - C.2.4 in Appendix C).

4. Results

Prior to controlling for group effects, the new model is used to estimate the average effects of all countries in the sample and compare the coefficients to prior research. Although the adjusted R^2 indicates that the random effects model has more explanatory power the Hausman test indicates the complete fixed effects model, controlling for year effects is a more efficient estimate; therefore, it is used as the preferred specification for analysis of cultural clusters.

Δ (Private Debt / GDP)	**RE**	**FE**	**RE Year**	**FE Year**	**RE Wages**	**FE Wages**	**RE Year Wages**	**FE Year Wages**
Lag Private Debt/GDP	0.001	0.006	0.005	-0.003	0.002	0.011	-0.001	-0.022
	(0.009)	(0.019)	(0.007)	(0.017)	(0.011)	(0.021)	(0.009)	(0.024)
Lag Social Expenditure/GDP	-0.001**	-0.006***	-0.001*	-0.003**	-0.002**	-0.009***	-0.002***	-0.006**
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Δ Current Account/GDP	-0.778***	-0.698***	-0.688***	-0.638***	-0.822***	-0.704***	-0.671***	-0.577***
	(0.144)	(0.128)	(0.103)	(0.158)	(0.147)	(0.128)	(0.124)	(0.160)
Δ Public Debt/GDP	-0.196**	-0.135	-0.126**	-0.069	-0.183	-0.131	-0.070	0.015
	(0.092)	(0.085)	(0.049)	(0.094)	(0.117)	(0.118)	(0.067)	(0.115)
Δ Real Consumption per Capita	-0.001	-0.002	0.000	-0.000	-0.002	-0.002	0.001	0.000
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Inflation	-0.057	-0.390***	-0.030	-0.253*	0.767**	0.040	0.973***	0.646
	(0.081)	(0.093)	(0.086)	(0.135)	(0.326)	(0.328)	(0.329)	(0.430)
Δ Log Real Wages					0.434**	0.189	0.248	0.160
					(0.170)	(0.172)	(0.161)	(0.178)
R-sq	0.155	0.093	0.306	0.253	0.188	0.111	0.344	0.233
observations	570	570	570	570	410	410	410.000	410.000

Table 4.5 - Random and Fixed Effects Estimations (1980-2016 and 1990-2016)

Δ (Private Debt / GDP)	RE Rules	FE Rules	RE Year Rules	FE Year Rules	RE Ins Env	FE Ins Env	RE Year Ins Env	FE Year Ins Env
Lag Private Debt/GDP	0.001	0.014	-0.004	-0.018	-0.003	-0.025	0.004	-0.051
	(0.010)	(0.023)	(0.011)	(0.027)	(0.012)	(0.027)	(0.011)	(0.034)
Lag Social Expenditure/GDP	-0.003***	-0.008***	-0.002**	-0.006**	-0.004***	-0.008***	-0.002***	-0.005*
	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.003)
Δ Current Account/GDP	-0.789***	-0.708***	-0.652***	-0.579***	-0.751***	-0.657***	-0.633***	-0.567***
	(0.150)	(0.129)	(0.164)	(0.161)	(0.162)	(0.144)	(0.175)	(0.191)
Δ Public Debt/GDP	-0.169	-0.136	-0.061	0.008	-0.144	-0.095	-0.048	-0.022
	(0.120)	(0.116)	(0.119)	(0.115)	(0.115)	(0.099)	(0.104)	(0.094)
Δ Real Consumption per Capita	-0.002	-0.002	0.001	0.000	-0.002	-0.002	0.002	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Δ Log Real Wages	0.380**	0.158	0.240	0.144	0.263**	0.204	0.053	0.146
	(0.173)	(0.188)	(0.184)	(0.192)	(0.106)	(0.123)	(0.135)	(0.113)
Inflation	0.530*	-0.021	0.827**	0.621	0.119	-0.200	0.340	0.087
	(0.293)	(0.347)	(0.391)	(0.449)	(0.228)	(0.377)	(0.349)	(0.481)
Expenditure Rule	-0.011	-0.014	-0.008	-0.009	-0.011	-0.007	-0.009	-0.003
	(0.011)	(0.014)	(0.011)	(0.013)	(0.011)	(0.014)	(0.008)	(0.009)
Debt Rule	0.026***	0.020*	0.015*	0.003	0.034***	0.001	0.026**	-0.006
	(0.009)	(0.011)	(0.009)	(0.010)	(0.012)	(0.013)	(0.011)	(0.010)
Home Taxes					-0.001	-0.008***	0.001	-0.003
					(0.002)	(0.003)	(0.002)	(0.003)
Reserve Requirements					0.001*	-0.003	0.001*	-0.001
					(0.001)	(0.004)	(0.001)	(0.005)
LTV Prohibition					0.016***	0.017***	0.016***	0.022***
					(0.005)	(0.005)	(0.005)	(0.005)
DTI Prohibition					-0.025**	-0.036**	-0.016**	-0.036**
					(0.010)	(0.014)	(0.008)	(0.014)
R-sq	0.224	0.140	0.351	0.234	0.320	0.077	0.463	0.227
observations	410	410	410	410	313	313	313	313

Table 4.6 - Random and Fixed Effects Estimations (1990-2016 and 1990-2012)

The Breusch and Pagan Lagrangian Multiplier Test for Institutional Environment:
Hypothesis: Var(u) = 0
Test statistic: chibar2(01) = 17.51
Probability (Prob > chibar2): 0.0000

Hausman Test Results for Institutional Environment (Not Controlling for Year Effects):
Hypothesis: Difference in coefficients not systematic
Test statistic: 51.65
Probability: 0.0000

Hausman Test Results for Institutional Environment (Controlling for Year Effects):
Hypothesis: Difference in coefficients not systematic
Test statistic: 54.99
Probability: 0.0000
Note: (V_b-V_B is not positive definite)

Tables 4.5 and 4.6 reflect a series of more restrictive analyses on shorter panels of data. Given some variables only exist for specific windows of time the results are included to show the consistency of estimates across progressively more constrained models. The Breusch and Pagan Lagrangian multiplier confirms the assumption of a constant error variance across different levels of random effects. The results provide robust evidence of substantial unobserved heterogeneity among the individual countries. This suggests that the random effects is a viable albeit incomplete choice capable of adding context to the analysis. The higher R^2 indicates that the random effects model captures a greater amount of the underlying variation in the data and differences in coefficient magnitude can still provide valuable insight into between country effects.

Results from the Hausman tests indicate that the fixed effects model, controlling for year effects, provides a more suitable specification for capturing the systematic relationship between private credit and factors affecting its growth. In this case two Hausman tests were performed—one with year effects included and another without year effects included. Both reject the hypothesis of no systematic difference in coefficients; however, a violation of the positive definite assumption suggests that year dummies are highly correlated with random effects and may not accurately reflect underlying relationships in the data.

A Hausman test comparing the results of fixed effects and fixed year effects was determined inconclusive; however, a higher R^2 indicates the year effects are more reliable. These outcomes confirm the assumption that controlling for country level fixed effects and year level variations will produce the most robust estimations and that although the random effects estimations are useful, results should be interpreted with caution (McGovern, 2012; Wooldridge, 2019). Next, grouping the countries into cultural clusters (*Anglo Economies, Nordic Europe, Latin Europe, Germanic Europe*) provides evidence that the effectiveness of rules and governance decisions vary depending on institutional conditions. Overall, the findings suggest that considering cultural and institutional factors is essential when analyzing the relationship between social expenditure, current account, and private credit growth.

4.1 Social Expenditure and the Current Account

When controlling for group effects, there is observed variation among factors affecting private sector credit growth; however, the average effects of social expenditure and the current account on private credit growth remain generally consistent. Outcomes of the exercise confirm the presence of a significant and negative relationship between level differences in social expenditure and the change in private sector debt. The results suggest that social expenditure is a far more reliable predictor of private sector credit growth than public sector debt among the countries included in the sample. This is demonstrated by the continued significance of social expenditure in the most robust models; wherein, public debt loses its explanatory power (see Tables 4.5 - 4.8). Despite losing some explanatory power under year effects in the Anglo Economies the magnitude is consistent across all estimations.

When estimating the effects of current account balances, the results are similar, but less robust than those of social expenditure. In particular, increases in private sector credit are associated with negative movements in current account balances, as a function of total output (see Table 4.8). When year effects are controlled for it loses its explanatory power in

Latin and Germanic Europe. Although it is insignificant, a still negative relationship implies that year unobservables, not captured by the model, could be responsible for increasing private sector debt in some of these countries. These results suggest economies that see an increase in exports with respect to imports, could be less reliant on private sector credit.

A chi-squared test for contrasts of marginal linear predictions identifies differences in group effects varying social expenditure and changes in the current account. Based on the results, the observed differences are unlikely to have occurred by chance alone, suggesting there is significant variation between the groups in relation to the respective variables (Table 4.8).

Δ (Private Debt / GDP)	**RE**	**FE**	**RE** Year Effects	**FE** Year Effects
Anglo Lag Social Expenditure/GDP	-0.011*** (0.002)	-0.009*** (0.000)	-0.007** (0.003)	-0.005 (0.003)
Nordic Europe Lag Social Expenditure/GDP	-0.007*** (0.001)	-0.009*** (0.000)	-0.005*** (0.001)	-0.007*** (0.001)
Latin Europe Lag Social Expenditure/GDP	-0.008*** (0.002)	-0.005*** (0.000)	-0.007*** (0.001)	-0.004** (0.001)
Germanic Europe Lag Social Expenditure/GDP	-0.009*** (0.001)	-0.013*** (0.000)	-0.007*** (0.002)	-0.012** (0.003)
Observations	313	313	313	313
R-sq	0.587	0.125	0.664	0.145

Table 4.7 - Social Expenditures and Private Debt Growth Among Cultural Clusters (1992 - 2012)

Δ (Private Debt / GDP)	**RE**	**FE**	**RE** Year Effects	**FE** Year Effects
Anglo Δ Current Account/GDP	-1.145*** (0.297)	-1.163*** (0.000)	-0.816*** (0.205)	-0.829** (0.197)
Nordic Europe Δ Current Account/GDP	-0.728*** (0.165)	-0.684*** (0.000)	-0.707*** (0.041)	-0.679*** (0.017)
Latin Europe Δ Current Account/GDP	-0.436 (0.296)	-0.388*** (0.000)	-0.324* (0.172)	-0.283 (0.147)
Germanic Europe Δ Current Account/GDP	-0.255* (0.133)	-0.224*** (0.000)	-0.100 (0.061)	-0.061 (0.072)
Observations	313	313	313	313
R-sq	0.587	0.125	0.664	0.145
Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$				

Table 4.8 - The Current Account and Private Debt Growth Among Cultural Clusters (1992 - 2012)

Contrasts of Marginal Linear Predictions Among Groups

Margins: asbalanced

Group#Lag Social Expenditure/GDP: df (3) chi2(16.76) P>chi2(0.0008)

Group# Current Account/GDP: df (3) chi2(24.50) P>chi2(0.0000)

4.2 Anglo Economies

Variations in coefficients from the Hausman test implies that the Anglo cluster has a high amount of consistency. In this cluster the negative effects of changes to real wages becomes insignificant when controlling for year effects. The effects of level differences in lagged social protection and current account-to-GDP hold across all assumptions; however, detrended analyses determine the current account to be an inconsistent estimator. In this cluster, public debt growth also contains predictive power when controlling for country level fixed effects and year effects. The outcomes suggest that expenditure rules and home taxes see reductions in private debt and that reserve requirements, LTV prohibition and DTI prohibition see increases in private debt under fixed effects assumptions. These counterintuitive observations vary significantly from the other cultural clusters and would need further investigation to understand (see Tables 4.7 - 4.9).

Δ (Private Debt / GDP)	**RE**	**FE**	**RE** Year Effects	**FE** Year Effects
Anglo Public Debt Growth	-0.467 (0.395)	-0.480*** (0.000)	-0.459*** (0.095)	-0.456** (0.088)
Anglo Δ Real Consumption Per Capita	-0.009** (0.005)	-0.009*** (0.000)	-0.007*** (0.002)	-0.006** (0.002)
Anglo Δ Log Real Wages	-0.239 (0.218)	-0.149*** (0.000)	-0.181 (0.194)	-0.099 (0.157)
Anglo Inflation	-0.927 (0.709)	-0.804*** (0.000)	-0.946*** (0.268)	-0.847 (0.363)
Anglo Expenditure Rule Dummy	-0.043*** (0.008)	-0.039*** (0.000)	-0.036*** (0.007)	-0.032** (0.008)
Anglo Debt Rule Dummy	0.010 (0.011)	0.007*** (0.000)	0.012*** (0.004)	0.009 (0.006)
Anglo Home Taxes	-0.002 (0.014)	-0.003*** (0.000)	0.005 (0.007)	0.005 (0.007)
Anglo Reserve Requirement	0.001** (0.001)	0.001*** (0.000)	0.002*** (0.000)	0.002** (0.000)
Anglo LTV Prohibition	0.002 (0.006)	0.001*** (0.000)	-0.002 (0.008)	-0.003 (0.007)
Anglo DTI Prohibition	0.005 (0.009)	0.007*** (0.000)	0.018* (0.010)	0.021* (0.009)
Observations	313	313	313	313
R-sq	0.587	0.125	0.664	0.145

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.9 - Determinants of Private Debt Increase in Anglo Economies (1992 - 2012)

4.3 Nordic Europe

Results indicate less heterogeneity among the Nordic cluster than Anglo Economies. A reduction in social expenditures, erosion of current account balance-to-GDP, an increase in real average wages all correspond to increases in private sector credit. The expenditure and debt rule behave as expected, insofar that contractions in public spending and debt lead to increases in private debt. Also as expected, reserve requirements and DTI provisions are associated with reductions in private debt; however, LTV provisions on home loans appear to be associated with increases. Robust trends suggest that the behavior of individuals in Nordic countries is consistent with the permanent income hypothesis, and that the market responds to fiscal policies and prudential measures. As real average wages increase or decrease so does the preference to assume more debt. This also is supported by the explanatory power of DTI provisions (see Tables 4.7 - 4.8 and 4.10).

Δ (Private Debt / GDP)	**RE**	**FE**	**RE** Year Effects	**FE** Year Effects
Nordic Europe Public Debt Growth	-0.042 (0.110)	-0.020*** (0.000)	-0.017 (0.035)	0.006 (0.024)
Nordic Europe Δ Real Consumption Per Capita	-0.006*** (0.002)	-0.007*** (0.000)	-0.004*** (0.001)	-0.005** (0.001)
Nordic Europe Δ Log Real Wages	0.971*** (0.274)	0.709*** (0.000)	0.915*** (0.132)	0.700*** (0.102)
Nordic Europe Inflation	0.553 (0.378)	0.234*** (0.000)	0.614*** (0.206)	0.312 (0.390)
Nordic Europe Expenditure Rule Dummy	0.030*** (0.006)	0.032*** (0.000)	0.022** (0.008)	0.022* (0.007)
Nordic Europe Debt Rule Dummy	0.009 (0.014)	0.013*** (0.000)	0.006 (0.004)	0.010 (0.006)
Nordic Europe Home Taxes	0.003 (0.003)	0.007*** (0.000)	0.004 (0.004)	0.006 (0.003)
Nordic Europe Reserve Requirement	-0.001** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001* (0.000)
Nordic Europe LTV Prohibition	0.019** (0.009)	0.022*** (0.000)	0.019*** (0.005)	0.021** (0.004)
Nordic Europe DTI Prohibition	-0.082*** (0.013)	-0.091*** (0.000)	-0.083*** (0.013)	-0.090*** (0.013)
Observations R-sq	313 0.587	313 0.125	313 0.664	313 0.145

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.10 - Determinants of Private Debt Increase in Nordic European Economies 1992 - 2012

4.4 Latin Europe

In the same way Nordic Europe produces consistent robust results, Latin Europe appears to be a cultural cluster with strong predictive power. It is in this cluster that public debt-to-GDP is consistently significant. Prudential measures related to homeowner taxation and DTI ratios are also significant under all assumptions. Outcomes indicate decreasing social expenditure, an eroding current account balance and loosening of institutional rules are all capable of predicting private sector debt growth in this cluster. Under fixed effect assumptions an increase in consumption can also explain private sector credit growth, supporting claims that under certain conditions, consumption led growth is being financed with private sector credit in Latin European economies. Although the effects are not robust, changes in real consumption and real wages are positive and significant (see Tables 4.7 - 4.8 and 4.11).

Δ (Private Debt / GDP)	**RE**	**FE**	**RE** Year Effects	**FE** Year Effects
Latin Europe Public Debt Growth	-0.502*** (0.099)	-0.477*** (0.000)	-0.376*** (0.082)	-0.354** (0.074)
Latin Europe Δ Real Consumption Per Capita	-0.002 (0.002)	0.001*** (0.000)	0.004 (0.002)	0.006* (0.002)
Latin Europe Δ Log Real Wages	0.159 (0.216)	0.477*** (0.000)	0.020 (0.123)	0.290 (0.136)
Latin Europe Inflation	-0.713* (0.412)	0.134*** (0.000)	-0.224 (0.330)	0.435 (0.495)
Latin Europe Expenditure Rule Dummy	0.009 (0.020)	-0.003*** (0.000)	0.001 (0.003)	-0.009 (0.005)
Latin Europe Debt Rule Dummy	-0.000 (0.025)	0.032*** (0.000)	0.009 (0.026)	0.038* (0.013)
Latin Europe Home Taxes	-0.037*** (0.007)	-0.034*** (0.000)	-0.030*** (0.008)	-0.028** (0.007)
Latin Europe Reserve Requirement	-0.000 (0.002)	-0.001*** (0.000)	-0.001 (0.001)	-0.001 (0.001)
Latin Europe LTV Prohibition	0.035*** (0.009)	0.030*** (0.000)	0.030*** (0.005)	0.027** (0.005)
Latin Europe DTI Prohibition	-0.035** (0.016)	-0.028*** (0.000)	-0.052*** (0.006)	-0.047*** (0.004)
Observations	313	313	313	313
R-sq	0.587	0.125	0.664	0.145

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.11 - Determinants of Private Debt Increase in Latin European Economies (1992 - 2012)

4.5 Germanic Europe

Similar to the Anglo cluster, Germanic Europe provides some counter intuitive estimates. Public debt growth has a positive relationship with private debt and changes in the current account lose their significance when controlling for year effects. As in Nordic Europe, increases in wages are associated with increases in private credit, but the results are not as robust. Germanic Europe has the most consistent relationship with the institutional environment (all but LTV provisions and reserve requirements have the expected effect, but the results are counter intuitive for all groups). Both expenditure rules and debt rules lead to increases in private sector credit; whereas, an increase in home taxes and DTI provisions leads to reductions. The consistent negative and insignificant current account coefficient, under fixed and year effects assumptions, indicates that there is an observable relationship, but that it should be interpreted in the context of global shocks controlled for by the year effects (see Tables 4.7 - 4.8 and 4.12).

Δ (Private Debt / GDP)	**RE**	**FE**	**RE** Year Effects	**FE** Year Effects
Germanic Europe Public Debt Growth	0.051 (0.047)	0.033*** (0.000)	0.208* (0.115)	0.195 (0.097)
Germanic Europe Δ Real Consumption Per Capita	-0.000 (0.003)	-0.002*** (0.000)	0.006*** (0.002)	0.004** (0.001)
Germanic Europe Δ Log Real Wages	0.175** (0.086)	0.101*** (0.000)	0.158 (0.156)	0.085 (0.112)
Germanic Europe Inflation	-1.037*** (0.318)	-1.336*** (0.000)	-0.806*** (0.260)	-1.146** (0.358)
Germanic Europe Expenditure Rule Dummy	0.032*** (0.007)	0.033*** (0.000)	0.036*** (0.008)	0.039** (0.008)
Germanic Europe Debt Rule Dummy	0.026*** (0.009)	0.022*** (0.000)	0.021** (0.010)	0.017 (0.009)
Germanic Europe Home Taxes	-0.013*** (0.002)	-0.016*** (0.000)	-0.009*** (0.002)	-0.012** (0.003)
Germanic Europe Reserve Requirement	0.011*** (0.001)	0.011*** (0.000)	0.011*** (0.001)	0.011*** (0.001)
Germanic Europe LTV Prohibition	0.015*** (0.003)	0.019*** (0.000)	0.027*** (0.008)	0.030* (0.011)
Germanic Europe DTI Prohibition	-0.032*** (0.008)	-0.018*** (0.000)	-0.057*** (0.015)	-0.041** (0.007)
Observations	313	313	313	313
R-sq	0.587	0.125	0.664	0.145

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.12 - Determinants of Private Debt Increase in Germanic European Economies 1992 - 2012

5. Discussion

Cultural clusters were used to control for informal institutions such, customs, traditions and norms in business settings across varying Western economies (Gupta et al., 2002; Williamson, 2000). Differences in random effects and fixed effects coefficients implies a greater heterogeneity in Anglo and Germanic groups, but robust results hold across all assumptions. The interpretation of year effects indicates the presence of year variations, and offers additional information regarding significant variables. Regressions that do not control for year effects point to the interconnectedness of economies, as common shocks may explain the variation. Comparing these outcomes to those controlling for year effects, allows for a deeper understanding of these relationships in different contexts. The most reliable results for unbiased estimates control for both year effects and country level variations and are consistent across models.

Controlling for institutional factors reduces the explanatory power of public debt-to-GDP with respect to private sector credit growth; however, social expenditure is consistent and robust across all cultural clusters. The narrative proposed by Crouch (2009) and Streeck (2011), that as governments reduce spending on social programs, individual citizens are encouraged to finance their needs by accessing credit, appears plausible; however, the results are not as strong in Anglo Economies. Additionally, private sector debt, including credit issued to non-financial firms, does not appear to have an inverse relationship with real average wage growth, except for in Anglo Economies. This means there is not a lot of evidence that a stagnation of real wages is also driving private sector credit growth. There is also not a lot of evidence to support the claims that private debt is financing consumption. Based on the observations, it would be as a result of access to credit, rather than the depreciation of real average wages. In Nordic European countries, as real wages increase, the willingness to access credit is aligned with the capacity for repayment. It is more likely the deregulation of markets supported by government backed lending provided an excess supply of credit. Forward thinking individuals, who may or may not have been able to accurately assess risk, took the opportunity to maximize their consumption. A more nuanced investigation into household debt and segmented income groups would be required to draw more compelling conclusions about these effects.

For the period of analysis (1980 - 2016), variations in public debt do not have a strong predictive power for changes in private debt and are only significant under country level fixed effects and year effects in Anglo and Latin European economies, when controlling for additional institutional factors. The relationship may also depend on context, for instance, a reduction in public sector debt may increase the demand for private sector debt during times of stability; whereas, in times of crisis, recapitalizing banks that have overextended private credit, will increase the debt load on public sector balance sheets. Considering that reductions in social expenditures better explain increases in private debt among European countries, it could also depend on what the public debt is financing. The reality may not be as explicit as taking on public debt to fund expenditures. A potential explanation would be that the private credit cycle generates excess revenue for the government and asset credit-driven price gains reduce the need for governments to finance social programs with debt (Schularick, 2014).

Generally, fiscal policies and prudential measures did not possess explanatory power until testing for group effects. This implies that the same rules have varying levels of effectiveness in different settings. Of the cultural clusters used in the study, Nordic Europe and Germanic Europe provide the most robust results; however, varying institutional conditions do predict private sector credit growth in each cluster. The institutional rule with the greatest predictive power is DTI provisioning. This is evident in both the aggregate estimations and the cultural clusters. It is not a surprise that tightening income based credit constraints has the greatest effect on private sector credit growth; however, the expected results help validate the research design. The implementation of LTV provisions does not appear to decrease home loans, rather it appears to be a consistent and robust predictor of increases to private sector credit. This could explain housing bubbles as a result of inflated values necssary to keep up with required asset to loan ratios.

The purpose of increasing reserve requirements is to reduce the amount of money that banks have available to lend out, which can help to control inflation and prevent economic bubbles; however, the introduction of a provision that tightens reserve requirements predicts an increase in lending in Anglo and Germanic clusters. This could be explained by a tendency for banks to increase lending as a means of compensating for the added costs associated with the new reserve requirements. Another possibility is that the increase in private debt is not directly related to the change in reserve requirements, but rather reflects broader economic conditions. If the economy is growing rapidly and demand for credit is high, both private debt and reserve requirements may have to increase at the same time (Schaechter et al., 2012). Estimating the model in first differences and implementing an Arellano and Bond estimation addresses some of these endogeneity concerns. Although making definitive claims on the direction of these relationships is difficult, there is clear evidence the relationships differ under varying cultural settings.

Analysis of long run trends indicate that prior to recent developments, there was only one period that reported a significant negative correlation between current account variation and bank lending (1870 - 1889); however, outcomes from the analyses in this paper (1980 - 2016; 1992 - 2012), indicate there may be an observable relationship between private debt and current account deficits (Taylor, 2012). Only when the results are disaggregated by country code does the relationships with the current account appear to be inconsistent, as less than half the countries show evidence of significant negative effects. Additionally, results from The Netherlands indicate a positive relationship. It is also unclear if eroding current accounts explain domestic private debt accumulation or whether the latter explains the former. Similar coefficients imply estimates of the original model are dependable and that the relationship between changes in the current account and private debt relies on other institutional forces.

Treatment groups were created using GLOBE data processed during the period of analysis; however, using the established country clusters can have several drawbacks. One of the main drawbacks is that these clusters oversimplify and generalize the complexities of cultural differences within a country or region. Additionally, the pre-established country clusters may not be relevant or applicable to all types of organizations and industries, as cultural differences can vary based on the nature of the work and industry context. Although the total number of observations in each group is limited to 84, the cultural clusters do add

explanatory power to the model and robustness checks verify their external validity. There are also public policy questions not addressed by the rules included in the dataset. Despite these drawbacks, this preliminary research does provide the foundation for a broader exploration and is a clear indication that although it is possible to codify our experiences, there is no single set of best practices that can act as a solution for all countries all the time (Rodrick, 2008).

6.0 Conclusion

A replication and extension establishes precedence for this research and provides a foundation to investigate the effects of institutional conditions on private sector credit growth. Variables representing cultural embeddedness, institutional rules, governance of resources and allocation of financial assets have been classified accordingly to investigate established institutional levels of analysis (Williamson, 2000).

Outcomes from the research design can be summarized into five key findings. 1) An established relationship between public and private debt loses explanatory power when controlling for social expenditure and the current account. 2) The change in social expenditures is a more robust predictor of private sector credit growth than public sector debt. 3) The change in the current account is also a better predictor of private sector credit growth, but these results are less robust 4) The effectiveness of institutional rules will vary in different cultural settings; and 5) The factors affecting private credit growth vary from one cultural setting to another although some factors are consistent.

Although a lagged variable is used to estimate level differences in social expenditure, the model is still subject to reverse causality issues and therefore conclusions on relationship between the current account and public debt are less dependable. The Arellano-Bond estimator further addresses endogeneity by using the lagged operator as an instrument; however, there is still a possibility that there are unobserved time-varying omitted factors affecting these relationships. Models testing joint probability, in addition to the implementation of smoothing effects, moving averages or instrumental variables could provide greater insight on interdependence of the variables and causation. Despite limitations to the study, multiple robustness checks were performed to validate the findings. Outcomes support the hypothesis that similar regulations, under different cultural and governance systems, will have varying effects. These results also imply that policymakers can prioritize social expenditure in managing private sector debt growth.

An element that appears to be overlooked in prior research, is the advancement of technology during the period of financialization. Transaction cost theory may play a role in the proliferation of both public and private credit. Debt is an innovation that reduces transaction costs; therefore, any innovation that enables debt enables the financial system to expand, until the cost of an additional transaction prevents it from doing so. This allows for the growth of expansive economic systems (Coase, 1988; North, 1990, pp. 4-9). During 'The Great Leveraging,' information technology advanced at a similar rate, allowing more transactions to be managed at a lower cost. Although this factor is not explored in the context of this study, it is an important consideration for future research

V. Concluding Remarks

Rules shape our behavior. The rules that shape our behavior are formal and informal and have been evolving since before recorded history. The shadows of rules from our past are still shaping our behavior today (e.g. path dependence and persistence). Williamson (1985), proposes the main purpose of rules in an economic system is the economizing transaction costs. "Transaction cost analysis supplants the usual preoccupation with technology and steady-state production expenses without an examination of the comparative costs of planning, adapting and monitoring task completion under alternative governance structures" (Williamson, 1985 p2). Whether or not this is true, it is clear that both formal and informal rules shape the behavior of group members.

There are formal and informal rules being enforced at every layer of society. Individual agents are constrained by formal and informal enforcement mechanisms of family, peer groups, work places, communities, municipalities, counties, states, societies, countries, cultures, treaties, trade agreements, security agreements, currency unions, common markets and supranational organizations. How rules are created and enforced vary at every identifiable layer. The average trade agreement is longer and more complex than the average constitution of a country. Rules build on rules in the same way technology builds on technology, creating ever more advanced structures and systems of behavior over time.

Coming to an agreement is the foundation of human cooperation and it becomes more complex as more people are involved. Two person agreements are simple, they can form an informal organization, even if only for a short time. Once an agreement is formal it becomes easier to navigate because terms are more explicit and recorded in an artifact. Organizations can come to an agreement with other organizations that form even larger organizations. All of this organizational development depends on the ability to transfer information (tell stories) about rules across time. The harder it is to enforce an agreement, the higher the transaction costs. The greater the asymmetric information, the higher the transaction costs (unless it is an obedient transaction). The often uncalculated costs of coming to an agreement increase the less people trust one another. Organizations designed to create and enforce rules reduce transaction costs but also reduce agency.

All rules were created in a time and a place where they made sense to the makers. Policy development at the highest levels is messy and slow and the results are often messy and slow. It is hard to measure progress in real time since we are all affected by the structures of our past. There are many influences that exist behind the scenes as well that are often indirectly addressed, but not openly discussed. The economic theories, ideas or perspectives of rule makers need consideration when working to change the rules. New rules require defensible theories, ideas and perspectives that stand on the shoulders of modern science. One size fits all institutions are ineffective and violent conflict still exists in many parts of the world. The problem of social costs addresses the challenges between the utility and the cost of enforcement (Coase, 1960). The problems that come with persistence and path dependence add complexity to solutions and create unexpected outcomes.

In this analysis formal rules are limited to statutory rules and constitutional or political constraints; moreover, informal rules are defined as norms, cultures and customs not designed or enforced by government. Binding constraints found in institutional layers have varying degrees of rigidity, and some will be easier to change than others; therefore, a universal set of best practices can only provide noncontextual solutions. Casson et al (2010) identify the need for more rigorous study of the relationships between informal and formal institutions; particularly, with respect to how informal institutions influence the nature and quality of more formal institutions. Williamson (2010) references the concept of stickiness as a means of illustrating the relationship between these two constructs. Meaning, formal institutions will not 'stick' unless they are somehow in harmony with the existing constellations of informal constraints. In this sense, informal institutions lay the groundwork for sustainable and effective formal institutions; however, in the absence of formal institutions, informal constraints can offer compelling motivation for group members to behave in one way over another. The challenge is developing theories that can adequately frame these behaviors in a consistent way.

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VII. Appendices

Appendix A - Politics and Path Dependence

Appendix A.1 - Robustness Checks

	year	Decom General	Decom Dense
RIGHT WING	2017	2.3	1.9
	2013	2.7	2.7
	2009	1.9	1.6
LEFT WING	2017	2.4	2.4
	2013	>3	>3
	2009	2	1.8
LINKE	2017	2.1	1.8
	2013	>3	2.6
	2009	1	-
SPD	2017	1.7	1.8
	2013	1.8	1.8
	2009	1.6	1.6
CDU	2017	-	-
	2013	2.8	2.4
	2009	2.3	2.1

Estimator: *Nearest-neighbor matching* (*Population Density, Average Income and Voter Participation), robust (2)*
Distance: *Mahalanobis (bias adjustment*

Table A.1.1 - Rosenbaum Bounds Sensitivity Gammas 1994-2013 and 1998-2013 for Relevant Parties

	year	General 1994	Dense 1994	General 1998	Dense 1998
RIGHT WING	2017	PASS	PASS	PASS	PASS
	2013	PASS	PASS	PASS	PASS
	2009	PASS	PASS	PASS	PASS
LEFT WING	2017	PASS	PASS	PASS	PASS
	2013	PASS	NOT PASS	NOT PASS	PASS
	2009	PASS	NOT PASS	NOT PASS	PASS
LINKE	2017	PASS	PASS	PASS	PASS
	2013	PASS	PASS	PASS	PASS
	2009	PASS	PASS	PASS	PASS
SPD	2017	PASS	NOT PASS	PASS	PASS
	2013	PASS	NOT PASS	PASS	PASS
	2009	PASS	NOT PASS	NOT PASS	PASS
CDU	2017	PASS	PASS	PASS	PASS
	2013	PASS	PASS	PASS	PASS
	2009	PASS	PASS	PASS	PASS

Table A.1.2 - Parallel Trends Sensitivity Analysis 1994-2013 and 1998-2013 for Relevant Parties

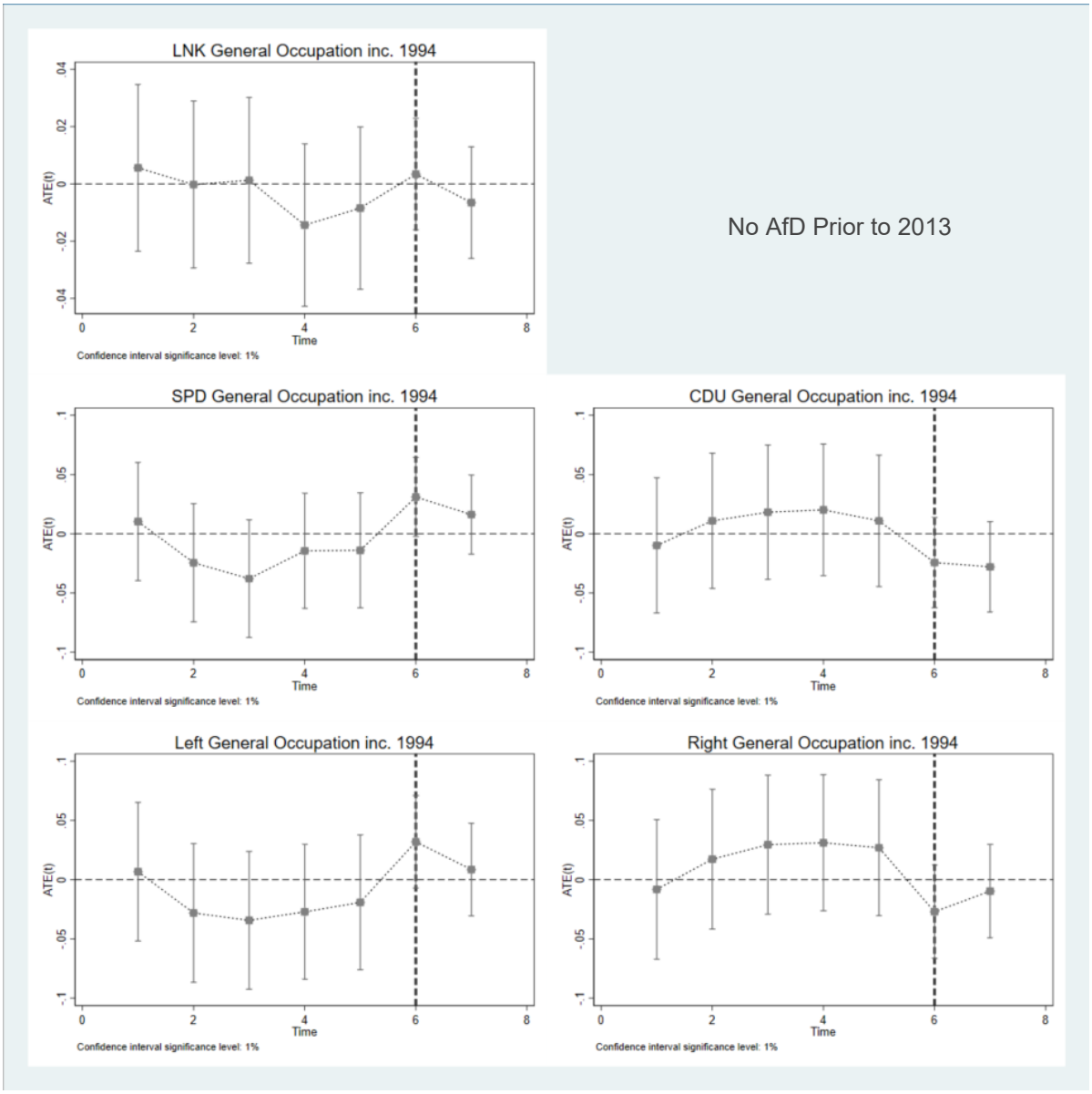

Figure A.1.1 - Two Way Graphs of Parallel Trends Analysis 1994-2013 for Relevant Parties (General)

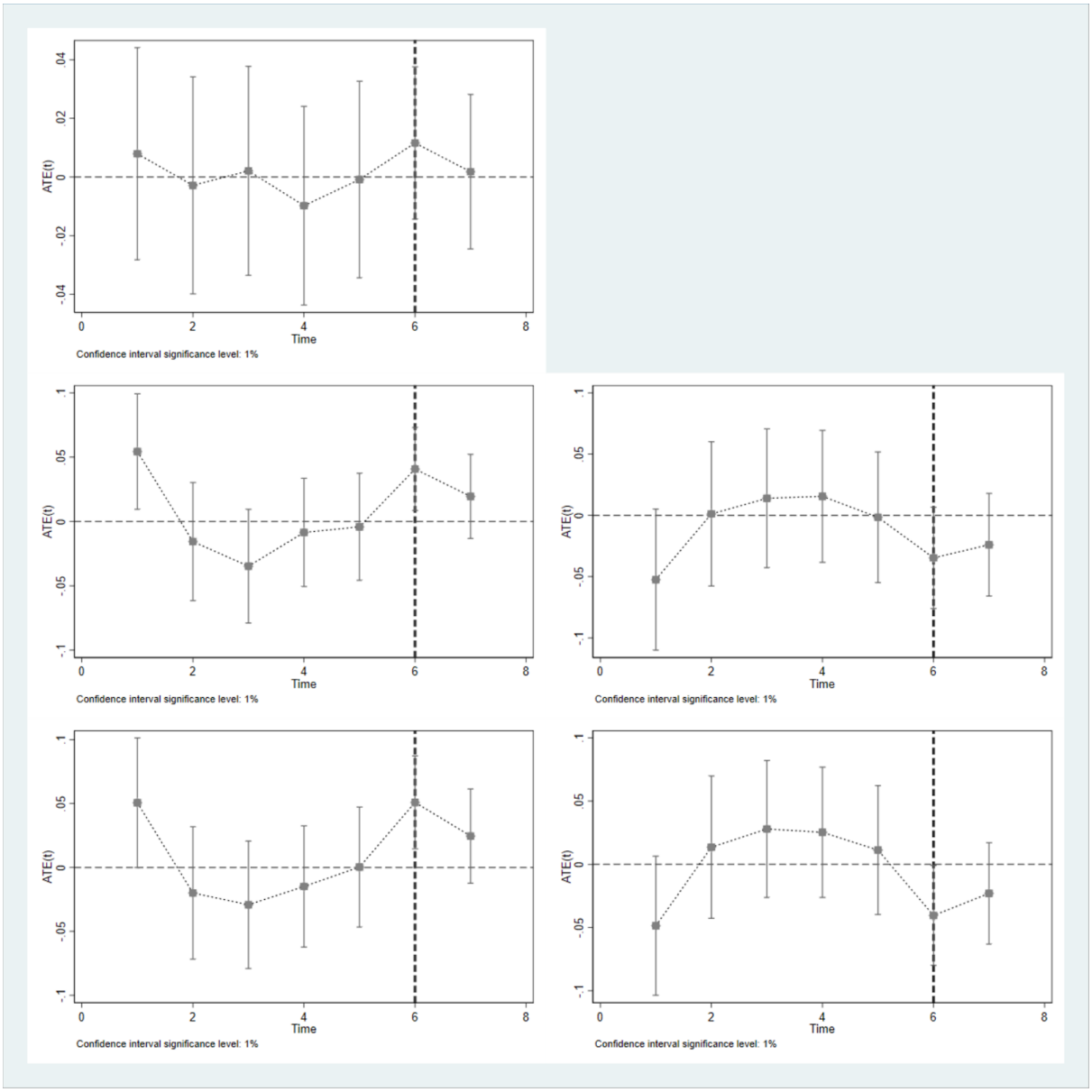

Figure A.1.2 - Two Way Graphs of Parallel Trends Analysis 1994-2013 for Relevant Parties (Dense)

Appendix A.2 - Extended Tables for Treatment Effects of Occupation and Withdrawal

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(general\ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.1)$$

	LNK	SPD	GRN	FDP	CDU	AFD
General Occupation	0.014***	0.008***	0.007***	-0.003***	-0.020***	-0.008***
Dummy	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Average Income	-0.042***	0.010**	0.020***	0.025***	0.025***	-0.028***
	(0.006)	(0.004)	(0.003)	(0.003)	(0.006)	(0.005)
Population Density	0.005***	0.001*	0.002***	0.002***	-0.009***	-0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Percentage Turnout	-0.071***	-0.044***	0.009**	0.013**	0.038***	0.004
	(0.010)	(0.008)	(0.004)	(0.006)	(0.013)	(0.011)
2013	-0.055***	-0.008***	-0.014***	-0.087***	0.092***	0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(.)
2017	-0.109***	-0.035***	-0.019***	-0.046***	-0.032***	0.189***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Overall R-sq	0.592	0.462	0.215	0.712	0.483	0.820
groups	2314	2313	2312	2314	2314	2314
Observations	6814	6815	6754	6778	6818	4562

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table A.2.1 - Municipal Federal Election (2009 - 17) (General Occupation within State and Year Fixed Effects)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(dense\ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.2)$$

	LNK	SPD	GRN	FDP	CDU	AFD
Heavy Occupation	0.015***	0.011***	0.018***	-0.002	-0.027***	-0.016***
Dummy	(0.005)	(0.003)	(0.004)	(0.002)	(0.005)	(0.004)
Average Income	-0.041***	0.010**	0.020***	0.024***	0.026***	-0.030***
	(0.006)	(0.004)	(0.003)	(0.003)	(0.006)	(0.005)
Population Density	0.005***	0.001	0.001**	0.002***	-0.009***	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Percentage Turnout	-0.072***	-0.038***	0.007*	0.010*	0.028**	0.009
	(0.011)	(0.008)	(0.004)	(0.006)	(0.013)	(0.011)
2013	-0.055***	-0.008***	-0.014***	-0.087***	0.092***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(.)
2017	-0.109***	-0.035***	-0.019***	-0.046***	-0.032***	0.189***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Overall R-sq	0.582	0.447	0.214	0.707	0.470	0.818
groups	2211	2210	2209	2211	2211	2211
Observations	6508	6509	6448	6472	6512	4356

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table A.2.2 - Municipal Federal Election (2009 - 17) (Dense within State and Year Fixed Effects)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(general\ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.1)$$

	LNK	SPD	GRN	FDP	CDU	AFD
General Occupation	0.010**	0.038***	0.004**	-0.005***	-0.041***	0.004
Dummy	(0.004)	(0.008)	(0.002)	(0.002)	(0.008)	(0.005)
Average Income	0.022	0.035*	0.018***	-0.006	-0.080***	-0.136***
	(0.015)	(0.020)	(0.007)	(0.004)	(0.020)	(0.016)
Population Density	0.005**	-0.013***	0.009***	0.002**	-0.002	-0.003
	(0.002)	(0.004)	(0.002)	(0.001)	(0.003)	(0.002)
Percentage Turnout	0.001	-0.002***	0.001***	0.000***	-0.001**	0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
2013	0.037***	-0.161***	0.002	-0.005***	0.016*	0.000
	(0.006)	(0.009)	(0.002)	(0.001)	(0.009)	(.)
2017	-0.024**	-0.196***	-0.008**	0.043***	-0.072***	0.155***
	0.037***	-0.161***	0.002	-0.005***	0.016*	0.000
Overall R-sq	0.653	0.777	0.619	0.851	0.644	0.909
groups	135	135	135	135	135	68
Observations	628	628	628	628	628	136.000

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table A.2.3 - County Federal Election Outcomes (1994 - 2021) (General Occupation within Year Effects)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(dense\ occupation)_i + \mathbf{Z}_{it} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.2)$$

	LNK	SPD	GRN	FDP	CDU	AFD
General Occupation	0.010	0.043***	0.001	-0.006***	-0.046***	0.001
Dummy	(0.008)	(0.013)	(0.002)	(0.002)	(0.011)	(0.004)
Average Income	0.047***	0.058**	0.024***	-0.010*	-0.104***	-0.124***
	(0.016)	(0.025)	(0.005)	(0.006)	(0.023)	(0.014)
Population Density	0.006***	-0.020***	0.005***	0.001	0.004	0.002
	(0.002)	(0.005)	(0.001)	(0.001)	(0.005)	(0.005)
Percentage Turnout	0.001*	-0.002***	0.001***	0.000***	-0.001**	0.005***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
2013	0.000	0.000	0.000	0.000	0.000	
	(.)	(.)	(.)	(.)	(.)	
2017	-0.056***	-0.009***	-0.014***	-0.086***	0.093***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(.)
Overall R-sq	-0.110***	-0.036***	-0.020***	-0.045***	-0.030***	0.190***
groups	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Observations	0.541	0.112	0.187	0.685	0.371	0.787

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table A.2.4 - County Federal Election Outcomes (1994 - 2021) (Heavy Occupation within Year Effects)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(general\ occupation)_i + \sum_j \mathbb{1}(stasi)_i + (\mathbf{Z}_{it} + \mathbf{Z}_{i33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.3)$$

	LNK	SPD	GRN	FDP	CDU	AFD
General Occupation	0.014***	0.006**	0.003**	-0.003***	-0.019***	-0.004
Dummy	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
StaSi Density	-0.001	-0.001	-0.002**	-0.000	-0.002	0.000
n=50th - 90th pctl	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
StaSi Density	-0.008**	-0.001	0.000	0.001	-0.011**	0.017***
n >90th pctl	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.003)
Average Income	-0.040***	0.009	0.018***	0.027***	0.028***	-0.028***
	(0.008)	(0.005)	(0.003)	(0.004)	(0.008)	(0.006)
Population Density	0.005***	0.002**	0.001	0.001**	-0.009***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Percentage Turnout	-0.063***	-0.054***	0.005	0.011	0.033**	0.020
	(0.013)	(0.010)	(0.005)	(0.007)	(0.017)	(0.013)
Nazi Party 1933	0.000	0.001**	-0.000***	-0.000	0.001**	-0.001***
Vote Share	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Communist Party	0.000	0.000	-0.000***	-0.000*	-0.000	-0.000
Vote Share 1933	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Voter turnout 1933	-0.000	0.003***	-0.001***	0.001*	0.000	-0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
2013	-0.057***	-0.007***	-0.014***	-0.086***	0.095***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(.)
2017	-0.112***	-0.034***	-0.019***	-0.045***	-0.030***	0.189***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Overall R-sq	0.627	0.479	0.206	0.745	0.533	0.836
groups	1335	1334	1333	1335	1335	1335
Observations	3922	3922	3889	3907	3925	2628

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0$

Table A.2.5 - Municipal Federal Election (2009- 2017) (Heavy Occupation with Stasi and Historic Controls)

$$percentage\ vote\ share_{ikt} = \alpha + \sum_j \mathbb{1}(distance_j)_i + \sum_j \mathbb{1}(stasi)_i + (\mathbf{Z}_{it} + \mathbf{Z}_{it33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.4)$$

	LNK	SPD	GRN	FDP	CDU	AFD
1 - 10 km to Base	-0.011***	-0.005**	-0.001	0.003***	0.012***	0.004
	(0.003)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
10 - 20 km to Base	-0.012***	-0.007***	-0.003**	0.002**	0.022***	0.002
	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
n > 20 km to Base	-0.019***	-0.020***	-0.008***	0.002	0.036***	0.009**
	(0.004)	(0.004)	(0.001)	(0.002)	(0.006)	(0.004)
StaSi Density	-0.000	0.000	-0.001*	-0.000	-0.002	-0.000
n=50th - 90th pctl	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
StaSi Density	-0.008**	0.001	0.001	0.001	-0.012***	0.017***
n >90th pctl	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.003)
Average Income	-0.041***	0.008	0.018***	0.026***	0.031***	-0.029***
	(0.008)	(0.005)	(0.003)	(0.004)	(0.008)	(0.006)
Population Density	0.005***	0.002	0.001	0.001**	-0.008***	0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)
Percentage Turnout	-0.063***	-0.056***	0.004	0.010	0.041**	0.023*
	(0.013)	(0.010)	(0.005)	(0.007)	(0.017)	(0.013)
Nazi Party 1933	0.000	0.001***	-0.000***	-0.000	0.001**	-0.001***
Vote Share	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Communist Party	0.000	0.000	-0.000***	-0.000*	-0.000	-0.000
Vote Share 1933	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Voter turnout 1933	-0.000	0.002***	-0.001***	0.000*	0.001	-0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
2013	-0.056***	-0.007***	-0.014***	-0.086***	0.094***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(.)
2017	-0.112***	-0.034***	-0.019***	-0.045***	-0.030***	0.189***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Overall R-sq	0.63	0.50	0.22	0.747	0.549	0.838
groups	1384	1383	1382	1384.000	1384	1384
Observations	4064	4064	4031	4049.000	4067	2724

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0$

Table A.2.6 - Municipal Federal Election (2009 - 2017) (Distance Classes with Stasi and Historic Controls)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(closure)_i + [\mathbb{1}(gen)_i \times \sum_j \mathbb{1}(stasi)_i] + z + \mathbf{Z}_{i33} + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.5)$$

	LNK	SPD	GRN	FDP	CDU	AFD
Decommissioned	0.014***	0.004	0.003*	-0.002*	-0.019***	-0.004
Dummy	(0.004)	(0.003)	(0.002)	(0.001)	(0.004)	(0.005)
Active BW	0.014	-0.003	0.003	-0.004*	-0.020***	0.005
Dummy	(0.009)	(0.009)	(0.003)	(0.002)	(0.006)	(0.007)
StaSi Density	-0.001	-0.002	-0.002**	-0.000	-0.002	0.000
n=50th - 90th pctl	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
StaSi Density	-0.009**	-0.001	0.000	0.001	-0.011**	0.018***
n >90th pctl	(0.003)	(0.003)	(0.001)	(0.001)	(0.004)	(0.003)
Interaction	-0.001	0.008	-0.000	-0.001	0.001	-0.002
Occupied*Mid StaSi	(0.005)	(0.005)	(0.002)	(0.002)	(0.006)	(0.006)
Interaction	0.025***	-0.002	-0.007***	-0.003	0.007	-0.016**
Occupied*Hi StaSi	(0.006)	(0.005)	(0.002)	(0.002)	(0.007)	(0.006)
Average Income	-0.040***	0.008	0.018***	0.027***	0.028***	-0.028***
	(0.008)	(0.005)	(0.003)	(0.004)	(0.008)	(0.006)
Population Density	0.006***	0.002**	0.001	0.001**	-0.009***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Percentage Turnout	-0.062***	-0.055***	0.005	0.011	0.033**	0.020
	(0.013)	(0.010)	(0.005)	(0.007)	(0.017)	(0.013)
Nazi Party 1933	0.000	0.001**	-0.000***	-0.000	0.001**	-0.001**
Vote Share	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Communist Party	0.000	0.000	-0.000***	-0.000*	-0.000	-0.000
Vote Share 1933	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Voter turnout 1933	-0.000	0.003***	-0.001***	0.001*	0.000	-0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
2013	-0.057***	-0.007***	-0.014***	-0.086***	0.095***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(.)
2017	-0.112***	-0.034***	-0.019***	-0.045***	-0.030***	0.189***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Overall R-sq	0.627	0.479	0.206	0.745	0.533	0.836
groups	1335	1334	1333	1335	1335	1335
Observations	3922	3922	3889	3907	3925	2628

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0$

Table A.2.7 - Municipal Federal Election (2009 - 17)(Decommissioned with Historic Controls)

$$\tau^{ATE} \approx \frac{1}{N}\sum_{i}^{n}((y_i(1) - \frac{1}{M}\sum_{j}^{m}(y_i(0)) - (y_i(0) - \frac{1}{M}\sum_{i}^{m} y_i(1))) \quad (2.6)$$

Party	Year	General	Decom General	Active General	Dense	Decom Dense	Heavy Troops	Heavy Building
AFD	2017	-0.005	-0.011	0.198***	-0.100***	-0.102***	-0.085***	-0.023*
	2013	-0.009***	-0.010***	0.027*	-0.023***	-0.023***	-0.021***	-0.027***
	2009							
CDU	2017	-0.053***	-0.051***	-0.094***	-0.002	-0.002	-0.004	-0.045***
	2013	-0.079***	-0.080***	0.050	-0.083***	-0.085***	-0.085***	-0.059***
	2009	-0.104***	-0.107***	0.090	-0.089***	-0.088***	-0.089***	-0.057**
FDP	2017	0.005*	0.004	0.023***	0.004	0.004	0.011***	0.016**
	2013	0.002	0.002	0.006	0.001	0.001	0.001	0.007**
	2009	-0.011**	-0.011***	0.065***	-0.022***	-0.022***	-0.022***	-0.005
GRN	2017	0.002	0.002	-0.015***	0.010***	0.011***	0.013***	-0.002
	2013	0.002	0.002	-0.017***	0.004	0.005	0.006**	-0.010
	2009	0.010***	0.009***	-0.010	0.010***	0.010***	0.010***	-0.001
SPD	2017	0.037***	0.041***	-0.065*	0.082***	0.085***	0.067***	0.043***
	2013	0.059***	0.061***	-0.090**	0.092***	0.095***	0.088***	0.061***
	2009	0.082***	0.085***	-0.076	0.098***	0.098***	0.095***	0.033
LNK	2017	0.014***	0.015***	-0.063***	0.020***	0.019***	0.009**	0.022**
	2013	0.034***	0.034***	-0.009	0.043***	0.041***	0.043***	0.044***
	2009	0.027***	0.028***	-0.069***	0.022**	0.022**	0.023**	0.036***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Estimator: *Nearest-neighbor matching* (*Population Density, Average Income, Voter Participation and Stasi Density Class), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table A.2.8 - ATE of Occupation Size and Status on Percent of Votes (2009 - 17)(Nearest Neighbor)

Party	Year	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
AFD	2017	-0.001	-0.005	0.179***	-0.063***	-0.061***	0.208***	-0.063***	-0.062***
	2013	-0.011***	-0.011***	0.050***	-0.017***	-0.018***	-0.099***	-0.017***	-0.018***
	2009								
CDU	2017	-0.067***	-0.063***	-0.040**	-0.021	-0.016	0.119***	-0.021	-0.014
	2013	-0.091***	-0.090***	0.092**	-0.053	-0.047	0.552***	-0.053	-0.047
	2009	-0.110***	-0.111***	0.049	-0.058*	-0.056*	0.515***	-0.058*	-0.053*
FDP	2017	0.005**	0.005**	0.046***	0.016**	0.015**	0.167***	0.016**	0.015**
	2013	0.003*	0.003*	0.010	0.003	0.003	0.050***	0.003	0.003
	2009	-0.006	-0.008*	0.087***	-0.009	-0.010	0.112***	-0.009	-0.010
GRN	2017	0.001	0.001	-0.003	0.002	0.001	-0.025***	0.002	0.000
	2013	0.004**	0.003	-0.019***	0.001	0.000	-0.012***	0.001	-0.000
	2009	0.012***	0.012***	0.010	0.005**	0.005**	-0.034***	0.005**	0.004**
SPD	2017	0.043***	0.045***	-0.112***	0.037**	0.033**	-0.094***	0.037**	0.033**
	2013	0.077***	0.079***	-0.158***	0.044	0.043	-0.183***	0.044	0.042
	2009	0.085***	0.088***	-0.105**	0.048	0.048	-0.234***	0.048	0.046
LNK	2017	0.018***	0.018***	-0.087***	0.026***	0.024***	-0.295***	0.026***	0.024***
	2013	0.028***	0.028***	-0.034	0.032**	0.031**	-0.313***	0.032**	0.032**
	2009	0.022**	0.022	-0.073***	0.029***	0.029***	-0.191***	0.029***	0.029***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Exact match: *Municipality class (City, Suburb or Countryside) and StaSi Density Class (<50th, 50th – 90th, >90th pctl)*
Estimator: *Nearest-neighbor matching* (*Population Density, Average Income and Voter Participation), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table A.2.9 - ATE of Occupation Size and Status on Percent of Votes (2009 - 17)(Exact)

$$\tau^{ATE} \approx \frac{1}{N}\sum_{i}^{n}((y_i(1) - \frac{1}{M}\sum_{j}^{m}(y_i(0)) - (y_i(0) - \frac{1}{M}\sum_{i}^{m} y_i(1))) \quad (2.6)$$

Party	km to Control Municipality	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
AFD	n > 20 km	-0.005	-0.011	0.198***	-0.100***	-0.102***		-0.085***	-0.023*
2017	11- 20 km	0.011	0.008	0.124***	-0.064***	-0.064***		-0.058***	-0.015
	1- 10 km	0.003	0.002	0.120***	-0.078***	-0.079***		-0.072***	-0.040***
CDU	n > 20 km	-0.053***	-0.051***	-0.094***	-0.002	-0.002		-0.004	-0.045***
2017	11- 20 km	-0.033***	-0.032***	-0.065***	-0.007	-0.004		-0.010	-0.029**
	1- 10 km	-0.019***	-0.018***	-0.066***	0.003	0.010		-0.001	-0.019
FDP	n > 20 km	0.005*	0.004	0.023***	0.004	0.004		0.011***	0.016**
2017	11- 20 km	-0.003*	-0.003*	0.008	-0.003	-0.003		-0.003	0.002
	1- 10 km	-0.005**	-0.005**	0.002	-0.010***	-0.008**		-0.009***	-0.003
GRN	n > 20 km	0.002	0.002	-0.015***	0.010***	0.011***		0.013***	-0.002
2017	11- 20 km	-0.002	-0.002	-0.010***	0.008***	0.009***		0.009***	-0.002
	1- 10 km	-0.002	-0.001	-0.007**	0.013***	0.016***		0.013***	-0.000
SPD	n > 20 km	0.037***	0.041***	-0.065*	0.082***	0.085***		0.067***	0.043***
2017	11- 20 km	0.019***	0.020***	-0.041	0.046***	0.047***		0.042***	0.025**
	1- 10 km	0.013**	0.014**	-0.053*	0.046***	0.049***		0.041***	0.021*
LNK	n > 20 km	0.014***	0.015***	-0.063***	0.020***	0.019***		0.009**	0.022**
2017	11- 20 km	0.006**	0.007**	-0.034**	0.018***	0.015***		0.017***	0.016***
	1- 10 km	0.010***	0.010***	-0.013	0.029***	0.018***		0.028***	0.045***

Party	km to Control Municipality	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
AFD	n > 20 km	-0.009***	-0.010***	0.027*	-0.023***	-0.023***		-0.021***	-0.027***
2013	11- 20 km	-0.005**	-0.006***	0.025**	-0.014***	-0.014***		-0.014***	-0.016**
	1- 10 km	-0.007***	-0.008***	0.028**	-0.015***	-0.014***		-0.014***	-0.017***
CDU	n > 20 km	-0.079***	-0.080***	0.050	-0.083***	-0.085***		-0.085***	-0.059***
2013	11- 20 km	-0.046***	-0.047***	0.015	-0.059***	-0.055***		-0.061***	-0.043**
	1- 10 km	-0.028***	-0.030***	0.013	-0.058***	-0.038**		-0.061***	-0.057***
FDP	n > 20 km	0.002	0.002	0.006	0.001	0.001		0.001	0.007**
2013	11- 20 km	0.001	0.001	0.006	-0.002	-0.001		-0.002	0.001
	1- 10 km	0.000	0.000	0.001	-0.003**	-0.001		-0.003**	-0.000
GRN	n > 20 km	0.002	0.002	-0.017***	0.004	0.005		0.006**	-0.010
2013	11- 20 km	-0.001	-0.001	-0.010**	0.005	0.006*		0.006*	-0.008**
	1- 10 km	-0.003	-0.002	-0.011***	0.006**	0.013***		0.007***	-0.007
SPD	n > 20 km	0.059***	0.061***	-0.090**	0.092***	0.095***		0.088***	0.061***
2013	11- 20 km	0.037***	0.039***	-0.050	0.072***	0.072***		0.073***	0.043***
	1- 10 km	0.031***	0.033***	-0.072**	0.064***	0.063***		0.064***	0.036***
LNK	n > 20 km	0.034***	0.034***	-0.009	0.043***	0.041***		0.043***	0.044***
2013	11- 20 km	0.019***	0.019***	-0.009	0.018**	0.012		0.019**	0.031***
	1- 10 km	0.014***	0.014***	0.017	0.027***	-0.001		0.029***	0.058***

Party	km to Control Municipality	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
CDU	n > 20 km	-0.104***	-0.107***	0.090	-0.089***	-0.088***		-0.089***	-0.057**
2009	11- 20 km	-0.059***	-0.065***	0.043	-0.059***	-0.052***		-0.057***	-0.009
	1- 10 km	-0.038***	-0.044***	0.057	-0.045***	-0.029*		-0.040**	0.009
FDP	n > 20 km	-0.011**	-0.011***	0.065***	-0.022***	-0.022***		-0.022***	-0.005
2009	11- 20 km	-0.007*	-0.008**	0.040**	-0.019***	-0.016***		-0.018***	0.000
	1- 10 km	-0.004	-0.005	0.042**	-0.019***	-0.013***		-0.018***	-0.001
GRN	n > 20 km	0.010***	0.009***	-0.010	0.010***	0.010***		0.010***	-0.001
2009	11- 20 km	0.003	0.003	-0.001	0.009**	0.010**		0.010**	-0.001
	1- 10 km	0.002	0.002	-0.003	0.011**	0.013***		0.012**	-0.001
SPD	n > 20 km	0.082***	0.085***	-0.076	0.098***	0.098***		0.095***	0.033
2009	11- 20 km	0.048***	0.054***	-0.035	0.054***	0.050***		0.056***	-0.012
	1- 10 km	0.033***	0.037***	-0.064**	0.027	0.018		0.028*	-0.041**
LNK	n > 20 km	0.027***	0.028***	-0.069***	0.022**	0.022**		0.023**	0.036***
2009	11- 20 km	0.011	0.015*	-0.059**	0.021**	0.018**		0.022**	0.029**
	1- 10 km	0.007	0.009	-0.046	0.033***	0.024***		0.036***	0.051***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Estimator: *Nearest-neighbor matching* (*Population Density, Average Income, Voter Participation and Stasi Density Class), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table A.2.10 - ATE of Distance from Occupation on Percent of Votes (2009, 2013 and 2017)(Nearest Neighbor)

$$\tau^{ATE} \approx \frac{1}{N}\sum_{i}^{n}((y_i(1) - \frac{1}{M}\sum_{j}^{m}(y_i(0)) - (y_i(0) - \frac{1}{M}\sum_{i}^{m} y_i(1))) \quad (2.6)$$

Party	km to Control Municipality	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
AFD	n > 20 km	-0.001	-0.005	0.179***	-0.063***	-0.061***	0.208***	-0.063***	-0.062***
2017	11- 20 km	0.015	0.011	0.126**	-0.036***	-0.032***	0.162***	-0.036***	-0.042***
	1- 10 km	0.013	0.008	0.120**	-0.046***	-0.028***	0.136***	-0.046***	-0.048***
CDU	n > 20 km	-0.067***	-0.063***	-0.040**	-0.021	-0.016	0.119***	-0.021	-0.014
2017	11- 20 km	-0.033***	-0.031***	-0.062***	-0.007	-0.003	0.097***	-0.007	-0.006
	1- 10 km	-0.019**	-0.017**	-0.070***	0.004	0.011	0.092*	0.004	0.002
FDP	n > 20 km	0.005**	0.005**	0.046***	0.016**	0.015**	0.167***	0.016**	0.015**
2017	11- 20 km	-0.003	-0.003*	0.009	0.001	0.001	0.125***	0.001	-0.001
	1- 10 km	-0.005**	-0.005***	-0.001	-0.005	-0.003	0.107***	-0.005	-0.006
GRN	n > 20 km	0.001	0.001	-0.003	0.002	0.001	-0.025***	0.002	0.000
2017	11- 20 km	-0.001	-0.001	-0.010**	0.001	0.000	-0.020***	0.001	0.001
	1- 10 km	-0.002	-0.002	-0.009**	0.001	0.001	-0.018***	0.001	0.002
SPD	n > 20 km	0.043***	0.045***	-0.112***	0.037**	0.033**	-0.094***	0.037**	0.033**
2017	11- 20 km	0.015**	0.017**	-0.044	0.012	0.009	-0.081***	0.012	0.017
	1- 10 km	0.006	0.008	-0.048	0.005	-0.006	-0.072***	0.005	0.007
LNK	n > 20 km	0.018***	0.018***	-0.087***	0.026***	0.024***	-0.295***	0.026***	0.024***
2017	11- 20 km	0.005	0.006*	-0.036**	0.017***	0.013***	-0.224***	0.017***	0.021***
	1- 10 km	0.008*	0.009**	-0.009	0.032***	0.012***	-0.190***	0.032***	0.033***

Party	km to Control Municipality	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
AFD	n > 20 km	-0.011***	-0.011***	0.050***	-0.017***	-0.018***	-0.099***	-0.017***	-0.018***
2013	11- 20 km	-0.005**	-0.006***	0.025*	-0.008*	-0.007	-0.079***	-0.008*	-0.012***
	1- 10 km	-0.005**	-0.006***	0.003	-0.010**	-0.004	-0.072***	-0.010**	-0.011***
CDU	n > 20 km	-0.091***	-0.090***	0.092**	-0.053	-0.047	0.552***	-0.053	-0.047
2013	11- 20 km	-0.042***	-0.044***	0.017	-0.019	-0.011	0.437***	-0.019	-0.033
	1- 10 km	-0.024**	-0.025**	0.011	-0.016	0.041	0.390***	-0.016	-0.021
FDP	n > 20 km	0.003*	0.003*	0.010	0.003	0.003	0.050***	0.003	0.003
2013	11- 20 km	0.002	0.002	0.006	0.000	0.001	0.038***	0.000	-0.001
	1- 10 km	0.002	0.002	-0.007	-0.002	0.002	0.032***	-0.002	-0.002
GRN	n > 20 km	0.004**	0.003	-0.019***	0.001	0.000	-0.012***	0.001	-0.000
2013	11- 20 km	-0.001	-0.001	-0.010**	0.000	0.001	-0.011***	0.000	-0.002
	1- 10 km	-0.002	-0.002	-0.016***	-0.001	0.004**	-0.011	-0.001	-0.001
SPD	n > 20 km	0.077***	0.079***	-0.158***	0.044	0.043	-0.183***	0.044	0.042
2013	11- 20 km	0.034***	0.037***	-0.052	0.017	0.011	-0.150***	0.017	0.031
	1- 10 km	0.025***	0.028***	-0.040	0.008	-0.035	-0.134***	0.008	0.012
LNK	n > 20 km	0.028***	0.028***	-0.034	0.032**	0.031**	-0.313***	0.032**	0.032**
2013	11- 20 km	0.015**	0.016**	-0.010	0.012	0.005	-0.240***	0.012	0.024*
	1- 10 km	0.010	0.011	0.034	0.025**	-0.021*	-0.207***	0.025**	0.029**

Party	km to Control Municipality	General	Decom General	Active General	Dense	Decom Dense	Active Heavy	Heavy Troops	Heavy Building
CDU	n > 20 km	-0.110***	-0.111***	0.049	-0.058*	-0.056*	0.515***	-0.058*	-0.053*
2009	11- 20 km	-0.048***	-0.054***	0.073	-0.033	-0.018	0.406***	-0.033	-0.036
	1- 10 km	-0.023	-0.031**	0.099**	-0.005	0.022	0.363***	-0.005	-0.019
FDP	n > 20 km	-0.006	-0.008*	0.087***	-0.009	-0.010	0.112***	-0.009	-0.010
2009	11- 20 km	-0.004	-0.006*	0.044**	-0.013	-0.009	0.085***	-0.013	-0.015
	1- 10 km	0.002	-0.000	0.043**	-0.010	-0.002	0.070***	-0.010	-0.016
GRN	n > 20 km	0.012***	0.012***	0.010	0.005**	0.005**	-0.034***	0.005**	0.004**
2009	11- 20 km	0.002	0.002	-0.007	0.003*	0.002	-0.029***	0.003*	0.002
	1- 10 km	-0.001	-0.000	-0.014**	0.002	0.001	-0.028***	0.002	0.001
SPD	n > 20 km	0.085***	0.088***	-0.105**	0.048	0.048	-0.234***	0.048	0.046
2009	11- 20 km	0.038***	0.043***	-0.051	0.021	0.009	-0.195***	0.021	0.027
	1- 10 km	0.020*	0.026**	-0.075**	-0.021	-0.043	-0.180***	-0.021	-0.006
LNK	n > 20 km	0.022**	0.022	-0.073***	0.029***	0.029***	-0.191***	0.029***	0.029***
2009	11- 20 km	0.009	0.013	-0.065**	0.035***	0.032***	-0.141***	0.035***	0.039***
	1- 10 km	0.002	0.006	-0.053*	0.053***	0.045***	-0.111	0.053***	0.061***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Treatment: *Soviet Occupation*

Exact match: *Municipality class (City, Suburb or Countryside) and StaSi Density Class (<50th, 50th – 90th, >90th pctl)*

Estimator: *Nearest-neighbor matching* (*Population Density, Average Income and Voter Participation), robust (2)*

Distance: *Mahalanobis (bias adjustment)*

Table A.2.11 - ATE of Distance from Occupation on Percent of Votes (2009, 2013 and 2017)(Exact)

$$\tau^{ATE} \approx \frac{1}{N}\sum_{i}^{n}\left((y_i(1) - \frac{1}{M}\sum_{j}^{m}(y_i(0)) - (y_i(0) - \frac{1}{M}\sum_{i}^{m} y_i(1))\right) \quad (2.6)$$

	km to Control Municipality	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
RIGHT WING	n > 20 km	-0.042***	-0.047***	-0.088***	-0.085***	-0.088***	-0.071***	-0.050***
2017	11- 20 km	-0.023***	-0.028***	-0.070***	-0.066***	-0.070***	-0.069***	-0.039***
	1- 10 km	-0.018**	-0.021***	-0.083***	-0.071***	-0.083***	-0.081***	-0.059***
LEFT WING	n > 20 km	0.042***	0.047***	0.100***	0.098***	0.100***	0.078***	0.016***
2017	11- 20 km	0.020***	0.026***	0.070***	0.066***	0.070***	0.066***	0.000
	1- 10 km	0.018**	0.022***	0.086***	0.077***	0.086***	0.082***	-0.004
POPULISM	n > 20 km	0.013	0.005	-0.071***	-0.065***	-0.071***	-0.058***	0.058***
2017	11- 20 km	0.016*	0.011	-0.041***	-0.044***	-0.041***	-0.037***	0.038***
	1- 10 km	0.016*	0.011	-0.049***	-0.060***	-0.049***	-0.045***	0.063***
HEGEMON	n > 20 km	-0.022*	-0.012	0.066***	0.059***	0.066***	0.045***	-0.004
2017	11- 20 km	-0.014	-0.007	0.036***	0.039***	0.036***	0.029***	-0.005
	1- 10 km	-0.009	-0.003	0.050***	0.060***	0.050***	0.042***	-0.006

	km to Control Municipality	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
RIGHT WING	n > 20 km	-0.076***	-0.077***	-0.100***	-0.102***	-0.100***	-0.098***	-0.073***
2017	11- 20 km	-0.048***	-0.051***	-0.073***	-0.066***	-0.073***	-0.078***	-0.049***
	1- 10 km	-0.032***	-0.034***	-0.069***	-0.047***	-0.069***	-0.073***	-0.059***
LEFT WING	n > 20 km	0.083***	0.085***	0.132***	0.134***	0.132***	0.128***	0.089***
2017	11- 20 km	0.051***	0.056***	0.093***	0.086***	0.093***	0.098***	0.057***
	1- 10 km	0.039***	0.042***	0.093***	0.072***	0.093***	0.097***	0.072***
POPULISM	n > 20 km	0.022***	0.020***	0.016*	0.014	0.016*	0.017*	0.012
2017	11- 20 km	0.013***	0.012**	0.008	0.002	0.008	0.010	0.010
	1- 10 km	0.007	0.006	0.012*	-0.011	0.012*	0.013	0.031**
HEGEMON	n > 20 km	-0.015*	-0.011	0.011	0.013*	0.011	0.008	0.010
2017	11- 20 km	-0.008	-0.006	0.012	0.017**	0.012	0.009	0.007
	1- 10 km	0.001	0.002	0.008	0.023***	0.008	0.005	-0.010

	km to Control Municipality	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
RIGHT WING	n > 20 km	-0.115***	-0.116***	-0.113***	-0.111***	-0.113***	-0.111***	-0.061**
2009	11- 20 km	-0.068***	-0.074***	-0.075***	-0.064***	-0.075***	-0.075***	-0.010
	1- 10 km	-0.046***	-0.051***	-0.056***	-0.034**	-0.056***	-0.055***	0.012
LEFT WING	n > 20 km	0.114***	0.121***	0.131***	0.129***	0.131***	0.127***	0.059***
2009	11- 20 km	0.065***	0.071***	0.083***	0.075***	0.083***	0.087***	0.015
	1- 10 km	0.046***	0.050***	0.069***	0.051***	0.069***	0.074***	0.007
POPULISM	n > 20 km	0.028***	0.029***	0.021**	0.020**	0.021**	0.018*	0.031***
2009	11- 20 km	0.014**	0.016**	0.022***	0.019**	0.022***	0.025***	0.024**
	1- 10 km	0.011	0.012	0.034***	0.026***	0.034***	0.037***	0.046***
HEGEMON	n > 20 km	-0.022***	-0.022***	0.009	0.009	0.009	0.008	-0.018**
2009	11- 20 km	-0.011*	-0.012*	-0.004	-0.001	-0.004	-0.003	-0.014
	1- 10 km	-0.008	-0.009	-0.013	-0.006	-0.013	-0.011	-0.024**

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Estimator: *Nearest-neighbor matching* (*Population Density, Average Income, Voter Participation and Stasi Density Class), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table A.2.12 - ATE of Occupation Size and Status on Political Preferences (2009, 2013 and 2017)(Nearest Neighbor)

$$\tau^{ATE} \approx \frac{1}{N}\sum_{i}^{n}\left((y_i(1) - \frac{1}{M}\sum_{j}^{m}(y_i(0)) - (y_i(0) - \frac{1}{M}\sum_{i}^{m} y_i(1))\right) \quad (2.6)$$

	km to Control Municipality	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
RIGHT WING	n > 20 km	-0.064***	-0.063***	-0.068***	-0.061***	-0.068***	-0.060***	-0.092***
2017	11- 20 km	-0.020**	-0.023***	-0.040**	-0.033*	-0.040**	-0.048***	-0.044***
	1- 10 km	-0.010	-0.014*	-0.047***	-0.021	-0.047***	-0.052***	-0.074***
LEFT WING	n > 20 km	0.061***	0.063***	0.065***	0.058***	0.065***	0.057***	0.076***
2017	11- 20 km	0.017	0.021**	0.029*	0.021	0.029*	0.038**	0.003
	1- 10 km	0.011	0.015*	0.037**	0.008	0.037**	0.042**	-0.002
POPULISM	n > 20 km	0.016	0.012	-0.037***	-0.037***	-0.037***	-0.038***	0.069***
2017	11- 20 km	0.020*	0.017	-0.018***	-0.020***	-0.018***	-0.021***	0.036***
	1- 10 km	0.021*	0.017*	-0.014***	-0.016***	-0.014***	-0.015***	0.070***
HEGEMON	n > 20 km	-0.024	-0.019	0.016**	0.017**	0.016**	0.019**	0.021**
2017	11- 20 km	-0.017	-0.013	0.007	0.007	0.007	0.012**	-0.015
	1- 10 km	-0.013	-0.008	0.008	0.005	0.008	0.009*	-0.013

	km to Control Municipality	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
RIGHT WING	n > 20 km	-0.098***	-0.097***	-0.067**	-0.063*	-0.067**	-0.062*	-0.092***
2013	11- 20 km	-0.044***	-0.047***	-0.027	-0.017	-0.027	-0.045	-0.044***
	1- 10 km	-0.027**	-0.030**	-0.028	0.040	-0.028	-0.034	-0.074***
LEFT WING	n > 20 km	0.108***	0.108***	0.073*	0.070*	0.073*	0.070*	0.069***
2013	11- 20 km	0.047***	0.050***	0.028	0.015	0.028	0.051	0.036***
	1- 10 km	0.032**	0.036***	0.032	-0.053*	0.032	0.040	0.070***
POPULISM	n > 20 km	0.017**	0.017*	0.014	0.013	0.014	0.014	0.021**
2013	11- 20 km	0.010	0.010	0.003	-0.002	0.003	0.012	-0.015
	1- 10 km	0.005	0.004	0.015	-0.025**	0.015	0.017*	-0.013
HEGEMON	n > 20 km	-0.014	-0.011	-0.008	-0.004	-0.008	-0.005	-0.121***
2013	11- 20 km	-0.007	-0.006	-0.001	0.001	-0.001	-0.000	0.005
	1- 10 km	0.001	0.002	-0.008*	0.006	-0.008*	-0.009*	0.011

	km to Control Municipality	General	Decom General	Dense	Decom Dense	Heavy	Heavy Troops	Heavy Building
RIGHT WING	n > 20 km	-0.116***	-0.119***	-0.067	-0.066	-0.067	-0.063	-0.124***
2009	11- 20 km	-0.052***	-0.060***	-0.046	-0.027	-0.046	-0.052	-0.035
	1- 10 km	-0.021	-0.032*	-0.015	0.020	-0.015	-0.035	-0.011
LEFT WING	n > 20 km	0.118***	0.121***	0.082**	0.081**	0.082**	0.079**	0.113***
2009	11- 20 km	0.048***	0.057***	0.058*	0.042	0.058*	0.067**	0.039*
	1- 10 km	0.021	0.031**	0.034	0.003	0.034	0.057*	0.027
POPULISM	n > 20 km	0.022**	0.022	0.029***	0.029***	0.029***	0.029***	0.016
2009	11- 20 km	0.009	0.013	0.035***	0.032***	0.035***	0.039***	0.030***
	1- 10 km	0.002	0.006	0.053***	0.045***	0.053***	0.061***	0.051***
HEGEMON	n > 20 km	-0.025***	-0.023**	-0.009	-0.008	-0.009	-0.007	0.004
2009	11- 20 km	-0.008	-0.010	-0.011	-0.008	-0.011	-0.009	-0.020***
	1- 10 km	-0.003	-0.006	-0.026***	-0.021**	-0.026***	-0.024***	-0.031***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Treatment: *Soviet Occupation*
Exact match: *Municipality class (City, Suburb or Countryside) and StaSi Density Class (<50th, 50th – 90th, >90th pctl)*
Estimator: *Nearest-neighbor matching (Population Density, Average Income and Voter Participation), robust (2)*
Distance: *Mahalanobis (bias adjustment)*

Table A.2.13 - ATE of Occupation Size and Status on Political Preferences (2009, 2013 and 2017)(Exact)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(general)_i + \sum_j \mathbb{1}(stasi)_i \times \mathbb{1}(AFD)_t + (\mathbf{Z}_{it} + \mathbf{Z}_{i33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.7)$$

	LNK 09|13	LNK 09|17	GRN 09|13	GRN 09|17	SPD 09|13	SPD 09|17	FDP 09|13	FDP 09|17	CDU 09|13	CDU 09|17
Year	-0.055***	-0.110***	-0.014***	-0.020***	-0.008***	-0.033***	-0.086***	-0.049***	0.093***	-0.032***
Dummy	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)
General Occupation	0.017***	0.018***	0.004**	0.003*	0.004	0.007*	-0.007***	-0.007***	-0.024***	-0.022***
Dummy	(0.005)	(0.004)	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.002)	(0.004)	(0.005)
Interaction	-0.003	-0.007*	-0.001	-0.000	-0.001	-0.011***	0.007***	0.005**	0.004	0.013**
(Occupied x Year)	(0.003)	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.006)
StaSi Density	0.000	-0.001	-0.002*	-0.002*	-0.001	-0.002	-0.001	0.000	-0.002	-0.002
n=50th - 90th pctl	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
StaSi Density	-0.008**	-0.009***	-0.000	0.001	-0.003	-0.001	0.002	0.003	-0.006	-0.012***
n >90th pctl	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.005)	(0.004)
Interaction	0.000	-0.002	-0.000	-0.000	0.007	0.010*	0.000	-0.002	0.001	0.001
Occupied*Mid StaSi	(0.006)	(0.005)	(0.002)	(0.002)	(0.006)	(0.006)	(0.002)	(0.002)	(0.007)	(0.006)
Interaction	0.029***	0.023***	-0.007***	-0.009***	-0.007	0.000	0.003	-0.004	-0.002	0.010
Occupied*Hi StaSi	(0.007)	(0.006)	(0.003)	(0.002)	(0.006)	(0.006)	(0.002)	(0.003)	(0.007)	(0.006)
Average Income	-0.057***	-0.041***	0.022***	0.023***	0.012**	0.011*	0.024***	0.036***	0.034***	0.029***
	(0.009)	(0.008)	(0.004)	(0.004)	(0.006)	(0.006)	(0.005)	(0.006)	(0.009)	(0.008)
Population Density	0.005***	0.005***	0.001	0.001**	0.003***	0.001	-0.000	0.002**	-0.010***	-0.009***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Percentage Turnout	-0.054***	-0.092***	0.006	0.013*	-0.042***	-0.076***	0.001	0.021**	0.037**	0.069***
	(0.016)	(0.017)	(0.006)	(0.007)	(0.011)	(0.014)	(0.009)	(0.010)	(0.018)	(0.027)
Nazi Party 1933	0.000	0.000	-0.000***	-0.000***	0.000**	0.001**	-0.000**	-0.000	0.001	0.001**
Vote Share	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Communist Party	0.000	0.000	-0.000***	-0.000**	0.000	0.000	-0.000**	-0.000**	-0.001	-0.000
Vote Share 1933	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Voter turnout 1933	0.000	-0.001	-0.001***	-0.001***	0.002***	0.003***	0.000	0.001*	-0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Overall R-sq	0.427	0.712	0.189	0.244	0.489	0.489	0.809	0.498	0.545	0.245
groups	1328	1334	1324	1331.000	1327	1334.000	1328	1335	1328	1335
observations	2620	2594	2600	2575.000	2619	2595.000	2604	3074	2621	2597

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, ***+ $p < 0.01$

Table A.2.14 - Differential Response to the Addition of the New Party on General Occupation (2009-17)

$$percentage\ vote\ share_{ikt} = \alpha + \mathbb{1}(closed)_i + \sum_j \mathbb{1}(stasi)_i \times \mathbb{1}(AFD)_t + (\mathbf{Z}_{it} + \mathbf{Z}_{i33}) + \theta_k + \tau_t + \varepsilon_{ikt} \quad (2.7)$$

	LNK 09|13	LNK 09|17	SPD 09|13	SPD 09|17	GRN 09|13	GRN 09|17	FDP 09|13	FDP 09|17	CDU 09|13	CDU 09|17
Year	-0.055***	-0.110***	-0.008***	-0.033***	-0.014***	-0.020***	-0.086***	-0.049***	0.093***	-0.033***
Dummy	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
Decommissioned	0.015***	0.016***	0.005	0.009**	0.004*	0.003	-0.006***	-0.005***	-0.023***	-0.022***
Dummy	(0.005)	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)
Interaction	-0.001	-0.005	-0.002	-0.012***	-0.001	0.000	0.007***	0.004*	0.004	0.016**
(Occupied x Year)	(0.003)	(0.004)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.006)
StaSi Density	-0.000	-0.001	-0.001	-0.002	-0.002**	-0.002*	-0.001	0.000	-0.002	-0.002
n=50th - 90th pctl	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
StaSi Density	-0.008**	-0.009***	-0.003	-0.001	-0.000	0.001	0.002	0.003	-0.006	-0.012***
n >90th pctl	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.004)
Interaction	0.002	0.000	0.006	0.009*	0.000	0.000	-0.001	-0.003	-0.001	-0.001
Occupied*Mid StaSi	(0.006)	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)	(0.006)
Interaction	0.031***	0.024***	-0.009	-0.001	-0.007***	-0.009***	0.002	-0.004	-0.003	0.008
Occupied*Hi StaSi	(0.007)	(0.006)	(0.005)	(0.005)	(0.003)	(0.002)	(0.002)	(0.003)	(0.007)	(0.007)
Average Income	-0.057***	-0.041***	0.012**	0.011*	0.022***	0.022***	0.024***	0.036***	0.034***	0.030***
	(0.009)	(0.008)	(0.006)	(0.006)	(0.004)	(0.004)	(0.005)	(0.006)	(0.009)	(0.008)
Population Density	0.006***	0.005***	0.003***	0.001	0.001	0.001**	-0.000	0.002**	-0.010***	-0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Percentage Turnout	-0.055***	-0.093***	-0.042***	-0.076***	0.006	0.012*	0.002	0.021**	0.037**	0.069***
	(0.016)	(0.017)	(0.011)	(0.014)	(0.006)	(0.006)	(0.009)	(0.010)	(0.018)	(0.026)
Nazi Party 1933	0.000	0.000	0.000**	0.001**	-0.000***	-0.000***	-0.000**	-0.000	0.001	0.001**
Vote Share	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Communist Party	0.000	0.000	0.000	0.000	-0.000***	-0.000**	-0.000**	-0.000**	-0.001	-0.000
Vote Share 1933	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Voter turnout 1933	0.000	-0.001	0.002***	0.003***	-0.001***	-0.001***	0.000	0.001*	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Overall R-sq	0.427	0.712	0.489	0.489	0.188	0.244	0.809	0.497	0.545	0.244
groups	1328	1334	1327	1334	1324	1331	1328	1335	1328	1335
observations	2620	2594	2619	2595	2600	2575	2604	2596	2621	2597

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.2.15 - Differential Response to the Addition of the New Party on Decomissioned Bases (2009-17)

	income	*ocu_dum*	*ocu_dec*	*ocu_atv2*	*objektd*	*stazi_d~3*	*stazi_d~2*	*stazi_d~1*	***linke***	***spd***	***green***	***fdp***	***cdu***	***afd***	*k~1933*	*n~1933*
Income per Capita	1															
Occupation	-0.0578**	1														
Decommissioned	-0.0528**	0.936***	1													
Active BW	-0.0229	0.333***	-0.0197	1												
StaSi Office	0.024	-0.00173	0.00337	-0.014	1											
StaSi High	0.0646**	-0.0827***	-0.0762***	-0.0309	0.276***	1										
StaSi Mid	-0.106***	0.00699	0.0173	-0.0266	-0.0607**	-0.286***	1									
StaSi Low	0.0604**	0.0469*	0.0327	0.0458*	-0.121***	-0.372***	-0.783***	1								
% LINK	-0.259***	0.103***	0.0945***	0.0404*	-0.0196	-0.0673***	0.0358	0.00905	1							
% SPD	-0.0816***	0.111***	0.113***	0.0136	-0.0943***	0.0179	0.105***	-0.113***	0.352***	1						
% GRN	0.185***	0.0209	0.0213	0.00236	-0.011	0.0269	-0.0563**	0.0371	0.0607**	0.141***	1					
% FDP	0.335***	-0.00273	-0.004	0.00299	-0.00614	-0.0560**	-0.0798***	0.114***	-0.592***	-0.388***	-0.0362	1				
% CDU	-0.140***	-0.118***	-0.110***	-0.0409*	0.0381	0.0434*	0.0412*	-0.0681***	0.162***	-0.0206	-0.0456*	-0.593***	1			
% AFD	0.216***	-0.00587	-0.0077	0.00396	0.0245	0.0113	-0.0571**	0.0480*	-0.647***	-0.465***	-0.187***	0.732***	-0.736***	1		
Communist 1933	-0.0117	0.106***	0.0899***	0.0608**	0.110***	-0.301***	-0.100***	0.293***	0.0412*	-0.139***	-0.0367	0.116***	-0.116***	0.0637**	1	
Nazi 1933	-0.149***	-0.0361	-0.0276	-0.0287	-0.0509**	0.171***	0.0780***	-0.186***	-0.00597	0.225***	-0.0585**	-0.135***	0.0494*	-0.0645**	-0.490***	1

** p<0.05, ** p<0.01, *** p<0.001*

Table A.2.16 - Correlation Coefficients for Model Variables

Appendix A.3 - Visualization of Data

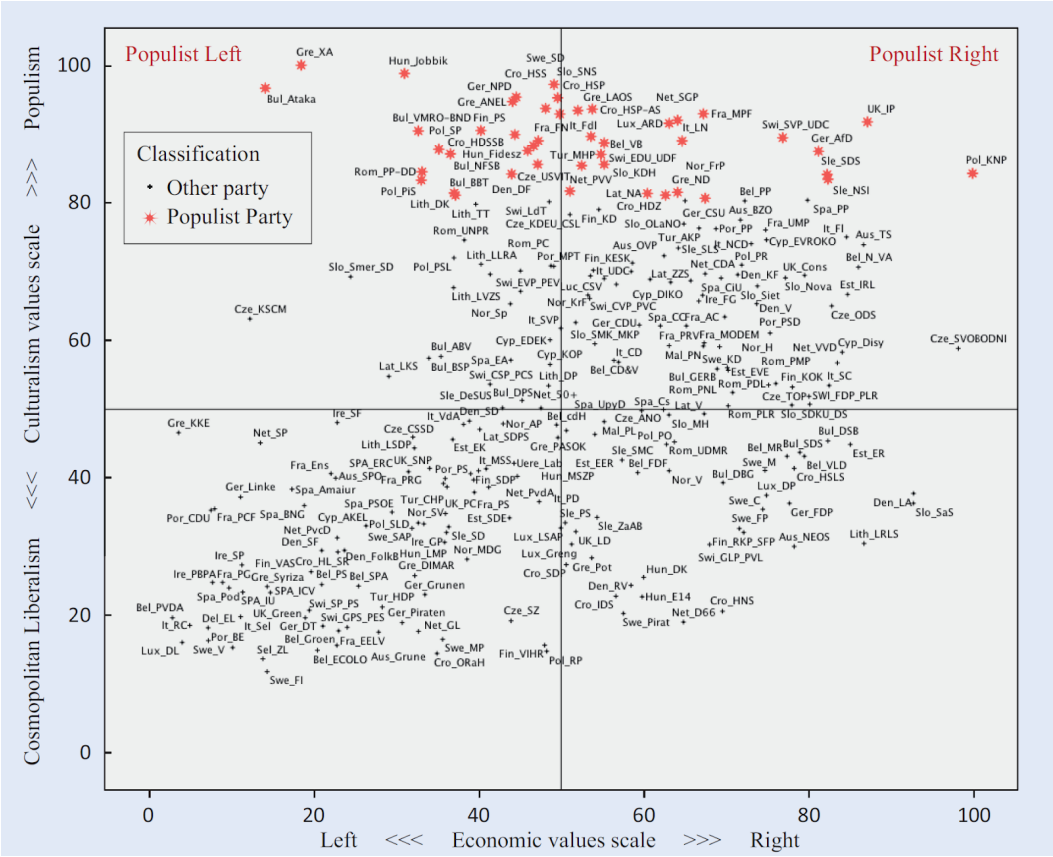

Figure A.3.1 - European Political Parties Compass (Inglehart and Norris 2016)

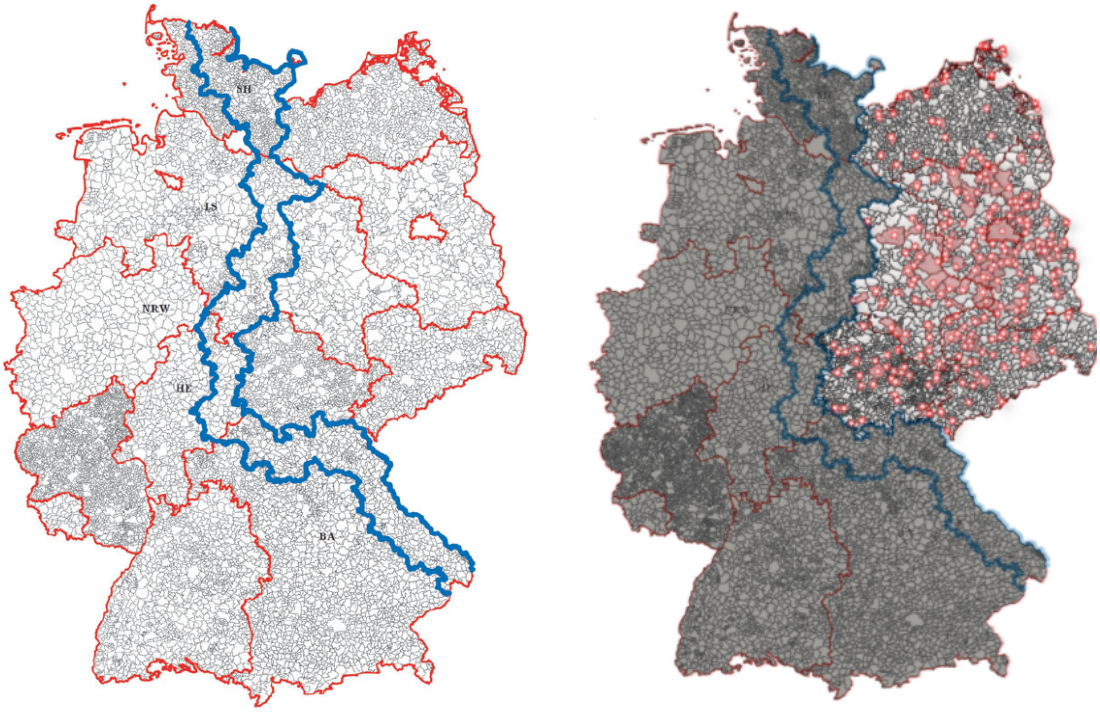

Figure A.3.2 - Area of Analysis Comparison (Ehrlich and Seidel 2016; Avdeenko 2018)

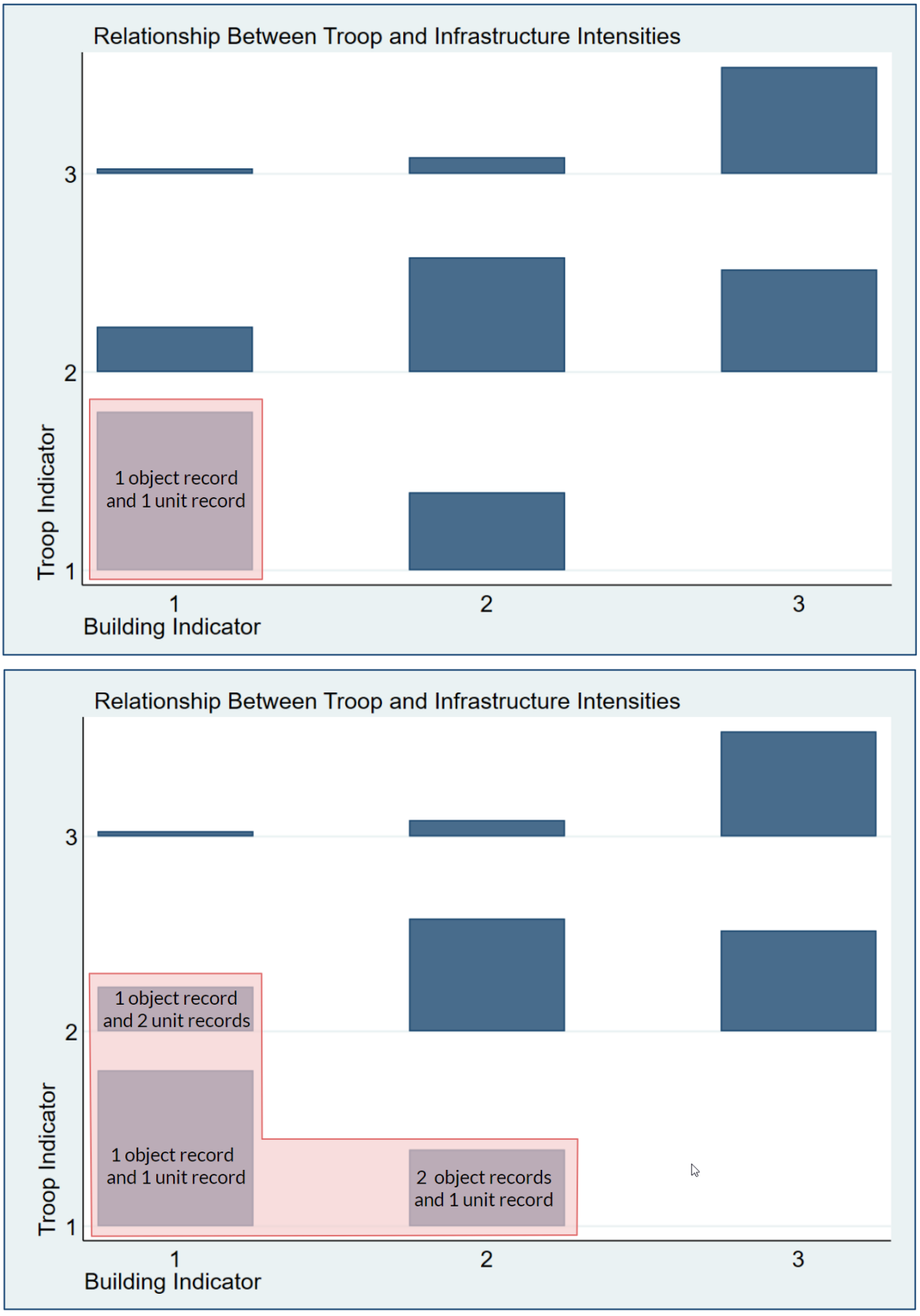

Figure A.3.3 - Categorical Variable of Soviet Occupation Density

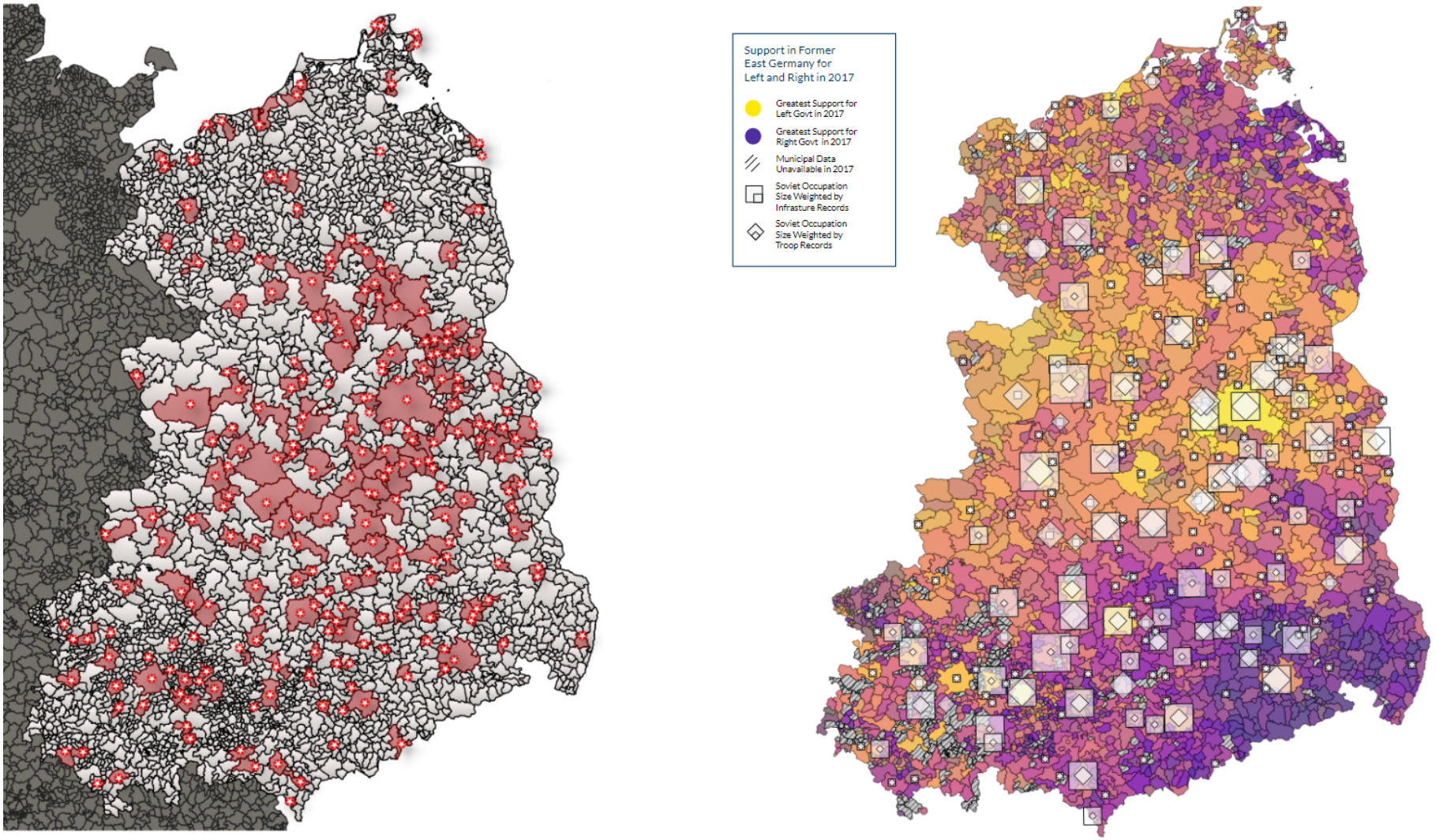

Figure A.3.4 - Support for Left and Right Parties in Regions with Military Installations

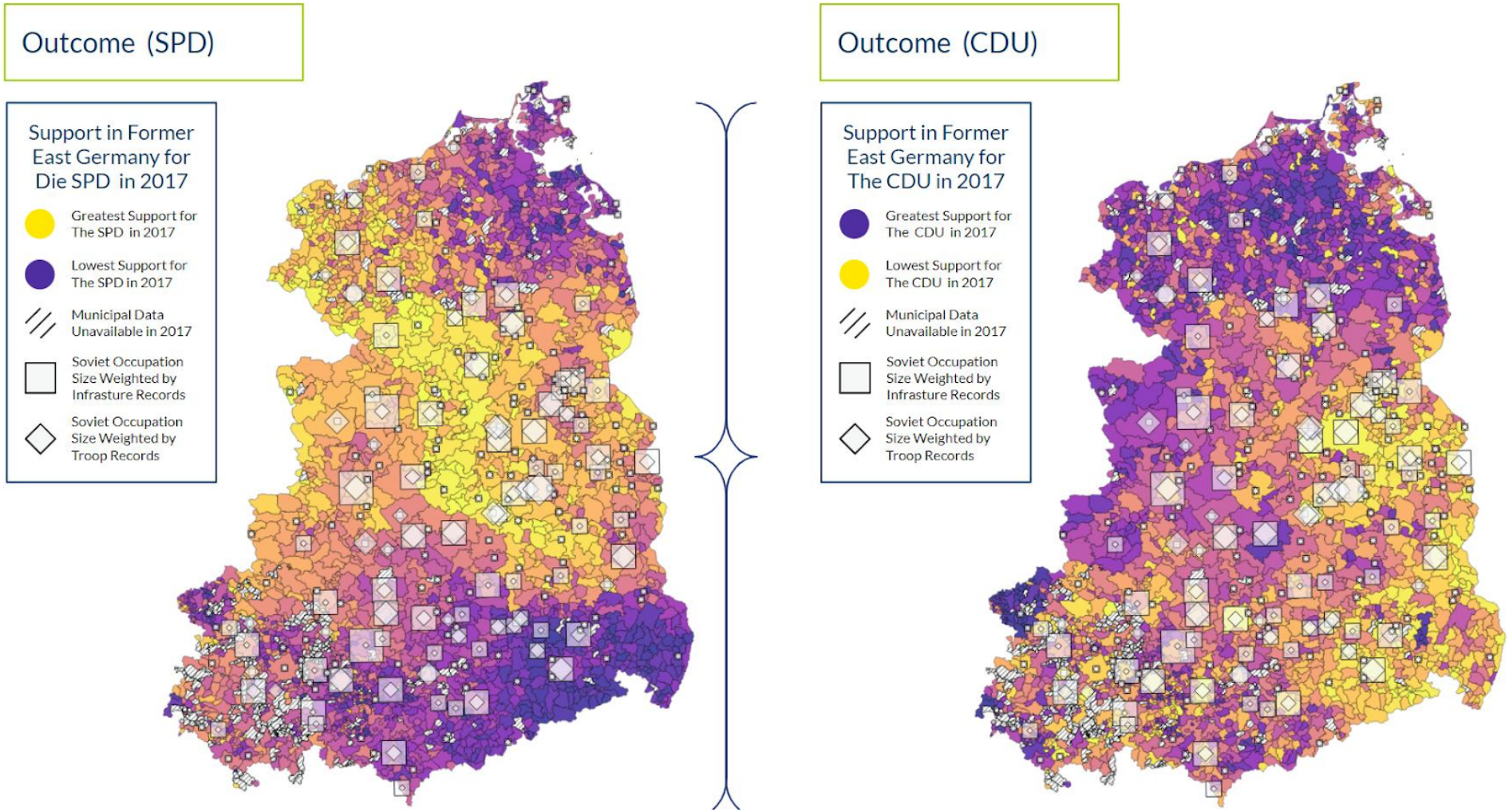

Figure A.3.5 - Support for SPD and CDU in Regions with Military Installations

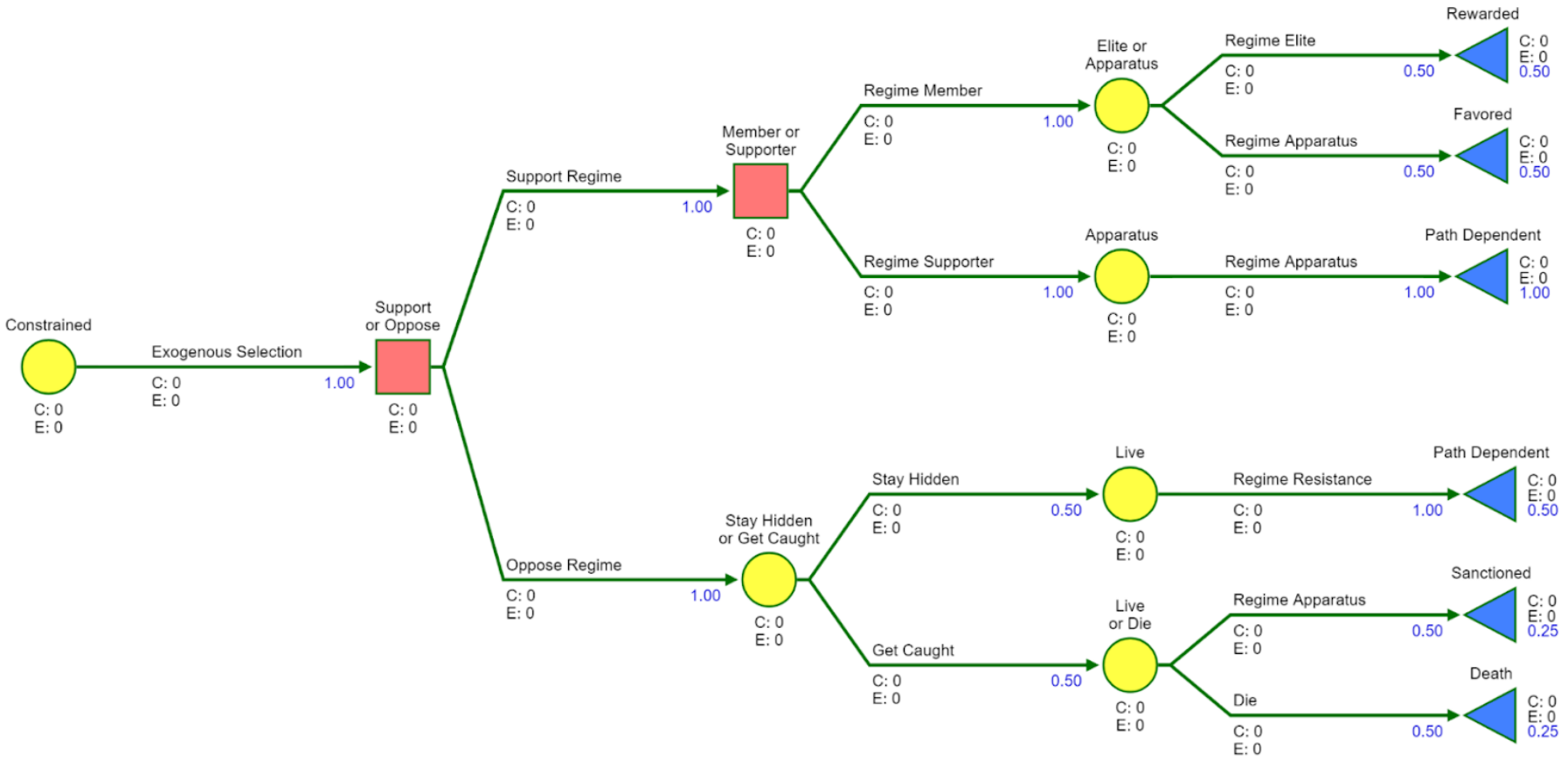

Figure A.3.6 - Preconditions for Social Strata and Self Sorting After Reunification

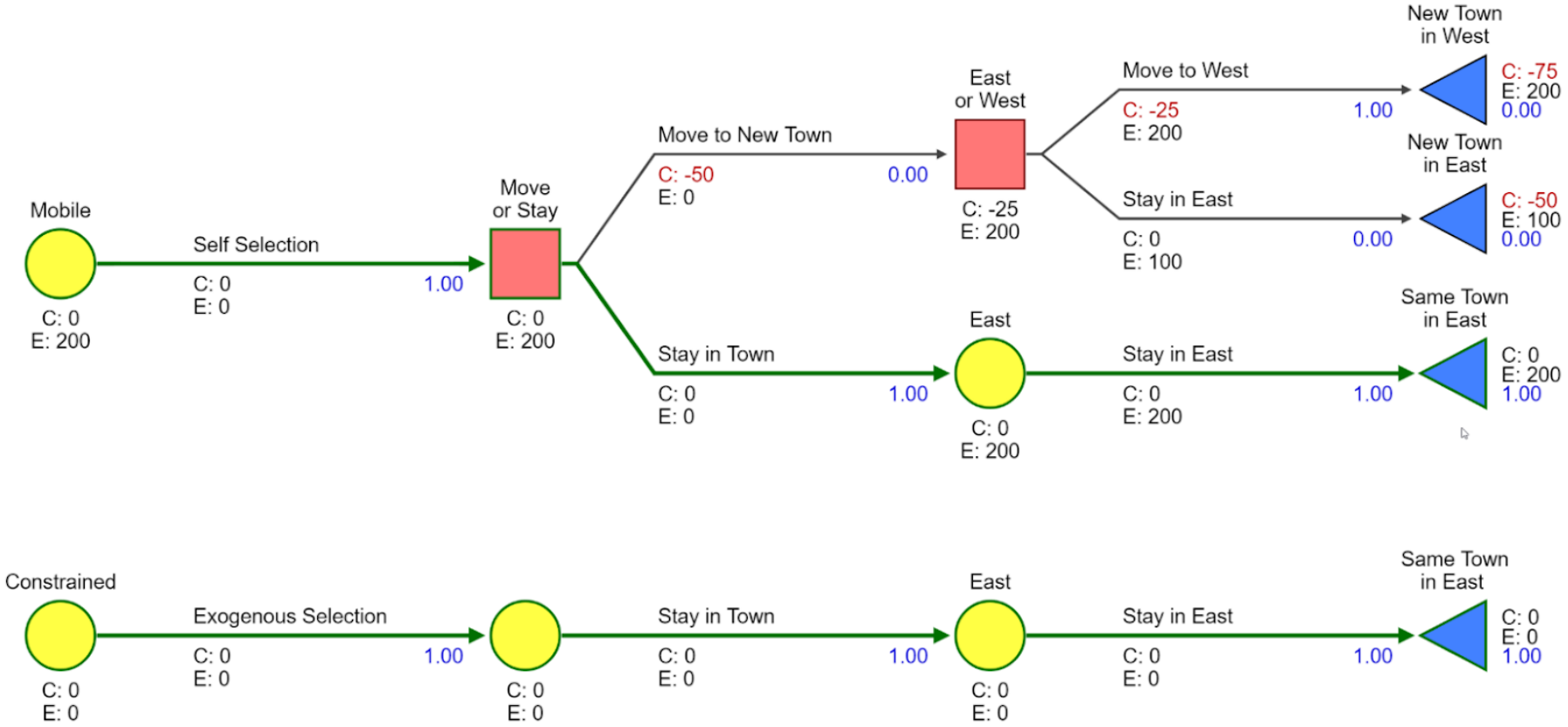

Figure A.3.7 - Mechanisms for Mobility and Self Selection after Reunification

Appendix A.4 Description of Data for Politics and Path Dependence

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Year	7162	2012.972	3.260	.039	2009	2013	2017
group(AGS)	7348	1262.967	743.546	8.674	1	1251	2591
Percent Linke Vote	7019	.209	0.070	.001	.02	.203	.519
Percent Linke Vote	7020	.155	0.051	.001	.023	.15	.386
Percent Green Vote	6959	.036	0.019	0	.002	.033	.232
Percent FDP Vote	6983	.068	0.041	0	.003	.066	.416
Percent CDU Vote	7023	.364	0.087	.001	.082	.354	.915
Percent AfD Vote	4700	.152	0.105	.002	.004	.116	.5
Percent Voter Turnout	7023	61.441	7.750	.092	28.1	61	97.3
Percent Nazi (NSDAP) 33’	4305	49.819	5.189	.079	36.604	49.736	66.191
Percent Communist (KPD) 33’	4305	11.475	4.827	.074	4.11	10.709	31.319
Voter Turnout 33’	4305	89.272	2.151	.033	84.892	89.094	94.131
Log Population Density	7162	4.056	0.988	.012	1.386	3.97	8.323
Log Income per Capita	7105	3.344	0.183	.002	2.075	3.337	4.916
Share of Stasi Informers	4305	.404	0.154	.002	.184	.372	1.028
Categorical Stasi	4305	1.596	0.681	.01	1	1	3
km to Nearest Treated	7162	11.452	7.119	.084	0	10.823	38.476
Categorical Distance	7162	1.504	0.808	.01	0	1	3
BW Infrastructure Count	625	4.827	7.928	.317	0	1	52
Report Infrastructure Count	625	1.578	2.452	.098	0	1	15
Categorical Infrastructure	619	5.197	7.854	.316	0	2	52
Survey of Infrastructure Count	625	1.018	1.912	.076	0	0	16
Report of Units Count	625	1.502	2.778	.111	0	0	22
Survey of Units Count	625	4.493	8.998	.36	0	1	86
Categorical Units	625	3.974	7.887	.315	0	2	86

Table A.4.1 Descriptive Statistics for All Municipalities

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
group(AGS)	2404	1244.294	739.332	15.079	1	1225.5	2590
Percent Linke Vote	2312	.271	0.060	.001	.049	.273	.519
Percent Linke Vote	2312	.169	0.055	.001	.023	.161	.386
Percent Green Vote	2302	.044	0.020	0	.005	.041	.232
Percent FDP Vote	2312	.109	0.033	.001	.015	.105	.416
Percent CDU Vote	2313	.339	0.078	.002	.136	.334	.911
Percent AfD Vote	0	.	.	.	.	.	.
Percent Voter Turnout	2313	.59	0.070	.001	.281	.589	.918

Table A.4.2 Voting Statistics for All Municipalities in 2009

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
group(AGS)	2405	1244.457	739.221	15.074	1	1226	2590
Percent Linke Vote	2375	.209	0.047	.001	.041	.21	.4
Percent Linke Vote	2375	.161	0.048	.001	.023	.157	.33
Percent Green Vote	2353	.033	0.017	0	.003	.03	.222
Percent FDP Vote	2340	.026	0.014	0	.003	.024	.334
Percent CDU Vote	2376	.435	0.069	.001	.222	.434	.915
Percent AfD Vote	2367	.06	0.023	0	.004	.058	.247
Percent Voter Turnout	2376	.614	0.075	.002	.343	.614	.925

Table A.4.3 Voting Statistics for All Municipalities in 2013

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
group(AGS)	2353	1245.669	741.872	15.294	1	1229	2590
Percent Linke Vote	2332	.148	0.037	.001	.02	.149	.306
Percent Linke Vote	2333	.134	0.042	.001	.027	.13	.314
Percent Green Vote	2304	.031	0.016	0	.002	.027	.169
Percent FDP Vote	2331	.069	0.022	0	.008	.068	.214
Percent CDU Vote	2334	.315	0.062	.001	.082	.307	.884
Percent AfD Vote	2333	.246	0.067	.001	.066	.237	.5
Percent Voter Turnout	2334	.638	0.079	.002	.335	.633	.973

Table A.4.4 Voting Statistics for All Municipalities in 2017

Appendix B - Power and Port Dependence

B.1 Robustness Checks for Income Variation

PER CAPITA GDP GROUP		EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE
Middle 50 (IQR)	Partial	0.196***	0.006	0.045	0.046				
	Complete					0.118**	0.082*	0.067	0.130***
	rmse	0.275	0.275	0.275	0.307	0.275	0.275	0.275	0.307
	N	145894	165601	150409	133578	145894	165601	150409	133578
Above 25th Percentile	Partial	0.097**	0.030	0.017	0.069				
	Complete					0.176***	0.146**	0.112***	0.108**
	rmse	0.212	0.224	0.216	0.251	0.212	0.224	0.216	0.251
	N	135405	143784	134784	118708	135405	143784	134784	118708
Below 25th Percentile	Partial	1.242***	0.350***	0.000	-0.389*				
	Complete					2.292**	0.237**	0.586	0.606
	rmse	0.403	0.319	0.417	0.581	0.402	0.319	0.417	0.581
	N	36151	44095	39868	35245	36151	44095	39868	35245
Above 35th Percentile	Partial	0.058	0.032	0.018	0.043				
	Complete					0.151***	0.147**	0.063*	0.078**
	rmse	0.204	0.217	0.207	0.240	0.204	0.216	0.207	0.240
	N	119754	126530	117829	103116	119754	126530	117829	103116
Below 35th Percentile	Partial	0.485*	0.056	0.445	-0.107				
	Complete					0.835	-0.160	0.231	0.246
	rmse	0.356	0.318	0.357	0.390	0.357	0.318	0.357	0.390
	N	51872	61277	57172	51501	51872	61277	57172	51501
Above 50th Percentile	Partial	0.014	0.055	0.062	-0.016				
	Complete					0.111**	0.218***	0.046	0.037
	rmse	0.191	0.204	0.197	0.230	0.191	0.204	0.197	0.230
	N	93356	97653	90710	79169	93356	97653	90710	79169
Below 50th Percentile	Partial	0.169***	0.043	0.050	0.125**				
	Complete					0.132	-0.182	0.022	-0.098
	rmse	0.308	0.302	0.295	0.324	0.308	0.302	0.295	0.324
	N	77958	90155	83792	74939	77958	90155	83792	74939
Above 65th Percentile	Partial	0.017	0.102*	0.043	-0.030				
	Complete					0.311***	0.276***	0.190***	0.272***
	rmse	0.206	0.220	0.212	0.254	0.206	0.219	0.211	0.254
	N	129576	141589	129843	109027	129576	141589	129843	109027
Below 65th Percentile	Partial	0.222***	0.051	0.060	0.082				
	Complete					0.060	-0.051	0.016	0.027
	rmse	0.284	0.284	0.285	0.307	0.284	0.284	0.285	0.307
	N	103070	118689	108814	98580	103070	118689	108814	98580
Above 75th Percentile	Partial	0.030	0.130**	0.103***	0.001				
	Complete					0.553***	0.093	0.181***	0.473***
	rmse	0.166	0.191	0.170	0.206	0.166	0.192	0.170	0.206
	N	50656	50430	48308	38514	50656	50430	48308	38514
Below 75th Percentile	Partial	0.209***	0.074	0.043	0.080				
	Complete					0.069	-0.020	0.017	0.026
	rmse	0.282	0.282	0.285	0.306	0.282	0.282	0.285	0.306
	N	121477	137644	126863	116317	121477	137644	126863	116317

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.1.1 Tolerance Analysis of Partial and Complete Terminal Control on Trade with China

PER CAPITA GDP GROUP		EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE	EXPORTS DOTS	IMPORTS DOTS	WTF TRADE	BACI TRADE
Middle 50 (IQR)	Members	-0.170**	-0.031	-0.091	-0.132**				
	RoW					-0.022	-0.056*	-0.019	-0.029
	rmse	0.275	0.275	0.275	0.307	0.275	0.275	0.275	0.307
	N	145894	165601	150409	133578	145894	165601	150409	133578
Above 25th Percentile	Members	-0.109	0.064	0.074	-0.033				
	RoW					-0.100**	-0.128**	-0.088***	-0.016
	rmse	0.212	0.224	0.216	0.251	0.212	0.224	0.216	0.251
	N	135405	143784	134784	118708	135405	143784	134784	118708
Below 25th Percentile	Members	-0.287	0.236	-0.469**	-0.486***				
	RoW					-0.402	0.111	-0.019	0.029
	rmse	0.403	0.319	0.417	0.581	0.403	0.319	0.417	0.581
	N	36151	44095	39868	35245	36151	44095	39868	35245
Above 35th Percentile	Members	-0.139	0.087	0.067	-0.060				
	RoW					-0.077*	-0.132**	-0.055*	0.011
	rmse	0.204	0.217	0.207	0.240	0.204	0.216	0.207	0.240
	N	119754	126530	117829	103116	119754	126530	117829	103116
Below 35th Percentile	Members	-0.198	-0.190**	-0.058	0.289**				
	RoW					-0.002	0.156*	0.103	-0.128
	rmse	0.357	0.318	0.357	0.389	0.357	0.318	0.357	0.390
	N	51872	61277	57172	51501	51872	61277	57172	51501
Above 50th Percentile	Members	0.092	0.200***	0.129	-0.052				
	RoW					-0.064	-0.184***	-0.055	0.057
	rmse	0.191	0.204	0.197	0.230	0.191	0.204	0.197	0.230
	N	93356	97653	90710	79169	93356	97653	90710	79169.000
Below 50th Percentile	Members	-0.408***	-0.107*	-0.046	0.132				
	RoW					0.190	0.095	0.076	-0.009
	rmse	0.307	0.302	0.295	0.324	0.308	0.302	0.295	0.324
	N	77958	90155	83792	74939	77958	90155	83792	74939
Above 65th Percentile	Members	-0.110	-0.031	-0.069	-0.108				
	RoW					-0.127**	-0.114***	-0.094**	-0.098*
	rmse	0.206	0.220	0.212	0.254	0.206	0.220	0.212	0.254
	N	129576	141589	129843	109027	129576	141589	129843	109027
Below 65th Percentile	Members	-0.261*	0.027	-0.071	-0.111				
	RoW					0.043	0.028	0.034	0.071
	rmse	0.284	0.284	0.285	0.307	0.284	0.284	0.285	0.307
	N	103070	118689	108814	98580	103070	118689	108814	98580
Above 75th Percentile	Members	-0.205	-0.080	0.108	-0.244				
	RoW					-0.053	-0.045	-0.074	0.118
	rmse	0.166	0.192	0.170	0.206	0.166	0.192	0.170	0.206
	N	50656	50430	48308	38514	50656	50430	48308	38514
Below 75th Percentile	Members	-0.235*	0.040	-0.049	-0.093				
	RoW					0.020	-0.003	0.020	0.054
	rmse	0.282	0.282	0.285	0.306	0.282	0.282	0.285	0.306
	N	121477	137644	126863	116317	121477	137644	126863	116317

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.1.2 Tolerance Analysis Trade among Members and Trade with Rest of World

B.2 Description of Data for Power and Port Dependence

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Year	321374	2009.277	5.678	.01	2000	2010	2018
Real GDP at Origin	192801	2.342e+14	1.253e+15	2.853e+12	28439862	5.052e+11	1.234e+16
Goods, Exports (FOB)	236847	5.640e+08	5.68e+09	11669860	1	2270559	4.807e+11
Goods, Imports (CIF)	263802	5.142e+08	5.37e+09	1.17e+07	1	1714269.5	5.395e+11
Total Trade WTF (1000)	242216	531854.7	5556123.16	11289.38	.001	1866.08	4.817e+08
Total Trade BACI (1000)	210733	318206.34	3046209.98	6635.80	1	1974.77	2.932e+08
Larch PTA Measure	321374	.208	0.406	.001	0	0	1
MSR Partners	321374	.021	0.144	0	0	0	1
Project Dummy	321374	0	0.017	0	0	0	1
Project Investment	321362	.001	0.080	0	0	0	7.431
Contract Dummy	321374	.001	0.029	0	0	0	1
Ownership Dummy	321374	0	0.019	0	0	0	1
Partial Control Dummy	321374	0	0.021	0	0	0	1
Complete Control Dummy	321374	0	0.018	0	0	0	1

Table B.2.1 Descriptive Statistics for All Country Pairs

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Real GDP at Origin	192609	2.342e+14	1.253e+15	2.855e+12	28439862	5.022e+11	1.234e+16
Goods, Exports (FOB)	236580	5.401e+08	5.29e+09	10883737	1	2255225	3.649e+11
Goods, Imports (CIF)	263534	4.886e+08	4.83e+09	9403371.2	1	1702983	3.478e+11
Total Trade WTF (1000)	242016	511549.2	5136182.981	10440.431	.001	1857.429	3.632e+08
Total Trade BACI (1000)	210503	305604.49	2943241.818	6415.002	1	1965.685	2.932e+08

Table B.2.2 Descriptive Statistics for Countries without Port Contract

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Real GDP at Origin	192	2.422e+14	1.403e+15	1.012e+14	1.839e+10	5.654e+13	1.234e+16
Goods, Exports (FOB)	267	2.176e+10	5.783e+10	3.539e+09	9097	5.565e+09	4.807e+11
Goods, Imports (CIF)	268	2.567e+10	6.991e+10	4.271e+09	134000	5.494e+09	5.395e+11
Total Trade WTF (1000)	200	25103137	69888759.485	4941881.6	134.1	6179446	4.817e+08
Total Trade BACI (1000)	230	11851795	21035090.116	1387012.8	126.516	4211438.1	1.599e+08

Table B.2.3 Descriptive Statistics for Countries with Port Contracts

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Real GDP at Origin	192726	2.342e+14	1.253e+15	2.854e+12	28439862	5.052e+11	1.234e+16
Goods, Exports (FOB)	236755	5.534e+08	5.45e+09	11196388	1	2265108	3.649e+11
Goods, Imports (CIF)	263709	5.031e+08	5.07e+09	9877911.7	1	1710278	4.256e+11
Total Trade WTF (1000)	242166	524557.23	5363799.172	10899.735	.001	1863.34	4.444e+08
Total Trade BACI (1000)	210646	313819.52	3021904.966	6584.218	1	1971.26	2.932e+08

Table B.2.4 Descriptive Statistics for Countries without Projects

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Real GDP at Origin	75	1.388e+14	5.248e+14	6.060e+13	1.059e+10	7.462e+13	3.493e+15
Goods, Exports (FOB)	92	2.775e+10	7.737e+10	8.067e+09	14032	4.896e+09	4.807e+11
Goods, Imports (CIF)	93	3.191e+10	8.960e+10	9.291e+09	50030	5.394e+09	5.395e+11
Total Trade WTF (1000)	50	35875809	95581662.955	13517288	51602.91	6218789	4.817e+08
Total Trade BACI (1000)	87	10939654	16014326.008	1716916	46.346	3307697.5	83276112

Table B.2.5 Descriptive Statistics for Countries with Projects

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Real GDP at Origin	80	1.053e+15	2.916e+15	3.260e+14	2.873e+10	5.995e+13	1.234e+16
Goods, Exports (FOB)	104	1.254e+10	1.801e+10	1.766e+09	3500562	3.812e+09	8.696e+10
Goods, Imports (CIF)	104	1.518e+10	2.367e+10	2.321e+09	41315309	3.465e+09	1.051e+11
Total Trade WTF (1000)	80	12556623	19212209.083	2147990.3	41344.715	3331792.4	70895016
Total Trade BACI (1000)	104	13422590	19446412.515	1906877.6	35144.305	3502513.9	87914296

Table B.2.6 Descriptive Statistics for Countries with Complete Control

	N	Mean	Std. Dev.	se(Mean)	min	Median	max
Real GDP at Origin	70	1.068e+14	2.863e+14	3.422e+13	3.818e+10	6.540e+13	1.808e+15
Goods, Exports (FOB)	112	1.965e+10	2.678e+10	2.530e+09	9097	1.018e+10	1.622e+11
Goods, Imports (CIF)	112	2.228e+10	3.215e+10	3.038e+09	134000	9.852e+09	2.030e+11
Total Trade WTF (1000)	82	19228420	24839652.267	2743080.7	134.1	9839333.5	1.590e+08
Total Trade BACI (1000)	86	21511372	29868835.612	3220839.4	126.516	8905789	1.599e+08

Table B.2.7 Descriptive Statistics for Countries with Ownership

Appendix C - Culture and Debt Dependence

Appendix C.1 - Institutional and Cultural Framework

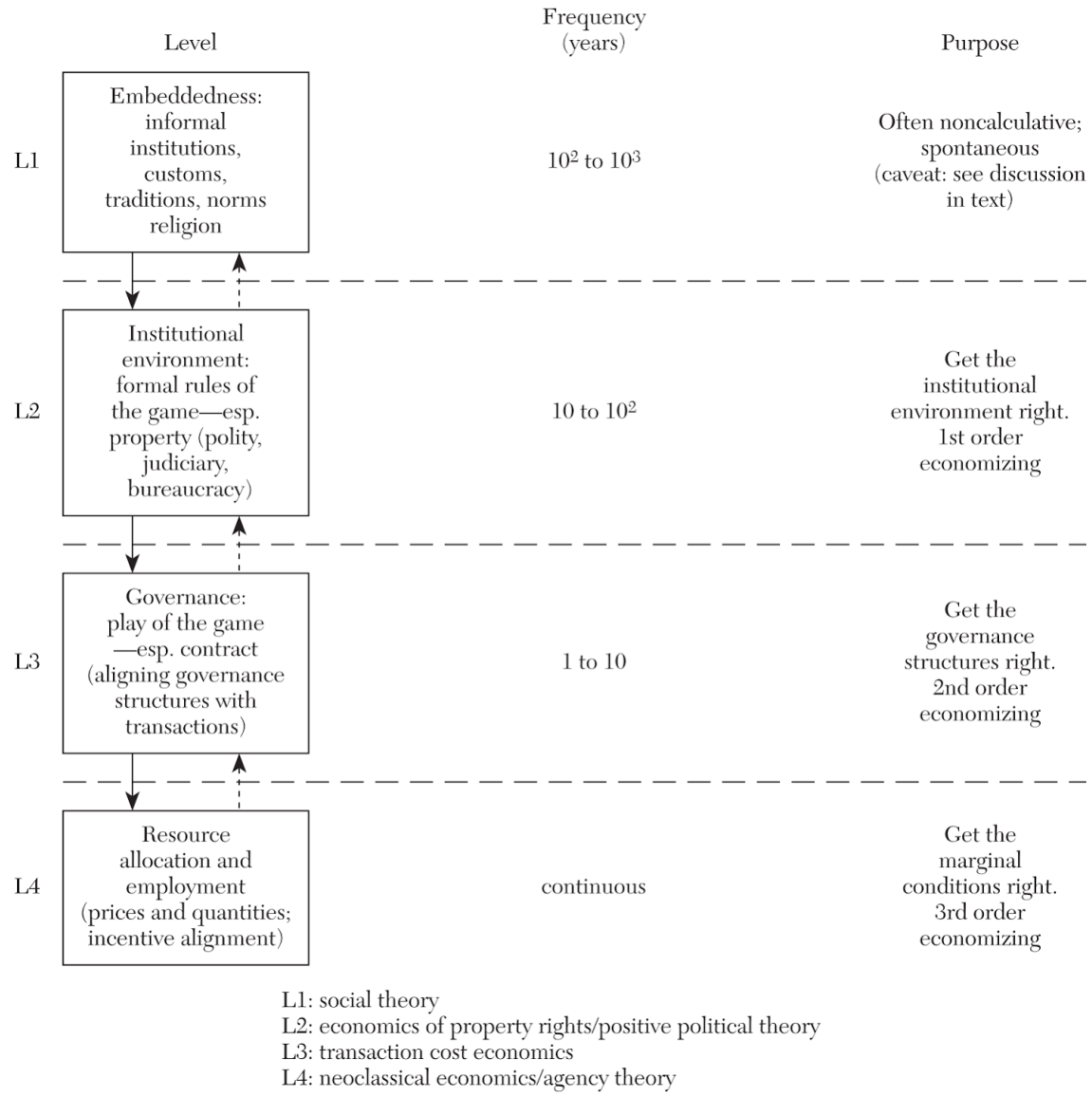

Figure C.1.1 - A Framework for New Institutional Economics (Williamson, 2000)

	Level	Frequency of Change	Purpose
L1	**Embeddedness:** Informal Institutions Culture	100 - 1000 years	Spontaneous
L2	**Institutions:** Formal Rules Property Rights	10 - 100 years	Defining Rules
L3	**Governance:** Governance Structures Playing the Game	1 - 10 years	Governing Resources
L4	**Resource Allocation:** Employment Incentives	continuous	Cultivating Marginal Conditions

Figure C.1.2 - A Simplified New Institutional Economics (Author Recreation; Williamson, 2000)

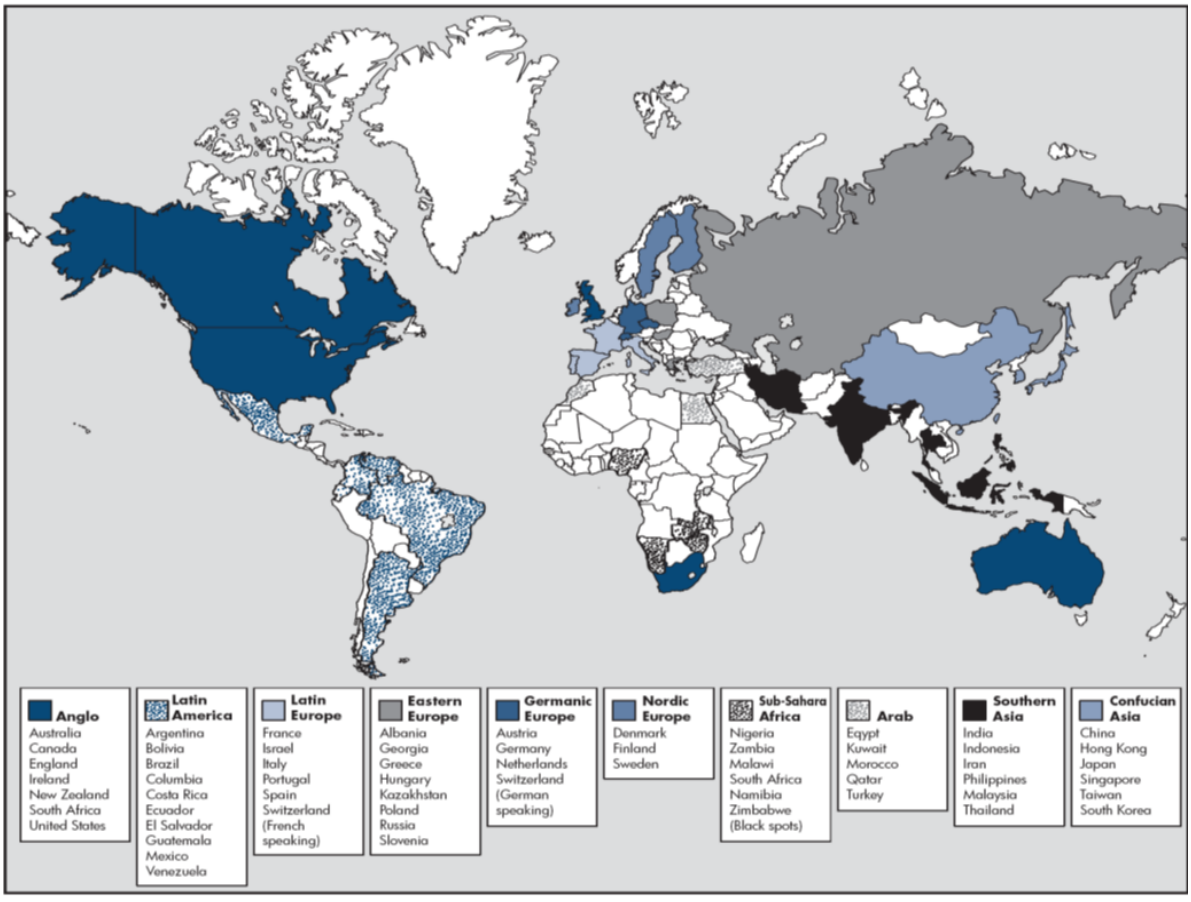

Figure C.1.3 - Geographic Culture Clusters (Gupta et al., 2002)

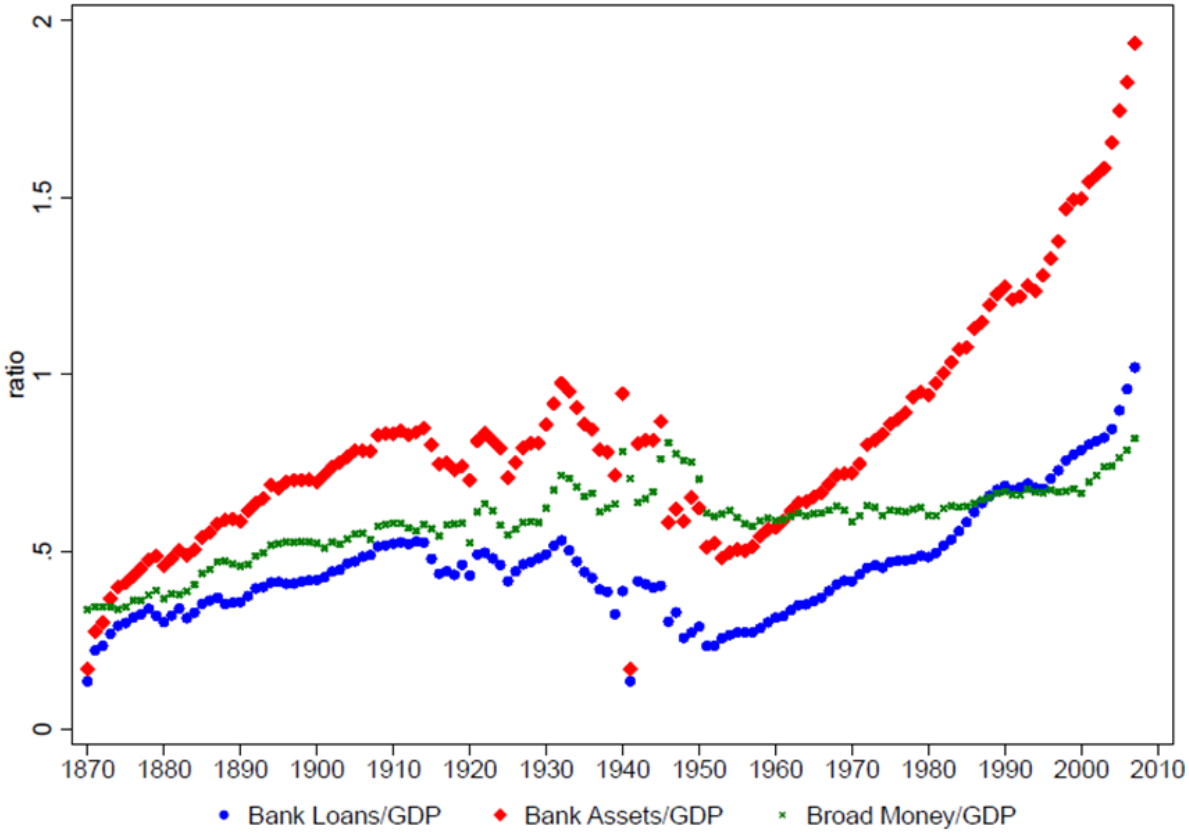

Figure C.2.1 - The Size of the Banking Sector Relative to GDP: Loans Assets and Broad Money Across 14 Advanced Economies (Taylor, 2012)

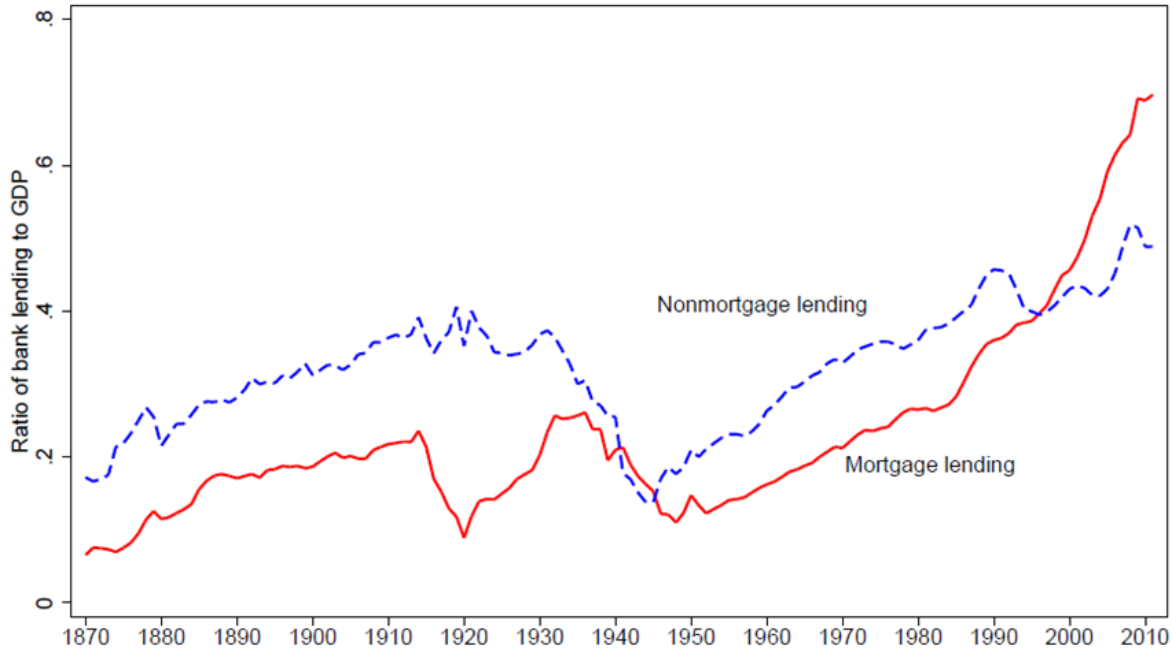

Figure C.2.2 - Mortgage and Non-mortgage Lending in Advanced Economies (Schularick, 2017)

$$\Delta\,(Public\ Debt\ /\ GDP)_{i,t} = \rho\ d_{i,t-1} + \beta\ \mathbf{Z}_{i,t} + \delta_t\ Year_t + \varepsilon_{i,t}$$

	(1)	(2)	(3)	(4)
Public Debt/GDP$_{t-1}$	−0.0028	−0.0056	−0.0146**	−0.0313***
	(0.0055)	(0.0056)	(0.0058)	(0.0084)
Growth	−0.419***	−0.403***	−0.374***	−0.435***
	(0.0788)	(0.0785)	(0.0840)	(0.0845)
Inflation	−0.0196	−0.0479	−0.0319	−0.0943
	(0.0438)	(0.0439)	(0.0511)	(0.0632)
Δ Private Credit/GDP		−0.131***	−0.120***	−0.115***
		(0.0371)	(0.0377)	(0.0388)
Financial Crisis		0.0075*	0.0074	0.0113**
		(0.0045)	(0.0045)	(0.0048)
Log(Transfers/GDP)			0.0220***	0.0474***
			(0.0053)	(0.0106)
Log(Strike Days)			0.0001	−0.0018*
			(0.0001)	(0.0011)
Left Government			−0.0001	0.0001
			(0.0001)	(0.0001)
Japan Dummy	0.0422***	0.0403***	0.0533***	–
	(0.0058)	(0.0058)	(0.0067)	–
Observations	645	645	614	614
Adjusted R^2	0.320	0.335	0.352	0.330

Standard errors in parentheses.
*p< 0.10, **p< 0.05, ***p< 0.01.

Table C.2.1 - Determinants of Public Debt Increase Replication (1970 - 2007) (Schularick, 2014)

$$\Delta\ (Public\ Debt\ /\ GDP)_{i,t} = \rho\ d_{i,t-1} + \beta\ \mathbf{Z}_{i,t} + \delta_t\ Year_t + \varepsilon_{i,ti,t}$$

Δ (Public Debt / GDP)	Year Effects Robust	Year Effects Robust	Year Effects Robust	FE Year Effects
Debt(t-1)	-0.00284	-0.00556	-0.0146**	-0.0313*
	(0.00565)	(0.00567)	(0.00596)	(0.0161)
growth	-0.419***	-0.403***	-0.374***	-0.435***
	(0.0873)	(0.0862)	(0.0924)	(0.117)
Inflation	-0.0196	-0.0479	-0.0319	-0.0943
	(0.0412)	(0.0434)	(0.0540)	(0.0665)
jpn	0.0422***	0.0403***	0.0533***	0
	(0.00709)	(0.00683)	(0.00724)	(.)
Private Credit Growth		-0.131***	-0.120***	-0.115**
		(0.0397)	(0.0417)	(0.0489)
Financial Crisis		0.00745	0.00735	0.0113
		(0.00470)	(0.00482)	(0.00650)
ltrans			0.0220***	0.0474***
			(0.00468)	(0.0127)
lstrike			0.000395	-0.00178
			(0.000720)	(0.00136)
Left Government			-0.0000490	0.00000610
			(0.0000372)	(0.0000715)
Observations	645	645	614	614
Adjusted R^2	0.320	0.335	0.352	0.349

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.2.2 - Determinants of Public Debt Increase Replication (1970 - 2007) (Replication; Schularick, 2013)

$$\Delta\ (Public\ Debt\ /\ GDP)_{\ i,t} = \rho\ d_{i,t-1} + \beta\ \boldsymbol{Z}_{i,t} + \delta_t\ Year_t + \varepsilon_{i,ti,t}$$

Δ (Public Debt / GDP)	Year Effects Robust	Year Effects Robust	Year Effects Robust	FE Year Effects
Debt(t-1)	-0.00675	-0.00814	-0.0138**	-0.0557***
	(0.00639)	(0.00645)	(0.00634)	(0.00978)
growth	0.00388	0.00465	0.00555*	0.00576
	(0.00323)	(0.00339)	(0.00316)	(0.00392)
Inflation	-0.00255	-0.00281	-0.00185	0.00156
	(0.00294)	(0.00295)	(0.00306)	(0.00457)
Private Credit Growth		-0.111***	-0.104***	-0.0895**
		(0.0346)	(0.0329)	(0.0397)
Financial Crisis		0.00657	0.00710*	0.0113*
		(0.00418)	(0.00423)	(0.00637)
ltrans			0.0205***	0.0428***
			(0.00454)	(0.0137)
Observations	592	592	592	592
Adjusted R^2	0.283	0.298	0.319	0.359

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.2.3 - Determinants of Public Debt Increase Extension 1970 - 2007 (Reconstruction; Schularick, 2014)

Δ (Public Debt / GDP)	Year Effects Robust	Year Effects Robust	Year Effects Robust	FE Year Effects
Debt(t-1)	0.00268	0.000120	-0.0106*	-0.0515***
	(0.00544)	(0.00555)	(0.00612)	(0.0111)
growth	0.00370	0.00447	0.00566*	0.00616
	(0.00359)	(0.00367)	(0.00330)	(0.00410)
Inflation	-0.00265	-0.00285	-0.00195	0.00158
	(0.00346)	(0.00338)	(0.00322)	(0.00467)
Private Credit Growth		-0.0941***	-0.118***	-0.110**
		(0.0337)	(0.0348)	(0.0439)
Financial Crisis		0.0121***	0.00994**	0.0137**
		(0.00444)	(0.00437)	(0.00563)
ltrans			0.0214***	0.0531***
			(0.00452)	(0.0128)
Observations	736	736	639	639
Adjusted R^2	0.283	0.301	0.346	0.388

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.2.4 - Determinants of Public Debt Increase Extension (1970 - 2016) (Extension; Schularick, 2014)

Appendix C.3 - Group Effects Hausman Tests

Δ (Private Debt / GDP)	RE	FE	RE Year	FE Year
Anglo	-0.011***	-0.009***	-0.007**	-0.005
Lag Social Expenditure/GDP	(0.002)	(0.000)	(0.003)	(0.003)
Nordic Europe	-0.007***	-0.009***	-0.005***	-0.007***
Lag Social Expenditure/GDP	(0.001)	(0.000)	(0.001)	(0.001)
Latin Europe	-0.008***	-0.005***	-0.007***	-0.004**
Lag Social Expenditure/GDP	(0.002)	(0.000)	(0.001)	(0.001)
Germanic Europe	-0.009***	-0.013***	-0.007***	-0.012**
Lag Social Expenditure/GDP	(0.001)	(0.000)	(0.002)	(0.003)
Anglo	-1.145***	-1.163***	-0.816***	-0.829**
Δ Current Account/GDP	(0.297)	(0.000)	(0.205)	(0.197)
Nordic Europe	-0.728***	-0.684***	-0.707***	-0.679***
Δ Current Account/GDP	(0.165)	(0.000)	(0.041)	(0.017)
Latin Europe	-0.436	-0.388***	-0.324*	-0.283
Δ Current Account/GDP	(0.296)	(0.000)	(0.172)	(0.147)
Germanic Europe	-0.255*	-0.224***	-0.100	-0.061
Δ Current Account/GDP	(0.133)	(0.000)	(0.061)	(0.072)
Anglo	-0.467	-0.480***	-0.459***	-0.456**
Public Debt Growth	(0.395)	(0.000)	(0.095)	(0.088)
Nordic Europe	-0.042	-0.020***	-0.017	0.006
Public Debt Growth	(0.110)	(0.000)	(0.035)	(0.024)
Latin Europe	-0.502***	-0.477***	-0.376***	-0.354**
Public Debt Growth	(0.099)	(0.000)	(0.082)	(0.074)
Germanic Europe	0.051	0.033***	0.208*	0.195
Public Debt Growth	(0.047)	(0.000)	(0.115)	(0.097)
Anglo	-0.009**	-0.009***	-0.007***	-0.006**
Δ Real Consumption Per Capita	(0.005)	(0.000)	(0.002)	(0.002)
Nordic Europe	-0.006***	-0.007***	-0.004***	-0.005**
Δ Real Consumption Per Capita	(0.002)	(0.000)	(0.001)	(0.001)
Latin Europe	-0.002	0.001***	0.004	0.006*
Δ Real Consumption Per Capita	(0.002)	(0.000)	(0.002)	(0.002)
Germanic Europe	-0.000	-0.002***	0.006***	0.004**
Δ Real Consumption Per Capita	(0.003)	(0.000)	(0.002)	(0.001)
Anglo	-0.239	-0.149***	-0.181	-0.099
Δ Log Real Wages	(0.218)	(0.000)	(0.194)	(0.157)
Nordic Europe	0.971***	0.709***	0.915***	0.700***
Δ Log Real Wages	(0.274)	(0.000)	(0.132)	(0.102)
Latin Europe	0.159	0.477***	0.020	0.290
Δ Log Real Wages	(0.216)	(0.000)	(0.123)	(0.136)
Germanic Europe	0.175**	0.101***	0.158	0.085
Δ Log Real Wages	(0.086)	(0.000)	(0.156)	(0.112)
Anglo	-0.927	-0.804***	-0.946***	-0.847
Inflation	(0.709)	(0.000)	(0.268)	(0.363)
Nordic Europe	0.553	0.234***	0.614***	0.312
Inflation	(0.378)	(0.000)	(0.206)	(0.390)
Latin Europe	-0.713*	0.134***	-0.224	0.435
Inflation	(0.412)	(0.000)	(0.330)	(0.495)
Germanic Europe	-1.037***	-1.336***	-0.806***	-1.146**
Inflation	(0.318)	(0.000)	(0.260)	(0.358)
R-sq	0.587	0.125	0.664	0.145
groups	4	4	4	4
observations	313	313	313	313

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.3.1.A - Determinants of Private Debt Increase 1 of 2 (1992 - 2012)

Δ (Private Debt / GDP)	RE	FE	RE Year	FE Year
Anglo	-0.043***	-0.039***	-0.036***	-0.032**
Expenditure Rule Dummy	(0.008)	(0.000)	(0.007)	(0.008)
Nordic Europe	0.030***	0.032***	0.022**	0.022*
Expenditure Rule Dummy	(0.006)	(0.000)	(0.008)	(0.007)
Latin Europe	0.009	-0.003***	0.001	-0.009
Expenditure Rule Dummy	(0.020)	(0.000)	(0.003)	(0.005)
Germanic Europe	0.032***	0.033***	0.036***	0.039**
Expenditure Rule Dummy	(0.007)	(0.000)	(0.008)	(0.008)
Anglo	0.010	0.007***	0.012***	0.009
Debt Rule Dummy	(0.011)	(0.000)	(0.004)	(0.006)
Nordic Europe	0.009	0.013***	0.006	0.010
Debt Rule Dummy	(0.014)	(0.000)	(0.004)	(0.006)
Latin Europe	-0.000	0.032***	0.009	0.038*
Debt Rule Dummy	(0.025)	(0.000)	(0.026)	(0.013)
Germanic Europe	0.026***	0.022***	0.021**	0.017
Debt Rule Dummy	(0.009)	(0.000)	(0.010)	(0.009)
Anglo	-0.002	-0.003***	0.005	0.005
Home Taxes	(0.014)	(0.000)	(0.007)	(0.007)
Nordic Europe	0.003	0.007***	0.004	0.006
Home Taxes	(0.003)	(0.000)	(0.004)	(0.003)
Latin Europe	-0.037***	-0.034***	-0.030***	-0.028**
Home Taxes	(0.007)	(0.000)	(0.008)	(0.007)
Germanic Europe	-0.013***	-0.016***	-0.009***	-0.012**
Home Taxes	(0.002)	(0.000)	(0.002)	(0.003)
Anglo	0.001**	0.001***	0.002***	0.002**
Reserve Requirement	(0.001)	(0.000)	(0.000)	(0.000)
Nordic Europe	-0.001**	-0.001***	-0.001**	-0.001*
Reserve Requirement	(0.000)	(0.000)	(0.000)	(0.000)
Latin Europe	-0.000	-0.001***	-0.001	-0.001
Reserve Requirement	(0.002)	(0.000)	(0.001)	(0.001)
Germanic Europe	0.011***	0.011***	0.011***	0.011***
Reserve Requirement	(0.001)	(0.000)	(0.001)	(0.001)
Anglo	0.002	0.001***	-0.002	-0.003
LTV Prohibition	(0.006)	(0.000)	(0.008)	(0.007)
Nordic Europe	0.019**	0.022***	0.019***	0.021**
LTV Prohibition	(0.009)	(0.000)	(0.005)	(0.004)
Latin Europe	0.035***	0.030***	0.030***	0.027**
LTV Prohibition	(0.009)	(0.000)	(0.005)	(0.005)
Germanic Europe	0.015***	0.019***	0.027***	0.030*
LTV Prohibition	(0.003)	(0.000)	(0.008)	(0.011)
Anglo	0.005	0.007***	0.018*	0.021*
DTI Prohibition	(0.009)	(0.000)	(0.010)	(0.009)
Nordic Europe	-0.082***	-0.091***	-0.083***	-0.090***
DTI Prohibition	(0.013)	(0.000)	(0.013)	(0.013)
Latin Europe	-0.035**	-0.028***	-0.052***	-0.047***
DTI Prohibition	(0.016)	(0.000)	(0.006)	(0.004)
Germanic Europe	-0.032***	-0.018***	-0.057***	-0.041**
DTI Prohibition	(0.008)	(0.000)	(0.015)	(0.007)
R-sq	0.587	0.125	0.664	0.145
groups	4	4	4	4
observations	313	313	313	313

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.3.2.B - Determinants of Private Debt Increase 2 of 2 (1992 - 2012)

Appendix C.4 - Description of Data for Culture and Debt Dependence

Group ID = All Groups	N	Mean	Std. Dev.	se(Mean)	Min	Median	Max
year	752	1993	13.5737	.495	1970	1993	2016
Unique Country Codes	752	8.8125	4.9935	.1821	1	8.5	17
Unique Country Groups	752	2.5	1.1188	.0408	1	2.5	4
Δ Private Credit-to-GDP	736	.0119	0.0465	.0017	-.4763	.012	.2043
Social Expenditure-to-GDP	599	20.833	5.8989	.241	.0548	21.55	34.178
Δ Current Account Balance	672	.0009	0.0184	.0007	-.0989	.0001	.0985
Δ Public Debt-to-GDP	736	.0096	0.0412	.0015	-.1464	.0048	.3413
Δ Real Consumption per Capita	656	1.1768	1.5542	.0607	-5.1288	1.2737	5.8028
Δ Log Real Wages	410	.0101	0.0153	.0008	-.0495	.0094	.0655
Δ Log Inflation	736	.0298	0.3267	.012	-7.2549	.03	.37
Home Tax Index	401	-.5486	1.2076	.0603	-5	0	2
Reserve Requirement Index	401	-1.2244	5.4290	.2711	-14	-1	18
LTV Provision Index	401	.0424	0.5438	.0272	-1	0	4
DTI Provision	401	.0125	0.2955	.0148	-1	0	2
Expenditure Rule	592	.3159	0.4653	.0191	0	0	1
Debt Rule	592	.4797	0.5000	.0206	0	0	1

Table C.4.1 Descriptive Statistics for All Countries

Group ID = Anglo	N	Mean	Std. Dev.	se(Mean)	Min	Median	Max
year	188	1993	13.6009	.9919	1970	1993	2016
Unique Country Codes	188	7.75	6.3166	.4607	1	6.5	17
Δ Private Credit-to-GDP	184	.013	0.0495	.0036	-.4763	.0145	.1432
Social Expenditure-to-GDP	151	16.1673	3.6883	.3001	.0548	16.681	22.977
Δ Current Account Balance	168	-.0001	0.0102	.0008	-.0287	-.0006	.0395
Δ Public Debt-to-GDP	184	.0068	0.0357	.0026	-.0924	.005	.147
Δ Real Consumption per Capita	164	1.3885	1.2607	.0984	-3.93	1.4942	4.52
Δ Log Real Wages	104	.0123	0.0151	.0015	-.0265	.011	.0493
Δ Log Inflation	184	.0465	0.0424	.0031	-.0032	.0326	.37
Home Tax Index	115	-.1391	0.4936	.046	-3	0	1
Reserve Requirement Index	115	-5.1043	4.9032	.4572	-14	-4	0
LTV Provision Index	115	.1043	0.5678	.0529	0	0	4
DTI Provision	115	.0696	0.3434	.032	0	0	2
Expenditure Rule	148	.277	0.4490	.0369	0	0	1
Debt Rule	148	.3378	0.4746	.039	0	0	1

Table C.4.2 Descriptive Statistics for Anglo Countries

Group ID = Nordic	N	Mean	Std. Dev.	se(Mean)	Min	Median	Max
year	188	1993	13.6009	.9919	1970	1993	2016
Unique Country Codes	188	11	4.1341	.3015	6	11	16
Δ Private Credit-to-GDP	184	.0149	0.0488	.0036	-.1358	.0133	.1553
Social Expenditure-to-GDP	146	24.0652	5.3776	.4451	.1269	24.4085	34.178
Δ Current Account Balance	168	.0016	0.0246	.0019	-.0989	.0019	.0985
Δ Public Debt-to-GDP	184	.0058	0.0453	.0033	-.1464	-.0012	.1734
Δ Real Consumption per Capita	164	1.1677	1.8503	.1445	-4.93	1.1993	5.41
Δ Log Real Wages	104	.0146	0.0156	.0015	-.0495	.015	.05
Δ Log Inflation	184	.045	0.0372	.0027	-.0027	.029	.1639
Home Tax Index	92	-.2717	0.6480	.0676	-2	0	2
Reserve Requirement Index	92	2.9348	7.1542	.7459	-5	0	18
LTV Provision Index	92	.3152	0.6100	.0636	0	0	2
DTI Provision	92	-.0761	0.3701	.0386	-1	0	1
Expenditure Rule	148	.3649	0.4830	.0397	0	0	1
Debt Rule	148	.4459	0.4988	.041	0	0	1

Table C.4.3 Descriptive Statistics for Nordic European Countries

Group ID = Latin	N	Mean	Std. Dev.	se(Mean)	Min	Median	Max
year	188	1993	13.6009	.9919	1970	1993	2016
Unique Country Codes	188	10.5	2.9659	.2163	7	10	15
Δ Private Credit-to-GDP	184	.0093	0.0490	.0036	-.1483	.0084	.2043
Social Expenditure-to-GDP	150	21.7338	5.9010	.4818	.128	22.0055	31.938
Δ Current Account Balance	168	.0011	0.0177	.0014	-.0554	-.0003	.0645
Δ Public Debt-to-GDP	184	.02	0.0385	.0028	-.0558	.0154	.1553
Δ Real Consumption per Capita	164	1.1557	1.8020	.1407	-5.1288	1.3334	5.8028
Δ Log Real Wages	99	.0053	0.0159	.0016	-.0442	.0052	.0655
Δ Log Inflation	184	.0249	0.5432	.04	-7.2549	.0375	.3212
Home Tax Index	96	-.0521	0.3033	.031	-1	0	1
Reserve Requirement Index	96	-.0208	2.3663	.2415	-3	-1	6
LTV Provision Index	96	-.3021	0.4616	.0471	-1	0	0
DTI Provision	96	-.0208	0.1436	.0147	-1	0	0
Expenditure Rule	148	.2095	0.4083	.0336	0	0	1
Debt Rule	148	.6486	0.4790	.0394	0	1	1

Table C.4.4 Descriptive Statistics for Latin European Countries

Group ID = Germanic	N	Mean	Std. Dev.	se(Mean)	Min	Median	Max
year	188	1993	13.6009	.9919	1970	1993	2016
Unique Country Codes	188	6	4.1945	.3059	2	4.5	13
Δ Private Credit-to-GDP	184	.0103	0.0379	.0028	-.1284	.0113	.1299
Social Expenditure-to-GDP	152	21.4745	5.3918	.4373	.085	22.859	29.324
Δ Current Account Balance	168	.001	0.0183	.0014	-.0618	0	.072
Δ Public Debt-to-GDP	184	.0058	0.0432	.0032	-.1363	.0015	.3413
Δ Real Consumption per Capita	164	.9952	1.1696	.0913	-3.1838	1.038	4.2623
Δ Log Real Wages	103	.0079	0.0126	.0012	-.033	.0063	.0596
Δ Log Inflation	184	.0028	0.3594	.0265	-4.8346	.0227	.1194
Home Tax Index	98	-1.7755	1.7908	.1809	-5	-1	0
Reserve Requirement Index	98	-1.7551	1.9534	.1973	-7	-1	0
LTV Provision Index	98	.051	0.3003	.0303	0	0	2
DTI Provision	98	.0612	0.2410	.0243	0	0	1
Expenditure Rule	148	.4122	0.4939	.0406	0	0	1
Debt Rule	148	.4865	0.5015	.0412	0	0	1

Table C.4.5 Descriptive Statistics for Germanic European Countries

Appendix D - Codebook for Politics and Path Dependence

Name:	year
Type:	float
Variable label:	Year
Value label:	
Variable format:	%10.0g
Unique values:	4
Missing values:	186
Mean:	2012.9715
sd:	3.2600417

Value	Label	Freq.	Percent
2009		2404	32.7%
All other values		2539	34.6%

Percentiles:

10%	25%	50%	75%	90%
2009	2009	2013	2013	2017

Name:	n_ags
Type:	float
Variable label:	group(AGS)
Value label:	
Variable format:	%9.0g
Unique values:	2,591
Missing values:	0
Mean:	1262.967
sd:	743.5459

Value	Label	Freq.	Percent
1		3	0.0%
All other values		7342	99.9%

Percentiles:

10%	25%	50%	75%	90%
246	622	1251	1251	2331

Name:	percentagelinke
Type:	float
Variable label:	Percent Linke Vote
Value label:	
Variable format:	%9.0g
Unique values:	6,163
Missing values:	329
Mean:	.2090403
sd:	.0696982

Value	Label	Freq.	Percent
.		329	4.5%
All other values		7002	95.3%

Percentiles:

10%	25%	50%	75%	90%
.1240876	.1566901	.203252	.203252	.3042672

Name:	percentagespd
Type:	float
Variable label:	Percent Linke Vote
Value label:	
Variable format:	%9.0g
Unique values:	5,912
Missing values:	328
Mean:	.154832
sd:	.0509575

Value	Label	Freq.	Percent
.		328	4.5%
All other values		6990	95.1%

Percentiles:

10%	25%	50%	75%	90%
.0940992	.118515	.1498839	.1498839	.2252795

Name:	percentagegreen
Type:	float
Variable label:	Percent Green Vote
Value label:	
Variable format:	%9.0g
Unique values:	5,154
Missing values:	389
Mean:	.0361725
sd:	.0187499

Value	Label	Freq.	Percent
.		389	5.3%
All other values		6944	94.5%

Percentiles:

10%	25%	50%	75%	90%
.017418	.0239354	.0326827	.0326827	.0584652

Name:	percentagefdp
Type:	float
Variable label:	Percent FDP Vote
Value label:	
Variable format:	%9.0g
Unique values:	5,682
Missing values:	365
Mean:	.0677586
sd:	.0414448

Value	Label	Freq.	Percent
.		365	5.0%
All other values		6968	94.8%

Percentiles:

10%	25%	50%	75%	90%
.01998	.0297952	.0655271	.0655271	.1238269

Name:	percentagecdu
Type:	float
Variable label:	Percent CDU Vote
Value label:	
Variable format:	%9.0g
Unique values:	6,212
Missing values:	325
Mean:	.3636288
sd:	.0874137

Value	Label	Freq.	Percent
.		325	4.4%
All other values		6994	95.2%

Percentiles:

10%	25%	50%	75%	90%
.2601947	.2991453	.3543165	.3543165	.4758621

Name:	percentageafd
Type:	float
Variable label:	Percent AfD Vote
Value label:	
Variable format:	%9.0g
Unique values:	4,280
Missing values:	2,648
Mean:	.1522334
sd:	.1054687

Value	Label	Freq.	Percent
.		2648	36.0%
All other values		4689	63.8%

Percentiles:

10%	25%	50%	75%	90%
.0420811	.0578608	.1158085	.1158085	.2975518

Name:	perc_turnout
Type:	float
Variable label:	Percent Voter Turnout
Value label:	
Variable format:	%9.0g
Unique values:	439
Missing values:	325
Mean:	.6144061
sd:	.077504

Value	Label	Freq.	Percent
.		325	4.4%
All other values		6971	94.9%

Percentiles:

10%	25%	50%	75%	90%
.518	.561	.61	.61	.714

Name:	sh_nsda1933
Type:	float
Variable label:	Vote share Nazi Party (NSDAP) 1933
Value label:	
Variable format:	%9.0g
Unique values:	118
Missing values:	3,043
Mean:	49.81862
sd:	5.189467

Value	Label	Freq.	Percent
.		3043	41.4%
All other values		4184	56.9%

Percentiles:

10%	25%	50%	75%	90%
43.6399	45.70267	49.73603	49.73603	56.3333

Name:	sh_kpd1933
Type:	float
Variable label:	Vote share Communist Party (KPD) 1933
Value label:	
Variable format:	%9.0g
Unique values:	118
Missing values:	3,043
Mean:	11.47467
sd:	4.826743

Value	Label	Freq.	Percent
.		3043	41.4%
All other values		4184	56.9%

Percentiles:

10%	25%	50%	75%	90%
6.073344	7.563574	10.7094	10.7094	17.66279

Name:	sh_elect_fed_turnout1933
Type:	float
Variable label:	Voter turnout 1933
Value label:	
Variable format:	%9.0g
Unique values:	118
Missing values:	3,043
Mean:	89.2715
sd:	2.150762

Value	Label	Freq.	Percent
.		3043	41.4%
All other values		4184	56.9%

Percentiles:

10%	25%	50%	75%	90%
86.55603	87.64903	89.0944	89.0944	92.73398

Name:	ln_jekm
Type:	float
Variable label:	Log Population Density
Value label:	
Variable format:	%9.0g
Unique values:	390
Missing values:	186
Mean:	4.055921
sd:	.9875953

Value	Label	Freq.	Percent
.		186	2.5%
All other values		7014	95.5%

Percentiles:

10%	25%	50%	75%	90%
2.890372	3.332205	3.970292	3.970292	5.356586

Name:	ln_inc_per
Type:	float
Variable label:	Log Income per Capita
Value label:	
Variable format:	%9.0g
Unique values:	7,057
Missing values:	243
Mean:	3.343518
sd:	.1832072

Value	Label	Freq.	Percent
.		243	3.3%
All other values		7102	96.7%

Percentiles:

10%	25%	50%	75%	90%
3.12251	3.218512	3.337342	3.337342	3.565541

Name:	sh_im1
Type:	float
Variable label:	Share of Stasi Informers
Value label:	
Variable format:	%9.0g
Unique values:	118
Missing values:	3,043
Mean:	.4037796
sd:	.154163

Value	Label	Freq.	Percent
.		3043	41.4%
All other values		4184	56.9%

Percentiles:

10%	25%	50%	75%	90%
.2327594	.2854212	.3717183	.3717183	.6153265

Name:	stazi_ind
Type:	float
Variable label:	Categorical Stasi
Value label:	
Variable format:	%9.0g
Unique values:	4
Missing values:	3,043
Mean:	1.595819
sd:	.68146

Value	Label	Freq.	Percent
.		3043	41.4%
All other values		2084	28.4%

Percentiles:

10%	25%	50%	75%	90%
1	1	1	1	3

Name:	BWObjects
Type:	double
Variable label:	BW Infrastructure Count
Value label:	
Variable format:	%8.0g
Unique values:	29
Missing values:	6,723
Mean:	4.8272
sd:	7.92789

Value	Label	Freq.	Percent
.		6723	91.5%
All other values		410	5.6%

Percentiles:

10%	25%	50%	75%	90%
0	1	1	1	15

Name:	ZObject
Type:	double
Variable label:	Report Infrastructure Count
Value label:	
Variable format:	%8.0g
Unique values:	13
Missing values:	6,723
Mean:	1.5776
sd:	2.45161

Value	Label	Freq.	Percent
.		6723	91.5%
All other values		368	5.0%

Percentiles:

10%	25%	50%	75%	90%
0	0	1	1	5

Name:	bau_ind
Type:	float
Variable label:	Categorical Infrastructure
Value label:	
Variable format:	%9.0g
Unique values:	30
Missing values:	6,729
Mean:	5.197092
sd:	7.854044

Value	Label	Freq.	Percent
.		6729	91.6%
All other values		384	5.2%

Percentiles:

10%	25%	50%	75%	90%
1	1	2	2	15

Name:	FObj
Type:	double
Variable label:	Survey of Infrastructure Count
Value label:	
Variable format:	%8.0g
Unique values:	10
Missing values:	6,723
Mean:	1.0176
sd:	1.91184

Value	Label	Freq.	Percent
.		6723	91.5%
All other values		276	3.8%

Percentiles:

10%	25%	50%	75%	90%
0	0	0	0	3

Name:	ZUnits
Type:	double
Variable label:	Report of Units Count
Value label:	
Variable format:	%8.0g
Unique values:	14
Missing values:	6,723
Mean:	1.5024
sd:	2.77761

Value	Label	Freq.	Percent
.		6723	91.5%
All other values		261	3.6%

Percentiles:

10%	25%	50%	75%	90%
0	0	0	0	5

Name:	FUnit
Type:	double
Variable label:	Survey of Units Count
Value label:	
Variable format:	%8.0g
Unique values:	27
Missing values:	6,723
Mean:	4.4928
sd:	8.99753

Valuw	Label	Freq.	Percent
.		6723	91.5%
All other values		339	4.6%

Percentiles:

10%	25%	50%	75%	90%
0	0	1	1	14

Name:	je_ind
Type:	float
Variable label:	Categorical Units
Value label:	
Variable format:	%9.0g
Unique values:	22
Missing values:	6,723
Mean:	3.9744
sd:	7.887184

Value	Label	Freq.	Percent
.		6723	91.5%
All other values		453	6.2%

Percentiles:

10%	25%	50%	75%	90%
0	0	2	2	11

Appendix E - Codebook for Power and Port Dependence

Name:	year
Type:	float
Variable label:	Year
Value label:	
Variable format:	%8.0g
Unique values:	10
Missing values:	0
Mean:	2009.28
sd:	5.67777

Value	Label	Freq.	Percent
2000		33153	10.3%
All other values		256477	79.8%

Percentiles:

10%	25%	50%	75%	90%
2002	2004	2010	2010	2018

Name:	alpha_3
Type:	str3
Variable label:	ISO3 Origin Country Code
Value label:	
Variable format:	%9s
Unique values:	212
Missing values:	0

Value	Label	Freq.	Percent
GBR		2073	0.6%
All other values		317231	98.7%

Name:	ifs_pairid
Type:	long
Variable label:	Pair IMF Countries Code
Value label:	
Variable format:	%10.0g
Unique values:	40,909
Missing values:	0
Mean:	538187.72
sd:	271058.75

Value	Label	Freq.	Percent
111112		10	0.0%
All other values		321354	100.0%

Percentiles:

10%	25%	50%	75%	90%
172466	288911	546132	546132	926928

Name:	o_gdp_real
Type:	double
Variable label:	Real GDP at Origin
Value label:	
Variable format:	%10.0g
Unique values:	1,315
Missing values:	128,573
Mean:	2.342e+14
sd:	1.253e+15

Value	Label	Freq.	Percent
.		128573	40.0%
All other values		192592	59.9%

Percentiles:

10%	25%	50%	75%	90%
3.821e+09	3.028e+10	5.052e+11	5.052e+11	5.654e+13

Name:	export_dots
Type:	double
Variable label:	Goods, Exports (FOB)
Value label:	
Variable format:	%10.0g
Unique values:	203,076
Missing values:	84,527
Mean:	5.640e+08
sd:	5.679e+09

Value (sorted by frequency)	Label	Freq.	Percent
.		84527	26.3%
All other values		236615	73.6%

Percentiles:

10%	25%	50%	75%	90%
6096	94930	2270559	2270559	4.157e+08

Name:	import_cif_dots
Type:	double
Variable label:	Goods, Imports (CIF)
Value label:	
Variable format:	%10.0g
Unique values:	218,041
Missing values:	57,572
Mean:	5.142e+08
sd:	5.373e+09

Value	Label	Freq.	Percent
.		57572	17.9%
All other values		263552	82.0%

Percentiles:

10%	25%	50%	75%	90%
3516	60588	1714269.5	1714269.5	3.523e+08

Name:	wtf_tot_trade
Type:	float
Variable label:	Total Trade WTF (1000)
Value label:	
Variable format:	%9.0g
Unique values:	209,316
Missing values:	79,158
Mean:	531854.7
sd:	5556123

Value (sorted by frequency)	Label	Freq.	Percent
.		79158	24.6%
All other values		242082	75.3%

Percentiles:

10%	25%	50%	75%	90%
5.235	76.311	1866.084	1866.084	366307.2

Name:	total_trade_BACI
Type:	float
Variable label:	Total Trade BACI (1000)
Value label:	
Variable format:	%9.0g
Unique values:	202,165
Missing values:	110,641
Mean:	318206.3
sd:	3046210

Value (sorted by frequency)	Label	Freq.	Percent
.		110641	34.4%
All other values		210646	65.5%

Percentiles:

10%	25%	50%	75%	90%
13.582	115.015	1974.777	1974.777	252360

Appendix F - Codebook for Culture and Debt Dependence

Name:	year
Type:	double
Variable label:	year
Value label:	
Variable format:	%ty
Unique values:	47
Missing values:	0
Mean:	1993
sd:	14

Value	Label	Freq.	Percent
1970		16	2.1%
All other values		720	95.7%

Percentiles:

10%	25%	50%	75%	90%
1974	1981	1993	1993	2012

Name:	ccode
Type:	float
Variable label:	Unique Country Codes
Value label:	
Variable format:	%9.0g
Unique values:	16
Missing values:	0
Mean:	8.8125
sd:	4.993546

Value	Label	Freq.	Percent
1		47	6.3%
All other values		658	87.5%

Percentiles:

10%	25%	50%	75%	90%
2	4.5	8.5	8.5	16

Name:	group
Type:	float
Variable label:	Unique Country Groups
Value label:	
Variable format:	%9.0g
Unique values:	4
Missing values:	0
Mean:	2.5
sd:	1.118778

Value	Label	Freq.	Percent
1		188	25.0%
All other values		376	50.0%

Percentiles:

10%	25%	50%	75%	90%
1	1.5	2.5	2.5	4

Name:	dprivcredgdp
Type:	float
Variable label:	Change Private Credit to GDP
Value label:	
Variable format:	%9.0g
Unique values:	737
Missing values:	16
Mean:	.0118716
sd:	.0464976

Value	Label	Freq.	Percent
.		16	2.1%
All other values		735	97.7%

Percentiles:

10%	25%	50%	75%	90%
-.0365213	-.0078224	.0119591	.0119591	.0615835

Name:	socgdp
Type:	double
Variable label:	Social Expenditure-to-GDP
Value label:	
Variable format:	%8.0g
Unique values:	587
Missing values:	153
Mean:	20.833
sd:	5.89891

Value	Label	Freq.	Percent
.		153	20.3%
All other values		597	79.4%

Percentiles:

10%	25%	50%	75%	90%
-.0365213	-.0078224	.0119591	.0119591	.0615835

Name:	dcagdp
Type:	float
Variable label:	Change Current Account Balance
Value label:	
Variable format:	%9.0g
Unique values:	672
Missing values:	80
Mean:	.0009122
sd:	.0183993

Value	Label	Freq.	Percent
.		80	10.6%
All other values		670	89.1%

Percentiles:

10%	25%	50%	75%	90%
-.0172261	-.0077428	.0000601	.0000601	.0212926

Name:	ddebtgdp
Type:	float
Variable label:	Change Public Debt to GDP
Value label:	
Variable format:	%9.0g
Unique values:	701
Missing values:	16
Mean:	.0095871
sd:	.0411961

Value	Label	Freq.	Percent
.		16	2.1%
All other values		729	96.9%

Percentiles:

10%	25%	50%	75%	90%
-.033569	-.015363	.0047834	.0047834	.054896

Name:	drconpc
Type:	float
Variable label:	Change Real Consumption per Capita
Value label:	
Variable format:	%9.0g
Unique values:	596
Missing values:	96
Mean:	1.176756
sd:	1.554212

Value	Label	Freq.	Percent
.		96	12.8%
All other values		652	86.7%

Percentiles:

10%	25%	50%	75%	90%
-.6891	.2902	1.273713	1.273713	2.9542

Name:	dlwages
Type:	float
Variable label:	Change Log Real Wages
Value label:	
Variable format:	%9.0g
Unique values:	410
Missing values:	342
Mean:	.0101031
sd:	.01525

Value	Label	Freq.	Percent
.		342	45.5%
All other values		408	54.3%

Percentiles:

10%	25%	50%	75%	90%
-.0059381	.0012178	.0094271	.0094271	.0298886

Name:	dlcpi
Type:	float
Variable label:	Change Log Inflation
Value label:	
Variable format:	%9.0g
Unique values:	731
Missing values:	16
Mean:	.02979
sd:	.326705

Value	Label	Freq.	Percent
.		16	2.1%
All other values		734	97.6%

Percentiles:

10%	25%	50%	75%	90%
.0072637	.0173488	.0299571	.0299571	.1053605

Name:	cum_home_taxes
Type:	float
Variable label:	Home Tax Index
Value label:	
Variable format:	%9.0g
Unique values:	9
Missing values:	351
Mean:	-.5486284
sd:	1.207582

Value	Label	Freq.	Percent
.		351	46.7%
All other values		113	15.0%

Percentiles:

10%	25%	50%	75%	90%
-2	-1	0	0	0

Name:	cum_res_req
Type:	float
Variable label:	Reserve Requirement Index
Value label:	
Variable format:	%9.0g
Unique values:	24
Missing values:	351
Mean:	-1.224439
sd:	5.429042

Value	Label	Freq.	Percent
.		351	46.7%
All other values		304	40.4%

Percentiles:

10%	25%	50%	75%	90%
-6	-3	-1	-1	2

Name:	cum_ltv_prohib
Type:	float
Variable label:	LTV Provision Index
Value label:	
Variable format:	%9.0g
Unique values:	6
Missing values:	351
Mean:	.042394
sd:	.5437814

Value	Label	Freq.	Percent
.		351	46.7%
All other values		59	7.8%

Percentiles:

10%	25%	50%	75%	90%
0	0	0	0	0

Name:	cum_dti_prohib
Type:	float
Variable label:	DTI Provision
Value label:	
Variable format:	%9.0g
Unique values:	5
Missing values:	351
Mean:	.0124688
sd:	.2955404

Value	Label	Freq.	Percent
0		375	49.9%
All other values		26	3.5%

Percentiles:

10%	25%	50%	75%	90%
0	0	0	0	0

Name:	ER
Type:	byte
Variable label:	Expenditure Rule
Value label:	
Variable format:	%10.0g
Unique values:	3
Missing values:	160
Mean:	.31587838
sd:	.46525786

Value	Label	Freq.	Percent
0		405	53.9%
All other values		160	21.3%

Percentiles:

10%	25%	50%	75%	90%
0	0	0	0	1

Name:	DR
Type:	byte
Variable label:	Debt Rule
Value label:	
Variable format:	%10.0g
Unique values:	3
Missing values:	160
Mean:	.47972973
sd:	.50001143

Value	Label	Freq.	Percent
0		308	41.0%
All other values		160	21.3%

Percentiles:

10%	25%	50%	75%	90%
0	0	0	0	1