

ESSAYS ON TAX BEHAVIOR, PUBLIC GOODS PROVISIONS, AND INCOME
POVERTY

by

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DEDICATION

This is dedicated to my parents

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I am deeply grateful to all people who encouraged me to begin this Ph.D. journey and supported me till now. Without their support, I would not be able to finish this Ph.D. dissertation.

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LIST OF ABBREVIATIONS

American Community Survey (ACS)	126
Bureau of Economic Analysis (BEA)	126
corruption perception index (CPI)	38
Earned Income Tax Credit (EITC)	144
Ethnolinguistic Fractionalization (ELF)	80
European Value Studies (EVS)	23
Fixed Effect FE	55
General Social Survey (GSS)	141
good quality job (GQJ)	172
Gross Domestic Product GDP	50
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job market polarization JMP	16
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ABSTRACT

ESSAYS ON TAX BEHAVIOR, PUBLIC GOODS PROVISIONS, AND INCOME POVERTY

Abu Bakkar Siddique, Ph.D.

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Dissertation Director: Dr. Naoru Koizumi

This dissertation consists of three essays on civic tax behavior, public goods provisions, and poverty. First essay identifies indirect effects of corruption on individual tax morale which imply that corruption breaks the fiscal contract between government and taxpayers. Second essay examines the effects of ethnic institutions particularly ethnic fractionalization, economic heterogeneity among ethnic groups, and rising threats to White prototypicality on public goods supply in the USA. Third essay studies the puzzles of stagnating poverty amidst high growth and declining unemployment in the USA can be explained significantly by polarized job markets that occurred in job quality and job distribution.

INTRODUCTION

My research addresses injustices in the form of inequality, discrimination, and poverty in two broad ways: while the first approach is to recognize the problem of multi-dimensional injustices across race and classes, the second approach works on understanding better redistributive efforts such as public provisions of policies, goods, and welfares. We need to act on both areas simultaneously since they are insufficient without the other to realize any progress in achieve justice in our time of heightened inequality. This dissertation largely contributes to the second area of public provisions but has also been motivated by some earlier works that addressed inequality, discrimination, and poverty. Earlier I researched the complex relationship between international trade and economic inequality and how politics played redistributive roles using a novel identification strategy to solve endogeneity problems in the literature by using trade as predicted by a gravity equation as an instrument for actual trade. I published this paper in *CESifo Economic Studies*. I also studies the effect of development strategies on poverty where I found that development strategies that defy comparative advantage will worsen the poverty situation. I published this paper in *Journal of Economic Development*. At micro-levels, I studied how people with specific identities are discriminated against by Chinese institutions. The *hukou* registration is one of such institutions that control nonplanned population and capital movements have been effective since the 1950s. In this paper, I argued that earning difference by *hukou* status is not due to rural-urban segregations; but systematic and institutionally enforced because, contrary to self-employment and no-labor contract conditions,

discrimination exists only when others employ them and where a labor contract condition is enforced. They also face discrimination only when they work for the Chinese government, but not when they work for private firms. I published this paper in the *IZA Journal of Development and Migration*.

I also research better redistributive policies which are more proactive efforts to redistribute incomes and wealth in the form of effective public and welfare goods, civic morale, and promoting altruistic behavior. Redistributive policies are essential for healing damages caused by complex forms of injustice. One of the biggest challenges of publicly provided redistributive policies is the limited public sector capacity. My research addresses such problems by understanding civic behaviors and their interactions with public institutions. With such motivation, the first dissertation essay identifies indirect effects of corruption on individual tax morale which imply that corruption breaks the fiscal contract between government and taxpayers. So, it hurts the motivation to pay taxes, and thus creates dishonest citizens. When an individual experiences any corrupt transaction, his/her odds of showing full tax morale declines by about 23.5%. The aggregated consequences due to inferior tax morale for an economy can be considerable in terms of loss in collective goods. Only the USA loses \$1 trillion in unpaid taxes every year, which is equal to more than 15% of its annual budget because the agency lacks the resources to catch tax cheaters. I further find that the effects of corruption spill over to those who did not experience corruption, and it has a cultural component. Therefore, I exploited the origin country corruption of a large immigrant population in the destination country and find a sticky effect of corruption on first generations although it attenuates for second generations. This implies that the

elimination of corruption may not lead people to adjust their tax morale immediately, however, it can increase public income in the long run both directly and indirectly.

In my dissertation, I also examined state-government-level public and welfare goods provisions as responses to the changes in the inequality in diversity measured by utilizing poverty heterogeneity between ethnic groups and the role of white prototypicality threats that arise from racial demographic shift to a majority-minority situation. Earlier related but distinct literature explained negative associations between local diversity and local public goods provision, although they do not hold while addressing omitted variable biases, as negative exposure and group loyalty effects. In this paper, I provide alternative explanations with empirical evidence that it may not be the ethnic diversity that leads to lower public goods provisions but inequality in diversity and threats to white prototypicality. However, ethnic fractionalization hurts public goods that are more redistributive and excludable than pure public goods. In the third paper, I attempted to explain the puzzles of stagnating poverty in the USA amidst high growth and a declining unemployment rate. I presented evidence that such stagnating poverty is due to poor quality jobs and uneven job distribution across households. Using American Community Survey data, I created the job market polarization JMP measures that account for the distribution of jobs across households, where high JMP implies there are more households with multiple employed people and more households with no employed people. Analyses in this paper suggest that eradicating poverty requires labor market policies to be tailored more towards the distribution of jobs from individuals to households and alter bad jobs into good quality jobs.

PAPER NO. 1

SHAPING TAX MORALE: EFFECT OF CORRUPTION AS EXPERIENCE, SPILLING OVER, AND CULTURE

Abu Bakkar Siddique

Abstract

This paper identifies indirect effects of corruption on individual tax morale which imply that corruption breaks the fiscal contract between government and taxpayers. So, it hurts the motivation to pay taxes, and thus creates dishonest citizens. The effects spill over to those who did not experience corruption. Corruption and tax morale have also a cultural component that is often difficult to separate from the institutional effects. So, I exploited the origin country corruption of a large immigrant population in the destination country and find that first-generation immigrants from high-corruption countries reveal lower tax morale, even after controlling for destination corruption, local tax morale, and corruption experience. The effect attenuates for second-generation immigrants. Due to the sticky effect of corruption, its elimination may not lead people to adjust their tax morale immediately. Potential carriers of the effects are fairness in tax systems, ethnic diversity, shame of being exposed, and crowd-in of public policies.

Keywords: tax morale, culture, tax fairness, corruption experience, spillover effects

JEL: H26, D73, C91, E01, D91

1. Introduction

Corruption can carry both direct and indirect effects on taxes. While the direct effect of corruption is the reduced amount of tax revenue that was not paid by taxpayers for an exchange of bribes to the tax authorities, the indirect effect can be any changes to the future motivation for taxpayers. Tax morale is such motivation to comply with the tax system. Identifying the indirect effect of corruption on tax morale can be challenging and it can occur both on taxpayers who have directly experienced corruption as well as a spillover effect on taxpayers who did not directly experience it (but live in the same society with people who experienced corruption). Few researchers examined the direct effect of corruption on tax compliance and reported that corruption leads to low tax compliances (Alm et al., 2016; Bertinelli et al., 2020; DeBacker et al., 2015; Jahnke & Weisser, 2019; Le et al., 2020), however, they did not identify whether the low tax compliance was driven by a direct effect (i.e. the reduced tax revenue for bribes) or it was driven by an indirect effect (i.e. reduced tax morale). In this paper, I examine the indirect effect of corruption on the tax morale of individual taxpayers. As opposed to corruption perception measures in the literature, I use corruption experience which suffers less from endogenous biases due to the offering of a bribe was expected to originate from the public officials (with whom the individual interacted). I also report the spillover effect of corruption using national-level corruption heterogeneity on the tax morale of individuals with and without corruption experience. This paper also exploits the differences between corruption in the origin and the destination country of the immigrant population to identify the persistence of the effect of corruption, which I call cultural norms of corruption, on individual tax morale. I also

suggest potential carriers of the effect of corruption to tax morale and test other hypotheses to rule out potential alternative explanations.

A tax system is designed to provide the necessary public revenue to meet collective needs, and the realization of such collective needs depends on cooperation among the members of a collective society. Violation of collective rules by the members harms collective actions and non-compliance with the tax system is such a violation that not only jeopardizes these collective actions but also directly contributes to inequality. Tax non-compliance is a major challenge for most economies around the world. In the absence of tax morale, people always find ways to take advantage of the tax system by not paying taxes regardless of how strong the enforcement is in place. How much income an individual will declare as taxable income depends on his/her tax morale or voluntary compliance. Increasing the freedom and autonomy of taxpayers in different forms increases the relevance of cooperation between government and taxpayers. Corruption can be an obstacle in developing such cooperation between taxpayers and government because it hurts taxpayer's motivation, but the relationships have not been studied extensively, particularly when corruption is measured as experiences and as cultural norms.

What can explain tax morale is highly debated and how tax morale operates through various channels are also unknown although they are extremely important to understand tax behavior, and thereby, designing better tax policies. Allingham and Sandmo (1972) first approached to explain tax evasion saying that if the probability of getting caught combined with penalty is lower than the tax rate, people will have a higher tendency to evade taxes. So, in their view, enforcement was the factor that makes people pay taxes.

Since then, most economic research on tax noncompliance behavior has been dominated by this model that considers taxpayers as rational actors who do not comply with tax laws when it pays off. However, many recent research has identified the problems of this enforcement model and presents the relevance of many non-pecuniary factors such as norms, trust, and morality (Scholz & Lubell, 1998; Torgler, 2004), perceptions of justice and fairness (Wenzel, 2002), and cultural background (DeBacker et al., 2015; Fisman & Miguel, 2007; Kountouris & Remoundou, 2013). Thus, in this paper, I propose a framework that aims to explain tax morale, rather than tax evasion and avoidance, which incorporates the non-pecuniary of tax behavior along with the traditional enforcement framework. Nevertheless, the proposed framework primarily focuses on dissecting the carriers of corruption effects to tax morale where I define tax morale as the probability of self-reporting that cheating on taxes is never justifiable.

Tax morale plays a significant and sizable role in reducing tax cheating¹. Poor tax morale can have many implications on public sector economies. For example, poor tax morale can create a vicious cycle of low public welfare: poor tax morale can cause higher tax cheating which, in turn, reduce state income and weaken its capacity. When states failed to provide adequate public goods and welfare to meet citizen's expectations, their tax morale further declines, and the process continues until there is an intervention to break the cycle. Moreover, increasing tax compliance through higher tax morale is cheaper than

¹See the paper by Luttmer & Singhal (2014) for a review of related literature.

increasing it by enforcement². Note that superior tax morale may not necessarily lead to higher compliance with taxes, however, a large number of empirical works show that tax compliance decisions can be influenced by tax morale. Inferior tax morale is associated with a higher level of tax non-compliance (Dell’Anno, 2009; Kirchgässner, 2011; Lisi, 2015; Stark & Kirchler, 2017; Torgler et al., 2008) and shadow economy (Halla, 2012; Torgler et al., 2010; Torgler & Schneider, 2009; Williams & Horodnic, 2015; Windebank & Horodnic, 2017). Most earlier literature utilized cross-section data and found a negative association between corruption perception and tax compliance (Baum & Gupta, 2017; Lago-Peñas & Lago-Peñas, 2010) and between petty corruption and tax morale (Jahnke & Weisser, 2019). Others used firm-level data for the same analysis (Alm et al., 2016; Bertinelli et al., 2020; DeBacker et al., 2015). By contrast, in this paper, I address three specific research questions:

1. What happens to individuals’ motivation to pay taxes when they experience corruption?

For example, individuals had to pay bribes to receive public services. Conventionally, asking individuals about their views on corruption, like how widespread is corruption in your community, and estimating the effect of such perception of corruption on their tax morale or tax compliance can be endogenous due to the possibility of reverse causality. Note that high corruption perceptions of an individual can drive down his/her tax morale, but low tax morale can also lead that individual to report a high perceived level of corruption. I tackle this endogeneity problem by using individuals’ corruption

²If tax morale is zero where no one pays the tax without strict enforcement can be a costly operation for a government. In contrast, high tax morale where people pay taxes voluntarily with little to no enforcement can reduce the cost of operation and increase public revenues.

experiences, the measuring question has been newly added to the World Value Survey (WVS) conducted during 2017-2020. Similar to Clausen et al. (2011), I argue that the measure of corruption by experience is more exogenous as well as more precise because the origin of the expectation of bribes is at the public offices which offer services to the citizens and if services are provided with no constraints citizens are not expected to offer a bribe. Note that those constraints are the means of public officials to signal that they want bribes for the services they are supposed to provide. Using this more exogeneous measure of corruption, I found that corruption experience significantly deteriorates individual tax morale, which is that odds of self-reporting that cheating on taxes is never justifiable for an individual who experienced corruption is 21% to 23.5% lower than the odds of an individual who never experienced corruption. This effect is robust to many specifications.

2. What is the spillover effect of corruption? In other words, does corruption influence the tax morale of individuals who did not experience corruption but live in a society where other members experienced corruption? Survey data shows that within the same country a substantial number of respondents never experienced a corrupt transaction to receive public services while others experienced it. I exploit this heterogeneity to identify the spillover effect of corruption after merging individual-level data with national-level corruption data. Assuming all individuals within the same country encounter an identical corruption level, this is the corruption that people learn from various sources like television, newspapers, political campaign, and others, but all may not experience it. Thus, in addition to the effect of national corruption on individual tax

morale, I estimate the spillover effect of corruption by limiting samples to only a non-experienced group of people and confirm that there is a significant spillover effect of corruption. While the results confirm that corruption has a large spillover effect, the coefficient indicates that a 10% increase in national corruption can lead to an expected decline in the odds of reporting that cheating on taxes is never justifiable by 15.3% to 17.5%. This effect is also robust to a large set of individual, local region, and country-level controls.

3. How persistent is the effect of corruption on tax morale? Specifically, do people from more corrupt countries tend to show low tax morale in the destination country? This leads to further disaggregation by asking a question, do the first-generation immigrants transmit this cultural norm of corruption to the second-generation immigrants? This allows me to examine the persistence of the effect of corruption by looking at the norms or cultural inheritance of corruption that usually sustain for a longer time. This study proposes a link between the tax morale of people who migrated to a foreign country that is subject to its own legal and institutional framework (destination country) and corruption culture from these people's origin country. Origin country corruption is exogenous since it is unlikely that an individual's tax morale in one country will reversely impact the corruption of that individual's origin country. After estimating the effect of origin country corruption on the tax morale of the immigrant population in the destination country, this paper confirms that cultural norms of corruption that influence tax morale exists, and the effect is influential for at least first-generation immigrants. While the corruption experience and destination country corruption are the dominant

factors to deteriorate individual-level tax morale, the effect of origin country corruption remains a significant factor. A 10% increase in origin country corruption can cause a decline in tax morale of first-generation immigrants by about 4.2%.

By deploying a multi-level mixed effect (MLME) estimate on the WVS, the European Value Studies (EVS), and several other datasets and exploiting different research designs, this research provides important policy information that corruption not only significantly hurts the tax morale of those individuals who experience corruption in person but also creates a large spillover effect on other people who did not experience corruption. After exploiting the origin country corruption of a large immigrant population in the destination country that allows separating the institutional effect of origin country, this paper finds that the cultural norms of corruption persist on the tax morale of first-generation immigrants; however, the effect of origin country corruption attenuates for the second-generation immigrants. The results imply that corruption is the cause of unethical norms and poor institutions since corruption effect self-reinforces. While people unlearn many of such norms to meet contextual requirements, leaving cultural roots completely takes time. I also find that individual experiences, which is direct learning, matter significantly more than their passive learning. Therefore, policies to improve tax compliance with minimal enforcement should address corruption and understand the cultural influences. It is unlikely that the elimination of corruption will allow people to adjust their tax morale quickly. Rather, the adjustment process can be prolonged to at least one generation.

As the corruption experience drives down the individual tax morale, I identified several carriers of the effect of corruption to tax morale namely fairness in the tax system, ethnic

diversity, the shame of being exposed to the community, crowd-in of public policies, and others. All these heterogeneity tests reveal that corruption is a varying problem that depends on how the socio-economic composition of the society is, which is consistent with the theories that this paper proposes. For example, when citizens observe that governments do not provide enough public/welfare goods they react to corruption experience more aggressively to adjust tax morale than otherwise since citizens justify their tax payments against the public services their society receives. On the other hand, when their society is ethnically and culturally heterogeneous and corruption is too high, people have the minimum shame of being exposed, thereby, the effect of corruption on tax morale is limited. I also ruled out alternative explanations by testing other hypotheses, thus, I argue that the effect of corruption on tax morale was not driven by individuals peer effects and also not by a reduced expected cost of getting caught in tax cheating when corruption was revealed.

The next section differentiates between tax morale and tax compliance. Section 3 elaborates on the main research questions and states complete hypotheses between corruption and tax morale. Section 4 explains the empirical design and Section 5 presents the data descriptions. While Section 6 analyzed the results, Section 7 presents verifications of the suggested mechanisms by heterogeneity tests of corruption. Section 8 presents tests of alternative hypotheses. Section 8 concludes the paper.

2. Tax morale is not tax compliance

Tax morale has received much attention recently and it is a critical topic in related empirical research, however, the conceptual definition of tax morale remains unsettled. It

is often the intrinsic motivation to comply with tax systems (Torgler, 2011; Torgler & Schneider, 2007), while others see it as non-pecuniary factors that influence tax behavior (Luttmer & Singhal, 2014). In the real world, there is a continuum, where at one end, there are people who are extremely honest people who will never attempt to violate tax laws, and at other the end, there are people, often called rational actors, who make every attempt to evade taxes and consider this is a game (benefits from evading taxes versus benefits from obeying with taxes). All other people are in-between these two extreme groups. Although we certainly cannot know who has better tax morale than others, we can say that, in the continuum, the first end people on average have better tax morale than the last end people.

Tax morale exists with differing magnitude across individuals, and I think any residual motivations to comply with tax systems after enforcement can be attributed to tax morale³. However, it is challenging to differentiate the relative role of tax morale from the role of tax enforcement on an individual's tax compliance behavior. In other words, it is difficult to identify what proportion of tax payment is due to enforcement and what other proportion is due to tax morale, since they both interact in the same tax environment. In other words, we cannot observe whether people have any level of tax morale if 100% compliance is made by enforcement. Differentiating the role of tax morale from enforcement becomes

³A good example of tax morale was presented by Dwenger, et al. (2016) who reported that nearly 20 percent German people paid their obligatory church tax in full without any deterrence and note that Germans knew that there was no deterrence for such church taxes. While referring this tax payment as tax morale, we must be cautious that there is possibility that people view church tax and state tax differently, people may pay church tax for divine reason while state tax may not have any such appeal. See also Luttmer & Singhal (2014) for a review of similar other literature that presented role of tax morale.

more problematic when there is a possibility that citizens adjust their tax morale as a response to tax enforcement. For example, on one hand, Frey (1997) argued that law is designed for dishonest people, and when such laws are strongly enforced the civic virtues crowd out, since dishonest people utilize all means at full capacity to avoid the laws. On the other hand, a lack of enforcement can signal that obeying tax laws is not important. In such a low enforcement environment, tax morale can simply disappear. Supporting evidence shows that poorly designed public policies may reduce people's self-interest in collective goods (Bowles, 2008; Titmuss, 2018). Therefore, while some level of enforcement in the form of public policies is essential to observe tax morale in people's tax decisions, both strong enforcement and no enforcement can negatively influence tax morale.

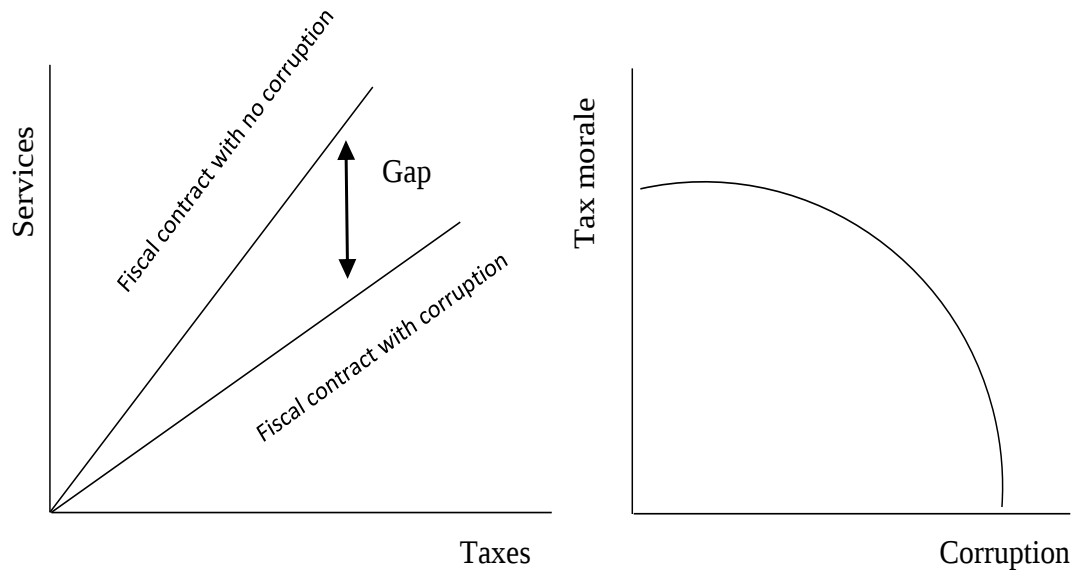
3. Corruption and tax morale

The bond between states and taxpayers is a contractual one that implies duties and rights for both parties: states trade services for tax revenues from citizens. This is called a fiscal contract where taxes and public services track each other closely as shown by the left panel of Figure 1. Fiscal contract theory says that the state should not impose its own will on citizens, but it should bargain with citizens for revenue⁴. Cooperation between states and citizens is the key promise of this theory. Due to increasing autonomy on the citizen sides, the idea of a fiscal contract of reciprocity between states and citizens has become more important. Moreover, the government tax collection process can be an extremely

⁴For details of the fiscal contract and analysis of Nash equilibrium for strategies employed by taxpayers and states see works of Timmons (2004).

costly operation if tax compliance has to be made entirely by force. Instead, a practical option for a government is to trade public services for exchanges of public revenues, particularly when citizens track both public services they consume and the tax contribution they make to the state. Tax morale is expected to be associated with such fiscal exchange between state and taxpaying people: a stronger fiscal contract can lead to higher tax morale. Evidence suggests that when a political system is perceived by citizens to be fair, they may pay full taxes regardless of their consumption of public goods (Feld & Frey, 2007; Hofmann et al., 2008).

However, corruption in the public sector can generate an obstacle for developing the relationship between citizens and states and can deteriorate tax morale for several reasons (Figure 1). Corruption has received less attention in the literature to explain tax morale than others such as cultural backgrounds and legal enforcement. It can influence tax morale both through pecuniary and non-pecuniary factors. Corruption operates like a vicious cycle: higher corruption creates a more convenient environment for others to be engaged in corruption. This means when corruption is a common norm of society, everybody helps each other to be more corrupt until it reaches an optimal level which can be an efficient predatory behavior for an anarchic society (Rose & Mishler, 2010).



Note: The author created the graph

Figure 1: Fiscal contract, corruption, and tax morale

Many including Lavallée et al. (2008) rejected the so-called “efficient grease” hypothesis that the trust of citizens can be increased by opening doors to otherwise inaccessible services through clientelism and bribes. Instead, they argued that corruption does not create trust-enhancing effects, it is not conditional on the quality of public services, and both perceived and experienced corruption influence trust negatively. It also distorts the market (Rose-Ackerman & Palifka, 2016) and reduces trust in public institutions (Cho & Kirwin, 2007; Clausen et al., 2011). Torgler (2006) and Ali et al. (2014) both find a negative correlation of tax morale with Transparency International's Corruption Perceptions Index (CPI) and the perceived number of corrupt tax officials. After studying petty corruption in African economies, Jahnke and Weisser (2019) showed that petty corruption also hurts tax morale. Timmons and Garfias (2015) argued that revealed

corruption reduces revenue from property tax for Brazilian municipalities. Bertinelli et al. (2020) also claimed that paying bribes reduces tax compliance after studying 700 small businesses in Mali.

3.1. Theoretical framework

To motivate this research, I have developed a simple theoretical framework of tax morale considering whether the taxpayers think that cheating on taxes is justifiable in their tax environment. This micro theoretical framework includes the role of state capacity (Besley, 2020)⁵, deterrence of Allingham and Sandmo's (1972) classic model, persuasion (Shimeles et al., 2017), Kantian psychic cost (Kant, 2017), and moral constraints (Bosco & Mittone, 1997). The classical model of Allingham and Sandmo (1972) is a pure gambling model where taxpayers face two possibilities. On the one hand, when they can avoid detection by the tax authority, they can report a small part of their income and pay tax only on that small part of income. On the other hand, when they cannot avoid the audit while not reporting the full income, they will pay the entire taxes and additionally the penalties. Such a gambling model has a von Neumann-Morgenstern utility function:

$$C(U) = (1 - \pi)U(Y) + \pi U(Z) \dots\dots (1)$$

Where C is the shares of income that are cheated and individuals want to maximize this share of cheated income. Y is the taxpayers' entire net incomes when they underreport and were not detected. Y is a function of a flat tax rate, $t \in [0, 1]$, and actual income of

⁵Besley's (2020) model categorizes citizens into different groups. A fraction of the population is the elite group with decision-making power over public goods and, I think, they are likely to be the main beneficiary of corruption. The other faction is the non-elite group, who fund the public goods through tax payment, are the main victim of corruption.

taxpayers, w , which tax authority does not know entirely. In non-audited case, the net income will be $Y = w(1 - t(1 - C))$. The probability of detection, π , is a constant in equation (1). However, if the taxpayers are audited, they must pay the full amount, tw , and the penalty, ρtCw , where ρ is the penalty rate on the cheated tax. Therefore, in the case of being audited, the net income will be $Z = w(1 - t - \rho tC)$ ⁶.

In equation (1), the people select an optimal amount of tax cheating, C , to maximize their utility, which is based on the assumptions that people are rational who play games against nature, and they are free riders. In the real world, these assumptions may not entirely hold for many taxpayers. Moreover, this is an extremely simplistic model to understand taxpayer's tax morale that, in this case, is some people think cheating on taxes is justifiable while others do not. Taxpayer's actual decision-making process to cheat on taxes must be more than just comparing monetary gains that this deterrence model can offer. In real life, taxpayers may not necessarily maximize their monetary gain, instead, they may maximize overall personal satisfaction after trading off between their optimal monetary gains and their moral positions. Taxpayers justify whether they should pay taxes or not, which is beyond the simple detection and penalties framework of the model in equation (1). Taxpayers consider many other non-pecuniary factors to maximize their overall personal satisfaction in a combination of their moral standard and monetary gains,

⁶If I introduce corruption in their tax environment, the probability of detection declines as they can avoid being caught by tax authorities, $(\pi - \lambda)$, where λ is the level of corruption. If they cannot avoid detection but opportunities of corruption exist, they can minimize penalty, $(\rho - \lambda)$, therefore, their net-income will be $Z + \xi = w\{1 - t - (\rho - \lambda)tc\}$. The ξ is the cheated money after paying bribes. With corruption, the new von Neumann-Morgenstern utility function will be as in quaiton (2):

$$C(U) = (1 - (\pi + \lambda))U(Y) + (\pi - \lambda)U(Z + \xi) \dots\dots\dots (2)$$

which are driven by perceived fairness in the tax system or reciprocity, their sense of obligation, social incentives of reputation, and many other factors that are valuable to each individual taxpayer. Corruption plays an indirect role through these pecuniary and non-pecuniary factors.

According to the Kantian morality approach, which is also called the “respect for persons” theory, moral grounds can supersede an individual’s self-interest in maximizing monetary gains through tax cheating (Kant, 2017; Laffont, 1975). Citizens recognize that when they are not paying their obligated taxes, but continuing consumption of public goods is morally wrong. They also recognize that their tax cheating negatively influences their own community’s wellbeing. Therefore, they develop a sense of obligation to society, which lightens their perceived tax burden. When they violate such civic duties by not paying their obligatory taxes, they experience psychic costs. Such Kantian costs are likely to occur when they make a wrong statement against the government-set tax rate regardless of their detection. Bosco & Mittone (1997) advances this Kantian approach with their idea of moral constraint that it is not necessarily for the condition set by society, if they violate, they incur psychic costs but when they believe that an unfair tax system has not been imposed on them. In other words, they argue that moral constrain is only effective to reduce tax cheating when citizens believe that the tax burden is fair.

Whether a tax system is fair or unfair is not a straightforward situation. A citizen may perceive a tax system to be fair or unfair based on many factors including winning a war and providing good schools to their community depending on citizen’s belief what is the best use of public revenue. To make it simple, objectively differentiate, and identifying

relevance with corruption, I elaborate a simple framework using public goods and services, G . The perceived fairness in the tax system, $(G - wt - \lambda)$ can be determined by subtracting the total tax bill, wt , and the total amount of corrupt transfers, λ , from the amounts of public goods available to the society, G . This is also known as *reciprocity* to many while others call it *quid pro quo* contributions. This is a situation where commitments to pay taxes are influenced by expected returns in the forms of public goods and services. With no corruption, λ , the tax burden is supposed to be reasonable when the amount of tax payment is equal to or less than the extent of public goods and services, $(G - wt) \geq 0$, thus, their tax morale improves. If the amount of tax payment is higher than the extent of public goods, $(G - wt) < 0$, taxpayers recognize the tax burden to be unfair, which leads to a decline in their tax morale. I hypothesize that corruption adds further relative weight to the total amount of taxes, $wt + \lambda$, against public goods, G . Any positive amount of corruption will lower the extent of public goods and services compared to their tax payment, $\{G - (wt + \lambda)\} < 0$, then the motivation increases the weight of the tax as the taxpayers perceive the tax amount to be unfair – negatively affect their tax morale. Realistically, assuming that the government has no external borrowing, this equation $(G - wt - \lambda) = 0$ to be true, the corruption must be zero, $\lambda = 0$ and all tax payments must be used for public goods and services. We assume that all income from taxation is spent on public goods, which may not be always true because the government can spend part of the revenue on some goods that disproportionately benefit elites in the society. Not spending all tax revenue on public goods, can also create a negative balance, $(G - wt - \lambda) < 0$, and leads to a feeling of unfair transactions with the government. On

the other hand, with no corruption, if people observe more public goods than they pay for them, $(G - wt - \lambda) > 0$, the motivation decreases the relative weight of the tax rate as they perceive it to be generous – acting as a complement to tax obligation in this way. When taxpayers observe public goods in their community equivalent to the amount that they have been asked to pay $(G - wt - \lambda) = 0$, then their motivation is indifferent.

I also hypothesize that taxpayers may adjust their feelings further with the observance of corruption considering if they would have paid the full tax it would go to the elite's pocket and not be used for public goods and services. Personal experience of corruption or even the knowledge of corruption in government can minimize both the Kantian psychic costs and moral constraints of Bosco and Mittone, and taxpayers may find new grounds to satisfy themselves that cheating on tax can be justifiable and they do not incur any psychic costs.

On the other hand, the taxpayers have also desire to be recognized by their neighbors that they are socially compliant individuals, and business firms and famous people want such recognition at the national and international level. Such incentives of reputation can be multiplied by the probability that their tax cheating decision will become known to their neighbors and their communities. Graham et al. (2014) reported that about sixty-nine percentage of officials from a survey of nearly 600 corporate executives do not adopt tax planning strategies due to their reputational concerns. People who decide to cheat on taxes must take into account both the risk of penalties and of being denounced by the community. Therefore, many people pay taxes because they want to preserve their reputation and they do not want to maximize their monetary gains. However, people may less care about such

reputation and being publicly denounced if most people are corrupt in some forms in their society and if they tend to accept such corruption as their regular norms. What is important in this case is the perceived level of corruption, it is not necessarily important that a true level of corruption has to be revealed to taxpayers to care less about preserving the reputation and to reduce the effect of social exposure.

3.2. The perception of corruption versus the experience of corruption

In the corruption literature, the most frequently used measure of corruption is the perception of corruption since there is no objective measure of actual corruption cases. However, in this paper, I emphasize that corruption perception is not an ideal proxy for the actual or experience of corruption. In that case, due to the identification problems, an association between the measure of corruption perception and tax morale is not a causal relation. Corruption perception and low tax morale can be simultaneously determined: people with low tax morale can report higher corruption and vice versa. Therefore, I do not use individual corruption perception as a measure of corruption, instead, I use corruption experience. The WVS-7 added new questions for the first time in their survey that asked respondents about their perceptions and experiences of corruption separately and we observe a sharp difference in the response patterns. Note that this experience-based indicator is not objectively verifiable between parties involved in corruption, but it is a shift from perceptions to realities. The kernel density distribution in Figure 2 shows that, in the experience case, the density of the respondent's response falls at the center and lower half of the scale of measures of corruption experience from never (1) to always (4). In the perception case, on the other hand, most respondents excessively reported the rate of

corruption in the response scale – most choose the highest level of corruption on a scale of 1-10. While the experience of corruption reflects what individuals go through in daily life like bribing a policeman to bypass a ticket and similar other events, the perception of corruption reflects an overall rate of corruption of an economy that is mostly learned by other socio-economic circumstances plus corruption.

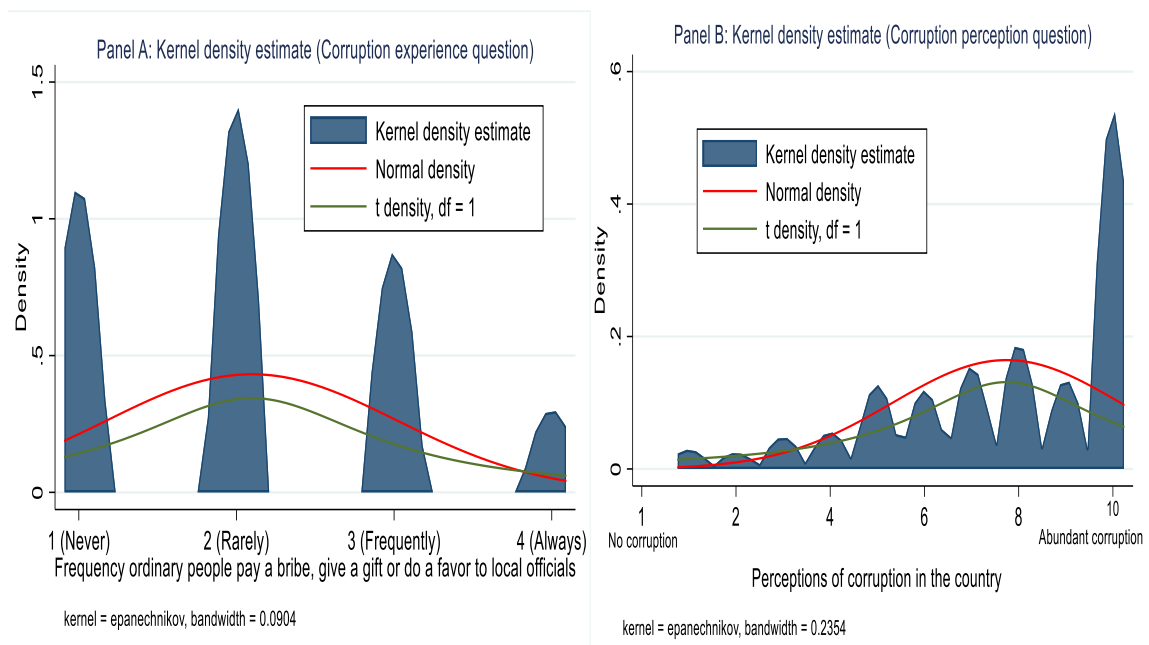


Figure 2: Kernel density distribution of corruption experience and perceptions

Note: The corruption experience question in the WVS-7: “We want to know about your experience with local officials and service providers, like police officers, lawyers, doctors, teachers and civil servants in your community. How often do you think ordinary people like yourself or people from your neighborhood have to pay a bribe, give a gift or do a favor to these people in order to get the services you need? Does it happen never -1, rarely -2, frequently - 3, or always - 4?”. The WVS-7 also asks the respondents about corruption perceptions: “Now I’d like you to tell me your views on corruption – when people pay a bribe, give a gift or do a favor to other people in order to get the things they need done or the services they need. How would you place your views on corruption in your country on a 10-point scale where “1” means “there is no corruption in my country” and “10” means “there is abundant corruption in my country”. If your views are somewhat mixed, choose the appropriate number in between.”

Moreover, the corruption experience is more exogenous in the WVS than the perception case, because the corruption experience question asked respondents about their experience with local officials and service providers, like police officers, lawyers, doctors, teachers, and civil servants in their community. When corruption occurs, the public officials are the origin, and they are not supposed to know the service receiver's tax morale. It is also unlikely that service seekers will offer bribes for services when they are easy to receive. The usual tactic on the public officials is to obstruct the services that people are looking for to provide a signal of bribes. Alternatively, we can mimic this with an experimental situation where people interact with public officials to obtain various public services. Public officials can be corrupt or non-corrupt. Whether a person meets a corrupt public official and experience a corruption transaction or meets a non-corrupt public official and never experience corruption is fortuitous. Therefore, there is little possibility of a reverse effect.

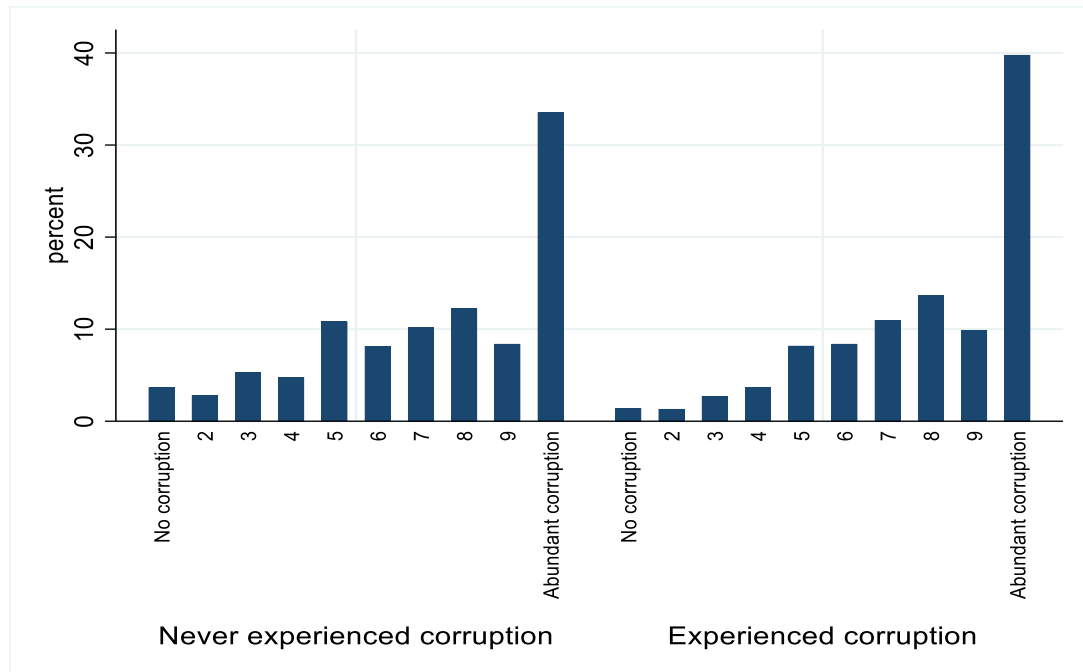


Figure 3: Corruption perceptions by corruption experience

Note: Response to corruption perception was on a 10-point scale where 1 means there is no corruption in my country and 10 means there is abundant corruption in my country.

Besides, corruption perception and actual corruption are not the same phenomena. If corruption perception is mainly shaped by corruption experience, they are supposed to be highly associated, but they are not highly connected (Gutmann et al., 2020). In the data used in this paper, the corruption perception and experience have a minimal correlation of less than 0.12. Figure 3 shows that people who never experienced corruption reported their perception of corruption at the same rate as reported by people who experienced corruption. This shows that the corruption perception was not primarily informed by corruption experience but something else.

Many shreds of evidence are coming out that asking individuals about their views on corruption and using that as a proxy of actual corruption can be misleading. While the

corruption experience event can be fortuitous, the perception of corruption is systematically related to an individuals' political orientation, economic position, educational status, country and local regions they live in, and other social and environmental factors (Gutmann et al., 2020)⁷. Considering the example of Russia where most Russians perceive that it is a corrupt country, however, alternative measures of corruption show otherwise. Rose and Mishler (2010) compared Russians' perception and experience of corruption regarding specific public institutions and their services using the New Russia Barometer XV survey and found no substantial association between them. They also reported that political awareness is the factor that drives corruption perceptions. Similarly, Olken (2009) compared the surveyed perception of corruption of rural Indonesian with actual corruption events measured as missing expenditures in road construction projects. He found a weak correlation that they should not be used as a proxy of one another. Many other scholars have challenged that corruption perception is not a good proxy of actual corruption and have emphasized the need for an experience-based corruption measure as the differences between corruption perception and corruption experience become more discernible (Donchev & Ujhelyi, 2014; Golden & Picci, 2005; Gorodnichenko & Peter, 2007; Gutmann et al., 2020; Svensson, 2003). Their arguments reflect the fact that only corruption experience cannot fully explain differences in corruption perceptions.

⁷For example, optimism is related to many choices in work and life which can also influence what to report on corruption (Puri & Robinson, 2007). Moreover, such optimism is related to many individual and society level success. An unemployed individual who is living through a bad life can potentially perceive that the government is corrupt, but that may not be true for someone who has a decent job and is living a good life.

3.3. The spillover effect of corruption

Corruption may not only damage the tax morale of individuals who experienced the corruption in person but also those individuals who never experienced corruption due to the spillover effect. The spillover effect of corruption is possible since taxpaying individuals may also respond to adjust their tax morale to the corruption experiences of their neighbors, friends, and other family members. Non-experienced persons can also learn about such corruption from various other sources such as television, newspapers, political campaign, and others (Ajzenman, 2021)⁸. In recent years, many easy-access sites, anyone can create an account in Twitter, Facebook, Instagram, or create a blog, and post corruption events which can widely and quickly be communicated not just with neighbors and friends but across the entire population in a country. Such social media can effectively educate people about corruption in their government (Enikolopov et al., 2018). Therefore, the estimated effect of corruption experience on tax morale can be underestimated due to such spillover effect. However, whether the spillover effect of corruption is large or small will differ by the level of corruption in their country assuming that all individuals within a country encounter a similar level of corruption. In other words, if a country is highly corrupted, more people will encounter random corruption experiences while seeking public services, and the information will also be more shared with other members who did not experience corruption in person.⁹

⁸For example, people learn every year the country's overall corruption profile published by several independent national and international organizations such as CPI (corruption perception index).

⁹But it is different from the experience of corruption, which is very individualistic where a person has been engaged in a corrupt transaction.

Taxpaying individuals should modify their tax morale to respond to the corruption level in their country regardless of their corruption experiences. However, the extent of the effect of country-level corruption on individual tax morale should be smaller than corruption experience because corruption experience is active learning while country-level corruption is passive learning. The difference in impact may arise from the fact that after being involved in a corrupt transaction, people leave no doubts that the government service system is corrupt and it will misuse tax revenue, on the other hand, when people learn about overall country-level corruption, they can still be doubtful since it has been a common political culture in most countries to blame the political opposition that they are corrupt. In other words, after experiencing corruption, people will have direct evidence to evaluate government performances, and based on their performances they adjust their decision on their tax payment (see Figure 1). On the other hand, in the case of country corruption profile, people lack direct evidence, and therefore, we expect a smaller effect on tax morality. Moreover, corruption experience is just an additional fact for experienced persons since they are also members of the same society, so indirect sources of corruption should equally inform them as non-experienced persons.

3.4. Corruption culture

How persistent is the effect of corruption? To answer this, I look at the cultural norms of corruption. What happens if people change their tax environment through migration and face new environments and institutional contexts? Do they carry their earlier influence of corruption with them? Culture can be wide and difficult to define, and it persists across many generations. In the empirical setups, it is challenging to separate a causal effect of

cultural norms on individual tax morale from other aspects of the tax environment.¹⁰ I answer this question by linking the surveyed individuals around the world who migrated to a new destination country with corruption from their origin country of residence. This setting places immigrants and children of immigrants in an enforcement context in the destination country who carry different cultural norms from overseas which should allow me to separate the role of cultural norms on their tax morale from the influence of institutions located in their origin country. Stationing the immigrant population in another country creates a prospect of natural experiments to assess the effect of culture. These immigrants are from a country that has distinct cultural norms, but they are facing an identical legal and economic incentive like the natives in their tax decisions. Therefore, I can distinguish not only the overall cultural elements but also the cultural norms of corruption after linking with the corruption of the origin country that may exert influence on individual tax morale. Such association between corruption culture and tax morale can explain the heterogeneity of tax compliance across countries with comparable socio-economic and political conditions. This also allows me to examine if the influence of corruption culture persists across generations and provide suggested evidence regarding the overall persistence of the effect of corruption norms.

While some literature claims that culture impacts tax morale (Kountouris & Remoundou, 2013) and tax evasion (DeBacker et al., 2015), no literature examines the

¹⁰Studies that examined the role of culture on tax behavior compared tax evasion in similar laboratory experiments across countries have little relevance to real word, moreover, they considered culture as a residual or gap that cannot be explained in the observable model (Cummings et al., 2009; Gërzhani & Schram, 2006).

effect of corruption culture on tax morale at the individual level. This study proposes a link between the tax morale of people who migrated to a foreign country that is subject to its own legal and institutional framework (destination country) and corruption culture from these people's origin country. In other words, I ask whether immigrant people from more corrupt countries exhibit lower tax morale in the destination country.

The mechanism by which corruption culture affects individual tax morale is ambiguous while related literature is growing in the field. For example, on firm's tax evasion, both DeBacker et al. (2015) and Bame-Aldred et al. (2013) found a statistically significant role of national-level cultural factors, while DeBacker et al. utilized Internal Revenue Service (IRS) audit data and Bame-Aldred et al. utilized World Bank survey data. At the individual level, Fisman and Miguel (2007) studied the illegal parking behavior of United Nations' diplomats who were relocated to New York City from all over the world for their services. They found that UN diplomats from more corrupt countries had gathered more unpaid parking tickets than diplomats from less corrupt countries. Similarly, at the country level, Alm and Torgler (2006) show that the USA has higher tax morale than Spain and 14 other European countries which are due to their cultural differences. All this literature argued that culture is in some forms connected to tax-paying behaviors at individual, firm, and country levels.

4. Data descriptions

The main source of data is the WVS-EVS. The WVS and the EVS have been collaborating to conduct the values survey since 2017. This means both organizations coordinated the questionnaire's design and administration, and the overlap in the two

questionnaires is about 70%. I use the 7th wave of WVS (WVS-7, V1.0) since it included the corruption experience questions for the first time and integrated EVS. Fieldwork for the WVS-EVS was conducted from mid-2017 to 2020. Therefore, combined, I have access to data from 79 countries that cover over 127,358 respondents which provides the largest coverage of countries and samples (see Table A1 for the breakdown of the samples by WVS and EVS). The WVS and EVS utilized a standard methodology and nationwide random probability sampling to ensure they are comparable across all surveyed economies¹¹. In each country, the sample population is individuals whose age is 18 and above dwelling within private households irrespective of their nationality, citizenship, and language. The minimum sample size is 1200 for most countries to be included in the national dataset. While larger countries have samples of 1500 to 5000, countries with a population of less than 2 million have samples of 1000. The interview in the WVS-EVS was face-to-face at the respondent's place of residence (EVS/WVS, 2020). To conduct analysis in this paper, I merged this individual-level survey data with country-level data and local region within country-level data.

4.1. Tax morale, corruption experience, and individual-level data

I measure tax morale using a question about the justification of the tax cheating activities in the WVS-EVS. In the WVS-EVS surveys, interviewees were asked to select their position on a scale of 1-10, to what extent do you think cheating on taxes is justifiable.

¹¹Visit this site for the detail explanation of survey by WVS-EVS: <https://www.worldvaluessurvey.org/WVSEVSjoint2017.jsp>. While the EVS conducted its survey in European economies, the WVS conducted it in rest of the world, except Germany, Romania, Russia, and Serbia where both the EVS 2017 and WVS7 have been conducted (EVS/WVS, 2020).

The original question was: *“Please tell me for each of the following actions whether you think it can always be justified (10), never be justified (1), or something in between (9 to 2), using this card, Cheating on taxes if you have a chance.”* The response to this question records one’s willingness to cheat on taxes when an opportunity is available, that is tax morale. I converted it into a binary variable: never justifiable = 1, and otherwise = 0 for two reasons. First, the key interesting issue is who deviates from the position of cheating on taxes is never justifiable and who does not. Any deviation from the position of never justifiable signals a lack of tax morale, however, the level of shortness of tax morale can be a more subjective issue. Second, the distribution of the response to measure tax morale is right-skewed, 64% of respondents consider that tax cheating is never justifiable. This means 36% of respondents showed some supports that tax cheating can be justifiable to some extent. The distribution of the original recoded scale of 1-10 (higher score indicates higher tax morale) and binary category is in Figure A.1 in the appendix. The joint WVS-EVS included the tax morale question, so data is available for 127,358 samples.

To identify those people who experienced corruption and those people who did not, I use the following question in the WVS: *“We want to know about your experience with local officials and service providers, like police officers, lawyers, doctors, teachers and civil servants in your community. How often do you think ordinary people like yourself or people from your neighborhood have to pay a bribe, give a gift or do a favor to these people in order to get the services you need? Does it happen never -1, rarely -2, frequently - 3, or always - 4?”* This question was newly added in the WVS, and it does not overlap with the EVS, so the samples are limited to 70,867 interviews in 49 countries. Nevertheless, the

wide coverage of the WVS data will allow me to inspect the role of corruption experiences for the first time in this fashion and produce generalizable results. I converted it into a binary variable to separate people who never experienced corruption (corruption experience = 0) from others who reported experience some level of corruption (corruption experience = 1). Data indicates that 30% of people reported that they never experienced corruption while the other 70% of people reported they experienced corruption (Figure 2). This corruption experience measure should represent more precise corruption of what individuals experience in their daily life. Panel A in Table 1 reports the balance check for various individual-level factors including age, sex, education, income, religion, and personality characteristics by corruption experience. It shows that male and younger people reported higher corruption experience on average. The difference in corruption experience by religious groups is also statistically significant. All religious groups including people with no religious denomination reported higher corruption experience except more Muslim, Buddhist, and other Christian-like evangelicals reported that they never experienced corruption. Data for these variables are also from the WVS-EVS and are available for full samples.

Table 1: Balance check between experienced and never experienced individuals

	(1)	(2)	(3)	(4)	(5)	(6)
	EC	NEC	NEC-EC	p-value	Obs. (EC)	Obs. (NEC)
Panel A: Individual level						
Tax morale (Justifiable=0)	0.611	0.695	0.084***	<0.00	45,563	19,646
Male =1 (Female=0)	0.487	0.457	-0.030***	<0.00	45,929	19,807
Age (years)	41.801	44.416	2.615***	<0.00	45,727	19,756
Education:						
Primary (yes=1)	0.173	0.208	0.034***	<0.00	44,353	19,376
Secondary (yes=1)	0.423	0.427	0.008	0.324	44,353	19,376
Post-secondary (yes=1)	0.173	0.134	-0.039***	<0.00	44,353	19,376
Tertiary (yes=1)	0.232	0.232	<0.00	0.993	44,353	19,376
Scale of incomes						
Lower	0.085	0.100	0.015***	<0.00	45,141	19,381
Second	0.064	0.062	-0.002	0.404	45,141	19,381
Third	0.118	0.114	-0.003	0.221	45,141	19,381
Fourth	0.146	0.131	-0.016***	<0.00	45,141	19,381
Fifth	0.247	0.240	-0.008**	0.042	45,141	19,381
Sixth	0.143	0.145	0.002	0.585	45,141	19,381
Seventh	0.109	0.114	0.006**	0.031	45,141	19,381
Eighth	0.056	0.056	<-0.00	0.921	45,141	19,381
Ninth	0.014	0.018	0.004***	0.001	45,141	19,381
Tenth	0.018	0.021	0.003**	0.019	45,141	19,381
Major religious groups						
No denominations	0.238	0.190	-0.048***	<0.00	45,454	19,640
Roman Catholic	0.188	0.168	-0.020***	<0.00	45,454	19,640
Protestant	0.099	0.078	-0.022***	<0.00	45,454	19,640
Orthodox (Russian/Greek/etc.)	0.086	0.061	-0.026***	<0.00	45,454	19,640
Jew	0.012	0.006	-0.006***	<0.00	45,454	19,640
Muslim	0.225	0.310	0.085***	<0.00	45,454	19,640
Hindu	0.016	0.011	-0.005***	<0.00	45,454	19,640
Buddhist	0.060	0.081	0.021***	<0.00	45,454	19,640
Other Christian (Evangelical/etc.)	0.060	0.050	0.010***	<0.00	45,454	19,640
Other	0.026	0.036	0.010***	<0.00	45,454	19,640
Kvetch 1	-0.035	0.139	0.174***	<0.00	45,329	19,521
Kvetch 2	-0.051	0.085	0.136***	<0.00	44,138	18,716
Kvetch 1.1 (nat)	-0.049	0.126	0.175***	<0.00	45,440	19,566
Kvetch 2.1 (nat)	0.147	0.183	0.036***	<0.00	43,501	18,260
Panel B: Local regional level						
Settlement types						
Capital city	0.208	0.215	0.007*	0.050	44,070	19,060
Regional center	0.211	0.234	0.023***	<0.00	44,070	19,060
District center	0.158	0.113	-0.045***	<0.00	44,070	19,060
Another city/town (Not district or regional)	0.132	0.148	0.015***	<0.00	44,070	19,060
Village	0.291	0.291	<-0.00	0.968	44,070	19,060
Settlement size groups						
Under 5,000	0.199	0.232	0.033***	<0.00	44,022	19,028
5000-20000	0.163	0.186	0.023***	<0.00	44,022	19,028
20000-100000	0.219	0.196	-0.023***	<0.00	44,022	19,028

100000-500000	0.179	0.164	-0.015***	<0.00	44,022	19,028
500000 and more	0.240	0.223	-0.017***	<0.00	44,022	19,028
Panel C: Country level						
Income group country						
Low income	0.039	0.031	-0.007***	<0.00	45,950	19,830
Lower middle income	0.246	0.161	-0.085***	<0.00	45,950	19,830
Upper middle income	0.443	0.452	0.009**	0.044	45,950	19,830
High income	0.272	0.356	0.084***	<0.00	45,950	19,830
Human development index (HDI)	0.743	0.773	0.030***	<0.00	43,921	18,518
Income share held by richest 10 %†	29.955	29.941	-0.013	0.745	41,352	17,038
Destination country corruption (CPI)	0.588	0.535	-0.053***	<0.00	43,889	18,789
Origin country corruption (CPI)	0.597	0.551	-0.045***	<0.00	41,919	19,049
Health expenditure (% of GDP)†	6.653	6.861	0.208***	<0.00	42,428	17,966
Education expenditure (% of GDP)†	4.550	4.417	-0.134***	<0.00	37,642	17,113
Ethnic fragmentation index (Fearon, 2003)	0.390	0.369	-0.021***	<0.00	35,627	15,327
Ethnolinguistic fractionalization index (Desmet et al., 2009)	0.424	0.402	-0.022***	<0.00	40,275	16,813

Note: EC=experienced corruption and NEC=never experienced corruption. Tax morale=1 (cheating is never justifiable) and tax morale=0 (Cheating on taxes is justifiable). This balance check was conducted using t-tests. * $p<0.1$; ** $p<0.05$; *** $p<0.01$ indicated if they are statistically different between people with experience and never experience corruption. † indicates data sources are from the World Bank.

4.2. Local region (i.e., states or city) level data

I use local regional ISO (International Organization for Standardization) identity which allows me to nest individual observation within their resident local regions in a country. The dataset covers individuals who were drawn for interviews from 1045 local regions in 79 countries. Moreover, local regions within a country can be widely heterogeneous such as the size of the town and settlement types like the capital city, regional centers, village, and others. Individuals from such a widely heterogeneous society can also be heterogeneous in their tax morale and corruption experience. Literature suggests that people from small cities have better communal ethics and, similarly, rural people are more socially connected than urban people. For example, the Mancur (1968) hypothesis that free-riding occurs more in large groups than in smaller groups. Panel B in Table 1 shows that people from a town with larger than 20

thousand population experience more corruption transactions than people who live in a town that has a population of less than 20 thousand.

4.3. National corruption and cross-country data

For national-level corruption measures, I use average CPI data from 2015 to 2019 published by Transparency International and is presented in Figure 4. Although there are several measures of national-level corruption is available, they all come with some advantages and limitations. However, they tend to correlate strongly. Following DeBacker et al. (2015), I choose the CPI because it is the most widely circulated corruption measure and usually national and international newspapers publish the CPI global ranking, therefore, general tax-paying people are more aware of this corruption index than any other corruption measures. The CPI comes from the survey of business and expert people, not the general public, based on 13 different external datasets (minimum 3 datasets are required for each economy) collected by the World Bank, the World Economic Forum, private risk, and consulting companies, and think tanks.¹² It is a composite index that scores and ranks countries and territories. On the original scale of hundred-point CPI, a lower CPI score represents a higher level of corruption at the country level. However, I have recoded the scale to reflect higher values represent higher corruption. I use average CPI data from 2015 to 2019 while the individual level survey was conducted between 2017 to 2020 which should make CPI more exogenous, meaning corruption was exposed to the interviewers earlier than they express their tax morale, not vice versa. Figure 2 shows a graded color code: more corrupt economies are in darker red and less corrupt economies are in yellow.

¹²Visit this website for details of how CPI is calculated: <https://www.transparency.org/en/cpi#>

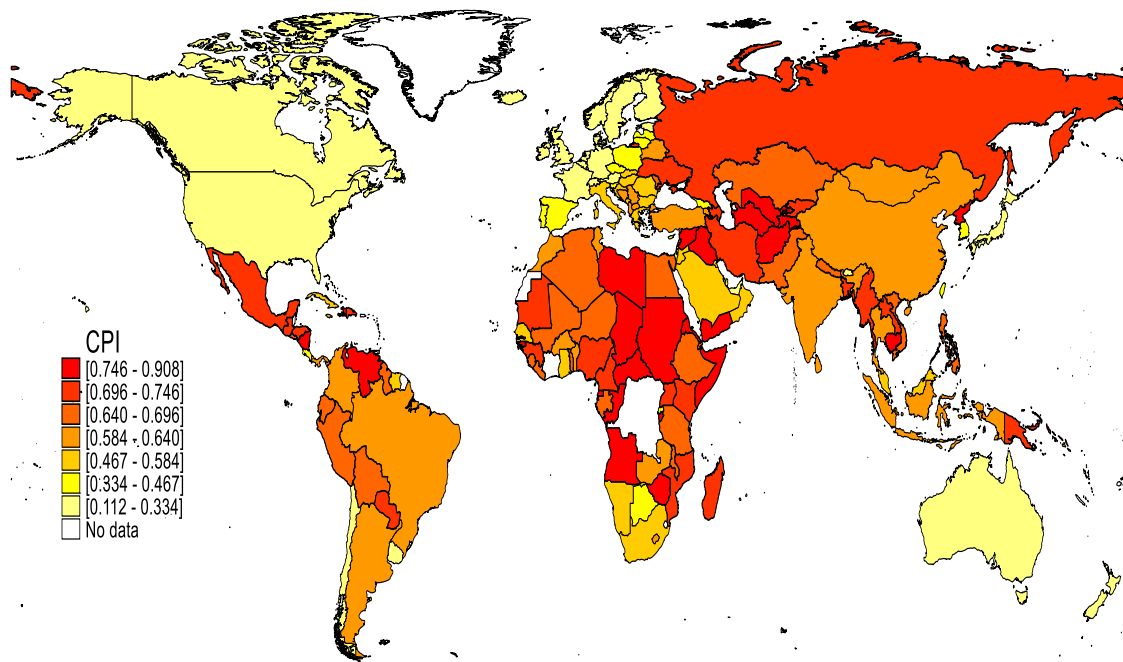


Figure 4: Average CPI around the world over 2015-2019

Note: The author created this map using the CPI reverse scale (higher values represent more corrupt countries). Data for CPI was averaged over 2015 to 2019. Darker red represents the most corrupt economies while lighter yellow indicates the least corrupt economies.

5. Empirical design

Most studies that utilized survey data that came from multiple countries or regions like the WVS-EVS assumed that individuals in a country were selected for an interview randomly and independently. This assumption may be legitimate if the individuals interviewed are from the same country. However, when individual people who are subject to the study are from several countries, there should be a clustering effect, which occurs due to the problem of homogeneity within groups and heterogeneity between groups. Individuals living in a country may share unique experiences compared to individuals living in other countries. This can also happen within the same country if a country is large and regionally diverse such as the USA, India, Canada, Brazil, and others. Due to

geographic or other factors, the population in any two regions/countries may differ markedly on factors such as culture, socioeconomic status, or racial composition¹³. It is reasonable to believe that people in one country are closer to each other than people from another country, so the measures of tax morale cannot be considered independent observations as required for generalized linear models. Consider an example, if a country has a highly effective legal enforcement mechanism for tax-paying people, and the government is more trusted, individuals from this country will show higher tax morale than a country that has a weak legal enforcement mechanism and the government is less trusted. Moreover, most individual-level factors that shape the tax morale of an individual are also supposed to be predisposed by country and regional level factors. People may also self-select into a region and/or country. The literature on welfare calls this “welfare magnet effect,” which is related to the welfare states and immigration issues. In the tax morale case, the welfare magnet effect can be similar to the immigrant’s self-selection into the countries with a lower tax rate or otherwise since economies with higher tax rates also likely distribute more welfare. However, it is not clear in which way the “magnet effects” may cause bias in the estimation. Countries and regions with higher tax rates may also host people who favor a high tax rate, and thereby, have a higher tax morale overage.

I utilize a different model than most of the literature in this field that incorporates three levels of factors – individual level, local regions within a country (i.e., size of the region

¹³ It should be noted that some studies attempted to study the home country culture on people’s preference (Kountouris & Remoundou, 2013; Luttmer & Singhal, 2011). The key problem of those studies is that they took average opinion on variables such as tax morale from a country the individual is from, however, this average number may not represent the average opinion of that country since sample may not be representative to that country.

or city, urban/rural), and country-level which practices spectrum of policies and operates under their unique political and economic system (i.e., fiscal autonomy/decentralization). Individuals combine their attributes to their tax morale, and this combining process occurs at level 1 (Otani et al., 2019). However, local- and country-level factors influence this combining process. Hence, this is a hierarchical modeling environment where variables operate at distinct levels, and I apply a mixed effect hierarchical model that can account for both levels distinctly but concurrently. So, I estimate the effect of corruption on individual tax morale, after correcting for the fact that individual subjects are clustered/nested within local regions, and local regions are again nested within countries. Individual i is selected to a local region r that is located within a country c . The role of level 2 that varies within level 3 is meant to capture cultural heterogeneity that should address behavioral differences across individuals. This estimation should account for the difference in tax morale at the individual level within a regional group. It should also account for differences that were brought by a concurrent movement of variables at the country level. So, I apply the multi-level mixed effect (MLME) to estimate the following baseline equation (3) for a logit distribution of tax morale:

$$TXM_{irc} = \mu_0 + \beta_1 Corr_Exp_{irc} + \mu_1 X_{irc} + \pi_1 R_{rc} + \delta_1 C_c + U_{rc} + U_c + \epsilon_{irc} . (3)$$

TXM_{irc} is the measure of tax morale for individuals i , who live in region r within-country c . It is the probability that individuals report that cheating on taxes is never justifiable. $Corr_Exp_{irc}$ is the individual i 's experience of corruption as yes or no, and X_{irc} is the vector of individual i 's characteristics such as age, gender, education, income, and others. In R_{rc} , I gather local regional factors within a country and in C_c , I gather country-

level factors. U_{rc} is a random effect in the model that accounts for culture-specific variations in tax morale within a country c , and U_c operating at the country level to account for variations specific to each country c . The ϵ_{irc} is the idiosyncratic residual that captures anything that is not in the model and plays role in the people's tax morale. This model estimation is based on the standard assumption of “nested random intercept” where U_c 's are distributed $iid N(0, \sigma_3^2)$ across countries, the U_{rc} 's are $iid N(0, \sigma_2^2)$ across regions within countries, and the ϵ_{irc} 's are $iid N(0, \sigma_1^2)$ across individuals. The testable hypotheses expect a negative sign of β_1 , which should capture the harmful effect of corruption experience on people's tax morale.

Alternative to the MLME, following Alesina et al. (2019), I also apply a country fixed effect and within-country local region fixed effect based on the assumption that most tax policies are decided at the national level or at the local region level, individuals interviewed within a country and local region are subject to those policies, reducing the selection biases due to the “tax magnet effect” within countries. Based on the earlier literature on tax morale and the theoretical considerations (Belmonte et al., 2018; Horodnic, 2018; Lago-Peñas & Lago-Peñas, 2010; Torgler & Schneider, 2007), I include a group of individual-level factors such as age, education, sex, income, and other socio-demographic factors as listed in Table 1. To ensure that lower tax morale is driven by corruption that I like to report in this paper is not driven by economic and socio-demographic factors, I also control for several country- and local region-level characteristics. While local regional factors include

settlement types and town sizes, country-level factors include GDP per capita, income inequality, HDI, ethnic fractionalization, and others¹⁴.

This model may still suffer from survey respondent perception bias, like most other research based on survey responses, that may be correlated across survey questions. For example, two individuals with identical corruption experience and tax morale, however, one of them while answering the survey question happened to be angry with some government policies may overly report corruption experiences. Moreover, some people habitually complain more than others. In that case, I may mistakenly find a higher negative association between corruption experience and tax morale. These are often labeled as the Kvetch effect after the Yiddish expression (Clausen et al., 2011; Kaufmann & Wei, 1999). This habitual complainer or people with perception biases may exaggeratedly report a higher level of corruption and may also show lower tax morale. To deal with such biases, I construct two Kvetch measures and use them to account for propensities to kvetch. The first Kvetch measure relies on five survey questions that represent individuals' self-reported happiness and well-being. For example, the WVS-EVS asks respondents whether they are happy, state of their health, satisfaction with life, satisfaction with the financial situation, and whether they have free choice and control over their lives (see Table A.2 in Appendix A for the details of the questions). Answers to these questions are correlated with individual respondents' predisposition to excessive reporting. To combine them, I

¹⁴A large literature argues that ethnic fractionalization is associated with lower tax contribution and lower public goods provision (Alesina et al., 1999; Siddique, 2021). These theories suggest that ethnic fractionalization may be a reason for lower tax morale because of inter-group bias. The measure of ethnic fractionalization ranges from 0 to 1 with higher values indicating denoting a higher level of fractionalization (see Table 1).

conducted Principal Component Analysis (PCA) and created the Kvetch index, called Kvetch-1. Similarly, for the second Kvetch measure, I use two questions about justifying avoidance of fares on public transport and stealing property. Kvetch is constructed to capture excessing reporting tax moral measures particularly, but it can also capture other perception biases. Note that the question from which the dependent variable – tax morale has been drawn includes more questions about justifying many other issues such as justifying divorce, homosexuality, abortion, political violence, and so on. However, I choose these two questions on justifying avoidance of fares on public transport and stealing property since they are closer to the issue of justifying cheating on taxes as opposed to other questions which tend to be highly influenced by political and ideological stance (see Table A.2 in Appendix A for details of factor loading data).

6. Results

6.1. Corruption experience and tax morale

To analyze the effect of corruption experience on people's tax morality, I estimate equation (3) and present results in Table 2. Following recommendations from Cameron et al. (2011) and Cameron and Miller (2015), I use two-way clustered standard errors at the local regional level in logit and logit FE estimations; however, MLME cluster standard errors at the highest level, in this case, it is the country¹⁵. The recoded dependent variable, tax morale, is the probability of reporting that cheating on taxes is never justifiable. In other words, it is a binary category – full tax morale is equal to 1 representing the position that

¹⁵It is appropriate to cluster standard errors at the regional/country level since corruption occurs for regional public sector's quality and individuals are nested within those regions/countries and therefore their errors can be correlated.

cheating on tax is never justifiable and otherwise is equal to 0 representing that cheating on taxes is justifiable. The corruption experience is also a binary variable – if people had any mention of experience of corruption is equal to 1, and if people never had an experience of corruption is equal to 0. For estimation, my preferred model is the MLME model for logit distributions (columns 2.7-9). The MLME model has two additional intercepts along with the intercept for individuals: intercept for the country and intercept for the local region. They imply those local regions are nested within countries and individuals are nested within local regions. I reject the null hypothesis that the intercepts are the same across all countries and local regions. In other words, individuals within regions and then with countries are more homogeneous than between regions and countries. The tests show that the variance due to the heterogeneity across countries is: $\rho_3 = \sigma_3^2 / (\sigma_1^2 + \sigma_2^2 + \sigma_3^2) = .53 / (3.55 + 0.50 + 0.53) = 0.12$, which about 12% of the variance is due to the variations at the country level (column 2.8). Similarly, the variance due to the heterogeneity across local regions is: $\rho_2 = \sigma_2^2 / (\sigma_1^2 + \sigma_2^2 + \sigma_3^2) = .50 / (3.55 + 0.50 + 0.53) = 0.11$, which about 11% of the variance is due to the variations at the local region levels (column 2.8). Therefore, the MLME is the appropriate choice of estimation techniques since it accounts for the correlations among individual observations within the same cluster of regions and countries¹⁶. However, I also estimated the non-hierarchical logit model with and without FE and linear probability model as part of the robustness checks and the results are identical (columns 2.1-6). All statistical estimates were performed in STATA 15.

¹⁶The null hypothesis I test is that H_0 : Intercepts are the same across all countries and local regions. I reject the null hypothesis which let me decide MLME over non-multi-level modeling.

The coefficient β_1 on tax morale from equation 5 can be cautiously interpreted as the causal effect of treatment of corruption experience. So, finding an estimate that satisfies $\beta_1 < 0$ would provide evidence to support my prediction: experience of corruption reduces tax morale. In columns 2.7-9, I present my preferred MLME specifications while columns 2.1-3 present the logit estimates, and columns 2.4-6 presents the logit country and local region FE with and without Kvetch-1 and Kvetch-2. The results support my hypothesis that the experience of corruption can significantly deteriorate individual tax morale. The coefficient of corruption experience, β_1 , indicates that holding everything else in the model constant, the odds of tax morale which is reporting that cheating on taxes is never justifiable for an individual who experienced corruption (experienced corruption = 1) over the odds for an individual who never experienced corruption (never experienced corruption = 0) is $\exp(-0.268) = 0.765$ (column 2.7). In terms of percent change, we can say that the odds for individuals with corruption experience are 23.5% ($1 - 0.765$) lower than the odds for individuals without corruption experiences. In other words, we can also interpret if an individual experiences any corruption transaction, his/her odds of showing full tax morale decline by 23.5%, holding everything else in the model constant. The size of the coefficient ranges from $\exp(-0.240) = 0.787$ (21%) to $\exp(-0.268) = 0.765$ (23.5%) depending on the choice of model specification (columns 2.1-9).

In probabilistic terms, this number means, while the probability of the overall sample population to self-report that cheating on taxes is never justifiable (the full-tax morale) is 64.4%, the probability of people who experienced corruption to report that cheating on taxes is never justifiable is 43.5%. The difference between these two numbers is 21%,

which is the effect of corruption while adjusting for a large set of controls. Note that the results are identical for both logit models with country and region FE and without country and region FE in terms of size of the effect as well as their significance level. The linear probability model also produced identical results. Both Kvetch-1 and Kvetch-2 measures have positive and highly statistically significant coefficients in all regressions. Including the measures of Kvetch does not tend to influence the magnitude of the corruption experience effect on tax morale significantly relative to the comparable specifications without Kvetch measures (Table 2). This means perception biases exist, but it is not strong enough to influence the association between corruption experience and tax morale.

Table 2: Effect of corruption experience on tax morale

	TXM-2.1	TXM-2.2	TXM-2.3	TXM-2.4	TXM-2.5	TXM-2.6	TXM-2.7	TXM-2.8	TXM-2.9
	Logit	Logit	Logit	Logit FE	Logit FE	Logit FE	MLME	MLME	MLME
Corruption experience	-0.262***	-0.241***	-0.246***	-0.272***	-0.240***	-0.248***	-0.268***	-0.243***	-0.251***
	[23.1%]	[21.4%]	[21.8%]	[23.8%]	[21.3%]	[21.9%]	[23.5%]	[21.5%]	[22.2%]
	(0.055)	(0.055)	(0.052)	(0.046)	(0.048)	(0.048)	(0.050)	(0.051)	(0.052)
Individual-level controls									
Kvetch-1		0.152*** (0.023)		0.191*** (0.018)	0.193*** (0.018)			0.193*** (0.025)	
Kvetch-2			1.381*** (0.045)			1.372*** (0.043)			1.368*** (0.093)
Demographic controls	X	X	X	X	X	X	X	X	X
Education dummies	X	X	X	X	X	X	X	X	X
Income dummies	X	X	X	X	X	X	X	X	X
Religion dummies	X	X	X	X	X	X	X	X	X
Regional-level controls									
Settlement type dummies	X	X	X	X	X	X	X	X	X
Town size dummies	X	X	X	X	X	X	X	X	X
Country-level controls									
Country income group	X	X	X	X	X	X	X	X	X
Other controls	X	X	X	X	X	X	X	X	X
Country FE				X	X	X	Level ID	Level ID	Level ID
Local region FE					X	X	Level ID	Level ID	Level ID
var(indiv)	2.678*** (0.745)	2.663*** (0.744)	2.059*** (0.696)	2.765*** (1.015)	3.993*** (0.686)	-4.863*** (0.765)	3.306* (1.823)	3.546* (1.893)	2.884 (1.844)
var(countries)							0.499*** (0.149)	0.527*** (0.159)	0.385*** (0.150)
var(regions)							0.501***	0.497***	0.395***

							(0.106)	(0.107)	(0.082)
Probability of experienced individual	0.435	0.44	0.439	0.432	0.44	0.438	0.433	0.44	0.438
Probability of population	0.644	0.644	0.644	0.644	0.644	0.644	0.644	0.644	0.644
N. of observations	50,205	49,617	47,707	49,617	49,211	47,368	50,205	49,617	47,707
N. of local region(country)	594(38)	594(38)	576(36)	594(38)	554(36)	576(36)	594(38)	594(38)	576(36)

Note: Robust standard errors are clustered at the regional level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. For multi-level ME, robust standard errors are clustered at the highest level by default. Individual-level data are only from the WVS since the corruption experience question was not asked in the EVS. If an individual experienced corruption is equal to 1, otherwise is 0. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable has been coded as 1, and if said cheating on taxes is justifiable is equal to 0. Statistical significance was reported by * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. X indicates variable was included in the model. Demographic controls include sex, age, and age squared. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Settlement types include dummies for 5 groups of location types like the capital city, regional center, district center, another city/town, and village. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the HDI and inequality measured as the income share held by the top 10% of people.

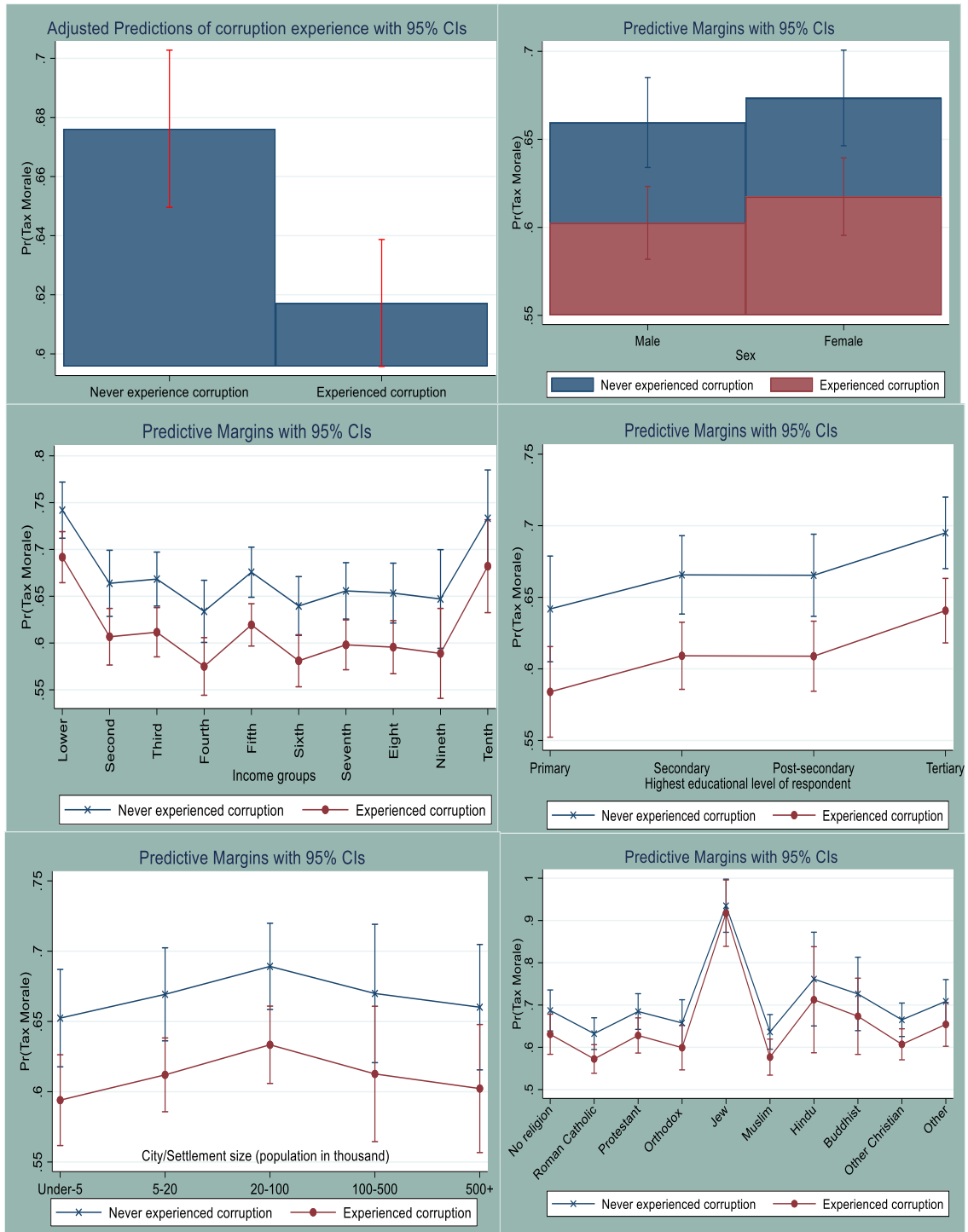


Figure 5: Effects of corruption experience on tax morale

Note: It presents the adjusted effect of corruption experience on tax morale based on models FE effect model presented in Table 2 by gender, income, education, settlement size, and religion. It shows the gap in tax morale between individuals with and without corruption is obvious. The effects of corruption experience on tax morale are at means.

More than 32% = $100(64.4-43.3)/64.4$ percent decline in probability (from 64.4% to 43.33%) that individual will think that cheating on taxes is never justifiable is considerable damage to an individual's tax morale that is caused by experiencing corruption transaction(s). However, there are still many people who will not justify tax cheating after experiencing corruption. This is because tax morale is not only subject to whether they experience corruption or not, but also their sex, education, income, religion, city/village characteristics, and others. So, I conducted some heterogeneity tests and presented them in Figure 5. The slope of the curve is the marginal effect of corruption experience. It shows that although there are differences in tax morale across gender, city size, income and education groups, and religion, the effects of corruption experience are almost identical across all of them. This means both male and female, high- and low-income people, non-educated and educated people, and people living in the small or large city/town identically adjust their tax morale as a response to their corruption experiences. The only exception was people of Jewish religion who shown higher tax morale on average, and they did not adjust their position on tax cheating after experiencing corruption. It also shows that higher education and medium-sized living towns are positively associated with higher tax morale.

6.2. The spillover effect of corruption

This section examines whether taxpaying individuals adjust their tax morale as a response to national corruption with and without corruption experience in person. I estimate the same equation (3) but add national-level corruption in the equation and deploy a different set of samples. National corruption may negatively influence the tax morale of people with corruption experience and without corruption experience. However, the size

of the effect of corruption is expected to be smaller on people who never experienced corruption. It is likely that while the effect of national corruption on tax morale of people with corruption experience should reflect their own experiences plus the effect of overall corruption in their community, the effect of national corruption on people without any corruption experience is the spillover effect of corruption in the society.

I use the CPI as the measure of national-level corruption. First, I reverse the original CPI scale of 1 to 100 to represent a higher value means a higher corruption level, and then I converted the index into a ten-point scale. Therefore, a negative coefficient of national corruption should indicate a harmful effect of corruption on individual tax morale. Table 3 reports the results using my preferred estimation technique – the MLME. The results indicate that, like the corruption experience, higher national corruption is also associated with lower individual tax morale. The coefficient reported in Table 3 is the log of odds of reporting that cheating on taxes is never justifiable and I also added its converted predicted probability. For all samples of both experienced and non-experienced models in column 3.1-2, data is from the combined WVS-EVS, one unit increase in a ten-point scale of national corruption will lead to an expected decline in the odds of reporting that cheating on taxes is never justifiable by $\exp(-0.166) = 0.847$ to $\exp(-0.192) = 0.825$. In other words, one unit increase in a ten-point scale of national corruption is associated with a 15.3% to 17.5% decrease in the odds of reporting that cheating on taxes is never justifiable. We can also say that a 10% increase in national corruption causes a 15.3% to 17.5% decline in odds that an individual thinks tax cheating is never justifiable since one unit increase on a ten-point scale is identical to a 10% increase in the original CPI. This effect is robust to a large

set of individual, local region, and country-level control variables like estimates presented in Table 2. The impact is again economically sizable, meaning that the probability that the population adjusts their mind that cheating on taxes can be justifiable increases if their country's corruption increases. Note that effects also hold after controlling for corruption experience which limits the samples to only WVS as shown in column 3.3. Interpreting the coefficient of corruption experience and national corruption in column 3.3 makes the following conclusion: while having corruption experience reduces the odds of reporting that cheating on taxes is never justifiable by 29.3% ($\exp(-0.347) = 0.707$), increase in national corruption by 10% leads to a decline in such odds by 18.4% ($\exp(-0.204) = 0.816$).

The last four columns in Table 3 (columns 3.4-7) separates the analysis by a sample of people who have an experience of corruption and people who never have an experience of corruption. The effect of corruption in columns 3.5 and 3.7 can be attributed as a spillover effect of corruption because samples in these two columns include those individuals who reported that they never experienced corruption in their daily life. Thus, these results reveal that corruption has a spillover effect on other people who have not been engaged in corruption transactions but are likely aware of the corruption in their society, and they adjusted their tax morale accordingly. This strong association between corruption and tax morale can have significant ramifications on many aspects of development and public sector operations. Higher corruption does not only impair the immediate development process and operations but also damages the future possibility of public sector revenues as populations become more demotivated to pay taxes.

Table 3: National corruption effect and spillover effect on tax morale

	TXM-3.1 All samples	TXM-3.2 All samples	TXM-3.3 Only WVS (EC)	TXM-3.4 Samples of EC	TXM-3.5 Samples with NEC (spillover effect)	TXM-3.6 Samples of EC	TXM-3.7 Samples with NEC (spillover effect)
National corruption	-0.166*** [15.3%] (0.056)	-0.192*** [17.5%] (0.063)	-0.204*** [18.5%] (0.056)	-0.244*** [21.7%] (0.087)	-0.268*** [23.5%] (0.098)	-0.325*** [27.8%] (0.092)	-0.370*** [30.9%] (0.100)
Corruption experience			-0.347*** [29.3%] (0.098)				
Individual-level controls							
Kvetch-1		0.171*** (0.016)	0.166*** (0.023)			0.159*** (0.022)	0.205*** (0.038)
Kvetch-2		0.738*** (0.052)	0.922*** (0.067)			0.926*** (0.067)	0.947*** (0.089)
Demographic controls	X	X	X	X	X	X	X
Education group dummies	X	X	X	X	X	X	X
Income group dummies	X	X	X	X	X	X	X
Religion dummies	X	X	X	X	X	X	X
Regional-level controls							
Town size dummies		X	X			X	X
Country-level controls							
Country income group	X	X	X	X	X	X	X
Other controls	X	X	X	X	X	X	X
Country	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID
Local regions	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID
var(indiv)	3.512* (2.018)	2.435 (2.244)	6.966*** (2.511)	5.948*** (2.162)	7.631*** (2.217)	6.164*** (2.336)	8.387*** (2.581)
var(countries)	0.433*** (0.103)	0.420*** (0.111)	0.391*** (0.135)	0.380*** (0.113)	0.426*** (0.130)	0.339*** (0.115)	0.365** (0.154)
var(regions)	0.369*** (0.073)	0.352*** (0.072)	0.423*** (.099)	0.465*** (0.104)	0.641*** (0.155)	0.434*** (0.098)	0.641*** (0.162)

Probability conversion of national corruption	0.459	0.452	0.449	0.439	0.433	0.419	0.409
Probability of population	0.644	0.644	0.636	0.611	0.611	0.695	0.695
N. of observations	93,649	81,357	46,525	37,767	14,587	33,912	12,613
N. of Regions(country)	892(64)	773(59)	575(36)	642(39)	599(39)	574(36)	535(36)

Note: EC=experienced corruption and NEC=never experienced corruption. All models are multi-level mixed effect estimations for a logit distribution. Robust standard errors are clustered at the highest level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. Statistical significance was reported by * $p<0.1$; ** $p<0.05$; *** $p<0.01$. X indicates variable was included in the model. Data are from the WVS-EVS. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable is equal to 1, otherwise 0. The key independent variable is the national corruption - the CPI. CPI has been converted into a ten-point scale: a higher number indicates higher corruption. Demographic controls include sex, age, and others. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the Human Development Index (HDI) and inequality measured as the income share held by the top 10% of people.

6.3. Corruption norms/culture and tax morale

The empirical approach in this section follows DeBacker et al. (2015) and Fisman and Miguel (2007). I exploit the fact that the WVS-EVS interviewed many immigrants and children of immigrant parents who migrated from all over the world, and thus, they are carrying different corruption norms. However, now they are facing an enforcement environment for their tax decisions that is identical to their native counterparts in the destination countries. This includes a total of 19,273 individuals in the WVS-EVS, out of them, 8,335 are first-generation immigrants and 10,938 are second-generation immigrants.

Given the verdict of earlier literature that cultural norms have a significant part in following tax and other civic responsibilities (Alm & Torgler, 2006; DeBacker et al., 2015; Fisman & Miguel, 2007), I hypothesize that immigrants and their children from more corrupt countries will show lower tax morale and vice versa. Moreover, given that I have already shown that corruption carries a damaging effect on tax morale, I evaluate in this section how persistent the effect of corruption is through the cultural norms. Even after leaving the origin country, if people are still carrying their origin country's corruption norms while facing a completely different institutional control, this can provide us essential information regarding the persistence of the effect of corruption. If the effect is less persistent, the elimination of corruption can allow people to quickly adjust their tax morale. In contrast, if the effect is more persistent, corruption eradication may not improve people's tax morale immediately. Moreover, it reinforces corruption effects since low tax morale makes people engage more in corruption, so it persists. In these new stationing countries, I can separate the impact of institutions that influence people's tax behavior from the cultural norms.

Therefore, the magnitude of the effect of corruption should be less visible since I separate the influence of the home country's institutions from the corruption norms effect.

Family plays a significant role in shaping children's behavior since parents manage the family, in which case the cultural norms and customs of these parents may manifest in their children's actions. Immigrant parents can play a role to transmit their home country's corruption norms to their children. Children not only take parents as role models but also learn from the information that parents share such as the corrupt behavior of the government in their home country, and children adjust their minds to a degree to cooperate with the government – how much to pay as taxes. For this, however, I expect that the corruption norms for immediate immigrants should be more impactful on tax morale than for children of immigrant parents. To identify the immigrant population from the native population, I exploited three questions in the survey - *In which country were you, your father and your mother (or those who raised you) born?* There are some cases where parents are from two different countries: for example, respondent born in the USA, mother came from Germany, but father came from China. In such a case, to link corruption data, I merge the mother's origin country corruption since the mother would play a more active role in developing children's behavior than the father. Note that the number of such cases is too few to make any significant influences on the results.

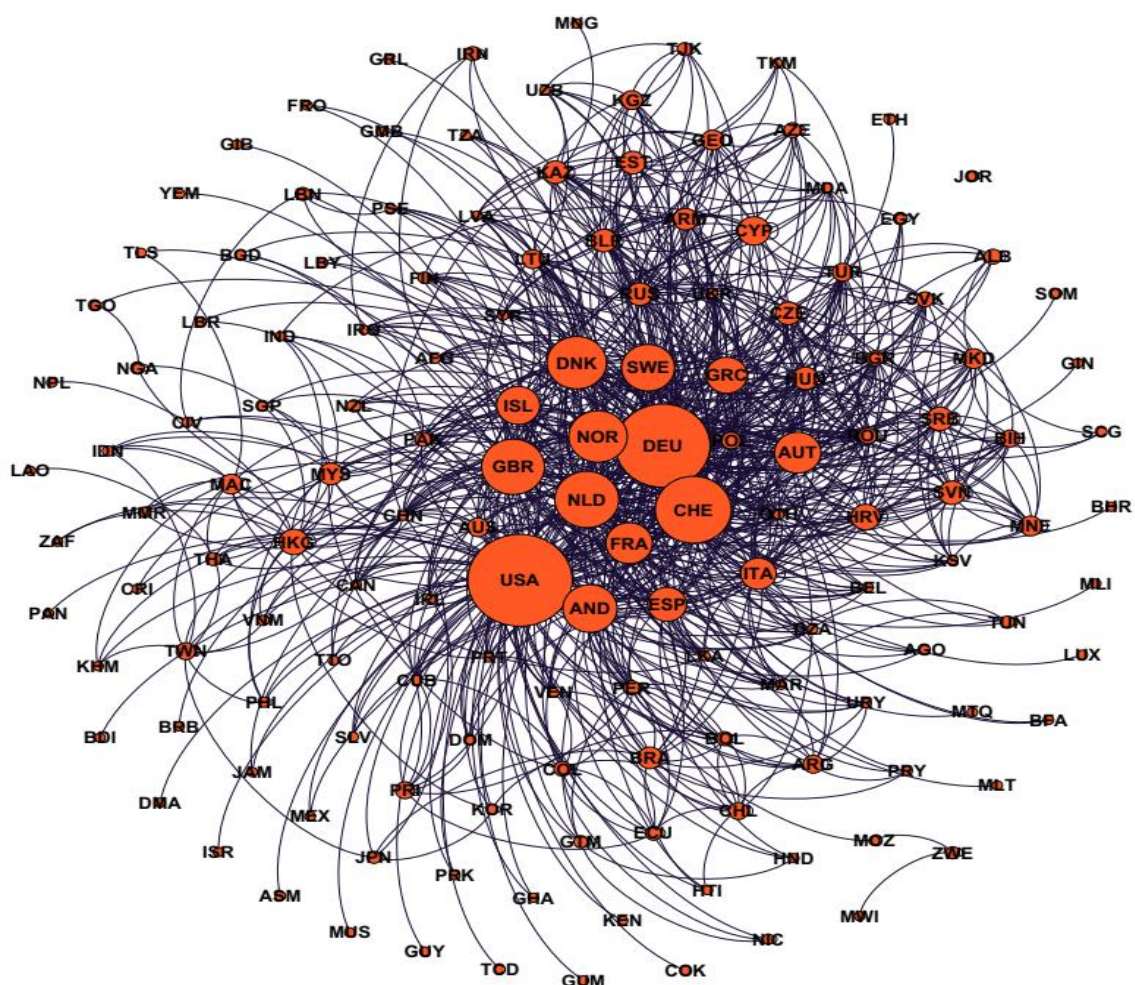


Figure 6: Destination country of the immigrant population

Notes: Country's name is represented by 3 digit ISO code. Edges indicate an individual-level connection between destination and origin countries. Nodes represent countries where the immigrant population is stationed covered in the WVS-EVS interviews. Larger nodes indicate a larger number of immigrants have been interviewed in that country. Since the WVS-EVS is household-based, they are their current residence country. Some of the largest nodes are the DEU=Germany, USA=United States of America, CHE=Switzerland, NLD=Netherlands, DNK=Denmark, and GBR=Great Britain. To identify other countries using ISO code, visit this website: <https://www.iso.org/iso-3166-country-codes.html>. Networks are rendered with Fruchterman Reingold algorithm with curved edges.

Figure 6 shows the destination country of the immigrant respondent and their parents. It has 19,273 edges that represent each individual's connection between the destination and origin countries. The nodes represent the destination countries, which indicates stationed

immigrants have been interviewed in those countries. A larger node in Figure 6 indicates a larger number of interviews were taken from the immigrant population in those countries. Although Figure 6 shows that most of the immigrant population are stationed in Germany and the USA, followed by Switzerland, United Kingdom, Denmark, Norway, Sweden Andorra, Spain, Australia, and others, there is a large variation in countries to be an immigrant's destination in the dataset. For example, in the dataset, Argentina has immigrants from Chile, Bolivia, Uruguay, Italy, Peru, Spain, Germany, Poland, and the USA. Similarly, for example, the USA has immigrants from Argentina and all over the world.

Figure 7 presents, as opposed to Figure 6, the origin country where these immigrant people came from. Larger nodes indicate a larger number of the immigrant population mentioned that this was their birth country. This means, in the dataset, the largest share of immigrants was born in Russia and Poland is indicated by the size of their nodes, but they do not live in those countries anymore. This was followed by Germany, Ukraine, France, Brazil, China, Romania, UK, the USA, Greece, Turkey, and others. The color codes of nodes represent the corruption level of their origin country, measured as CPI in reverse scale - higher value indicates more corrupt countries. The red color represents those origin countries that are most corrupt, and the green color represents the group of least corrupt countries, and others are in between.

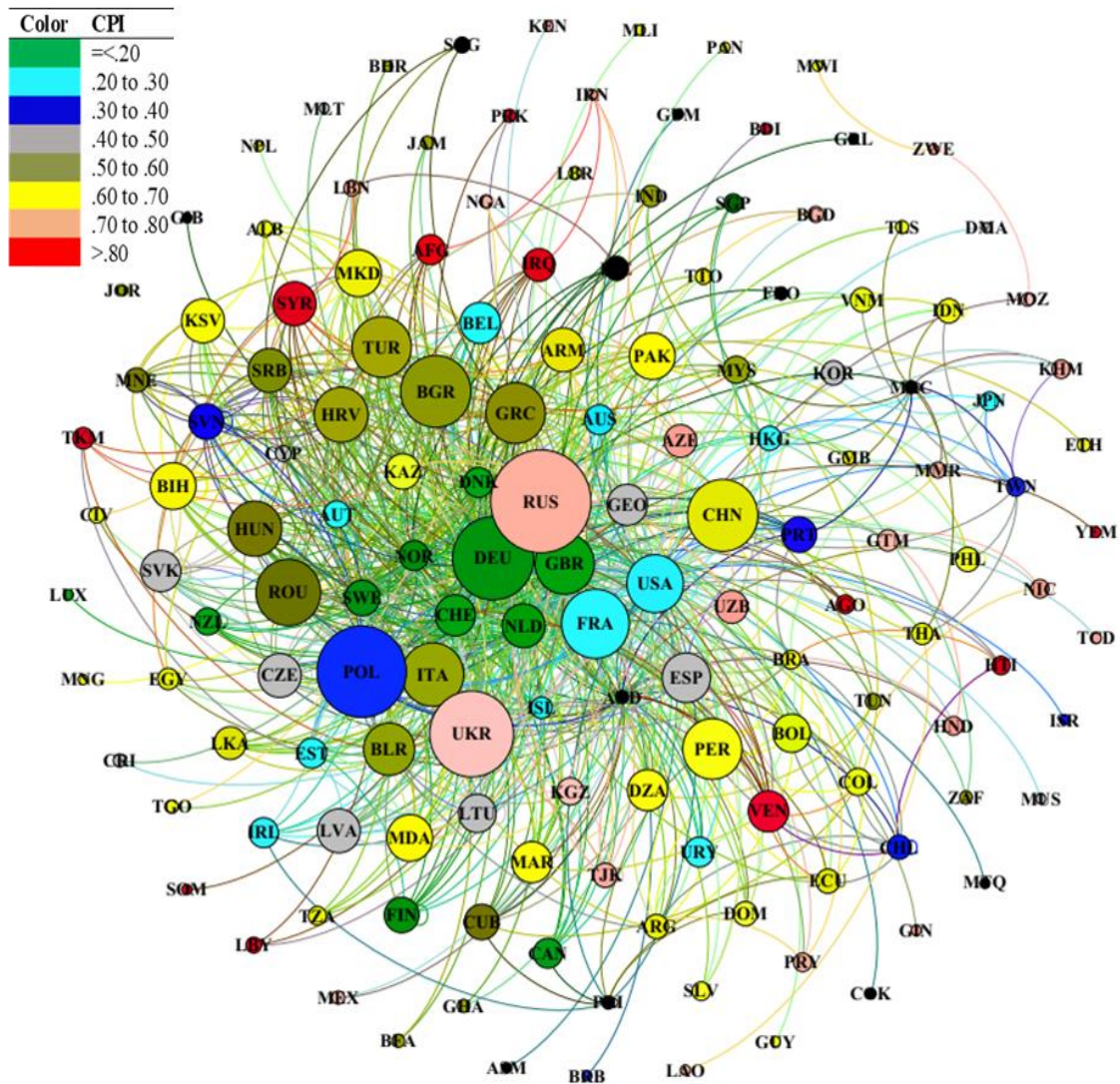


Figure 7: Birth or origin country of the immigrant population

Notes: Country's name is represented by 3 digit ISO code. Color code represents the level of corruption, measured by the CPI reverse scale. Nodes represent the origin countries of the immigrant population covered in the WVS-EVS. Larger nodes indicate a larger number of immigrants reported they migrated from those countries. Edges indicate the bilateral direction of immigration: origin to destination countries. Some of the largest nodes that sent the most immigrants are the RUS=Russia, POL=Poland, UKR=Ukraine, CHN=China, FRA=France, ITA=Italy, GRC=Greece, PER=Peru, GBR=Great Britain, and the USA=United States of America. For ISO codes of other countries, visit this: <https://www.iso.org/iso-3166-country-codes.html>. Dark black nodes are missing data, means respondent or their parents born in some other country but not in the resident countries. Networks are rendered with Fruchterman Reingold algorithm with curved edges.

As we can see the immigrant population, who have been covered in WVS-EVS, have come from a large number of countries with wide heterogeneity in corruption levels. This

creates wide variations in the dataset: immigrants have been stationed not only from developing countries to developed countries but also from developed to developing countries, from a neighboring country to another neighboring country, from East to West, from socialist economies to capitalist and vice versa. I exploit this opportunity to evaluate the persistence of the role of corruption on individual tax morale: if people carry a culture of corruption from their origin countries to their destination countries. Using such stationing of the immigrant population, I can eliminate the institutional influence of their origin countries. So, I utilize a portion of the WVS-EVS of immigrants and their children. Tax morale of foreign-born individuals or their children in a country other than their birth country creates an opportunity that is similar to natural experimentation since these immigrants are no longer facing their origin country's tax environment and institutions. Since the first-generation immigrants can be different from the second-generation immigrants in terms of cultural assimilation in the destination country, I examine the effect of corruption norms on tax morale together and separately for first- or second-generation immigrants.

Before I evaluate the effect of origin country corruption, I compare differences in tax morale between the native and immigrant population in Table 4. The result shows that there is a strikingly significant variance in tax morale between the native and immigrant populations¹⁷. This fitted model says that holding everything else in the model at a fixed

¹⁷Most of the immigration researches in the last few decades focused on the effect of immigration on natives and produced mixed evidences (Alesina & Stantcheva, 2020; Nannestad, 2007). The theoretical mechanism about the distribution gains from immigration is also inconclusive. Note that there have been no studies that compared the tax morale between immigrants and natives. Understanding differences in tax morale between migrants and natives is important for many key

value, the odds of reporting that cheating on taxes is never justifiable for the immigrant population (immigrant = 1) over the odds of reporting that cheating on taxes is never justifiable for native population (native = 0) is $\exp(-0.123) = 0.884$. In terms of percent change, we can say that the odds for immigrants are 11.6% ($1 - 0.884$) lower than the odds for natives. Note that while this number is 9.7% lower for first-generation immigrants, this is 13.8% lower for second-generation immigrants (columns 4.2-3). In other words, the immigrant population attempts to justify cheating on taxes more often than the native population on average. Note after including both the first- and second-generation immigrants, the statistical difference between native and second-generation immigrants disappears, indicating cultural integration of second-generation immigrants. This complementary comparison between immigrant and native for their tax morale provide us valuable information since all conditions are the same for both immigrants and natives in a country of destination, particularly the legal and institutional part, except migrants are the minority and natives are the majority. Therefore, after controlling for characteristics of destination countries and individual-level factors, any difference in tax morale between immigrants and natives should reflect the cultural distance.

However, the cultural difference may not explain the entirety of the difference in tax morale between immigrants and natives. The differences in tax morale between natives and immigrants can also be due to: intergroup biases, heterogeneous tastes, and political disadvantages (Siddique, 2021; Xin Li, 2010). At least one of these differences if not all

policies such as managing public money, immigration, and welfare systems since there are widespread misperceptions about the immigration in terms their size, culture, religions, socio-economic ability, and welfare consumptions (Alesina, Miano, et al., 2019).

applies to all countries¹⁸. Intergroup bias occurs because, as psychological and experimental economic studies suggest, contribution to tax revenue and conditional cooperation are better within the social group than across the social groups (Charness et al., 2007; Frey & Torgler, 2007; Siddique, 2021). Since the benefits of public programs are largely enjoyed by majority groups, they develop a feeling of more altruism and conditional cooperation¹⁹. Therefore, the natives, the majority group, is likely to present higher tax morale. Public programs can be partially or fully excludable, and natives can be the main beneficiary while immigrants are excludable. Since the preferences of the natives regarding public goods win over the preferences of the immigrants (since immigrants are the minority and some of them may not have voting rights as well), the immigrants may report lower tax morale than the natives. Immigrants are also politically and economically disadvantaged, so they may perceive that they have not been fairly treated, and thus, they can report lower tax morale²⁰.

¹⁸Immigrants are the minority and natives are the majority in most countries except for few countries like Qatar and UAE.

¹⁹Difference in tax morale between migrants and natives is due to the fact that the natives have been exposed to higher ethnic diversity and have grown up their group. This means natives will have higher tax morale in more homogeneous society.

²⁰The concern over the impact of influx of immigrants into a country can potentially reduce the support level for redistribution from natives can potentially bias our estimates. This should happen only if a country has growing perceptions that immigrants have larger number of freeloaders than native freeloaders. Therefore, actual verification of this suspicion will depend on actual share of immigrants that do not work and depend on government transfers compared to the share of native that falls in the same group. There are also alternative reasons that the immigrant population may rather demonstrate higher tax morale due to the legal reasons and the perception that as immigrant population they are on more surveillance than native.

Table 4: Comparing tax morale between immigrants and natives.

	TXM-4.1	TXM-4.2	TXM-4.3	TXM-4.4
Immigrant all	-0.123*** [11.6%] (0.030)			
Immigrant (first generation)		-0.102** [9.7%] (0.050)		-0.152*** [14.1%] (0.042)
Immigrant (second generation)			-0.149*** [13.8%] (0.033)	0.008 [0.8%] (0.078)
Individual-level controls				
Kvetch-1	0.171*** (0.016)	0.171*** (0.016)	0.172*** (0.017)	0.172*** (0.017)
Kvetch-2	0.739*** (0.052)	0.739*** (0.052)	0.738*** (0.054)	0.738*** (0.054)
Demographic controls	X	X	X	X
Education group dummies	X	X	X	X
Income group dummies	X	X	X	X
Religion dummies	X	X	X	X
Regional-level controls				
Town size dummy	X	X	X	X
Country-level controls				
Country income group	X	X	X	X
Other controls	X	X	X	X
Country	Level ID	Level ID	Level ID	Level ID
Local regions	Level ID	Level ID	Level ID	Level ID
var(indiv)	-0.261 (1.998)	-0.256 (1.999)	-0.338 (1.993)	-0.328 (1.993)
var(countries)	0.486*** (0.127)	0.485*** (0.127)	0.489*** (0.129)	0.489*** (0.129)
var(regions)	0.352*** (0.072)	0.351*** (0.072)	0.364*** (0.076)	0.364*** (0.076)
Probability of population	0.644	0.644	0.644	0.644
Predicted probability of immigrants	0.469	0.475	0.463	0.462
N. of observations	81,313	81,312	76,747	76,728
N. of local region(country)	773(59)	773(59)	737(57)	737(57)

Note: All models are multi-level mixed effect estimation for a logit distribution. Robust standard errors are clustered at the highest level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. Statistical significance are presented by * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. X indicates variable was included in the model. Data are from the WVS-EVS. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable is equal to 1, otherwise 0. The key independent variables are the immigrant is equal to 1, otherwise 0. Demographic controls include sex, age, and others. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the Human Development Index (HDI) and inequality

measured as the income share held by the top 10% of people.

Does corruption culture matter for tax morale? How persistent is the effect of corruption? Is the origin country's corruption culture part of the differences in tax morale between immigrants and natives? To answer these related questions, I estimate the equation (4) that inspects the effects of corruption of origin country on tax morale of individual immigrants who are stationed to a region in a destination country while controlling for destination country corruption and other standard controls. The TXM_{mrc} represents tax morale of immigrant individuals, m , in region, r , within a destination country, c . It is the same tax morale measure: probability to report that cheating on taxes is never justifiable. The $Corr_origin_c$ represents the corruption level of origin country, $Corr_Exp_{irc}$ represents individual level corruption experience, and $Corr_destination_c$ represents the destination country's corruption of immigrant individuals. All other terms are identical to equation (3) above.

$$TXM_{mrc} = \mu_0 + \beta_1 Corr_Exp_{mrc} + \beta_2 Corr_origin_c + \beta_3 Corr_destination_c + \mu_1 X_{mrc} + \pi_1 R_{rc} + \delta_1 C_c + U_{rc} + U_c + \epsilon_{mrc} \dots (4)$$

Table 5 reports the MLME estimates from equation (4). The results point to a significant cultural component of corruption that negatively influences the tax morale of only first-generation immigrants. The effect is statistically significant only when corruption experience has been controlled in the model. Note that the origin country's corruption has no statistically significant impact on the tax morale of second-generation immigrants. Immigrants who migrated from high corrupt countries show inferior tax

morale. In other words, first-generation immigrants tend to justify tax cheating more if they came from a more corrupt country than if they came from a less corrupt country. However, this does not imply for second-generation immigrants which is understandable since second-generation immigrants are less connected to their parent's origin country and more connected to their own destination country. We can also interpret this differentiated effect of origin country corruption between first- and second-generation immigrants as those local socio-economic contexts are more powerful for children of immigrant parents to decide on whether to cheat on taxes than their parent's cultural inheritance of corruption²¹.

These results support the idea that cultural norms of corruption can potentially shape individual tax decisions, which continues to play a significant role for at least one generation. These suggest that cultural norms of corruption are quite persistent, or corruption culture is sticky. Even after being stationed far away from their origin home, these immigrants process information to decide on whether to cheat on taxes in a way highly suggestive of people in their origin country. Therefore, it is likely that the elimination of corruption may not lead people to immediately adjust their tax morale since corruption norms are deep-rooted. Tax policies that aim to minimize non-compliance can be ineffective if cultural influences are not understood appropriately. However, these results also support the view that as immigrants stay longer times in the destination country it can attenuate the influence of their home country's corruption norms.

²¹ Note that when it is not the corruption experience cases, it is the institution that may matter for tax morality. Therefore, the effect of national level corruption on tax morality is likely to be driven by the institutional factors. However, after I separate the effect of home country institution by stationing people in different institutional context, I see the home country corruption has stronger effect on tax morale.

Table 5: Persistence of the effect of corruption on tax morale

	TXM-5.1	TXM-5.2	TXM-5.3	TXM-5.4	TXM-5.5	TXM-5.6
	All immigrant samples	First- generation immigrant samples	Second- generation immigrant samples	All immigrant samples	First- generation immigrant samples	Second- generation immigrant samples
Origin country corruption	-0.005 [0.5%] (0.016)	-0.001 [0.1%] (0.021)	0.007 [0.7%] (0.017)	-0.030 [3%] (0.024)	-0.043*** [4.2%] (0.015)	0.027 [2.6%] (0.030)
Destination country corruption	-0.163*** [15%] (0.051)	-0.183*** [16.7%] (0.058)	-0.147*** [13.7%] (0.048)	-0.240*** [21.3%] (0.060)	-0.224*** [20.1%] (0.085)	-0.223*** [20%] (0.060)
Corruption experience				-0.432** [35.1%] (0.168)	-0.694*** [50%] (0.200)	-0.411** [33.7%] (0.191)
Individual-level control						
Demographic controls	X	X	X	X	X	X
Education group dummies	X	X	X	X	X	X
Income group dummies	X	X	X	X	X	X
Religion dummies	X	X	X	X	X	X
Kvetch-1	0.189*** (0.028)	0.231*** (0.045)	0.186*** (0.032)	0.172*** (0.038)	0.209*** (0.047)	0.167*** (0.048)
Kvetch-2	0.589*** (0.068)	0.638*** (0.061)	0.586*** (0.072)	0.822*** (0.118)	0.811*** (0.090)	0.873*** (0.169)
Regional-level controls						
Town size dummy	X	X	X	X	X	X
Country-level controls						
Country income group	X	X	X	X	X	X
Other controls	X	X	X	X	X	X
Country	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID
Local regions	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID
var(indiv)	0.551 (1.955)	1.365 (2.277)	-1.470 (1.672)	5.361*** (1.470)	4.305 (2.701)	2.863* (1.625)
var(countries)	0.214*** (0.069)	0.105** (0.048)	0.196*** (0.066)	0.058* (0.034)	0.000 (0.000)	0.028 (0.029)
var(regions)	0.147*** (0.055)	0.129** (0.059)	0.157** (0.066)	0.262*** (0.083)	0.128*** (0.048)	0.302** (0.121)
N. of observations	7,333	3,964	6,207	2,711	1,598	1,789
N. of Regions(country)	445(56)	341(53)	392(54)	277(33)	196(30)	223(31)

Note: All models are multi-level mixed effect estimation for a logit distribution. Robust standard errors are clustered at the highest level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. It estimates the relations between origin country corruption and tax morale of immigrant populations. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. X indicates variable was included in the model. Data are from the WVS-EVS for columns 5.1-3 and WVS for columns 5.4-6. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable is equal to 1, otherwise 0. Demographic controls include sex, age, and others. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the Human Development Index (HDI) and inequality measured as the income share held by the top 10% of people.

Note that these results complement the works of Fisman and Miguel (2007) and DeBacker et al. (2015) who both claim that home country corruption norms exist and can influence people's behavior even after leaving their home countries. However, their source of evidence was restricted to a limited context of diplomats and firm owners, thus bear limited inference ability. On the other hand, evidence in this paper is more generalizable to general individual people since the subjects of this study are individual taxpaying people and they are stationed in a diverse list of countries and migrated from all over the world. Moreover, general tax-paying individuals should react to corruption differently than firms and diplomats to adjust their tax morale, which can be more effective information for tax policies.

7. Potential mechanism and heterogeneous effect of corruption

Why have people adjusted their tax morale when they have been exposed to corruption? This section provides suggestive evidence for potential channels that facilitated such adjustment in tax morale led by corruption. In the theoretical framework in section 3.1, I identified that several pecuniary and non-pecuniary factors contribute to developing tax morale and that corruption can play an indirect role to suppress that motivation. For example, individuals with corruption experience exhibited inferior tax morale because they felt that tax payment was an unfair deal with the government, or the tax revenues were not their intended use (the reciprocity). Higher corruption minimizes the shame of being exposed in the society; therefore, people may adjust tax morale differently depending on where they live and their societal characteristics. While I find consistent evidence for tax

fairness, social exposure effect, crowd-in of enforcement, I did not find much for trust in public institutions.

7.1. The reciprocity or the fairness in the tax system

As section 3.1 mentioned the *perceived fairness* in tax systems, $\{G - (wt + \lambda)\}$, is determined by subtracting the total tax bill, wt , and corruption transfers, λ , from the amount of public/welfare goods to the society, G . Any positive amount of corruption should lower the amount of public/welfare goods compare to their tax payment, $\{G - (wt + \lambda)\} < 0$, then the motivation increases the weight of the tax rate as the taxpayers perceive the tax amount to be unfair – negatively affect their tax morale. This is a suggestive framework, but total settings can be more complex since total reciprocity can involve the legitimacy of the state, fairness of the tax burdens, usage of revenues, and others. I test this reciprocity mechanism in this section by interacting corruption experience, $Corr_exp_{irc}$, with government expense in health and education (% of GDP) and their combined score which was created using a PCA, $Goods_c$ as in equation (5), and I find a shred of insightful supportive evidence. β_3 is the coefficient of interest which estimates the interaction effect of corruption experience and public/welfare goods. All other terms in equation (5) are identical to equation (3) above.

$$TXM_{irc} = \mu_0 + \beta_1 Corr_exp_{irc} + \beta_2 Goods_c + \beta_3 Corr_exp_{irc} \times Goods_c + \mu_1 X_{irc} + \pi_1 R_{rc} + \delta_1 C_c + U_{rc} + U_c + \epsilon_{irc} \dots (5)$$

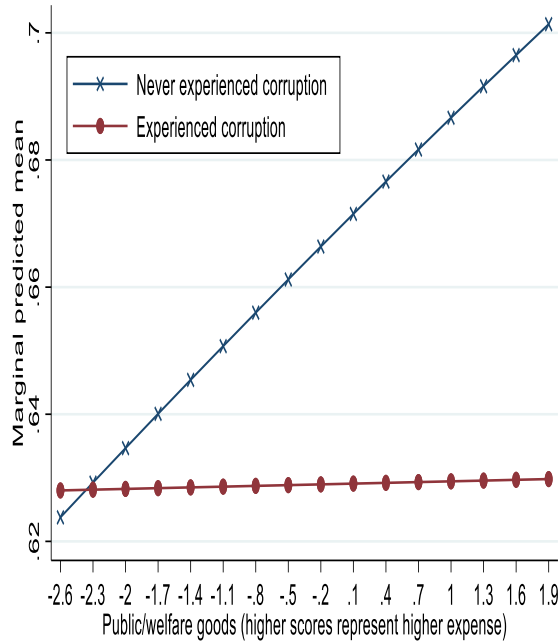
Figure 8 shows that when a government spends more on education and health, two key essential public/welfare goods, people with no corruption experience show higher and increasing tax morale, however, people with corruption experience show no improvement

if not decline in their tax morale. This finding aligns with my hypothesis coming into this research: that people care about fairness and reciprocity. When people experience corrupt transactions, or in other words, when people had to pay bribes for public services that they are entitled to, they develop a sense of unfairness that they pay taxes for these services which have not been served to them and raise the question what is the justification to pay taxes? I observe this for both health and education expenses as well as their combined form. Table 6 reports the same regression results where I interacted corruption experience with education, health, and their combined score. It shows that all three interaction terms are negative and statistically significant. This indicates when the government increases expenses for public/welfare goods as a percentage of GDP people with corruption experience a drop in their tax morale relative to people with no corruption experience. However, as we see in Figure 8, this negative coefficient is actually driven by an increasing difference in tax morale between people with and with no corruption experience, and the difference was led by a rise in tax morale for people with no corruption experience as a response to increasing in public/welfare expenses while no improvement was observed in tax morale for people with corruption experience.

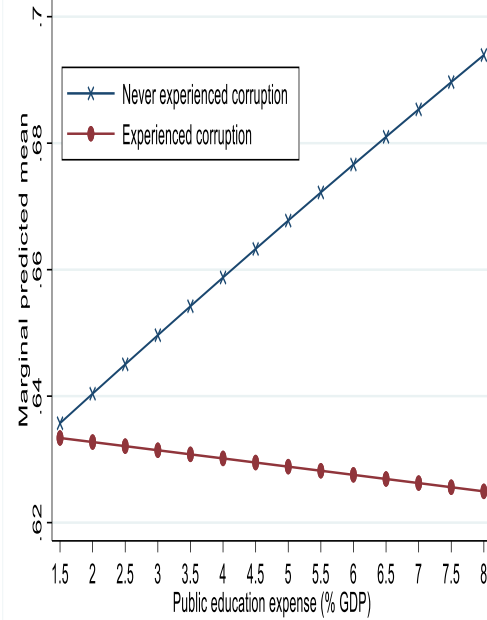
In the literature, the mechanism of reciprocity has been well discussed but, in contrast to my evidence, scholars have found little to no supportive evidence (Blumenthal et al., 2001; Castro & Scartascini, 2015; Fellner et al., 2013; Hallsworth et al., 2017). The probable reason is that they conducted field experiments and their intervention may not be large enough to make any impact. Most other studies involved laboratory tests that may not be entirely relevant to real-world situations. In this research setting, I find strong

support for the reciprocity or *quid pro quo* mechanism. After all, people observe the benefits of public expenditure on education and health in person, therefore, they do not think cheating on taxes can be justified if they did not experience corruption. This does not hold if they experienced corruption. These findings also suggest that tax morale can be influenced by overall public policies and state effectiveness since better education and health systems send signals to the taxpayers to confirm states' legitimacy and help growing belief that that revenue is not expropriated or inefficiently spent.

Panel A: Predictive margins of corruption experience by public/welfare goods



Panel B: Predictive margins of corruption experience by education expense



Panel C: Predictive margins of corruption experience by health expense

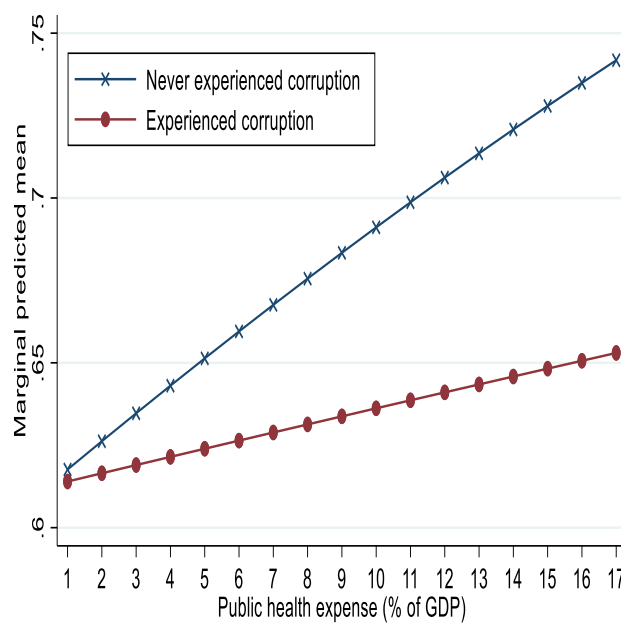


Figure 8: Effect of corruption experience by public/welfare goods expense

Note: The public/welfare goods expense score was created by conducting PCA using health and education expense as a percentage of GDP. The standard errors are robust and adjusted for at the country level clusters.

Factor loading for both education and health expense was 0.83. Data of public education and health expenditure was from World Bank, 2017.

Table 6: Effect of corruption experience on tax morale by public/welfare goods expense

	TXM-6.1 Education	TXM-6.2 Education	TXM-6.3 Health	TXM-6.4 Health	TXM-6.5 Public/welf are goods	TXM-6.6 Public/welf are goods
Corruption experience	-0.229*** [20.5%] (0.056)	0.089 [9.3%] (0.176)	-0.230*** [20.6%] (0.053)	0.016 [1.6%] (0.105)	-0.229*** [20.5%] (0.056)	-0.271*** [23.7%] (0.047)
Education expense (% of GDP)	0.007 [0.7%] (0.078)	0.061 [6.3%] (0.083)				
Corruption experience*education expense		-0.070* [6.8%] (0.036)				
Health expense (% of GDP)			0.027 [2.7%] (0.060)	0.055 [5.7%] (0.061)		
Corruption experience*health expense				-0.039*** [3.8%] (0.014)		
Public/Welfare goods score					0.032 [3.3%] (0.129)	0.117 [12.4%] (0.126)
Corruption experience* Public/Welfare						-0.115*** [10.9%] (0.039)
Individual control						
Demographic controls	X	X	X	X	X	X
Education group dummies	X	X	X	X	X	X
Income group dummies	X	X	X	X	X	X
Religion dummies	X	X	X	X	X	X
Kvetch-1	X	X	X	X	X	X
Kvetch-2	X	X	X	X	X	X
Regional level controls						
Town size dummies	X	X	X	X	X	X
Settlement type dummies	X	X	X	X	X	X
Country-level controls						
Country income group	X	X	X	X	X	X
Other controls	X	X	X	X	X	X

Country	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID
Local regions	Level ID	Level ID	Level ID	Level ID	Level ID	Level ID
var(indiv)	3.252 (2.167)	3.032 (2.153)	3.117* (1.883)	2.970 (1.877)	3.384 (2.081)	3.463* (2.066)
var(countries)	0.480** (0.188)	0.481** (0.188)	0.402** (0.171)	0.401** (0.170)	0.479** (0.191)	0.479** (0.190)
var(regions)	0.373*** (0.094)	0.376*** (0.094)	0.395*** (0.082)	0.396*** (0.082)	0.373*** (0.094)	0.377*** (0.094)
N. of observations	39,700	39,700	47,134	47,134	39,700	39,700
N. of regions (countries)	466 (31)	466 (31)	576 (36)	576 (36)	466 (31)	466 (31)

Note: All models are multi-level mixed effect estimation for a logit distribution. Robust standard errors are clustered at the highest level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. X indicates variable was included in the model. Data are from the WVS. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable has been coded as 1, and otherwise is 0. The key independent variables are corruption experience, public education, and health expense. Demographic controls include sex, age, and others. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the Human Development Index (HDI) and inequality measured as the income share held by the top 10% of people.

7.2. The shame of being exposed, desires for reputations, and ethnic diversity.

The effect of corruption experience on tax morale can also be conditional on the population heterogeneity in their society in terms of their ethnic, language, and religious diversity due to the fact that motivation to pay taxes may depend on conditional cooperation and intergroup biases as mentioned earlier (Alesina et al., 1999; Frey & Torgler, 2007; Siddique, 2021). Literature suggests that motivation to pay taxes is low in a more heterogeneous society than in a more homogenous society (Siddique, 2021; Xin Li, 2010). So, I interacted corruption experience with two different ethnic fractionalization indices proposed by Desmet et al. (2009) and Fearon (2003) as in equation (6) and estimate it using MLME. While Fearon's index emphasized cultural distances, the focus of Desmet et al.'s index is on linguistic distances, however, they are complementary indices.

$$TXM_{irc} = \mu_0 + \beta_1 Corr_exp_{irc} + \beta_2 Ethnic_frac_c + \beta_3 Corr_exp_{irc} \times Ethnic_frac_c + \mu_1 X_{irc} + \pi_1 R_{rc} + \delta_1 C_c + U_{rc} + U_c + \epsilon_{irc} \dots (6)$$

Results reveal that corruption experiences affect individual tax morale through ethnic diversity since both interaction terms are positive and statistically significant (Table 7). Panel A and B in Figure 9 show that the difference in tax morale is higher between people with and without corruption experience in a more homogeneous society, and the difference almost disappears in a more heterogeneous society. In other words, people adjust their tax morale as a response to their corruption experiences to a large extent if they live in a more homogeneous society than if they live in a more heterogeneous society. This is due to the fact that a heterogeneous society is more corrupt than a homogeneous society (Cerqueti et al., 2012; Dincer, 2008). So, a heterogeneous society has less shame of being exposed to

corruption, or corruption is considered to be acceptable to some extent, thus, taxpayers do not incur any moral cost from tax cheating in those societies.

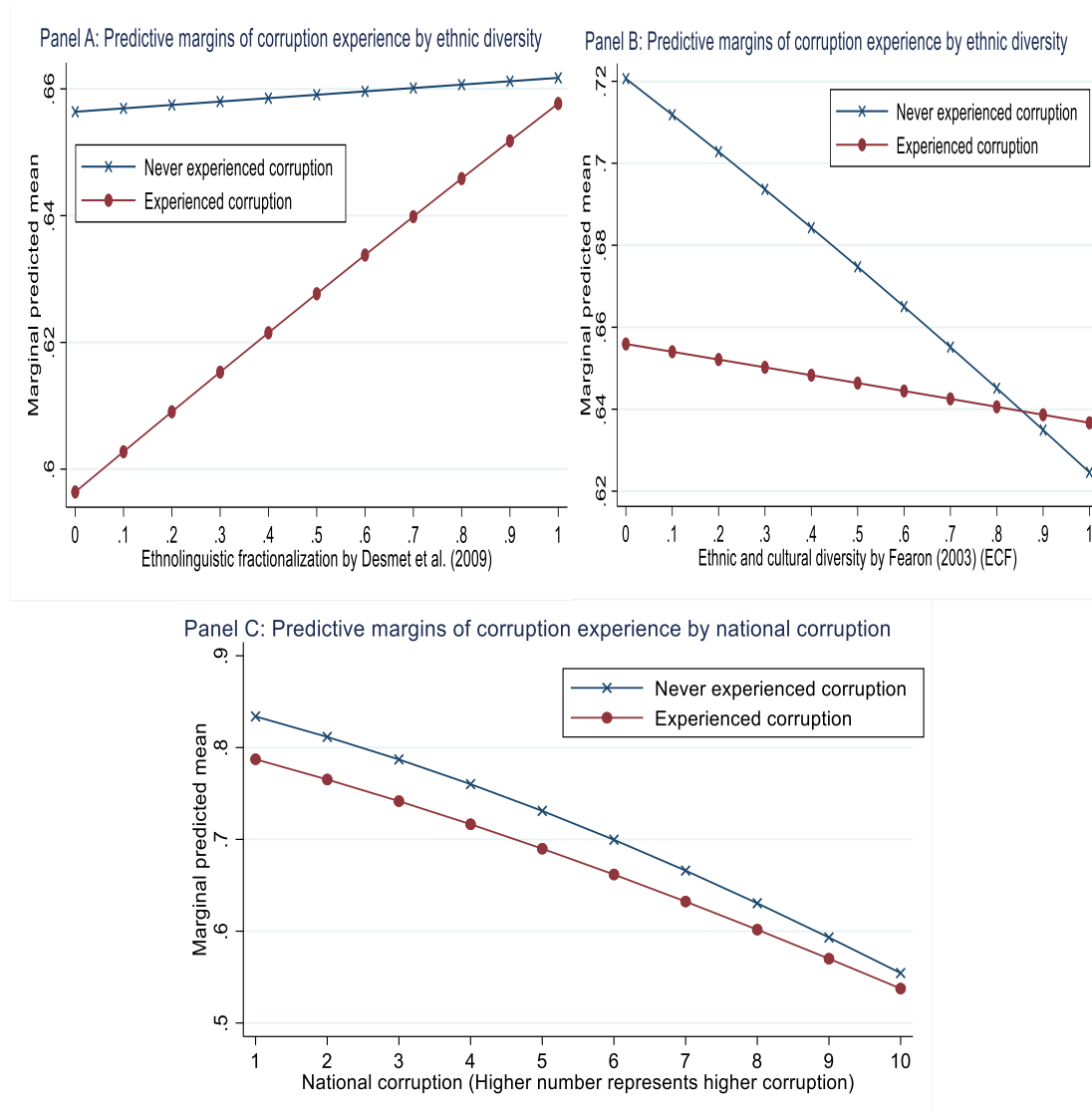


Figure 9: Corruption experience effect on tax morale by ethnic diversity

Note: All these estimations are based on the full model: panel A is based on model 7.4, panel B is based on model 4.2, and panel C is based on model 7.5 in Table 7. All the interaction terms are statistically significant.

As mentioned in section 3.1, taxpayers carry desires of being recognized by their neighbors as socially compliant individuals, which can be multiplied by the probability that their tax cheating decision will become known to their neighbors and their communities. However, people may less care about such reputation and being publicly censured if most people are corrupt in some forms in their society and if they tend to accept such corruption as their regular norms. So, I interacted individual corruption experience with national-level corruption to see if this argument of social desires is true. The results show that this argument holds as we can see in panel C in Figure 9. It shows that the effect of corruption experience on tax morale diminishes as individual taxpayer's countries become more corrupt. The coefficient of interaction term of corruption experience and national corruption in model 7.5 in Table 7 is also positive and significant indicating higher corruption at the community level reduces the effect of social exposures and taxpayers reduce the moral and psychic cost from tax cheating.

Table 7: Corruption experience effect on tax morale by ethnic diversity

	TXM-7.1 ELF (Desmet et al., 2009)	TXM-7.2 ELF (Desmet et al., 2009)	TXM-7.3 ELF (Fearon, 2003)	TXM-7.4 ELF (Fearon, 2003)	TXM-7.5 National Corruption
Corruption experience	-0.238*** (0.054)	-0.389*** (0.070)	-0.235*** (0.061)	-0.447*** (0.080)	-0.517*** (0.138)
Ethnolinguistic fractionalization by Desmet et al. (2009) (EFD)	0.305 (0.503)	0.036 (0.503)			
Corruption experience*EFD (Desmet)		0.361*** (0.135)			
Ethnic and cultural diversity by Fearon (2003) (ECF)			-0.254 (0.371)	-0.646* (0.388)	
Corruption experience*ECF (Fearon)				0.523*** (0.148)	
Corruption experience*National corruption					0.041** (0.019)
Individual control					
Demographic controls	X	X	X	X	X
Education group dummies	X	X	X	X	X
Income group dummies	X	X	X	X	X
Religion dummies	X	X	X	X	X
Kvetch-1	X	X	X	X	X
Kvetch-2	X	X	X	X	X
Regional level controls					
Town size dummies	X	X	X	X	X
Settlement types	X	X	X	X	X
Country-level controls					
Country income group	X	X	X	X	X
Other controls	X	X	X	X	X
Country	Leve ID	Leve ID	Leve ID	Leve ID	Leve ID
Local regions	Leve ID	Leve ID	Leve ID	Leve ID	Leve ID
var(indiv)	2.120 (1.783)	2.267 (1.764)	4.801*** (1.483)	5.048*** (1.456)	6.129** (2.412)
var(countries)	0.386** (0.158)	0.380** (0.156)	0.155** (0.063)	0.151** (0.063)	0.353** (0.144)
var(regions)	0.395*** (0.084)	0.395*** (0.085)	0.362*** (0.086)	0.363*** (0.087)	0.396*** (0.082)
N. of observations	44,924	44,924	39,308	39,308	47,134
N. of regions(countries)	540(34)	540(34)	493(29)	493(29)	576(36)

Note: All models are multi-level mixed effect estimation for a logit distribution. Robust standard errors are clustered at the highest level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. ELF = Ethnolinguistic Fractionalization. * $p < 0.1$; ** $p < 0.05$;

*** $p < 0.01$. X indicates variable was included in the model. Data are from the WVS. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable is equal to 1, otherwise is 0. The key independent variables are corruption experience, ethnic fractionalization, and national-level corruption. Demographic controls include sex, age, and others. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the Human Development Index (HDI) and inequality measured as the income share held by the top 10% of people.

7.3. Trust in the institutions and tax morale

Several past studies have shown relations between trust in public institutions and tax morale; although, they did not specify any causal mechanisms (Feld & Frey, 2002; Torgler, 2005). Therefore, some scholars may think that an individual's trust in the public institution may be an important factor that can mediate the effects of corruption experience on tax morale. So, I conducted several tests for corruption experience by interaction with trust in government, parliament, political parties, civil service, military, court, police, and others (some of the results are reported in Figure A.2 in the appendix). I see that higher trust in these institutions is related to higher tax morale, which is in line with the existing literature; however, I did not find any significant relationship for the interaction term. This means the possibility that corruption experience reduces trust in public institutions, and therefore, individuals adjust their tax morale is not the likely scenario, or individuals with strong trust in institutions may not prevent people to adjust their tax morale even after experiencing corruption.

8. Alternative hypotheses

8.1. Reduced expected cost of cheating after being exposed to corruption.

A potential alternative hypothesis is that when corruption was revealed to taxpaying individuals it may have affected the expected cost of cheating on taxes, which could lead to an adjustment in tax behavior, rather than causing damage in their tax morale. In other words, after they experience corruption, individuals might have reasoned that if they are caught on their tax cheating, they would not be punished harshly. So, the effect of corruption may not be a loss in tax morale but a change in tax morale caused by a decrease in the expected cost of being detected and punished. If this is true, I would expect to see a heterogeneous effect of corruption experience with a change in the expected level of enforcement. For example, the effect of corruption on tax morale would be larger in a society where originally the likelihood of catching a tax cheater is high compared to a society where catching a tax cheater is difficult. To test this, it would be ideal to have a measure of the expected level of enforcement by the tax authority. However, the WVS asked respondents a question: *“How high is the risk in this country to be held accountable for giving or receiving a bribe, gift or favor in return for public service?”* The response was recorded on a 10-point scale where “1” means “no risk at all” and “10” means “very high risk”. This question can serve as a good substitute for the perceived level of enforcement since it gives the signal of both probabilities of detection and the level of penalties after detection. So, I interacted corruption experience with the perceived level of enforcement to see if there is important heterogeneity in the effect of corruption experience

with the perceived level of enforcement. Although this test is not perfect, the result can be at least suggestive.

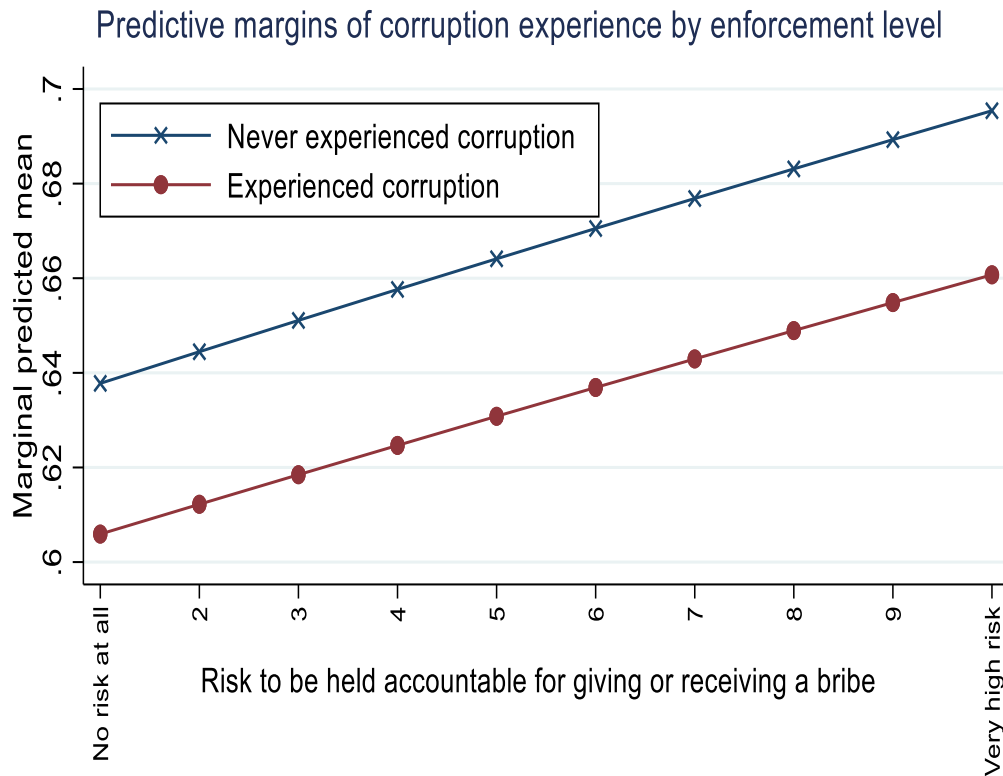


Figure 10: Crowd in the effect of enforcement by corruption experience

Note: This estimation is based on model 8.3 in Table 8 that includes all control variables.

Figure 10 and Table 8 report the estimates that the interaction term is highly insignificant, which implies that the level of enforcement does not intensify or weaken the effect of corruption experience. This is useful evidence to rule out the possibility that a reduced expected cost of detection and thereby punishment is a cause of reporting inferior tax morale by individuals with corruption experience.

However, the individual effect of perceived enforcement is interesting and relevant. It shows that perceived enforcement crowds in tax morale, rather than crowds out, which indicates policymakers can increase the expected cost of cheating on taxes, and thus, can increase the tax compliance rate. Note that in theory, it was ambiguous whether increasing enforcement should favor tax morale or not. On the one hand, tax morale is an intrinsic motivation that may crowd out due to the extrinsic incentives of tax enforcement, for example, Benabou and Tirole (2006) predicted that external interventions demotivate prosocial behavior, and similarly, Frey (1997) argued that law is designed for dishonest people, and when such laws are strongly enforced the civic virtues crowd out since dishonest people utilize all means at full capacity to avoid the laws. Overall, their views reflect that excessive tax enforcement could backfire by reducing voluntary motivation. On the other hand, Richard (2018) claims in “The Gift Relationship” that the absence of the role of the state can potentially extinguish the moral incentives to donate voluntarily, which implies that the complete absence of tax enforcement may not increase tax morale too. Our results support the latter that some level of enforcement does not erode intrinsic motivation but enrich, however, such claim can be too stylistic and hard to see as a single effect of enforcement in the real world. Instead, a higher level of enforcement not only reflects the level of risk to be held accountable for wrongdoing but also signals the state capacity. Strong enforcement can actually amplify motivation to pay taxes by implying that paying tax is a significant civic responsibility.

Table 8: Effects of perceived enforcement interacting with corruption experience

	TXM-8.1	TXM-8.2	TXM-8.3
Perceived level of enforcement	0.042*** (0.009)	0.040*** (0.009)	0.043*** (0.015)
Corruption experience		-0.223*** (0.054)	-0.195 (0.120)
Corruption experience*Enforcement			-0.004 (0.015)
Kvetch-1	0.160*** (0.021)	0.158*** (0.022)	0.158*** (0.022)
Kvetch-2	1.353*** (0.089)	1.342*** (0.089)	1.342*** (0.089)
Individual control			
Demographic controls	X	X	X
Education group dummies	X	X	X
Income group dummies	X	X	X
Religion dummies	X	X	X
Regional level controls			
Town size dummy	X	X	X
Settlement types	X	X	X
Country-level controls			
Country income group	X	X	X
Other controls	X	X	X
Country	Leve ID	Leve ID	Leve ID
Local regions	Leve ID	Leve ID	Leve ID
var(indiv)	3.263*** (1.145)	3.980*** (1.176)	3.957*** (1.179)
var(countries)	0.182*** (0.052)	0.170*** (0.052)	0.170*** (0.052)
var(regions)	0.363*** (0.074)	0.360*** (0.077)	0.359*** (0.077)
N. of observations	47,858	45,344	45,344
N. of regions(countries)	593(36)	571(35)	571(35)

Note: All models are multi-level mixed effect estimation for a logit distribution. Robust standard errors are clustered at the highest level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. X indicates variable was included in the model. Data are from the WVS. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable is equal to 1, otherwise is 0. The key independent variables are perceived level of enforcement: the level of risk in this country to be held accountable for giving or receiving a bribe, gift, or favor in return for public service. The risk is measured on a 10-point scale. Demographic controls include sex, age, and others. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the Human Development Index (HDI) and inequality measured as the income share held by the top 10% of people.

8.2. Tax morale peer effects

The second possible competing hypothesis is that there could be tax morale peer effects, meaning that people with low tax morale may influence other people in their community to develop inferior tax morale. If a community with inferior tax morale can also be associated with other forms of inferior civic virtues, they may thereby engage in more corruption. In such a case, there is a doubt that the effect of corruption that I reported in this paper may be driven by such already built-in characters, rather than an additional effect of corruption experience. To rule out such a potential explanation, ideally, I should account for the tax morale of individuals' peers. Since we do not know who the peers of these individuals are, I cannot do that. However, I can control for the average tax morale of the community members of each individual-level observation in the dataset. So, I calculated the average tax morale of the local regions and the country where these individuals live in. Then I controlled these average community-level tax morale in the main regression equation (3). The reported results in Table 9 show that controlling for average community-level tax morale does not take away the original effect of corruption experience on individual tax morale and the effect experience remains highly statistically significant. Note that the community-level tax morale is strongly related to individual tax morale which means if an individual was interviewed from a low tax morale society, he or she also tends to report low tax morale. It is the peer effect, and it is not surprising, which also supports the earlier literature that reported peer effect in tax compliance behavior (Castañeda et al., 2020; Hallsworth et al., 2017).

Finally, note that the MLME modeling treats individual observations as clustered within local regions and then local regions are clustered within-country should have also addressed this problem in the estimation and many such other peer effects and omitted biases. Even after a deliberate effort to address most potential problems, if anything has not been addressed appropriately, I believe such a possibility should not entirely void the strong association between corruption and tax morale reported in this paper.

Table 9: effect of corruption experience after controlling for regional and country-level average tax morale.

	TXM-9.1	TXM-9.1	TXM-9.1	TXM-9.1
Corruption experience	-0.230*** (0.053)	-0.230*** (0.053)	-0.215*** (0.052)	-0.215*** (0.052)
Mean tax morale by country		3.982*** (0.687)		-0.222 (0.548)
Mean tax morale by local regions			4.327*** (0.149)	4.340*** (0.144)
Kvetch	0.174*** (0.022)	0.174*** (0.021)	0.168*** (0.021)	0.168*** (0.021)
Kvetch1	1.363*** (0.093)	1.359*** (0.093)	1.305*** (0.090)	1.305*** (0.090)
Individual control				
Demographic controls	X	X	X	X
Education group dummies	X	X	X	X
Income group dummies	X	X	X	X
Religion dummies	X	X	X	X
Regional level controls				
Town size dummy	X	X	X	X
Settlement types	X	X	X	X
Country-level controls				
Country income group	X	X	X	X
Other controls	X	X	X	X
Country	Leve ID	Leve ID	Leve ID	Leve ID
Local regions	Leve ID	Leve ID	Leve ID	Leve ID
var(indiv)	(0.087)	(0.087)	(0.085)	(0.085)
	3.056	-2.077	-2.340**	-2.075*
var(countries)	(1.920)	(1.366)	(1.147)	(1.163)
	0.407**	0.096**	0.120***	0.118***
var(regions)	(0.160)	(0.047)	(0.038)	(0.040)
	0.394***	0.394***	0.014	0.014
	(0.082)	(0.081)	(0.010)	(0.010)
N. of observations	47,134	47,134	47,134	47,134
N. of regions (countries)	576 (36)	576 (36)	576 (36)	576 (36)

Note: All models are multi-level mixed effect estimation for a logit distribution. Robust standard errors are clustered at the highest level and are presented in the parenthesis. Values within the bracket are the converted coefficient of log of odds to percentage change. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. X indicates variable was included in the model. Data are from the WVS. The dependent variable is the tax morale – if an individual responded that cheating on tax is never justifiable is equal to 1, otherwise is 0. Demographic controls include sex, age, and others. Education group dummies include primary, secondary, post-secondary, and tertiary. Income controls include dummies for 10 income groups. Religion includes dummies for 10 major religious groups. Town size includes dummies for 5 group of town size such as under 5000, 5,000-20,000, 20,000-100,000, 100,000-500,000, and 500,000+. Country income groups include dummies for the World Bank classification into low income, lower middle income, upper middle income, and high-income economies. Other country-level factors include the Human Development Index (HDI) and inequality measured as the income share held by the top 10% of people.

9. Conclusion

Does corruption matter for tax morale? I conclude that it matters; that corruption significantly deteriorates individual tax morale; that it has a large spillover effect on other members of the community, and that people carry corruption norms for a long-time. Government corruption creates dishonest taxpaying citizens. The effect of corruption is sticky, implying that even if a country eliminates corruption, citizens may take time to adjust their tax morale, or in other words, an effective increase in overall tax compliance may not be realized immediately. Overall results also imply that people do not always maximize monetary gains that the traditional economic model offers but the overall satisfaction after trading off between monetary gains and moral positions.

When an individual experiences any corrupt transaction, his/her odds of showing full tax morale declines by 23.5%. Similarly, when national corruption increases by 10%, it can reduce tax morale by more than 15%. Based on these results, if we try to extrapolate, the aggregated consequences due to inferior tax morale for an economy can be considerable. If we accept all motivations to pay taxes after enforcement is tax morale, most economies lose a large fraction of public income due to lack of enforcement and tax morale which could have contributed to better public welfare. For example, according to the estimates of the IRS, only the United States loses approximately \$1 trillion in unpaid taxes every year, which is equal to more than 15% of its annual budget for 2020, because the agency lacks the resources to catch tax cheaters (Rappeport, 2021). The ability of a state to tax its people is at the core of creating an effective state. However, tracking each tax payment accurately

can be extremely expensive or simply impossible work. Therefore, the role of tax morale is more important than what we can simply express in writing here.

The potential significance of corruption to determine tax morale and, thereby, determining tax compliance recommends that policymakers may now have options of a larger set of policy tools to guide compliance behavior than implied by the traditional deterrence model. This paper provides robust evidence that corruption weakens people's tax morale by explaining the dynamics of individual's decision-making behavior about tax payments in their tax environment. It also explains institutional behavior indirectly since corruption in any form represents the quality of institutions. When corruption is widespread, it signals that the quality and performance of major institutions have deteriorated. When people's morality to pay taxes declines as a response to corruption, it further worsens the quality and performance of those institutions, including the tax authorities. Therefore, institutions that are performing badly reinforce other institutions in the same direction operating in the same context. This paper used exogenous variations to complement such discourse without applying institution-level analysis which tends to be endogenous.

Although I have taken careful approaches and attempted to rule out alternative explanations, I must acknowledge that several issues may still affect these estimates. First, for the corruption question, people who reported lower tax morale may mistakenly understand any legitimate constraints on the public official sides as a signal for bribing than other people who reported higher tax morale. Note that this concern to be true, people with low tax morale have to have an inferior social-cognitive skill which is unlikely to be

true. Moreover, as I mentioned earlier, for corruption experience measure, it is extremely hard to have a reverse effect channel. Even if there is a reverse effect problem, it would have to be tremendously strong to weaken the conclusion in this paper. Therefore, I can still argue that the results in this paper can be partially interpreted as a causal effect from corruption to tax morale. Second, there might be omitted variable biases that may drive the results. To minimize such possibility, I controlled for many individual-, local regional-, and country-level variables including country and local region fixed effects. However, there can be still some unobserved factors that may remain uncontrolled that could bias the estimations. Third, the WVS-EVS survey samples are randomly drawn within the country, however, usage of such individuals across countries may generate any non-randomness that can cause sample selection bias. To correct such biases, I nested individuals within regions and regions within the country. Moreover, to detect the effect of corruption on individual tax morale, I use several investigational designs from corruption experience to national corruption to stationing people away from the origin country to the destination country. Nevertheless, the relationship between corruption and tax morale remains significant and consistent in all specifications which indicates a robust effect, and it should eliminate any doubt of any spurious correlations. Finally, one practical challenge to connect self-reported tax morale to actual tax compliance in the real world remains unsettled in this paper. The relative application of tax morale may differ across communities and types of taxes within the community, thus, the generalization of findings in this paper can be a little ambiguous when it comes to specific corruption and types of tax. I will leave these for future research.

Appendix A

Table A.1: WVS-EVS data samples

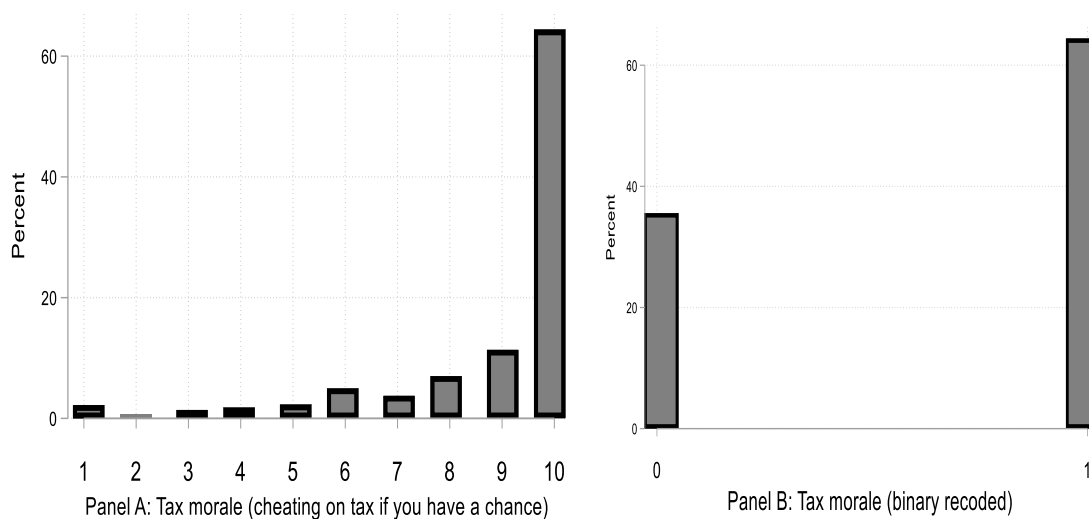
	Joint EVS/WVS	EVS	WVS
Survey period	2017-2020	2017-2020	2017-2020
Number of waves	Joint EVS/WVS wave	5th wave	7th wave
Number of cases	127,358	56,491	70,867
Local regions	1,045	292	751
Countries/territories	79	34	49

Table A.2: Kvetch measurement information

Kvetch- 1	Original question no.	Questions in the survey	Response recorded	Factor loading
	Q46P ^{E(N)}	“Taking all things together, would you say you are (readout and code one answer)”	“(1) Very happy, (2) Rather happy, (3) Not very happy, (4) Not at all happy”	0.69(0.75)
	Q47P ^{E(N)}	“All in all, how would you describe your state of health these days? Would you say it is... (readout)”	“(1) Very good, (2) Good, (3) Fair, (4) Poor, (5) Very poor”	0.56(0.66)
	Q48 ^{E(N)}	“Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "no choice at all" and 10 means "a great deal of choice" to indicate how much freedom of choice and control you feel you have over the way your life turns out (code one number)”	“No choice at all – 1 2 3 4 5 6 7 8 9 10 - A great deal of choice.”	0.62(0.64)
	Q49 ^{E(N)}	“All things considered, how satisfied are you with your life as a whole these days? Using this card on which 1 means you are “completely dissatisfied” and 10 means you are “completely satisfied” where would you put your satisfaction with your life as a whole? (Code one number)”	“Completely dissatisfied 1 2 3 4 5 6 7 8 9 10 Completely satisfied.”	0.82(0.80)

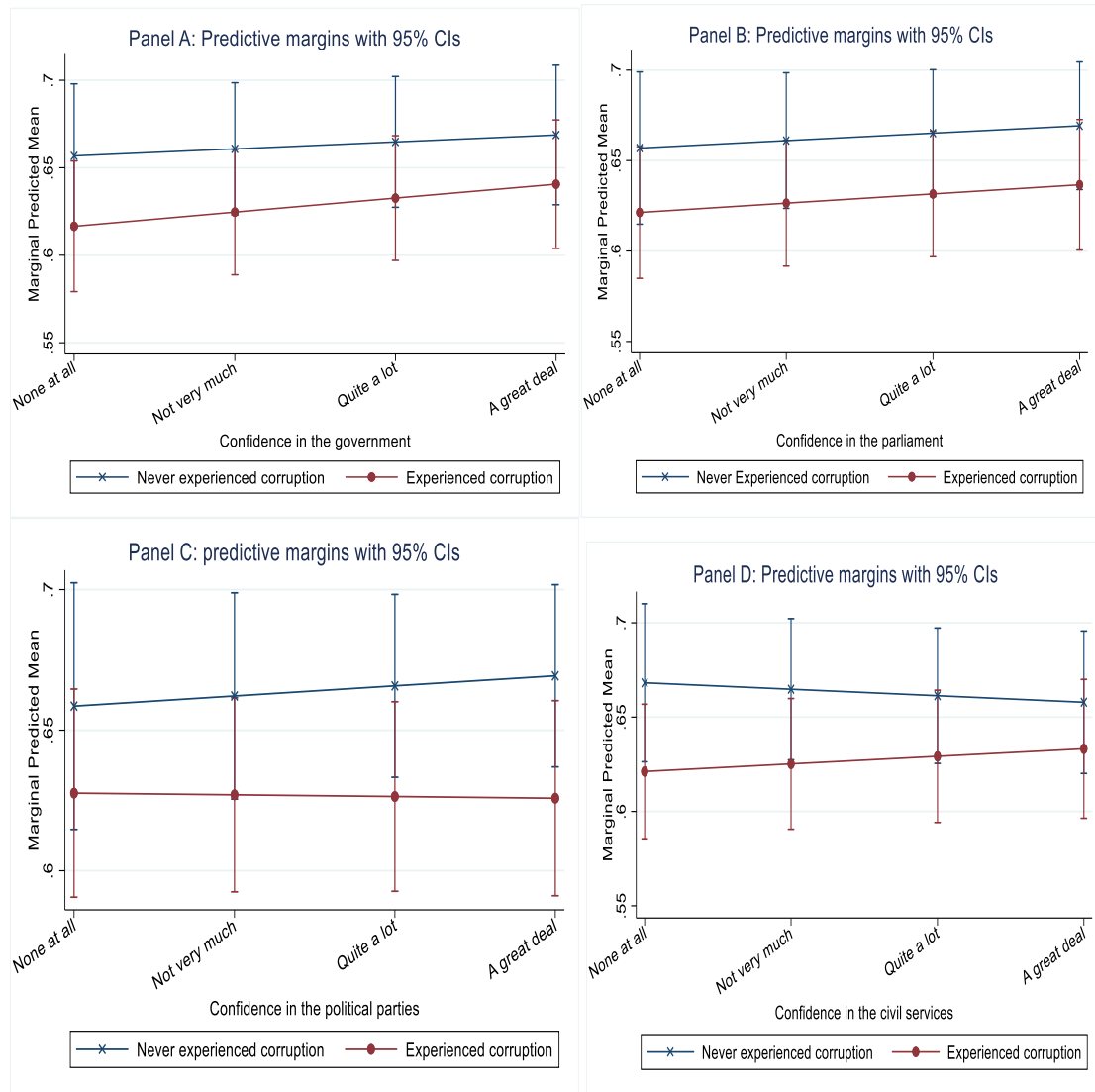
	Q50 ^E	“How satisfied are you with the financial situation of your household? Please use this card again to help with your answer (code one number)”	“Completely dissatisfied 1 2 3 4 5 6 7 8 9 10 Completely satisfied.”	0.75
Kvetch-2	Q178 ^{E(N)}	“Please tell me whether you think it can always be justified, never be justified, or something in between, using this card: Avoiding a fare on public transport”	“Never Justifiable 1 2 3 4 5 6 7 8 9 10 Always Justifiable”	0.85(0.50)
	Q179 ^E	“Please tell me whether you think it can always be justified, never be justified, or something in between, using this card: Stealing property”	“Never Justifiable 1 2 3 4 5 6 7 8 9 10 Always Justifiable”	0.85
	Q185 ^(N)	“Please tell me whether you think it can always be justified, never be justified, or something in between, using this card: Divorce”	“Never Justifiable 1 2 3 4 5 6 7 8 9 10 Always Justifiable”	(0.77)
	Q187 ^(N)	“Please tell me whether you think it can always be justified, never be justified, or something in between, using this card: Suicide”	“Never Justifiable 1 2 3 4 5 6 7 8 9 10 Always Justifiable”	(0.82)

Note: E indicates the variable was used for corruption experience analysis and N indicates the variable was used for national corruption analysis. Factor loading within the bracket is for national-level corruption analysis.



Note: In panel A, 1=always justifiable and 10=never justifiable. In panel B, 0=justifiable and 1=never justifiable.

Figure A.1: Distribution of response for tax morale



Note: All estimations are based on the full model that includes all control variables. None of the interaction terms (corruption and confidence in government, parliament, political parties, and civil service) are statistically significant, however, both corruption and confidence in the institution are separately statistically significant.

Figure A.2: Effect of corruption experience by trust/confidence in institutions

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PAPER NO. 2

White prototypicality threats, inequality in diversity, and public and goods provisions

Abu Bakkar Siddique

Abstract

This research paper studies the relationship between ethnic institutions and public goods supply. Earlier related but distinct literature presented that ethnic fractionalization adversely influences public goods provision. Although such negative association does not hold while addressing omitted biases, they argued that ethnically fragmented society provides limited public goods due to negative exposure effects and group loyalty effects among others. In this paper, I provide alternative explanations for limited public and welfare goods provisions in the USA with empirical evidence. Ethnic fractionalization does not always limit all kinds of public goods provisions but the more excludable and redistributive public goods. However, economic heterogeneity among ethnic groups and rising threats to White prototypicality from racial swing to a majority-minority condition are the consistent determinants of limited public and welfare goods in the USA.

Keywords: ethnic diversity, White prototypicality, inequality, public goods, inter-group bias, redistribution

JEL: J11, J15, H41, H53, N42, P16

1. Introduction

Perceiving one's own group as prototypical is internally beneficial and associated with many socio-economic benefits. Declining Whiteness in the USA population is threatening the status of the White population who have been the most prototypical ethnic group in the country since the beginning of the colonial period at Jamestown in 1607. But the White share of the USA population has been shrinking, from a little under 90% in 1950 to less than 60% currently. It is likely to drop below 50% in about two decades. How people under prototypicality threats should react to defend their status? People who are experiencing prototypicality threats may attempt to re-establish their status by asking other groups to conform to their norms and cultures that are prototypical. Otherwise, they may undermine the general concept of diversity. In doing so, they target the sources that threaten their group's prototypicality and stand against them (Danbold & Huo, 2015). There are two main sources of these demographic shifts: a lower birth and higher death rate among White people and a higher rate of non-White immigration. Actions to revert the differentiated birth and death rate among the ethnic groups are likely to be slow and ineffective, but they swiftly become an antagonist to the non-White immigrants. Such threats to prototypicality are leading to rejecting diversity and multiculturalism to reassert White's standing which should cause significant changes in behavior and socio-economic strategies²². While America regards diversity positively and its education systems promote multiculturalism,

²² Whether there should be a prototypicality threats as reaction to demographic changes depends on individual's beliefs. Majority-minority conditions may trigger prototypicality threat for only those people who believe that White people represent the USA more than any other races. On the other hand, if individuals believe that all ethnic groups equally represent the USA, should not feel evoked by prototypicality threat due to declining White population (Danbold & Huo, 2015).

White people's little support for multiculturalism and their engagement in defensive strategies can be a barrier to developing an inclusive society (Citrin et al., 2001; Danbold & Huo, 2015; Knowles & Marshburn, 2010; Plaut et al., 2011).

What are the economic, political, and welfare consequences of this declining White population and turning into a majority-minority country that are broad interests of researchers and policymakers. In this paper, I study the consequence on public goods provisions which are the main pillar of inclusive developments, improving people's welfare, strengthening a shared sense of citizenship, and shaping attitudes toward equality and justice (Dagdeviren et al., 2002; Kallhoff, 2014). Related but distinct literature shows relationships between ethnic fractionalization and provisions of public goods although they are not causal relations. There are no works that investigated the effects of the threats to White prototypicality on economic outcomes and certainly not anything on public goods provisions.

A heterogeneous society is different from a homogeneous society in many ways. If we draw a bigger picture of diversity, multiculturalism, and overall socio-economic performances anecdotally and based on existing evidence although scientific evidence is scarce, we see a mixed scenario.²³ Understanding the consequence of ethnic diversity should help predict the progression of society and whether society will be more inclusive or otherwise. Diversity generates economic gains but with costs and distributional problems. Ethnic diversity may be positive or less negative factor to influence output in

²³ See the works of Alesina & Ferrara (2005) for surveys of related literature on ethnic fractionalization and economic outcomes and Horowitz (2000) for ethnicity and institutions.

developed economies (Alesina et al., 2003, 2016; Collier, 2000). Since the USA is a developed economy, it should be able to capitalize on the benefits of diversity for positive economic growth. On the other hand, diversity may reduce social capital, thus, increasing security costs (Huber & Mayoral, 2014; Putnam, 2007; Portes & Vickstrom, 2011; Fieldhouse & Cutts, 2010; Letki, 2008; Sturgis et al., 2011). Diversity may also deteriorate social welfare expenditure (Alesina et al., 1999; Banerjee et al., 2005; Habyarimana et al., 2007; Rugh & Trounstein, 2011) and creates fiscal unsustainability (Siddique, 2021). Therefore, there are economic gains from diversity and multiculturalism at some social and economic costs but are subject to economic development. Evidence on who receives the gains from improved productivity as a result of increased diversity is quite scarce. While diversity increases social cost and worsens social welfare expenditure and if the benefits of diversity, which are improved productivity and economic gains, are not evenly distributed among the members of the society, the society will be eventually more non-inclusive. Thus, the government policy should intervene to determine how much benefits of improved productivity and economic gains can be used to compensate for the cost of diversity. This is still an abstract area that involves many research questions which have not yet been answered scientifically.

The USA is also becoming more ethnically diverse over time. Existing literature has inconclusive verdict about the link between ethnic diversity and public goods. Many say that ethnic fractionalization causes lower public goods provision because ethnically fragmented society has conflicting preferences for the types and size of public goods as well as public goods consumption by people from another ethnic group other than own

reduces utilities (Alesina et al., 1999; Wimmer, 2016). Others argued that the relationship between ethnic diversity and public goods is not causal (Gisselquist, 2014). However, I think, while considering public goods provisions, ethnic fractionalization is less consequential ethnic institution than the economic heterogeneity between ethnic groups and if the minority groups pose any systemic threats to the majority White. Alternatively, ethnic fractionalization may only hurt redistributive and excludable public goods at ethnic lines where achieving cooperation from relatively more excluded groups is difficult. Pure public goods that are non-excludable and non-rivalrous should not be affected by ethnic diversity. This is because if only higher proportions of public goods consumers are perceived to be from the poorer minority groups, relatively richer ethnic groups are likely to deny contributing to such public goods provisions and divert resources for their private consumption to prevent consumption by people who are not from their own ethnic group. Ethnic diversity should be most consequential when different ethnic groups are under different economic conditions and if one or more ethnic groups threaten the status of the most prototypical ethnic group. This paper emphasizes that the simple measure of ethnic fractionalization that most past literature utilized neither captures any of these two important characteristics of ethnic institutions nor the connotation that could potentially lead to conflicting presences and reasons for negative utility.

This paper finds supportive evidence for our hypothesis after deploying a two-way fixed-effect model for a state-level panel dataset covering periods from 2008 to 2018. Both White prototypicality threats and economic differences between ethnic groups negatively influence public and welfare goods provisions in the USA. However, the effect of the

ethnic fractionalization is either statistically insignificant or dependent on the types of public goods – ethnic fractionalization does not hurt non-redistributive public goods such as police protection but the supply of distributive public goods such as welfare whose perceived rate of consumers is higher from the minorities and poorer ethnic groups. Ethnic institutions particularly, White prototypicality threats and inequality in diversity are structural problems in American society that contribute to non-redistributive policies. The market has failed (in the form of occupational, educational, managerial, capital rents, and others) to restrain the level of inequality within an acceptable limit in the USA (Weeden & Grusky, 2014). Post-market interventions (e.g., welfare payments) to reduce inequality levels are also constrained and they are worsening over time because of these structural problems. This paper produces systematic evidence against these structural problems combining ideas and tools from psychology, political science, and economics, and draws important lessons for future policy areas to emphasize.

The next section presents why majority-minority conditions matters for public goods provisions. Section 3 discusses why and why not ethnic diversity is a reason for limited public goods provisions. While section 4 details the empirical strategies, section 5 presents the results. Section 6 concludes the paper.

2. Why should the non-White over White ratio population size matter?

The left panel in Figure 1 shows that, in the USA, the White population will no longer be the majority by around 2044, and the right panel in Figure 1 shows that currently, more than 50% of children are from non-White population groups. Psychological research has advanced to identify the consequence of increasing perceived status threats rising from the

racial demographic shift turning into a “majority-minority” country. Research in the field started growing since the USA Census Bureau (2008) announced their projection that minority ethnic groups will combinedly form the majority of the population by 2042 (Craig & Richeson, 2014b, 2014a; Danbold & Huo, 2015; Major et al., 2018; Willer et al., 2016). The decline of Whiteness has increased resistance toward diversity (Danbold & Huo, 2015), endorse conservative policy positions by Whites (Craig & Richeson, 2014b), bad attitudes toward Latinos, Blacks, and Asian Americans (Craig & Richeson, 2014a), support for the Tea Party movement (Willer et al., 2016), and elevated President Trump’s win in the 2016 presidential election (Major et al., 2018). Group status threats were the key mechanism underlying these consequences. What can be potential consequences on the provision of the public and welfare goods?

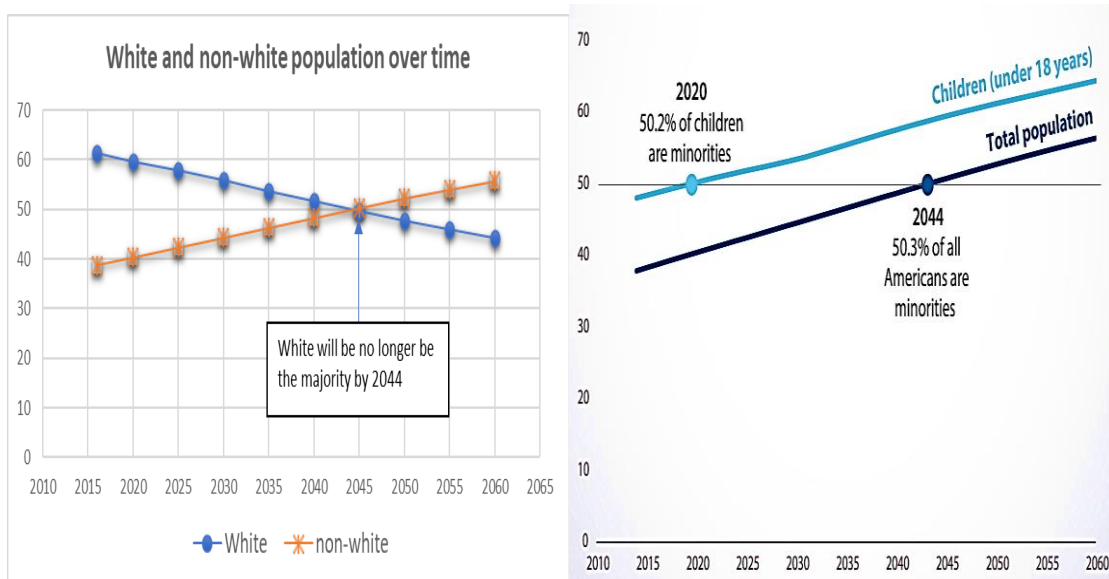


Figure 1: Projecting Majority-Minority condition in the USA

Note: 2014 National Projections from Census Bureau. Percent Minority by Age Group: 2014 to 2060. The minority is defined in this figure as any group other than non-Hispanic White.

Among the related literature, Danbold and Huo (2015) conducted an experiment where a group of participants was exposed to the condition that the minority groups together are increasing at a higher rate than the Whites and will be the majority of the USA population in 2050, called majority loss condition. The other group of participants was exposed to a condition that the White population is likely to increase at a similar rate to non-Whites and will remain the majority population group, called the majority retention condition. They found that after they were exposed to these two conditions, compared to the majority retention condition, members in the majority loss condition exhibited larger prototypicality threats. People from the majority loss condition also approved a lower level of diversity than the other group. Similarly, Craig and Richeson (2014b) found that making majority-minority racial swing salient, more White Americans approve conservative political ideologies. They concluded that threats that are not even physical over the likely loss of majority position in the country, even not likely to occur in less than three decades, can potentially provoke political conservatism. These results indicate that there should be some consequences and likely to be an adverse one on socio-economic outcomes as a response to these demographic changes and particularly on public goods provisions.

2.1. Uncertainty-threat model of conservatism

Jost et al. (2003) suggested an uncertainty-threat model of conservative ideology after integrating a myriad of research findings for a prudent framework of epistemic and experiential needs that motivate sociopolitical conclusions. This model illustrates the way people generally respond to a frightening environment including fear and uncertainty can

play an important role in the formation and manifestation of political stands about resistance to change and approving unfairness and conservative policies. Jost et al. (2007) reassessed this uncertainty-threat model through three experimentations, and they found strong evidence to confirm the hypothesis that both insecurity prevention and dealing with danger independently advance conservatism among people even after correcting for ideological edges. While uncertainty avoidance is a human behavior that prefers order over chaos, does not tolerate ambiguity, and is not open experience changes, threat management involves management of death anxiety, perception of dangers, threats to systems, and others. Several longitudinal experimental studies show that support for conservative policies is increased in high threats (Willer, 2004) and death anxiety (Cohen et al., 2005) environments.

Figure 2 presents a simplified version of the integrative political conservatism model as social cognition proposed by Jost et al. (2003). The key idea presented in this model is that the ideological difference between support for change and equality and opposition for change and equality have psychological roots²⁴. While change and equality catalyze greater chaos and unpredictability, stability and hierarchy help establish structure and reassurance (Jost et al., 2007). Therefore, people oppose change and accept inequality to minimize uncertainty and threats. On the other hand, people preserve the status quo so that they can retain what is familiar to them and reject the prospect of those changes that are risky, unknown, and involves uncertainty. Many dispositional variables are linked with the

²⁴They are often loosely associated with difference between left- and right-wing politics in the USA but not everywhere in the world. For example, originally, Euroscepticism was associated with the left in the UK, but then it shifted to the right, while still being present in some parts of the left.

management of uncertainty and threats that predict political orientation. While endorsing conservative opinions is positively correlated with the tendency to avoid uncertainty and preference for order and structure, conservative policy stands are negatively related to openness to experience (Jost et al., 2007).

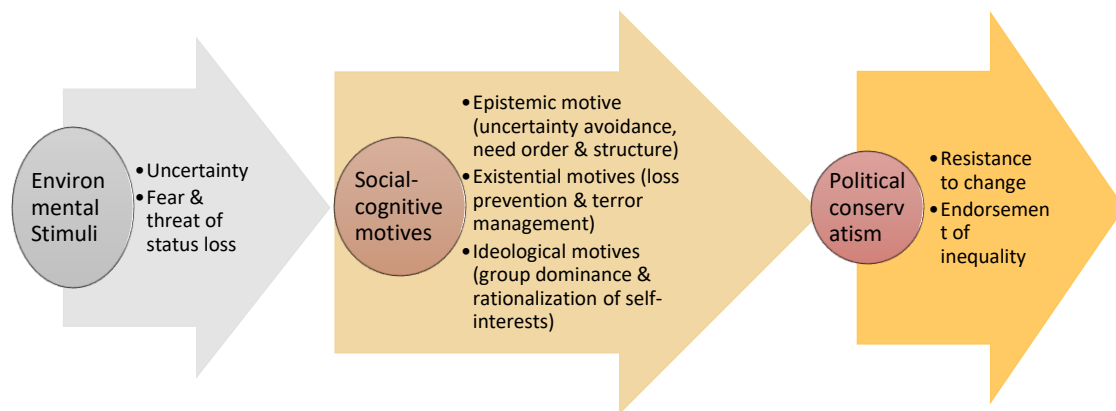


Figure 2: Political conservative model of uncertainty -threats and public goods provision

Note: Simplified version of the integrative model of political conservatism

Do these psychological motives arising from some environmental threats and uncertainty carry any impact on the redistributive public goods provisions? These motives lead to adopting certain beliefs relating to opposing any change and accepting inequality and unfairness to prevail. So, they may choose to spend less on public goods and spend more on private goods since they resist any redistribution activities that are expected to equalize society and eliminate the disparity. Evidence shows that differences in political

stands are built on differences in personalities, the ability to reason things encountered in life, and inspirational needs (Jost et al., 2003, 2007). Conservative supporters perceive this world as a dangerous place as opposed to non-conservative supporters who tend to perceive other ways (Altemeyer, 1998; Duckitt, 2001). Similarly, people who believe in conservative ideologies are less tolerant of ambiguity (Adorno et al., 1950) and support higher-order, structure, and closure compared to people who believe in liberal ideologies (Altemeyer, 1998). On the other hand, they tend to oppose openness to experience (Jost et al., 2003). Terrorist attacks can also increase support for a conservative policy position (Bonanno & Jost, 2006; Nail & McGregor, 2009; Ullrich & Cohrs, 2007). Therefore, these psychological motives arising from demographic shifts should influence the provision of the public good negatively as part of their overall support for conservative policy stands.

To measure this prototypicality threat from demographic shifts, I have developed a simple measure to reflect the relative rate of the non-White population to White population change over time as shown in equation (1). MM_{it} represents the demographic shift or changes from a White majority condition to a majority-minority condition in state i for year t . $Non - white population_{it}$ stands for the percentage of non-White population in state i for year t . The non-White population group includes populations from Black, Hispanic, Asian, American Indian, and others that are self-identified as that they do not belong to White ethnicity. $White population_{it}$ stands for a share of the population who identify themselves as that they belong to White ethnicity in state i for year t . This is a simple equation but captures an important intuition. If the numerator on the right-hand side of the equation (1) increases at a higher rate than the denominator the value on the left-hand side

increases, and this should pose a threat to the White ethnic group that they are going to lose their prototypicality status over time.

$$MM_{it} = S\left(\frac{Non-white\ population_{it}}{White\ population_{it}}\right) \dots\dots\dots (1)$$

2.2. Ethnic fractionalization and public goods provision

Demographic shifts in the USA are making the country more diverse and the White majority group is standing against diversity and multiculturalism, so the impact of these changes may manifest into public goods provisions through diversity channels. Theories of diversity suggest that diversity has many economic and non-economic consequences. Diversity can influence economic performance both positively and negatively depending on what arguments hold in some economies while it may not hold in others. In general, diversity can be a positive force if it is complementary to the production process through a diversity of ideas, skills, experiences (Alesina et al., 2016), and a variety of product demands and networks to extend markets (Dixit & Stiglitz, 1977). This positive impact of diversity is conditioned by economic development and democracy²⁵. Ashraf and Galor (2013) studied genetic diversity and found that genetic diversity is the cause of ethnolinguistic heterogeneity and is in an inverse u-shaped relationship with income per capita across economies. However, documenting the positive effect of ethnic diversity has been always challenging in the literature.

Diversity can also be a negative force if diversity creates disagreements on public policies and generates conflicts and animosity among ethnic groups (Alesina et al., 2003;

²⁵See Alesina and La Ferrara (2005) for a survey on these literature.

Collier, 2000; Easterly & Levine, 1997). In the empirical literature, the adverse effects of ethnic fractionalization are dominating. Many scholars of the existing literature claim that diversity is bad for public goods provisions (Alesina et al., 1999; Banerjee et al., 2005; Luttmer, 2001), tax morale (Belmonte et al., 2018; Xin Li, 2010), redistribution (Desmet et al., 2009), community participation (Alesina & La Ferrara, 2000), conflict resolution (Desmet et al., 2017), fiscal governance (Siddique, 2021), and economic performance (Alesina et al., 2003; Easterly & Levine, 1997; Patsiurko et al., 2012) both directly and indirectly with few exceptions where some scholars argued that diversity can be good at certain conditions and bad at others (Collier, 2000).

Why ethnic diversity should affect public goods provision negatively is based on some micro-foundations. Firstly, human beings feel higher positive utility to the well-being of people from their own groups they identify themselves with. On the other hand, they show higher negative utility when well-being belongs to people who do not identify themselves with their own groups (Shayo, 2009; Tajfel et al., 1971). This is different from nationalistic sentiments where when an individual person identifies himself/herself with a group and when the same individual is proud of his/her national identity, tends to oppose redistribution (Shayo, 2009). While group participation is considered an indicator of group contribution, an individual's utility from participating a group increases as the share of group members of his/her own type increases and his/her utility decreases as the share of group members of different types increases (Alesina & La Ferrara, 2000). Secondly, different ethnic communities may show different preferences for what public goods should be more available, when, where, how much, and their desired combinations. Such

systematic differences in their preferences are rooted in their history, custom, and geography (Kimenyi, 2006). These differentiated preferences may increase collective action and coordination problems, and thus, results in lower public goods provisions. For example, some ethnic groups may advocate their language to be the official language of instructions (Easterly & Levine, 1997, p. 1214; Siddique, 2021).

3. Should diversity be accused of lowering public goods provisions?

Empirical literature that supports the notion that ethnic fractionalization undercuts public goods in society did not provide any causal evidence but an association. On the other hand, many scholars have been upfront to refute some of this conclusion. Gisselquist (2014) rerun the analysis conducted by Alesina et al. (1999) between public goods and ethnic fractionalization in the USA and concluded that their claims are valid when omitted variables biases are addressed. Gisselquist utilized the same data as the Alesina et al.'s conclusion is based. Wimmer (2016) also argued that the relationship between public goods and ethnic diversity has not taken contemporary state capacity into consideration, which has been weakly formed on traditionally attained levels of state centralization and is strongly related to their ethnic fractionalization, and therefore, such relationship between public goods and ethnic diversity has been inaccurately presented. Moreover, the past literature that shows a link between ethnic heterogeneity and public goods provisions has not explained the very micro-foundation of why the own group biases exist (Alesina et al., 1999; Desmet et al., 2017; Orr, 1976; Poterba, 1997; Ribar & Wilhelm, 1996). There is no denying that the own group preferences or biases may transform the differences in racial diversity into differences in public goods provision. However, it is more important to detect

the factors that lead to the existence of these biases than perhaps been imprecisely indicting that ethnic fractionalization causes lower public goods provisions.

It is perhaps not the ethnic diversity that causes lower public goods provision but some other factors, such as threats to the prototypicality that arises from demographic changes and economic and social inequality across ethnic groups, that undermine the lower public goods provisions. However, the impacts of prototypicality threats and inequality across ethnic groups are probably channeled through diversity. Therefore, diversity may not be the cause but one of the mechanisms. Habyarimana et al. (2007) worked on why ethnic heterogeneity undermines public goods supply and they identified three groups of mechanisms that relate ethnic diversity with public goods supply. They are called preference (group loyalty and negative exposure effect), technology (mutual findability in social networks and punish non-compliance), and strategy selection (sanctions) mechanisms. They conducted this experimental study for 300 random samples drawn from a slum neighborhood of Kampala in Uganda. While they found evidence for co-ethnics play a cooperative role in public goods provision in a homogeneous society through strategy selection and technology, they did not find any evidence for the most discussed mechanism of preference that emphasizes the homogeneity of tastes and higher altruism within groups and heterogeneity of tastes and less altruism across ethnic groups. Therefore, it is likely that popular literature did not correctly address the mechanisms.

It may not be the ethnic diversity that causes lower public goods provisions but the inequality of poverty distribution among the ethnic groups. Ethnic diversity should matter more when different ethnic groups are under different economic conditions. Contrarily, if

there are no significant socio-economic distinctions among the ethnic groups, diversity may not be a problem for public goods provisions. This is because if a higher number of welfare recipients or public goods consumers are perceived to be from the poorer minority groups, relatively richer ethnic groups may deny contributing more to such public and welfare goods and divert resources for private consumption and vice versa so that they can prevent consuming higher proportions by people from out of their own ethnic groups. A simple diversity measure, which is often defined as the measure of the likelihood that randomly drawn people from a city, county, metropolitan, or state belong to distinct groups, does not account for the micro-foundation of the *negative exposure effect*. The most common way to define diversity is the ethnic fractionalization index as a measure of ethnic diversity (Alesina et al., 1999; Siddique, 2021). It considers the population distribution by race as in equation (2):

$$Ethnic = \{1 - \sum_{s=i}^s (Race_i)^2\} \dots\dots\dots (2)$$

Where $Race_i$ represents the share of the population who self-identify as they belong to race i . These races include White, Black, Hispanic, Asian and Pacific Islander, American Indian, and Others. So, the existing literature which utilizes this ethnic fractionalization index does not account for if there are any significant economic and social differences across ethnic groups, other than the ethnic diversity, that should play a major role in limiting public goods provisions. In other words, the conventional measures of diversity cannot account for this important distinction between diversity and inequality in diversity. Therefore, I propose the inequality in the diversity index in order to capture the *negative exposure* and *group loyalty effect* as shown in equation (3). Equation (3) should capture

the notion that individuals decrease their support for public goods provision when the number of users increases not from their own group (negative exposure effect) and individuals increase their support for public goods provisions when the number of users increases from their own racial group (racial group loyalty effect)²⁶.

$$InqDiversity_{it} = S\left(\frac{NonWpoverty_{it}}{Wpoverty_{it}} \times \frac{NonWpopulation_{it}}{Wpopulaiton_{it}}\right) \dots\dots\dots (3)$$

In equation (3), *InqDiversity_{it}* stands for inequality in poverty distribution between White and non-White populations weighed by their relative population rate (the economic status difference between White and non-White groups) in state *i* for year *t*. The first term on the right-hand side is the relative poverty rate between the White and non-White population. If the poverty rate increases for the non-White population, *NonWpoverty_{it}*, at a rate higher than the poverty rate for the White population, *Wpoverty_{it}*, the value for the inequality in diversity should increase as well. Inequality in the diversity index will also increase if the size of the non-White population, *NonWpopulation_{it}*, increases at a higher rate than the size of the White population, *Wpopulaiton_{it}*.

An important distinction between the conventional measure of ethnic diversity and this inequality in diversity measure is that the new measure incorporates the relative economic well-being conditions between White and non-White populations. While considering the effect of the heterogeneous nature of a society on its public and welfare goods provisions, such heterogeneity must represent whether the minority communities are relatively better off or worse off relative to the majority. In other words, in addition to more people from

²⁶ See Luttmer (2001) for more about the group loyalty effect.

other ethnic groups, relative economic conditions of the minority groups should influence the decision of majority groups whether to provide more public goods or not. For example, assume that there are only three ethnic communities such as White, Black, and Hispanic. White is the majority group and Black and Hispanics are the minority groups. The poverty rate among the Black and Hispanic people is 5 to 10 times higher than that of the White majority depending on the state. Therefore, public goods expenditure may be perceived by the White majority that the Black and Hispanic people are the net receiver, or at least they tend to perceive that Black and Hispanic people will consume a higher proportion of public goods provided. If this is true, White people tend to decide to allocate a lower amount of public goods and divert more resources for their private consumption. On the other hand, let's assume that there are only two ethnic groups in the USA: The White majority and the Asian minority. In terms of economic well-being measures, such as poverty, the Asian community is almost as better off as the White majority. In some states, the poverty rate is lower among Asians than Whites. In that case, the White majority has less or no incentives to divert more resources for private consumption and less for public consumption as both the ethnic groups are equal contributors and consumers of public goods. No one should perceive that an ethnic group may consume more public goods than others. So, if there is more than one minority group who is better off than the majority group, this situation should not be different where the White majority has no negative incentive to provide more public goods. Therefore, it is likely that it is not the ethnic diversity that leads to lower public goods provision, but the presence of relative economic differences such as higher level of poverty in some ethnic groups than others plus the relative size of poverty-prone

ethnic groups that causes lower public goods provisions. However, this is to be true we should not find any significant negative effect for a measure of ethnic fractionalization from equation (2) but find a negative statistically significant effect for inequality in diversity from equation (3)²⁷.

There are also possibilities that ethnic diversity may influence public goods provisions positively since ethnic groups can minimize the costs of resolving prisoner's dilemma problems. So, diversified societies may have better schools, health systems, and welfare programs. However, these possibilities have not been studied carefully yet. Ethnic diversity may increase public goods provisions through various other possibilities. First, the economic growth channel, if diversity becomes complementary can bring various innovations, skills, and abilities to contribute to higher economic growth. Thus, the government becomes better able to collect tax revenue, and thus, can provide more public goods. Second, a diversified society tends to have more interest groups who may influence government decisions to provide more and better public goods. However, this should lead to the provision of certain public goods more than others depending on the types of public goods the interest groups lobby for which is difficult to isolate. But total public expenditures for public goods provision may increase as a response to the growing demands of various interest groups in the economy. Third, tax limitations mostly favor the White majority groups in the USA. Thus, a relative increase of the share of the non-White population can lead to overall higher tax contributions and that may allow more public

²⁷If we see that diversity has negative impact at individual level analysis but not at policy levels like county or states it means that animosity may exist, but it does not translate into policy effect because of political shyness and median voter theorem does not hold.

goods provisions. The underlying reason for this assumption is that about many States had passed laws to restrict the increase of tax revenues from local properties in the late 20th century. These limits on property tax lower the effective tax rates on properties regardless of owners' ethnic identities, however, such property tax limits aggravate racial inequality since property ownerships are disproportionately higher among the White population. Therefore, the greatest reduction in effective tax rates goes to the White population, such as White homeowners (Martin & Beck, 2017). This is problematic because such tax privileges for estate owners essentially undermine the potential public goods supply.

3.1. Excludable (targeted) versus non-excludable (non-targeted) public goods

Some public goods can be partially excludable or targeted while others are not. Similarly, some public goods are partially rivals while others are not. If the goods are pure public goods that satisfy the conditions of non-excludability and non-rivalry, markets fail to provide them efficiently and sufficiently, therefore, public provision becomes critical²⁸. Partially excludable or partially rival goods are often called impure public goods and are provided publicly as well as through markets, however, markets still produce and provide them inefficiently and in small quantities. Note that governments also fail to provide impure public goods efficiently and sufficiently since policymakers are not entirely benevolent maximizers of social interests, instead they can be motivated by self-interests. Governments also engage in the provision of merit goods such as education due to large positive externalities to communities. Different types of public goods should receive a

²⁸ For example, due to free-rider problems, private provision of non-excludable goods can be very costly and infeasible. Similarly, non-rivalry goods have zero marginal cost to provide to another consumer, implying that goods cannot be divided up and sold in the market.

differentiated response from the racial demographic changes and economic heterogeneity among ethnic groups. Some ethnic groups may consume some public goods more than others because of their different socio-economic situations. If the poverty rate is higher in some ethnic groups, such as Black and Hispanic groups in the USA, the perceived consumption rate of public welfare goods such as Supplemental Nutrition Assistance Program (SNAP)/Food Stamp, Medicaid, Temporary Assistance to Needy Families (TANF), and other would-be higher among Blacks and Hispanics. On the other hand, a relatively richer ethnic group such as Whites may need better roads and highways for their easy commuting as they tend to use more private vehicles. Moreover, many public goods such as health, transport, education, and infrastructure are spatially dependent which means the supply of such public goods disproportionately benefits certain ethnic groups due to housing segregation and geo-ethnicity (Kimenyi, 2006). Similarly, public education at the primary and secondary levels may be consumed more equally by ethnic groups than public education at the tertiary level. This is because dropout rates before tertiary education tend to be higher among the poorer ethnic groups than the richer groups. Richer ethnic groups such as Whites tend to consume a higher proportion of public education at the tertiary level, and thus, may want to allocate more resources for higher education, but other minorities may oppose it. Therefore, due to the conflicting preferences, simple ethnic diversity may lead to undermining the expense of higher education. On the other hand, both poorer and richer ethnic groups may want a higher allocation for elementary and secondary level education since they have fewer conflicting preferences here, thus, ethnic diversity does not hurt spending for elementary and secondary education. However, this does not imply

for White prototypicality threat and inequality in diversity since they are stronger forces in American society and will lead people to consume education more privately and less publicly.

It is expected that prototypicality threats and inequality in diversity should influence more intensely the public goods that are more likely to target poorer ethnic groups and less intensely or even positive impact on the public goods that richer majority groups consume more. Such differentiation of public goods as more excludable versus less excludable should distill the effect of prototypicality threats and inequality in diversity better. If there is any true negative impact of prototypicality threats and inequality in diversity on public goods provision it should be more apparent on targeted public goods that are directed to the poorest segments of the population such as publicly provided welfare goods. This assumption is correct because racial or own group bias among the majority should be more relevant when the majority will be able to perceive who is benefited most from public goods provisions and will divert more resources to private consumption than public consumption. For example, food stamps, targeted public goods, only eligible people can enjoy the benefits. Thus, a state that is experiencing prototypicality threats and inequality in diversity is less likely to budget a bigger share for expenses for welfare goods.

4. Methodology and data

This paper utilizes a strong balanced panel dataset covering data from 2008 to 2019 for all states compiled from various sources and applies a two-way fixed-effect model²⁹. I

²⁹ When each panel in the panel dataset contains the same time point called strongly balanced panel data, otherwise called weakly balanced panel data.

choose the main unit of analysis to be at the state level for at least two main reasons: states are the key administrative unit that decides on the size and types of public goods to be locally delivered and, within states, people are more heterogeneous than other smaller local units like cities and counties. For example, Gerring et al. (2015) said diversity may have undesirable implications on human development in a broader administrative unit like the national) levels government, it may not be the same for smaller administrative units like sub-national government. Therefore, I aggregated publicly available data to the state level for this study. Most economic and population-related data such as population size, demographic characters, citizenship, ethnicity, human capital, GDP, Theil inequality index, poverty, and other related data are from the Census Bureau's American Community Survey (ACS) and the US Bureau of Economic Analysis (BEA). Public expenditures and revenue data are from the National Association of State Budget Officers (NASBO) community. Descriptive statistics are presented in the Table 1. I will estimate the following main equation:

$$Y_{it} = \alpha_0 + \beta_1 White_prototypicality_{it} + \beta_2 Ethnic_Fract_{it} + \beta_3 Ineq_diversity_{it} + \gamma X_{it} + \delta_i + \mu_t + \varepsilon_{it} \dots (4)$$

Where Y_{it} stands for per capita expenditure on public goods in state i for year t . $White_prototypicality_{it}$ is the demographic shift from a White majority to a majority-minority condition in state i for year t , measured by applying equation (1), to capture White prototypicality threats. $Ethnic_Fract_{it}$ is the ethnic fractionalization index measured by applying equation (2). $Ineq_diversity_{it}$ is the inequality in diversity or relative economic heterogeneity across ethnic groups in state i for year t from equation (3). X_{it} is a vector of

time-varying factors that represent various economic, political, and social characteristics of state i for year t including GDP per capita, state population size, inequality level, per capita tax revenue, expenditure, percentage of children under 18, percentage of adults above 65, share of American citizens, and others. δ_i and μ_t are the state and year FEs which should control for all time-invariant factors across states and any unusual time-trends like a crisis, respectively. ε_{it} is the random error term estimating the residual of the model.

Table 1: Data and descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Police expense per capita	500	120.70	169.70	1.45	839.12
Education expense per capita	550	1890.48	587.78	796.53	3717.26
Elementary & secondary education expense per capita	550	1176.50	397.77	409.53	2979.41
Higher education expense per capita	550	713.99	419.96	66.03	1959.67
Public welfare per capita	500	4467.23	7604.82	83.06	38971.30
Non-White to White population (M/M condition)	561	0.55	0.58	0.04	3.86
Inequality in diversity	561	1.12	0.98	0.06	6.89
Ethnic fractionalization	561	0.43	0.16	0.09	0.76
Population (million)	561	6.20	6.98	0.55	39.56
GDP per capita	561	0.05	0.02	0.03	0.18
Theil inequality index	561	0.00	0.00	0.00	0.01
Non worker (%)	561	0.12	0.03	0.05	0.22
Elderly 65plus (%)	561	0.14	0.02	0.07	0.21
Children 0 to 18 (%)	561	0.25	0.02	0.18	0.33
Citizen (%)	561	0.95	0.03	0.85	0.99
Poverty rate (ud.100%)	561	0.14	0.03	0.07	0.24
Revenue per capita	550	2359.56	1279.59	743.92	15285.36
Spending per capita	550	6266.86	2334.94	2777.12	19378.48
High school graduate or higher (%)	561	87.55	3.35	78.90	93.00
Bachelor's degree or higher (%)	561	28.77	5.96	17.10	56.60
Workers are professionals and managers (%)	561	0.38	0.04	0.30	0.59

5. Results

There are rarely any pure public goods in terms of the traditional economic definition which must meet two conditions of non-excludability and non-rivalry. Most public goods are either partially excludable or rivalrous or both. I tested the hypotheses on three commonly identified public goods which may or may not meet the criteria of pure public goods, but they exhibit large positive spillover effects on our society such as police, education, and welfare. While police protection is relatively less excludable than education

and welfare goods. Welfare goods are most excludable compared to police and education since income disparities are strongly related to demand disparities for welfare goods, while police protections are uniformly provided to all citizens except if any discriminatory practice exists. Delegating responsibility of providing these goods to private entities can exhibit a large risk of under provisions and impede equal access to these goods.

5.1. Police protection

Police protection or security is a classic example of public goods, and it generally meets the economic definition of public goods which are non-excludability and non-rivalry. Police protection has also large positive spillover effects on society. Although police protection can both be provided publicly and privately, it is too dangerous to delegate the entire police protection responsibilities to private authorities since private police protection will not uniformly serve the residents. Therefore, providing police protection is an important legitimate function of the government. Table 2 presents regression results on police expenditure per capita at the state level using two-way panel fixed effect methods. Results show that, as hypothesized, ethnic fractionalization has no statistically significant effect on police expenditure per capita but White prototypicality threats and economic differences between ethnic groups (inequality in diversity) are negatively related and statistically significant. The reason ethnic fractionalization does not hurt police spending per capita is that police protection is less redistributive, and all ethnic groups will be willing to cooperate to keep the strong police protection if not the rich White needs more police protection. Therefore, achieving cooperation among ethnic groups is relatively easier than for more excludable public goods where excluded ethnic groups will not be willing to

cooperate. Moreover, police spending is likely to be endogenous to crime rates in the states and ethnic fractionalization is positively related to crime rate (Alesina et al., 1999, p. 1264). Therefore, it may be that the effect of ethnic fractionalization is subject to omitted biases of crime rates although the direct effect of ethnic diversity is negatively related to providing police services.

Moving from a least non-White populated state to most non-White populated states (or a one-point increase on a value range from 0.04 to 3.86 with a mean value of 0.55) can result in a decline in police expenditure per capita by about \$100 on average, which is a large decline for states with average per capita police spending of \$120. Similarly, a one-point increase in the measure of inequality in the diversity of 0.06 to 6.89 can lead to a decline in police spending per capita by about \$3 which seems economically small for states with average per capita police spending of \$120 but can be large for some states with low police spending per capita like less than \$10. These results strongly support our hypothesis in the paper that states respond to White prototypicality threats or majority-minority conditions by reducing public goods provisions, in this case, it is per capita police spending. Similarly, when relative poverty increases among the non-White population and interacts with the non-population size, the states also respond to such a situation by reducing spending on police protection. However, the independent effect of increasing relative poverty among the non-White population is positive and statistically significant on police protection spending, which fits into a standard economic and social explanation of police spending as a response to increasing poverty within minorities (Jackson & Carroll,

1981; Sever, 2001). Note that the overall poverty rate at the state level has no statistically significant effect on police protection spending.

Table 2: Expenditure on police

	Model 2.1	Model 2.2	Model 2.3	Model 2.4	Model 2.5
	Police expenditure per capita	Police expenditure per capita	Police expenditure per capita	Police expenditure per capita	Police expenditure per capita
Ethnic fractionalization	-171.404 (149.073)		-201.529 (146.307)		-163.674 (148.725)
Non-White to White population (M/M condition)		-104.187*** (24.691)	-105.821*** (24.694)		
Inequality in diversity				-2.826* (1.517)	-2.778* (1.517)
State population (million)	1.168 (4.055)	8.496** (4.204)	7.600* (4.249)	3.070 (4.017)	2.242 (4.086)
Theil index	-12,904.112*** (2,718.183)	-13,878.284*** (2,607.382)	-14,879.940*** (2,704.260)	-12,601.743*** (2,629.735)	-13,383.478*** (2,723.357)
GDP per capita	2.462*** (0.607)	2.601*** (0.575)	2.849*** (0.602)	2.361*** (0.581)	2.556*** (0.607)
Non-White poverty to White poverty rate	2.390*** (0.614)	2.266*** (0.602)	2.197*** (0.604)	3.559*** (0.854)	3.487*** (0.857)
Inter-governmental revenue to GDO rate	21.197 (64.516)	10.688 (63.292)	13.922 (63.269)	21.671 (64.333)	24.339 (64.363)
Total revenue to GDP rate	4.573 (10.741)	6.437 (10.335)	3.566 (10.533)	6.964 (10.505)	4.641 (10.712)
Elderly 65plus (%)	533.931 (348.441)	901.954*** (341.164)	808.270** (347.528)	556.447 (341.516)	477.758 (348.839)
Children 0 to 18 (%)	69.565 (338.655)	106.721 (331.368)	150.158 (332.520)	30.094 (336.373)	64.499 (337.740)

Homelessness (%)	15.678 (17.702)	27.030 (17.586)	29.213* (17.639)	12.882 (17.608)	14.507 (17.665)
Citizens (%)	-664.396*** (234.979)	-498.751** (232.911)	-515.135** (232.971)	-621.394*** (234.436)	-637.062*** (234.811)
Poverty (%)	-0.554 (0.804)	-0.647 (0.785)	-0.540 (0.788)	-0.661 (0.798)	-0.573 (0.802)
Workers are professionals and managers (%)	186.803 (127.497)	130.046 (124.922)	146.250 (125.344)	165.194 (126.629)	179.017 (127.219)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	430.593 (301.152)	187.788 (292.787)	264.625 (297.753)	342.770 (294.805)	407.743 (300.587)
R^2	0.21	0.24	0.24	0.22	0.22
N	500	500	500	500	500

Note: Control variables include population size (million), GDP per capita, Theil inequality index, non-worker (%), Elderly 65plus (%), Children 0 to 18 (%), Citizen (%), Poverty rate (under 100%), public revenue per capita, public spending per capita, high school graduate or higher (%), bachelor's degree or higher (%), and workers are professionals and managers (%). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

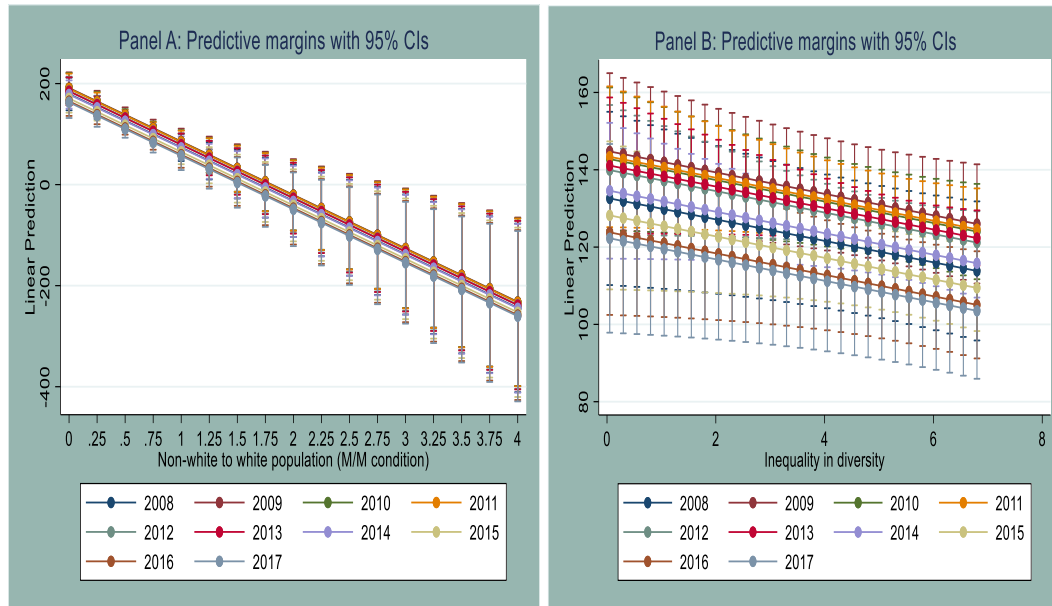


Figure 3: Effects on police expenditure

Figure 3 presents the distribution of effects of White prototypicality threats and inequality in diversity over time. It shows that their negative effects are consistent within states and overtimes on police spending per capita. If states become richer, they spend more on police protection on average, but public revenue and intergovernmental revenue have no statistically significant impact. But states with higher regional inequality represented by the Theil index spend significantly less on police protection. A state with a higher percentage of people who are USA citizens also spends less on police spending than otherwise. Other socio-demographic controls in the model like age groups, professional groups, and homelessness are not significant and consistent determinants of police protection spending per capita.

5.2. Education

Table 3 presents the results on expenditure on public education. Education is not a pure public good in economics language since it is excludable and rivalrous, but it is an important merit good. Education is a public good in the sense that it spillovers significant positive benefits to the public and complete handover of the responsibilities of providing education to private entities can jeopardize people's right to consume education. In the USA, education is both publicly and privately provided goods. Results show that while both non-White to White population (M/M condition) and inequality in the diversity are negatively associated with lower overall education expenditures per capita at the state level, the ethnic fractionalization of Alesina (1999) is not statistically significant (columns 3.1 to 3.4). These results confirm my argument earlier in the paper that ethnic diversity is not the reason for lower public goods but the White prototypicality threats and the inequality in diversity. Increasing non-White population or increasing threats to White prototypicality can explain a large part of heterogeneity in per capita expenditure for public education across and within states. Moving from least non-White populated states to most non-White populated states can lead to a decline in more than \$1200 decline in per capita expenditure for overall public education, which is about 60% down from the mean per capita education expenditure. Similarly, a one-point increase in the index of inequality in diversity, which ranges from 0.06 to 6.89, leads to a decline in education expenditure per capita by about \$147 (columns 3.3 & 3.4).

These results should not be surprising instead these reflect the behavior and support of people translated into policies. For example, recently Ang (2019) found that revising

Voting Rights Act increased minority participation in voting turn out that immediately decreases the share of Democratic votes cast, which was possible by a rightward political shift motivated by Whites' support of Republicans to oppose government assistance for non-Whites. Historically, at the ethnic lines, American education has been either underfunded or suffered from discriminatory institutional arrangements. Before US Supreme Court declares separate education for Blacks and Whites is illegal in 1954, Black Schools were extremely underfunded. After eliminating the racial divide in education, White people diverted education expenses to private provision and significantly limited public provisions for their children. Such White flight to private schools was more discernible in the areas where Blacks were more concentrated (Conlon & Kimenyi, 1991). This was again expanded by the migration of Blacks to White-dominated areas. All caused a sharp decline in public provision of education (Kimenyi, 2006, pp. 82–83). Now underfunding of public education is linked to White prototypicality threats and economic heterogeneity among ethnic groups.

Figure 4 further presents the distribution of the effect of White prototypicality and inequality in diversity on education over time, which visualize that their effects are very consistent – public education expenditure per capita declines as the non-White population relative to the White population and measures of inequality in diversity increase across all years. There is no tendency for larger or smaller states to spend significantly differently on education, but as states become richer it spends more on education on a per capita basis, particularly on elementary and secondary education but not on higher education. Correspondingly, increasing poverty reduces public spending on education. Note that

public income per capita does not significantly determine its per capita education expense, however, when states generally increase their overall expense, it also increases expense in their education sectors.

Columns 3.5 to 3.8 disaggregate the results on education expenditure by separating expenditure in elementary plus secondary education and higher education per capita. The negative effects of White prototypicality threats and inequality in diversity remain consistent in both elementary plus secondary education and higher education expenditure per capita. However, after separating, the effect of ethnic fractionalization turns statistically significant although the direction of the effects differs depending on whether education expense is in the higher education sector or elementary plus secondary education sectors. While ethnic diversity increases public education expenditures per capita in elementary plus secondary sectors, it reduces in the higher education sectors. This differing direction of the effect of ethnic diversity goes against what group loyalty effects and negative exposure effects suggest since elementary plus secondary education is less excludable than higher education.

Table 3: Effect on public education expenditure

	Model 3.1	Model 3.2	Model 3.3	Model 3.4	Model 3.5	Model 3.6	Model 3.7	Model 3.8
	Education expense per capita	Education expense per capita	Education expense per capita	Education expense per capita	Elementary & secondary education expense per capita	Elementary & secondary education expense per capita	Higher education expense per capita	Higher education expense per capita
Non-White to White population (M/M condition)	-1,242.654***	-1,258.098***			-641.919***		-616.179***	
	(206.436)	(209.622)			(149.227)		(151.692)	
Inequality in diversity			-146.916***	-146.275***		-73.230**		-73.045**
			(50.131)	(50.188)		(35.263)		(35.778)
Ethnic fractionalization		-434.485		498.387	2,551.568***	3,028.278***	-2,986.054***	-2,529.891***
		(995.712)		(1,009.305)	(708.834)	(709.162)	(720.545)	(719.523)
Population (million)	23.969	22.218	-28.693	-25.905	12.973	-11.605	9.245	-14.300
	(26.700)	(27.023)	(25.777)	(26.409)	(19.237)	(18.555)	(19.555)	(18.826)
GDP per capita	13,456.794***	13,695.407***	10,064.063**	9,829.527**	13,797.754***	11,833.804***	-102.347	-2,004.276
	(4,526.651)	(4,563.387)	(4,645.779)	(4,673.671)	(3,248.612)	(3,283.833)	(3,302.287)	(3,331.807)
Theil inequality index	-47,102.939***	-48,773.580***	-35,819.790**	-34,074.704**	-10,774.181	-3,261.758	-37,999.398***	-30,812.946**
	(16,294.807)	(16,752.056)	(16,624.041)	(17,008.467)	(11,925.556)	(11,950.555)	(12,122.597)	(12,125.145)
Non worker (%)	2,798.662**	2,756.364**	2,697.956**	2,743.225**	1,725.638**	1,723.526**	1,030.725	1,019.699
	(1,172.461)	(1,177.456)	(1,214.562)	(1,218.980)	(838.215)	(856.484)	(852.064)	(868.997)
Elderly 65plus (%)	-1,556.569	-1,963.360	-1,272.267	-814.930	5,941.264***	6,532.950***	-7,904.626***	-7,347.882***
	(2,334.772)	(2,515.855)	(2,403.212)	(2,577.287)	(1,791.002)	(1,810.864)	(1,820.595)	(1,837.319)
Children 0 to 18 (%)	6,059.529**	6,013.226**	7,156.211***	7,193.812***	4,149.095**	4,751.402***	1,864.130	2,442.409
	(2,430.029)	(2,434.412)	(2,491.516)	(2,494.660)	(1,733.024)	(1,752.808)	(1,761.658)	(1,778.415)
Citizen (%)	564.133	408.382	-759.859	-563.232	1,786.546	1,291.962	-1,378.164	-1,855.195
	(2,201.460)	(2,232.058)	(2,253.794)	(2,290.466)	(1,588.971)	(1,609.336)	(1,615.225)	(1,632.847)

Poverty rate (ud.100%)	-2,203.699**	-2,155.613**	-3,007.243***	-3,048.659***	129.498	-328.431	-2,285.110***	-2,720.227***
	(1,081.095)	(1,087.613)	(1,100.197)	(1,104.262)	(774.256)	(775.881)	(787.049)	(787.216)
Revenue per capita	-0.001	-0.001	-0.003	-0.003	-0.013*	-0.014*	0.012	0.011
	(0.010)	(0.010)	(0.010)	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)
Spending per capita	0.083***	0.084***	0.078***	0.078***	0.030***	0.026***	0.054***	0.051***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)
High school graduate or higher (%)	-8.551	-11.319	8.861	11.686	-14.167	-2.328	2.849	14.014
	(17.024)	(18.180)	(17.211)	(18.150)	(12.942)	(12.752)	(13.156)	(12.939)
Bachelor's degree or higher (%)	-81.601***	-79.112**	-49.030	-52.537	16.834	30.569	-95.946***	-83.106***
	(31.431)	(31.971)	(31.757)	(32.567)	(22.760)	(22.882)	(23.136)	(23.216)
Workers are professionals and managers (%)	-672.294	-677.420	334.496	327.332	-726.890	-215.511	49.470	542.842
	(904.830)	(905.677)	(919.328)	(920.174)	(644.739)	(646.536)	(655.392)	(655.982)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2,315.587	2,875.651	711.529	108.241	-3,176.177	-4,604.800*	6,051.831**	4,713.045*
	(3,224.715)	(3,473.310)	(3,316.529)	(3,536.880)	(2,472.601)	(2,485.096)	(2,513.455)	(2,521.402)
R ²	0.50	0.50	0.47	0.47	0.41	0.40	0.39	0.37
N	550	550	550	550	550	550	550	550

Note: Control variables include population size (million), GDP per capita, Theil inequality index, non-worker (%), Elderly 65plus (%), Children 0 to 18 (%), Citizen (%), Poverty rate (under 100%), public revenue per capita, public spending per capita, high school graduate or higher (%), bachelor's degree or higher (%), and workers are professionals and managers (%). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

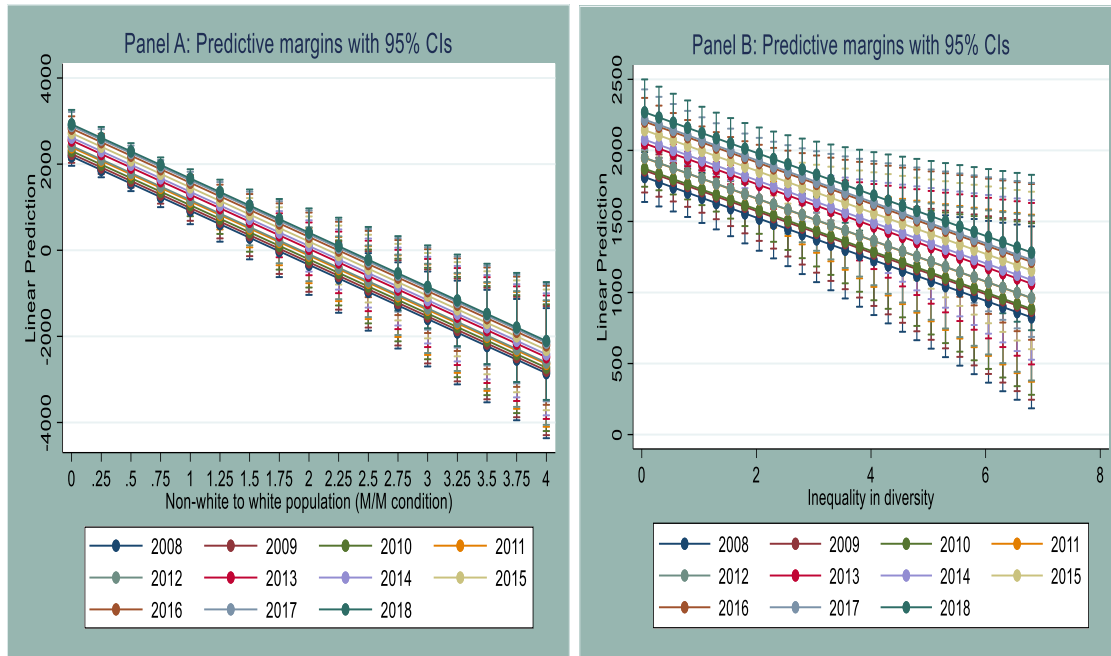


Figure 4: Effects on education expenditure

However, an alternative and interesting explanation can be drawn from these results in the form of the club goods model of ethnic provisions. People from across ethnic groups but with homogeneous interests are more likely to cooperate in providing excludable club goods than the same people with heterogeneous interests (Kimenyi, 1998). The optimal size of such club goods is determined by the membership of the dominant group, which is the White group here, at which marginal costs equal marginal benefits. If non-White groups cooperate with the dominant White group, the cost of providing collective goods where they have common interests should considerably decline. In other words, ethnic fractionalization can relatively easily solve the problem of prisoner's dilemma and reduce the costs of cooperation. Otherwise, if non-White ethnic groups do not cooperate on their heterogeneous interests with the White group, the cost of providing such goods should

increase. For example, consider a situation where White and non-White groups with a preferred level of education expense in higher and elementary plus secondary education with bimodal distribution as shown in panel A in Figure 5. This is further demonstrated in panel B in Figure 5 with actual educational attainment data where a higher share White population has bachelor's and graduate degrees, and a higher share of the non-White population has high school or less education. The non-White population has higher dropout rates in early education, and therefore, they consume less higher-level education than their white counterpart. While White has a higher preference for higher education expense, it does not mean they have limited support for lower-end education. Therefore, both the White and non-White groups are likely to agree on spending more on early childhood education than spending on tertiary education. That's why we see a positive and statistically significant coefficient of ethnic diversity on education expenditures per capita in the elementary and secondary sectors but a negative and significant coefficient for the higher education sector. So the claim earlier literature made about the effects of ethnic diversity on public goods provision due to the negative exposure effect is difficult to confirm from these results on education goods (Miguel, 2001), but these results provide evidence that the club goods model of ethnic provisions.

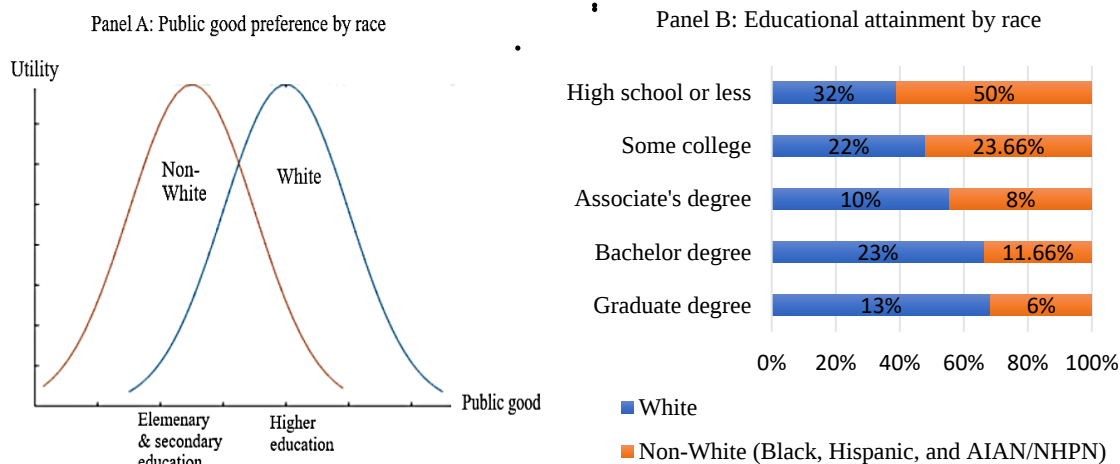


Figure 5: Preference for education and actual educational attainment by race

Note: Data for panel B are from the US Census Bureau, American Community Survey (ACS), 2013-17 pooled. Non-white data includes only Black, Hispanic, & American Indian, Alaska Native, Native Hawaiian, & Pacific Islander (AIAN/NHPN) and excludes Asian and Others categories. Asians have even higher educational attainment than White, so their preferences are expected to be close to White.

5.3. Welfare

Public welfare has also been commonly labeled as public goods although it is not a pure public good for the same reason as education is not a pure public good. However, like public education, public welfare carries positive externalities to our society. Table 5 reports the regression results on public welfare expenditures per capita at the state level with two-way fixed effects estimations. Data for public welfare expenditures combine several cash assistance programs including TANF, Supplemental Security Income, Medicaid, and other payments made directly to individuals and service providers. Interestingly, all three variables of interest – White prototypicality threats, inequality in diversity, and ethnic fractionalization are negatively associated with public welfare expenditure per capita, and they are statistically highly significant. These results support both the hypotheses made in

this paper as well as hypotheses made in the earlier literature. While one unit increase in the inequality in diversity can lead to a decline in the public welfare expenditures per capita by about \$195, one unit increase in the majority-minority condition (equivalent to moving from a least non-White populated state to most non-White populated states) can lead to a decrease by about \$3,450 (model 4.1 & 4.2). Likewise, moving from a complete homogeneous state to a fully heterogeneous state can lead to a decline in public welfare spending per capita by more than \$18,000. Interestingly, while increasing non-White poverty to White poverty independently increases public welfare spending, however, when it interacts with increasing non-White population it shows a negative influence on public welfare spending per capita. But overall poverty rate does not affect public welfare spending. An increase in GDP per capita and public revenue to GDP ratio are both associated with higher public welfare spending per capita, but demographically aging states spend less on public welfare.

Table 4: Effects on per-capita welfare expenditure

	Model 4.1	Model 4.2	Model 4.3	Model 4.4	Model 4.5
	Total welfare expenditure per capita	Total welfare expenditure per capita	Total welfare expenditure per capita	Total welfare expenditure per capita	Total welfare expenditure per capita
Non-White to White population (M/M condition)	-3,448.738*** (986.258)			-3,606.716*** (975.664)	
Inequality in diversity		-195.215*** (59.719)			-190.024*** (59.155)
Ethnic fractionalization			-18,454.332***	-19,481.073***	-17,925.591***
State population (million)	504.913*** (167.925)	302.470* (158.699)	(5,858.866) 192.117 (159.229)	(5,780.732) 416.772** (167.791)	(5,798.442) 209.862 (159.388)
Theil index	-238,638.225** (104,149.991)	-215,295.75** (103,521.465)	-268,122.549** (106,829.860)	-335,464.78*** (106,847.833)	-300,911.36*** (106,177.249)
GDP per capita	61.938*** (22.954)	57.801** (22.869)	72.749*** (23.849)	85.941*** (23.773)	79.212*** (23.679)
Non-White poverty to White poverty rate	25.305 (24.055)	108.160*** (33.632)	25.210 (24.135)	18.637 (23.852)	100.231*** (33.399)
Intergovernmental revenue to GDP	-4,784.075* (2,528.139)	-4,300.813* (2,532.514)	-4,223.525* (2,535.622)	-4,471.457* (2,499.817)	-4,008.587 (2,509.352)
Total revenue to GDP	2,057.255*** (412.832)	2,073.156*** (413.522)	1,814.101*** (422.159)	1,779.788*** (416.152)	1,818.719*** (417.640)
Elderly 65plus (%)	-42,245.535*** (13,627.563)	-55,876.18*** (13,444.047)	-60,651.926*** (13,694.396)	-51,301.624*** (13,731.138)	-64,494.185*** (13,600.398)

Children 0 to 18 (%)	10,960.962 (13,236.255)	8,298.440 (13,241.558)	12,412.949 (13,309.807)	15,159.817 (13,138.169)	12,066.444 (13,167.672)
Estimated homelessness (%)	570.772 (702.449)	62.392 (693.140)	320.459 (695.727)	781.785 (696.920)	240.414 (688.725)
Citizen (%)	9,065.177 (9,303.444)	5,979.705 (9,228.763)	2,394.125 (9,235.118)	7,481.396 (9,204.888)	4,263.767 (9,154.710)
Poverty rate (%)	-30.310 (31.365)	-31.337 (31.422)	-20.422 (31.602)	-19.940 (31.144)	-21.764 (31.266)
Workers are professionals and managers (%)	-12,506.411** (4,989.916)	-11,604.271** (4,984.836)	-9,557.806* (5,010.878)	-10,939.988** (4,952.477)	-10,090.408** (4,959.973)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Constant	3,170.970 (11,695.165)	7,576.416 (11,605.219)	16,255.215 (11,835.870)	10,598.521 (11,764.481)	14,692.230 (11,719.187)
R^2	0.41	0.41	0.41	0.43	0.42
N	500	500	500	500	500

Note: Control variables include population size (million), GDP per capita, Theil inequality index, relative poverty between White to non-White population, Fulltime employment (%), Elderly 65plus (%), Children 0 to 18 (%), Citizen (%), Poverty rate (under 100%), intergovernmental revenue (thousand), and homeowners (%). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

It is not easy to understand American welfare spending without understanding its racial stereotypes as not easy to understand other ethnically diverse African economies. Public welfare recipients are disproportionately distributed among the non-White population in the USA. Therefore, achieving cooperation from the White population to decide on spending for generous public welfare is costly and unlikely to materialize. That's why not only White prototypicality threats and economic heterogeneity at ethnic lines hurt public welfare spending per capita but also the ethnic fractionalization of the USA. As mentioned earlier in this paper, such adverse consequential effects of ethnic institutions on public welfare spending occurs through individuals' preferences. Martin Gilens (1999) wrote in his book *Why Americans Hate Welfare* that people perceive welfare in the country through a complex mixture of skepticism, empathy, misinformation, and racially propelled feelings. These individual-level supports eventually form the aggregate relationship between ethnic institutions and welfare spending as portrayed by the conventional political economy mode of median voter theorem.

When the poverty rate is higher across the ethnic lines, the perceived rate of welfare recipients is likely to be higher in other ethnic groups than in their own ethnic group, which triggers their own group biases further. Therefore, rising economic disadvantages among people from other ethnic groups pushes to introduce less generous welfare policies at the state level. Similarly, when the non-White share of the population increases relative to the White share of the population, White people encounter prototypicality or status threats, and therefore, they become antagonists to non-White people, particularly non-White immigrants. As a result, States that are going through such prototypicality threats introduce

less generous welfare programs and policies. Therefore, the intermediation of this effect on welfare spending per capita is people's support or preferences for redistribution, for example, Lind (2007) reported based on the General Social Survey (GSS) from the USA that higher group antagonism reduces self-reported support for redistribution by the rich White groups but increases self-reported support by the poor Black groups.

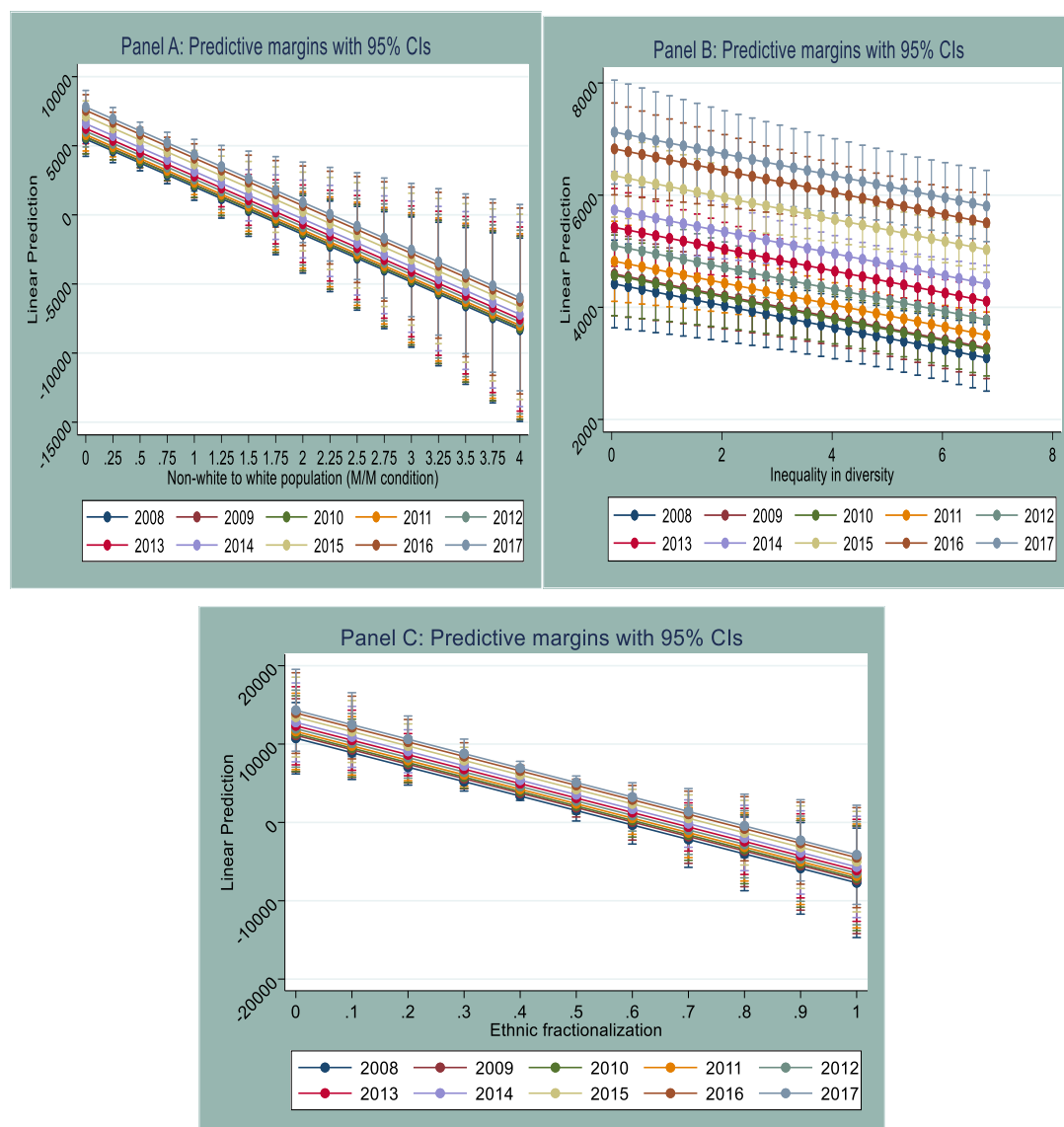


Figure 6: Effects on welfare expenditure

The other ethnic groups demonstrated on average more support for redistributive efforts than the Whites. Lind (2007) also reported that higher economic inequality between ethnic groups lowers welfare service supports but higher within ethnic economic inequality increases it. This is because people's utility is higher when they observe their groups are relatively better off than other groups. Therefore, a society with higher ethnic fractionalization, higher economic differences between ethnic groups, and any perceived status threats for the majority by the minority are significant barriers to developing policies that aim to benefit the poor.

6. Conclusion

This paper finds that ethnic institutions matter for public goods, however, the influences of ethnic institutions on public provisions are not straightforward and markedly contextual. While the effect of ethnic diversity on public goods is either statistically insignificant or inconclusive for less excludable public goods such as police protection, its effect on more excludable public goods depends on whether there is a common ground of shared interests: homogenous interests across ethnic lines fosters cooperation among ethnic groups leading to an increased supply of that good but heterogenous interests impedes cooperation leading to a decreased supply. However, ethnic fractionalization is unambiguously detrimental to welfare goods provision which has also been predicted by much of the earlier literature (Stichnoth & Van der Straeten, 2013). However, the relationship between ethnic fractionalization and public goods provisions is not likely an even relation, ethnic fractionalization matters the most when there are unusual economic

disparities at the ethnic lines and when ethnic minority groups pose a systemic threat to majority groups. The effect of economic inequality across ethnic groups and White prototypicality threats on both more excludable and less excludable public goods provisions are negative and statistically highly significant.

The evidence and understanding that this paper produces about the consequence of ethnic institutions on public and welfare goods provisions partially tell us why the USA has not progressed, even after being one of the wealthiest countries, to a welfare state like its European counterparts. It also partially tells us why the USA spends more on social security programs, which transfers more incomes to the middle class, and spends less on social welfare programs that serve the bottom class more. When a country like the USA is heavily fractionalized has to choose one of the two potential paths to grow: either adopt a small government system that does little to no redistribution or allocate space by ethnic groups and adopt different nation-building processes for each ethnic group separately. While the former is not practical for the USA, so it chooses to be one country with a small government. We never know what could happen in the long run. Developing a further understanding of the implications of ethnic composition on distributional consequences in the USA is important for future policy interventions. This paper provides some new evidence to such long debates around the line of ethnic diversities and redistributions, particularly and newly about how economic inequality between ethnic groups and demographic shift to a majority-minority condition that pose prototypicality threats to White majority matter for the well-being of the Americans. While ethnic diversity generally brings positive economic growth to an economy as existing literature claims

(Alesina & Ferrara, 2005), it comes with distributional problems by limiting provisions of redistributive public and welfare goods. Since ethnic composition is a built-in character of our society and as we understand the adverse effect of ethnic composition, we must take effective reforms and redistributive policy actions to fully capitalize on the benefits of ethnic diversity.

Identifying this relationship between ethnic institutions and public goods has been possible in this paper because racial groups in the USA are spatially scattered and the public goods are mostly distributed locally, so they are regionally heterogeneous, and they also vary over time. However, to interpret these results as partial causal effects of ethnic institutions on public goods provision is conditional on several assumptions. All measures of ethnic institutions including rising ethnic diversity, White prototypicality threats, and changing economic heterogeneity among ethnic groups are not influenced by any changes in the provisions of the public goods. For example, if a state's generous welfare policies attract more low-income minorities to relocate to that state that could potentially change the ethnic compositions will generate biases in the results. Similarly, while these estimations control for many potential covariates along with time and state FE, there are still possibilities that some time-variant factors can be omitted which could potentially lead to both underestimation and overestimation of the coefficients of ethnic institutions. Moreover, there could be measurement errors, particularly with the ethnic institutions due to the undocumented population who are not likely to be covered in government-administered surveys such as ACS. Similarly, for example, welfare spending should ideally include Earned Income Tax Credit (EITC) since it is redistributive and welfare-improving

but general welfare spending at the state level does not include them. Nevertheless, it is unlikely that our conclusions will be invalid due to any of these biases given the various robustness checks and such a strong association between the ethnic institutions and public goods provisions.

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PAPER NO. 3

Poverty in the USA: The Role of Job Market Polarization in Job Quality and Job Distribution

Abu Bakkar Siddique

Abstract:

The article argues that the puzzles of stagnating poverty rates amidst high growth and declining unemployment in the USA can be explained significantly by polarized job markets that occurred in job quality and job distribution. In recent decades in the developed world, particularly in the USA, there has been an increased number of poor quality jobs and unequal distribution of jobs. I calculated a measure of uneven job distribution (UJD) which accounts for the distribution of jobs across households, where a higher value of UJD implies there are a relatively large number of households with multiple employed people and households with no employed people. Similarly, poor quality jobs (PQJ) are those jobs that do not offer full-time work. Two-way fixed-effect models estimate that higher UJD worsens aggregated poverty rate at the state level but better job distribution at the household level reduces the poverty. Similarly, while good quality jobs help households escape poverty, poor quality jobs do not. Therefore, this paper suggests that eradicating poverty requires that government should direct labor market policies to be tailored more toward the distribution of jobs from individuals to households and altering bad jobs into good jobs than merely creating more jobs. This paper contributes by elaborating theories of employment and poverty while addressing employment quality and distribution and providing empirical evidence.

Keywords: Job market polarization, job quality, job distribution, poverty, households

JEL: I30, E24, D19

1. Introduction

Poverty in the USA is a threshold measure where people fall into poverty and escape it for distinct reasons. Many consider employment as the primary policy solution to poverty in all forms, which accounts for both falling in and out of poverty (Krishna, 2007; Middleton & Loumidis, 2002; Saunders, 2006)³⁰. In the recent pre-pandemic time, the USA reached its 50-year high in employment and low in unemployment. By many metrics, the job market was doing well (Kelly, 2019). However, poverty in America remained stagnant for many decades (Desmond, 2018). Then what kind of jobs are available? Don't they pay enough to live? Are these jobs unequally distributed?³¹

Higher employment should reduce the poverty rate since poor people derive most of their income and consumption from their work. So, intuitively, work and poverty should be directly linked, meaning higher employment growth should create more opportunities for people and help them escape poverty. However, evidence shows that the relationship between jobs and poverty is not straightforward, and research opinions on how employment and poverty are connected remain widely diverse. Some scholars assume that higher number of individuals are employed means lower level of poverty (Cantillon et al., 2003). Others believe that there is a trade-off between non-subsidized employment and poverty: a higher level of non-subsidized jobs is only possible if allowing

³⁰Standard literature on poverty identified a wide range of factors that are responsible for poverty such as lack of education (Hofmarcher, 2021), industrialization (Kimura & Chang, 2017), technology adoption (Comin et al., 2010), redistribution (Jouini et al., 2018), and others. Read Ravallion (2012), McMillan (2016), and Rosenzweig (2012) for more standard explanation of poverty.

³¹In economics, this is called the productivity-pay gap when economic expansion does not broaden social uplift.

creation of large numbers of low-paid jobs that may not necessarily reduce poverty, rather it may leave more working people in poverty (Kalleberg, 2009, 2011). In other words, when employment growth occurs at the cost of wage reduction it does not eradicate poverty (Gardiner & Millar, 2006; Sloane & Theodossiou, 1996). Poverty reduction may not also be realized if employment growth occurs in sectors that do not accommodate many poor people (Ravallion & Datt, 2002; Satchi & Temple, 2009) and industries that require higher sets of skills (Loayza & Raddatz, 2010) and capital (Siddique, 2016). Moreover, in many societies, poor people cannot afford to be unemployed. Thus, poor people are not necessarily unemployed people (Saunders, 2002; Visaria, 1981). So, the connection between employment and poverty remains elusive and mostly unexplored in the current literature. Therefore, there are fewer evidence-based policy actions in this area, specifically scientific evidence on the relationship between job distribution and job quality and poverty.

Literature that attempted to explain why the poverty rate remained persistent in the USA even after most economic indicators were doing well could not disentangle the puzzle well (Hoover et al., 2004; Hoynes et al., 2006). In this paper, I offer an explanation that poverty remains stagnant even during high employment due to job market polarization, which occurs in its distributions and qualities. If jobs are not distributed evenly across households (UJD) and if available jobs are poor quality jobs that do not offer full-time work (PQJ), it is unlikely that high employment growth can help poor people escape poverty. Job growth in a polarized job market does not benefit jobless households, thus, no improvement occurs in the poverty situation. In recent times in the USA, employment-rich households experienced higher employment growth than

employment-poor households which made the USA job market a more polarized one. In a non-polarized job market where jobs are equally distributed, the unemployment rate at both individual- and household levels should be identical (Gregg et al., 2010).

Likewise, poverty reduction has not been achieved in the USA during the wave of high employment because a large share of the available jobs in the market is of poor quality. The USA has been witnessing a bifurcated job market, and that has significant implications for poverty reduction outcomes and strategies. Since the service sectors started growing and replacing manufacturing sectors in the 1980s, the Americans have experienced an increase in low-quality jobs with less pay, fewer hours of work, no benefits, little room for growth, and high insecurity (Desmond & Gershenson, 2016; Herzenberg et al., 2000; Kelly, 2019). These bad jobs have been offered by almost every sector of the economy as a part of employers' restructuring strategies and affected the daily life of millions of Americans (Kalleberg, 2009, 2011; Newman, 2009). Contrarily, some sectors like technology do not find sufficient application pool to staff their open positions which offer skilled people higher salaries, promotion, advantages, and even equity in the company (Kelly, 2019). These are good jobs with security and other benefits. Economic prosperity fails to reduce poverty if it does not produce enough good jobs (Odhiambo, 2011; Page & Shimeles, 2015). Most jobs that have been recently available are part-time contract jobs that do not come with any health and other benefits. More of these types of poor-quality jobs are increasing the number of working poor and inequality³². The growth of these

³² According to the Bureau of Labor Statistics, in 2016, there were about 7.6 million "working poor" who spent at least half the year either looking for job or working.

PQJs is another possible explanation for the existing higher level of poverty in the USA.

This research paper studies the role of UJD and PQJ on poverty rates in the USA. To estimate their effects, I constructed a longitudinal dataset after merging household-level data with state-level variables and applied a two-way fixed effect (FE) model. The findings indicate that the USA can eradicate poverty by a large margin by redistributing jobs from individuals to households and by transforming bad-quality jobs into good-quality jobs. Policymakers should focus more on transforming existing bad jobs into good jobs and their distribution instead of focusing on creating more jobs. This does not encourage stopping the creation of more jobs but the poor-quality jobs. I also see convincing evidence that a high growth economy and high employment are unlikely to help poor people to escape poverty. The key contribution of this paper is that it provides theoretical foundations on the relationship between UJD, PQJ, and poverty rate supported by fresh evidence.

The next section describes the measures of UJD and its relations with poverty. Section 3 devotes to analyzing the growth of bad jobs and their consequences on poverty. While section 4 presents methods and data, section 5 presents the results. Section 6 concludes the paper.

2. Job distribution and poverty

2.1. Measuring the uneven distribution of jobs (UJD)

UJD refers to the increasing concentration of jobs at individual levels and decreasing at household levels. This polarization measure reflects unequal job distribution between individuals and households as opposed to job polarization in terms of occupation, pay, and

sectors³³. To measure this UJD, I use the polarization measure offered by Gregg & Wadsworth (2008), which is based on the idea of linking aggregated incomes of individuals and households. Consider a population that has individuals $i=1, 2, 3, 4, \dots, P$ and household $h=1, 2, 3, 4, \dots, H$. If $k_h = 1, 2, 3, \dots, K$ individuals live in household h , the total population $P = \sum_{h=1}^H k_h$. If a person residing in household h is not working, the binary outcome $n_{ih} = 1$ and otherwise $n_{ih} = 0$. Therefore, the individual unemployment rate in the population can be expressed as:

$$n = \frac{\sum_{h=1}^H \sum_{i=1}^{k_h} n_{ih}}{P}$$

The household can group the unemployed individual outcome as N set as:

$$N = (\{n_{11}, n_{21}, n_{31}, \dots, n_{k1}\}, \dots, \{n_{iH}, n_{2H}, n_{3H}, \dots, n_{kH}\}).$$

If M is the set of values that account for the share of the population who are not at work for each of the households H : $M = (m_1, m_2, m_3, \dots, m_H)$, where $m_h = \sum_{i=1}^{k_h} n_{ih} / k_h$.

So, the value of m_h is expected to be less than a value of one but greater than zero.

Therefore, the rate of the workless household will be: $WL =$ (number of households with a value of one for m_h/H). Let's consider a small economy that has only two families and each family has two people totaling four people. The economy has only two jobs, which two of these four people can take, so there are two possible alternatives in this economy. First, one person is out of work in each household, $N = \{1,0\}, \{1,0\}$ and $M = [0.5, 0.5]$, second, both working persons belong to one of these

³³ For example, in terms of occupation, job polarization will mean higher growth of jobs in high-wage occupation and low-wage occupation. Eventually, this would lead mid-waged occupational jobs to be wiped out (Jaimovich & Siu, 2020).

two households, leading the other household with no working people, $N = \{[1,1], [0,0]\}$ and $M = [1, 0]$. In this economy, while the unemployment rate will be 50% in both scenarios, the rate of workless households will be not the same. In the first case, the workless household is zero and in the second case, the workless household rate is 50%. Therefore, aggregated individual-level statistics cannot reflect the actual jobs distribution, like the income distribution of an economy. The above example demonstrates the difference in inequality of employment distribution between individuals and households. If jobs are randomly allocated for all individuals, which is a counterfactual and we will never know, should reveal the degree of polarization of job distribution across households in a country. So, the job market polarization in its distribution will be the disparity between the real rate of workless families and the randomly predicted workless household rate. Such difference should account for the extent of households that are jobless than random job distribution.

With the *ceteris paribus* assumption, the probability of fewer people residing with people who are at work is higher in a nuclear family than in an extended family. Considering households are distinguished only based on their size, if the smaller size of families increases, the rate of jobless families will also increase. Therefore, the size of workless households is subject to individual-level unemployment rate and the size of households.

$$UJD_{it} = JL_{it} - JL_{it}^e \dots\dots\dots (1)$$

Where UJD_{it} is the rate of polarization in job distribution in state i for year t . JL_{it} is a fraction of actual workless households and JL_{it}^e is the expected rate of workless families in

state i for year t if jobs are randomly distributed. A counterfactual rate of households with no employed people, WL^e , for every family with k adults can be presented as: $\hat{j}_k = E[J_k|k, n] = n^k$. With random assumption, all individuals k in a household has equal probabilities of being not employed. Thus, the probability of observing an individual adult residing in a household not employed (counterfactual rate) should be identical to the observed unemployment rate at the individual level. Similarly, the likelihood of a family with two-adult being not employed would double the unemployment rate (Gregg & Wadsworth, 2008). Probabilities of equal job distribution should be considered as a benchmark since it has an intuitive appeal identical to the criterion of income equality used in the Lorenz curve. Aggregated counterfactual households with no employed people should then be weighted by the population, (s_k) , of households of size k :

$$\hat{J} = \sum_{k=1}^k s_k \hat{j}_k = \sum_{k=1}^k s_k n^k \dots\dots\dots (2)$$

So, the polarization of job distribution or UJD is the distinction between actual and counterfactual workless families.

$$UJD(n, s_k, j_k) = J - \hat{J} = \sum_{k=1}^k s_k j_k - \sum_{k=1}^k s_k n^k - \sum_{k=1}^k s_k (j_k - n^k) \dots\dots\dots (3)$$

This polarization measure does not carry any normative meaning. A larger UJD value should indicate a more significant percentage of households are workless and a higher inequality of job distribution. Since the number of jobs is limited, positive polarization values can be considered as ‘Matthew effects,’ which reflect the concentration of additional new jobs for those families who are already employed compared to a household where both partners/all members are jobless. On the other hand, negative polarization values should mean there are a smaller number of jobless families than it should be if jobs are randomly

distributed, which can be a form of solidarity. If the expected and actual rates of jobless households are identical, the value for UJD should be a value of zero.

We never know the counterfactual workless household rate. I can consider the individual unemployment rate as a proxy for the counterfactual workless households. However, this will be an extremely conservative measure of UJD since there are more jobs available than the number of families in the country. Consider, for example, each household consists of one individual. If a state has a population of 1 million, it will have precisely 1 million households. If, for example, the unemployment rate of a state is 5%, then the individual unemployment and household worklessness should be the same, which is 5%. Since the number of jobs is fixed at a point in time, a negative or a positive polarization will start occurring when two or more individuals will form a family and whether all of them have a job, or none of them have a job, or one or two of them have a job. If one household has multiple jobholders, that must be at the cost of another family that has no people at work. The value of UJD increases as more households have no jobholders, and other households have multiple jobholders.

For alternative UJD, for example, as reported by the US Census Bureau, there are 326.68 million people in the USA in 2018, and 60% of them are of their working-age, which equals 196.01 million working-age people. The average family size is 2.53, so there are approximately 129.13 million households in the USA. Compared to this number of households, there are about 197.31 million jobs available in the country for 2018. If these jobs are randomly distributed, there should not be a single workless household (Table 1). Taking the percentage of workless households as a measure of UJD will still be a

conservative measure but less conservative than what has been expressed in equation (3). Therefore, I will test the effect of both of these measures of UJD on the poverty rate in this paper. I call this less conservative UJD as UJD-1 and the more conservative UJD in equation (3) as UJD-2.

Table 1: Population, households, and jobs in the USA

Year	Total population (million)	Working-age population	Working-age population (million)	Average family size	Number of households (million)	Number of people employed (million)	Expected workless households
2008	304.09	61%	185.50	2.56	118.79	189.14	None but negative
2018	326.68	60%	196.01	2.53	129.13	197.31	None but negative

Note: Data are from the US Census Bureau, American Community Survey (ACS), World Development Indicators, and the Department of Labor.

Figures 1 and 2 show the variations in UJDs within and across states, respectively. Figure 1 shows a diverging trend between the individual-level unemployment rate and jobless households at states-level from 2008 to 2018. The central concern of this illustration is that the workless household rate (UJD-1) has been rising in most states and stagnant in a few states, while the individual-level unemployment rate has been falling. So, there has been a rising gap between individual and jobless household rates (UJD-1) in all states. This divergence indicates, in the last decades, that the job growth in the USA did not benefit the workless household. States that experienced higher employment growth benefited only individuals or households with already employed people, leading to no improvement in job distributions at household levels but worsened. Such employment growth that mainly benefitted households with already people in work occurred not only in the USA but also

in the UK, Netherlands, and other developed economies (Beer, 2001; Cantillon et al., 2003; Corluy & Vandenbroucke, 2017; Gregg & Wadsworth, 1994, 2003). While the growing gap in employment distribution between households and individuals may raise different problems about labor market performance in the states, the rising workless household rate should carry significant implications for poverty reductions strategies. As mentioned earlier, in the case of the normative world of random employment distribution, the individual-level unemployment rate and jobless families rate should be identical, and similarly, the rate of joblessness at the household level should be equal to zero. Therefore, these numbers in Figure 1 present the degree of UJD in the USA. Even though with excellent job market outcomes at the individual level, the job market outcome at the household level has been deteriorating. In this paper, I hypothesize that this higher UJD may be responsible for higher poverty in the USA.

Figure 2 presents the percentage of jobless families (UJD-1) and individual unemployment rates against the poverty rate across the states for the year 2018. It shows the variations in UJD-1 across states. The individual-level unemployment rate is much lower than the jobless family rate. The UJD is much higher in some states, such as West Virginia, Mississippi, Alabama, Kentucky, New Mexico, Louisiana, and others. UJD is at the lowest level in the state of Utah, Minnesota, New Jersey, Nebraska, Iowa, North Dakota, Wisconsin, Maryland, Colorado, New Hampshire, Connecticut, and others. Interestingly, these states with a higher rate of jobless families are also accompanied by a higher level of poverty rate (Figure 2).

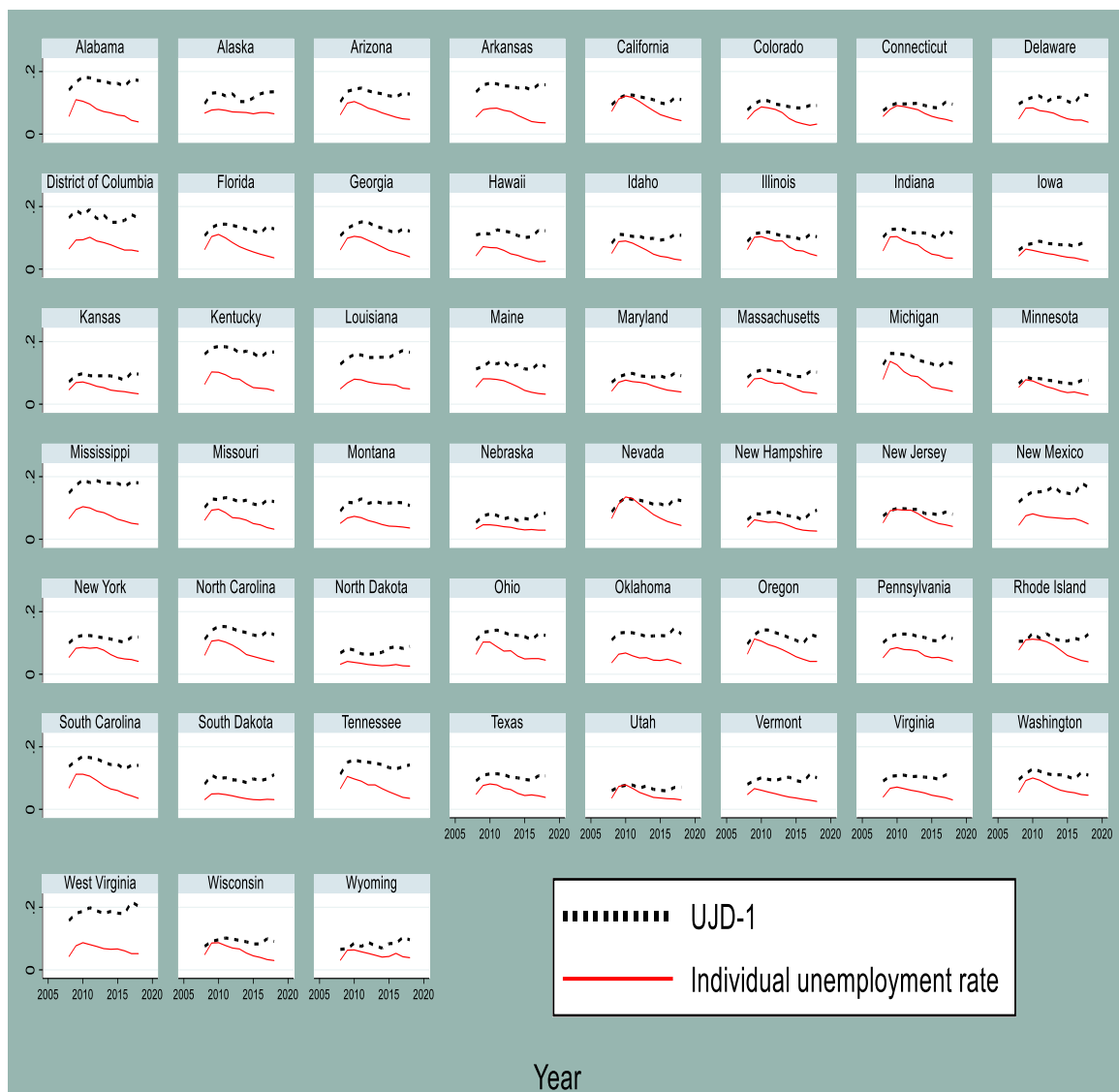


Figure 1: UJD-1 and individual unemployment by states

Note: This was calculated using ACS and BLS data.

2.2. Why family is central to avoiding poverty?

The risk of being poor is uneven in most societies - some groups such as ethnic groups, lone parents, people with disabilities, etc. have higher poverty rates than others. There are

also events such as an illness that pull down people into poverty (Flaherty et al., 2004; Gardiner & Millar, 2006). However, these vulnerable people can potentially avoid being under the poverty threshold by living with other family members and/or receiving state transfer benefits and tax credits. Gardiner and Millar (2006) reported that, in British society, more than 30% of low-paid workers avoid poverty through other family members' income and more than 60% through the income of partners and other adults. However, by working long hours to compensate for their low earnings about 8%, and through combined state transfers, about 13% of low-paid workers can avoid poverty. Living with other people is an important way through which many low-income people prevent the impact of poverty. When all sources of income are placed together, a relatively low-earning individual member of the family can be better off. A single individual, who can earn decent pay, can lift the entire family out of poverty.

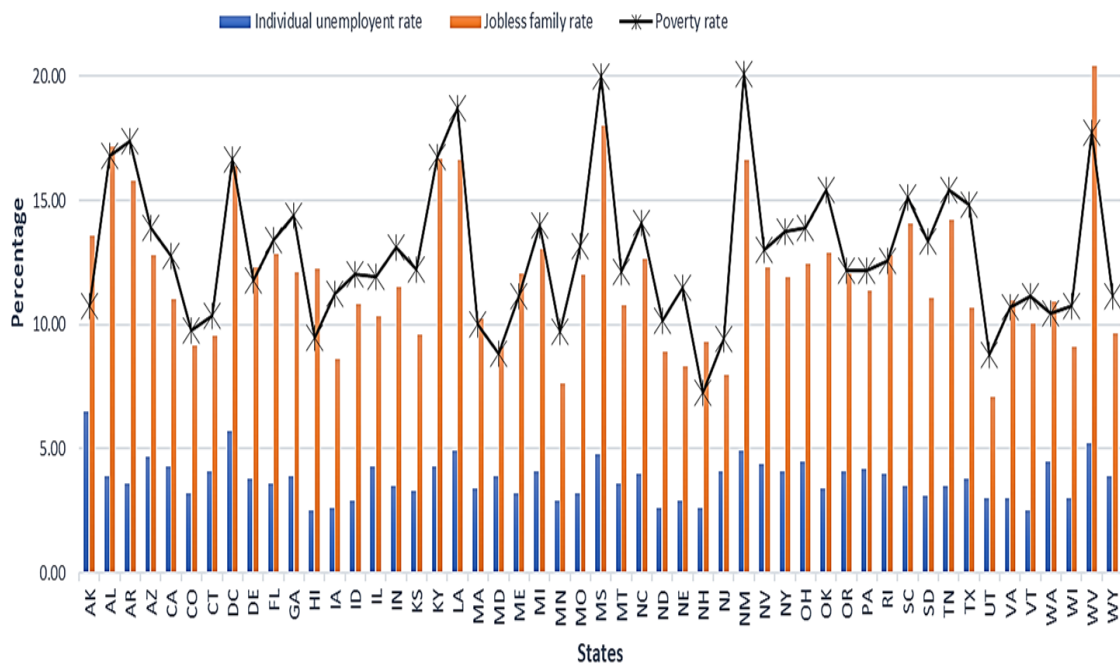


Figure 2: Employment across states for the year 2018

Note: The data sources are ACS and BLS.

Over the last 4-5 decades, family structure has been transformed dramatically in the USA. These changing patterns of the family are characterized by a substantial decline in marriage, a decrease in children born in marriage, and an increase in children born outside of marriage (Cancian & Haskins, 2014; Thiede et al., 2017). Many women have entered the labor market; in contrast, many men have experienced declining employment opportunities, particularly those with lower education over the same time (Binder & Bound, 2019; Cancian & Haskins, 2014). These changes in family structure carry a substantial adverse impact on the poverty rate through labor market opportunities; however, more women entering the labor market may have a poverty-reducing effect. US Census and ACS report that families of a single female with children have poverty rates, on average, around 40%. In comparison, families of a married couples with children have

poverty less than 8% over the last 4-5 decades. The poverty rate of a married couple without children is even lower than 4% on average compared to families of a single female and a single male has a poverty rate higher than 15% approximately (Cancian & Haskins, 2014). Thus, families play an essential role by shielding many people from poverty.

If a single female marries, the needs will increase but it will add a second earning adult in the household that can potentially reduce the risk of being poor. Or if she joins a joint family that has another earner it can also benefit similarly. This is called economies of scale – each additional person adds less than proportional needs (Cancian & Haskins, 2014; Reyes, 2020). Modernization including nuclear family, feminization of labor markets, and the increasing number of recipients of tertiary education affect the current state of individual and household employment (Corluy & Vandenbroucke, 2017; Thiede et al., 2017). Therefore, I hypothesize that this trending family structure that is leading to unequal distribution of jobs across households should explain why high poverty has been persistent in the USA. No studies have attempted to report the distribution of employment across households and their impact on poverty in the USA.

3. Good versus bad jobs matter for poverty.

Distance is increasing between good and bad jobs in the country. While the number of good jobs attached to fringe benefits is declining over time, the number of bad jobs is increasing that have no attached fringe benefits. Many large companies such as Amazon, Microsoft, Sheraton, etc. contract out many positions to independent contractors that offer jobs mostly on a part-time basis with no predictable schedules. About 40% of the hourly employees can know their work times just a week or less in advance (Desmond, 2018).

These intermediaries (the contractors) do not only take a percentage of the wage that host companies offer to the employees, but this system also provides no option of advancing their careers within the company regardless of their hard work. Therefore, many workers who are on these contracts do not even receive their full wages. In most cases, by contracting these positions out to independent contractors, big companies avoid the responsibilities of paying health and other security benefits. Many times, we see those cleaners, reception assistants, or security officers working at big companies, but they do not employ them directly. Instead, they are arbitrated by an independent contractor that shares part of their wages.

In non-competitive labor markets, good quality jobs and poor quality jobs coexist. Acemoglu (2001) presented that the labor market in laissez-faire equilibrium is ineffectually biased toward poor quality jobs due to “hold-up.” His (2001) search model shows that diverse job creation costs lead to a situation similar workers are offered differentiated remunerations. Employers and employees also break the relations between wage and marginal product to share rents, and employers do not internalize externalities from rent-sharing, which market allocation could have internalized such pecuniary externalities otherwise. Capital-intensive firms with large sunk investments are forced to bargain and create more significant positive (pecuniary) externalities on workers. Therefore, they tend to open too few good quality jobs and too many poor-quality jobs.

Moreover, with less prevalence of social security programs such as unemployment insurance in the USA, most workers cannot afford to be unemployed and wait for an offer of a good job. This leads to an excessive supply of laborers in the market. Therefore, firms

shift job compositions to more PQJ. On the other hand, if they are protected with unemployment insurance, waiting for a better job would be less costly. So, social protection programs could lead to a limited supply of labor by increasing reservation wages (Marinescu & Skandalis, 2021). Thus, this change in search behavior can force firms to create more good quality jobs. Acemoglu (2001) argues that, in the general equilibrium, when firms create higher numbers of jobs, workers can increase their returns to staying as unemployed by rejecting PQJ and expecting to receive a better job in the near future. Similarly, setting no minimum wage can also cause the creation of more PQJ since it is more profitable for firms than with a higher minimum wage condition in the market. Setting a higher minimum wage in the economy makes PQJ also pay higher wages, which makes PQJs less profitable to firms, and thus, they improve their job compositions otherwise. The growth of PQJs is associated with several recent developments such as changes in technology and work arrangements, the rise of service sectors and decline of industrial employment, and changes in corporate governance and employers' strategies (Kalleberg, 2011). It is also related to the emerging trends of privatization, marketization, and individualization (Keune, 2013) and the declining trends of trade unions (Farber & Levy, 2000).

Measuring job quality is challenging particularly, identifying households with PQJ. Generally, low-paying jobs are PQJs, which is true. However, it is not the most appropriate measure of job quality. For example, low-paying jobs do not indicate whether this job has fringe benefits attached, whether the job is secured, and whether the job has good income trajectories – the three defining feature of GQJ (Adamson & Roper, 2019). A low-paying

job can sometimes be a good job if it comes with in-work benefits, job security, a full-time position, and others. Many employees care more about other benefits like security which has a higher welfare-improving impact than wages. In this paper, I consider a household with at least one full-time worker who works 35 hours per week or more as a household with a good job. And a family with a part-time worker(s) who work less than 35 hours per week as a household with only a bad job. I use this measure to differentiate between good and bad jobs at the household level since most full-time contracted jobs are secured, and part-time positions are not secured jobs. These two categories of jobs come with two extremely different remuneration packages for employees. For example, most of the part-timers like substitute teachers in public schools have lost their jobs during this COVID-19 pandemic, while the full-timers have not lost their jobs. Losing a source of earnings is worse than accepting lower wages. Many may argue that some women choose part-time positions voluntarily to spend more time on family work. Note that this measure is at the household level (share of household with the only part-time worker) where at least one person should be willing to accept a full-time position unless the family is a single parent house. Moreover, evidence shows that most part-time jobs are involuntary; people would otherwise prefer full-time contracts (Kalleberg, 2009; Tilly, 1991).

The measure of job quality as good and poor by full-time versus part-time can be a better indicator. Most PQJs come in the form of part-time employment. Part-time employees comprise more than one-fifth of the total US workforce. Part-time jobs always carry a wage penalty (Baffoe-Bonnie & Gyapong, 2018; Gallego-Granados, 2019; Hirsch, 2005), provide a lack of advancement opportunities, and have high turnover (Sloane &

Theodossiou, 1996; Tilly, 1991). Most of these part-timers are involuntary part-timers who would, otherwise, prefer full-time jobs, and they represent the most increase in part-time jobs since 1970 (Tilly, 1991). These involuntary part-time jobs are rising to meet the demand of employers who are increasingly demanding flexible schedules, and a workforce that requires lower compensation is not driven by workers' preferences (Kalleberg, 2009; Tilly, 1991). In addition to limited income from the part-time position, McDonald et al. (2009) show that it has some serious concerns of lack of progress in the jobs, limited access to high-status roles, higher workloads, difficult work environment, and other problems.

Economic prosperity may fail to reduce poverty if it does not produce enough good jobs for households. I expect that increase in the number of families with full-time or good jobs should help eradicate poverty in the USA since a combined remuneration package that comes with full-time jobs can set a household above the poverty threshold. However, the growth of households with only part-time jobs or bad jobs should increase poverty in the country. These are more micro-level indicators that should directly influence poor people's economic status more than broad macro-level determinants, such as economic growth and employment level.

4. Data and empirical strategy

I use publicly available data for this study. Data for most variables such as population, population demography, citizenship, ethnicity, and poverty-related data are from the American Community Survey (ACS). The ACS has individual-level data with household and geographic codes, which allows for precise local administrative unit-level estimates as well as a long-time trend. It is collected by the Census Bureau and is representative of the

USA population based on a 1% sample of the USA population. Data were first aggregated to the household level and then to the state level to match with macro-variables. Household-level employment status data is also from the ACS, but individual unemployment data at the state level is from the Department of Labor and Training. To measure households with good quality and poor quality jobs, I also use data from the ACS. Their inequality index and other macro-economic variables such as GDP per capita were collected from the US Bureau of Economic Analysis (BEA). Government expenditure and revenue-related data came from the National Association of State Budget Officers (NASBO) community. Human capital or educational attainment data was from the US Census Bureau. For poverty measures, I use the measurement of poverty set by the Federal Government - poverty threshold of \$20,212 for a family with two adults and one child in 2018. Table 2 presents the descriptive statistics of data after aggregating to the state level.

I aggregated individual and household level data to the state level to match with state-level macro variables for at least four reasons. First, income is a flow variable that is often used to measure poverty but employment/unemployment status records labor market conditions at a point in time, thus, it is a stock variable. Therefore, if a person is interviewed when he/she was unemployed but employed for the rest of the year, and thus, he/she can have an annual income sufficient to take him/her above the poverty line (Saunders, 2002). Likewise, people report income yearly, but the employment report is not usually on an annual basis. So, analyzing the impact of employment status on poverty can be misleading without aggregation. Second, generally, the unit of analysis used to determine employment status is individual, whereas poverty measures use the incomes of the family together to

determine the poverty level. As discussed earlier in this paper, an individual may have low or zero income but may not be poor as defined by Federal guidelines because other family members can have higher earnings. People within the household share their incomes, and together their incomes determine whether he/she/family qualifies for any welfare benefits. Research on poverty and employment supposedly be aggregated at the family level and averaging status for the entire year. Third, the microdata, such as ACS vary over time but are not in a panel format, meaning ACS does not observe the same individual/household over time. Without panel data, I cannot apply the FE effect model, and therefore, I cannot control many observable and unobservable characters that are time-invariant. Two-way FE, which is identical to a difference-in-difference estimate, is more appropriate for causal inference than the pooled cross-section model (Lechner et al., 2016). Fourth, one of the critical determinants of poverty is public welfare expenditure; however, individual or household-level records in the ACS have no data about the benefits of public welfare programs such as cash assistance. I aggregated data at the state level because the state is the principal authority that disburses these kinds of payments. The state is also the key decision-making body for most of the poverty reduction programs.

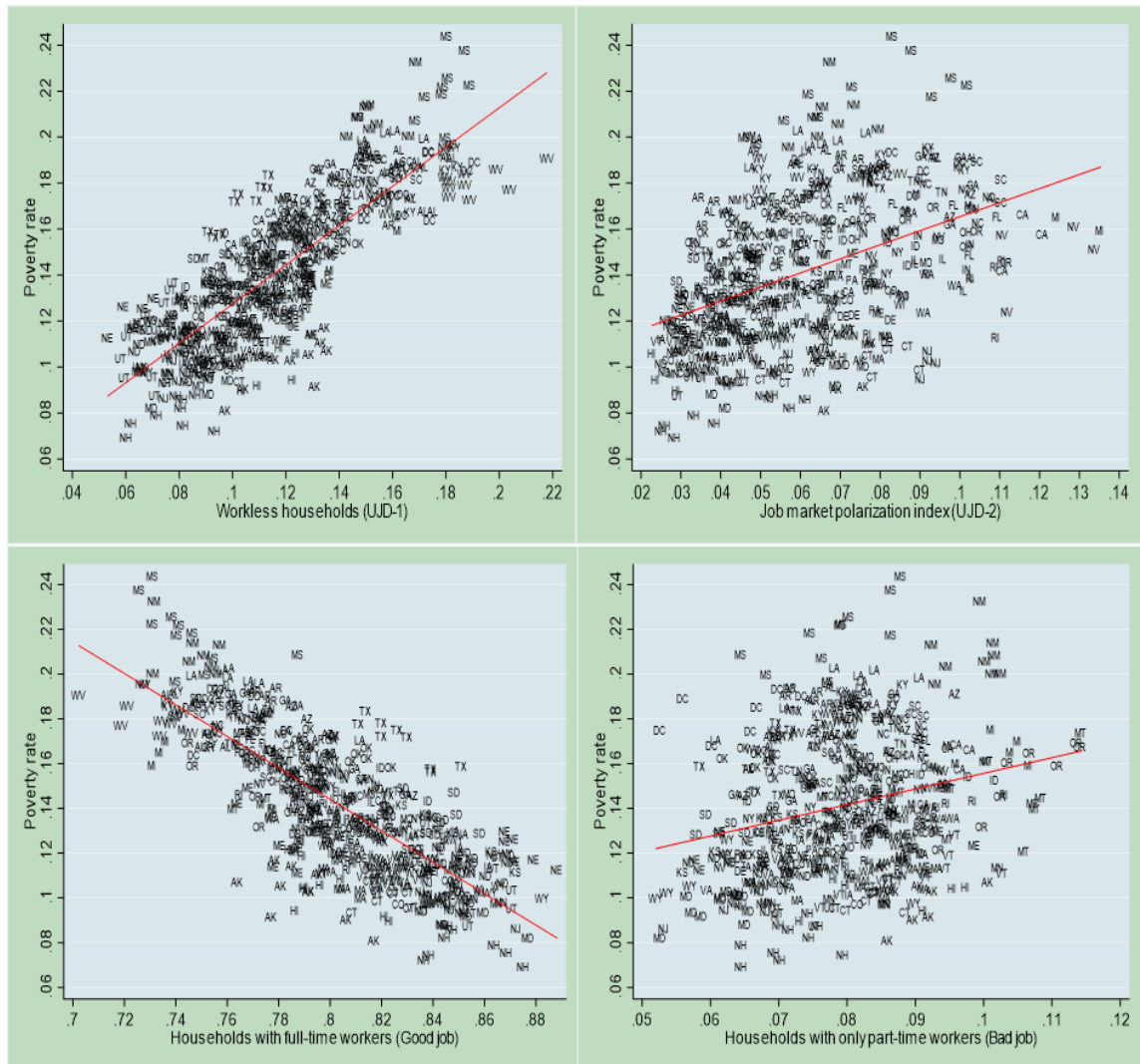


Figure 3: Scatterplot of UJD, job quality, and poverty

Figure 3 presents the scatterplot matrix among the key interested variables. Both the less and more conservative measures of UJD are positively associated with the poverty rate. Contrarily, there is a strong negative association between poverty and good quality jobs (households with full-time workers), but the relationship between poverty and PQJ (families with only part-time workers) is positive. All these relationships confirm what we predicted earlier in this paper that unequal job distribution across households is a strong

predictor of persistent poverty in the USA, even after achieving a higher individual-level employment rate. Similarly, bad jobs are also a predictor of higher poverty, but good jobs are a predictor of lower poverty in the country.

I estimate the equations (v) and (vi) using a two-way FE method for strong balanced panel data ranges from 2008 to 2018.

$$Y_i = \alpha_0 + \beta UJD_{it} + \gamma X_{it} + \delta_i + \mu_t + \varepsilon_{it} \dots \dots \dots (v)$$

$$Y_{it} = \alpha_0 + \beta JQ_{it} + \gamma X_{it} + \delta_i + \mu_t + \varepsilon_{it} \dots \dots \dots (vi)$$

Where Y_{it} stands for poverty rate in state i for year t . UJD_{it} represents either UJD-1 or UJD-2 and JQ_{it} represents either GQJ or PQJ measures in state i for year t . X_{ct} is a vector of characteristics that vary over time at the state level, including GDP per capita, GDP growth rate, state population size, regional inequality, per capita tax revenue, intergovernmental transfer, population demographics, such age groups, immigration/citizenship status, human capital, and others. δ_i and μ_t are the state and year FEs, respectively. ε_{it} is the random error term. By applying the two-way FE method, I examine the within-state variation to estimate the impact of polarized job distribution and job quality on the poverty rate. The state FE estimate controls for both observable and unobservable time-invariant factors that may impact poverty rates such as colonial history, geographic locations, and others. And, the year FE effect captures all unusual time trends, such as financial crisis, that may also influence the poverty rate.

Table 2: Descriptive statistics

Variable	No. of obs.	Mean	Std. Dev.	Min	Max
Poverty rate	561	0.14	0.03	0.07	0.24
UJD-1 (workless households)	561	0.12	0.03	0.05	0.22
UJD-2	561	0.06	0.02	0.02	0.14
Households with full-time workers (GQJ)	561	0.80	0.04	0.70	0.89
Households with only part-time workers (PQJ)	561	0.08	0.01	0.05	0.11
Non-management/professional	561	0.62	0.04	0.41	0.70
State population (million)	561	6.20	6.98	0.55	39.56
GDP per capita (thousand)	561	53.18	20.10	33.15	183.97
Non-white population (%)	561	0.30	0.16	0.04	0.79
Theil inequality index (regional)	561	0.00	6.75	-27.04	9.08
Children aged 0 to 18	561	0.25	0.02	0.18	0.33
Elderly aged 65+	561	0.14	0.02	0.07	0.21
Citizen (%)	561	0.95	0.03	0.85	0.99
Non-citizen (%)	561	0.05	0.03	0.01	0.15
Non-white children (%)	561	0.39	0.18	0.04	0.87
Less than 9th grade (%)	561	4.86	1.67	1.80	10.40
High school graduate (25 years & over)	561	29.24	4.18	17.60	41.40
Associate degree (%)	561	8.08	1.59	2.90	13.50
High school or higher (%)	561	87.55	3.35	78.90	93.00
Bachelor or higher (%)	561	28.77	5.96	17.10	56.60
Revenue / GDP	550	0.05	0.02	0.02	0.21
Public expenditure /GDP	550	0.12	0.04	0.06	0.32
Temp. assistance for needy family (\$100 per capita)	550	0.41	0.50	0.00	3.67
Per capita other cash assistance (\$100)	550	0.26	0.45	0.00	2.44

5. Results: two-way fixed effect model

5.1. The UJD and poverty

Table 3 presents two-way FE estimates of the effect of UJD on the poverty rate. The poverty rate was the average poverty across all races measured at the Federal poverty guideline at 100%. The UJD has two measures: more conservative UJD-2 from equation (i) and less conservative UJD-1 as the share of jobless households as discussed in section III. Figure 4 presents the marginal effect of UJD-1 (panel A) and UJD-2 (panel B) which

are based on models 2.5 and 2.6 in Table 3. The estimate in Table 3 is a percentage point estimate for both UJD-1 and UJD-2. The results strongly support the prediction I made earlier in this paper that higher UJD will lead to a higher poverty rate. The UJD-1 has a substantially higher impact on the poverty rate than the UJD-2. The interpretation of this coefficient is simple. One percentage point increase in UJD-1 will cause an approximately 0.50 percentage point increase in the poverty rate. For UJD-2, a one percentage point increase will cause an about 0.25 percentage point increase in the poverty rate. Presumably, the difference in the magnitude for UJD-1 and UJD-2 is due to the subtraction of unequal job distribution for UJD-2 from UJD-1. This difference makes the hypothesis stronger that the poverty rate increases as the level of uneven job distribution increases. In other words, this is strong evidence that to reduce poverty in the USA, equal distribution of jobs is a necessary condition. This result also indicates that the higher level of employment in the USA did not benefit all families, particularly low-income families. The results are persistent in terms of both sizes of the effect and significance level across all model specifications. The models have high goodness of fit measures as indicated by R^2 , which are 0.79 and 0.75 for models 2.5 and 2.6. All models include both state and year FE.

The most vulnerable group of people in every society are those living in a family where no one is employed (Cantillon et al., 2003; Gallie et al., 2000). Our results support the past literature. Still, this number is extraordinarily higher in the USA even after controlling for a large set of variables, as in Table 3 and Figure 4. Förster (2000) reported raw numbers that the mean poverty among families with a working-age head but none employed is about 36% in 16 OECD countries. This is only about 13% for families with one person employed

and 3% for families with two persons employed. The coefficient in this paper is not comparable with the raw numbers in Förster's (2000) works. Our coefficients indicate a ten percentage point increase in jobless families (UJD-1) leads to a five percentage point increase in poverty, which is quite large. Both panel A and B in Figure 4 shows a large marginal effect of UJDs with precise confidence interval on the poverty rate. While some factors such as the share of children, elderly, and non-white population, and non-professional occupations are also important factors that determine a higher overall poverty rate in the USA, these factors are considerably smaller in magnitude than the UJDs. Variables that are negatively associated with poverty rates, such as GDP per capita, human capital, and public expenditures are also relatively small. Earlier studies excluded these UJD measures in their studies of poverty, that is why their models had less predicting power.

A higher percentage of the non-white and non-working age population (i.e., children and older people) are positively associated with the poverty rate, which is consistent with the earlier literature (Bradbury et al., 2001; Hoover et al., 2004). This result indicates that part of children and the non-working age population have no shelter in a family where they can receive support from other working-age people. The fraction of the people who are immigrants and non-white has been increasing for many decades. Data shows that recent immigrants are relatively less educated and have fewer skillsets compare to their native counterparts on average, therefore, relatively a higher fraction of immigrants earns less income and live in poverty (Hoynes et al., 2006; Siddique et al., 2022).

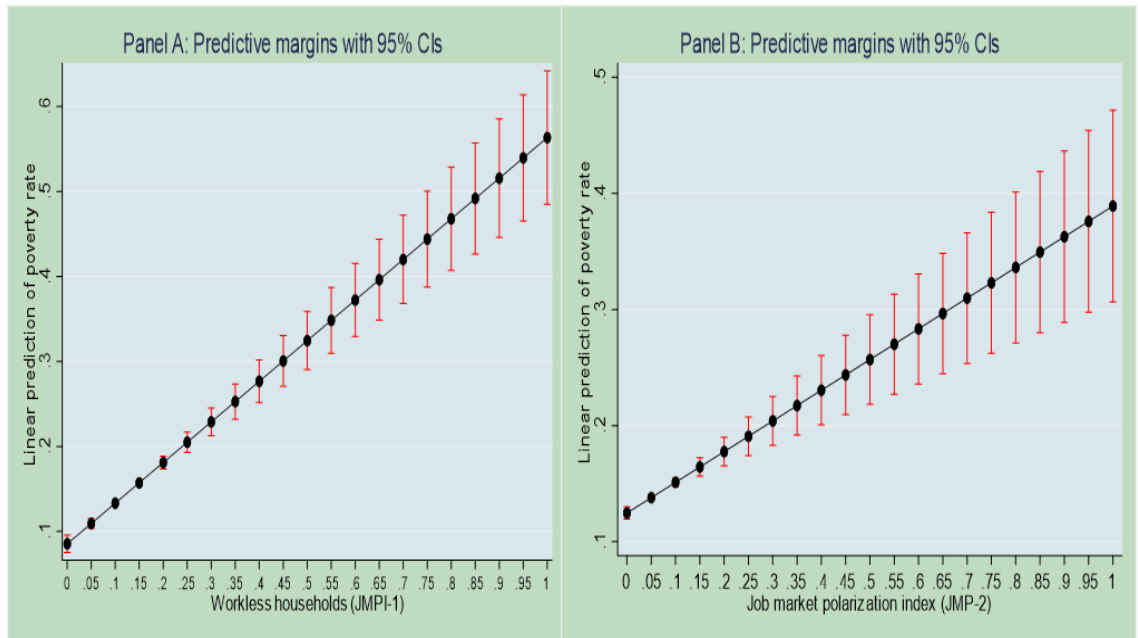


Figure 4: Marginal effect of UJD-1 and UJD-2 on the poverty rate

Note: Marginal effects of both the UJD-1 and UJD-2 have been adjusted for all the covariates in models 2.5 and 2.6.

Alternatively, the influx of immigrants may reduce job market opportunities for natives, thus, the overall association between the share of immigrants and the poverty rate will be positive if this argument holds but the evidence is mixed in the literature (Lull, 2017). The increasing share of non-white and immigrants also makes states more ethnically diverse and such diverse states contribute less in public income and goods (Siddique, 2021, 2022), which may indirectly hurt poverty reduction. The historically non-white population on average is relatively disadvantaged in this country. Therefore, an increasing fraction of the non-white population may be a predictor of higher poverty. The association between the non-white population and poverty shows the non-white disadvantage in society (Siddique, 2022). However, immigration status (Citizenship) is not statistically associated

with poverty except in model 2.2. This is because, even though recent immigrants are in poverty at a higher rate than their predecessors, their share of the overall population in the USA is too little (the non-citizen population is 4.91%, see Table 2) to significantly influence overall state-level poverty rate. The growth rate among non-white children is larger than that of white children and non-white children are likely to be poorer because of their parents' low economic ability (Mordechay & Orfield, 2017; Siddique, 2022). Therefore, a higher share of non-white children may lead to higher overall poverty. However, the share of non-white children is not statistically significant. The effects have likely been absorbed by the share of the non-white population.

Table 3: Impact of UJD on the poverty rate

	Model 2.1	Model 2.2	Model 2.3	Model 2.4	Model 2.5	Model 2.6
	Poverty	Poverty	Poverty	Poverty	Poverty	Poverty
Employment polarization						
Workless households (UJD-1)	0.478***		0.497***		0.478***	
	(0.043)		(0.045)		(0.045)	
Job polarization index (UJD-2)		0.245***		0.283***		0.264***
		(0.042)		(0.045)		(0.045)
Non-management/professional	0.104***	0.093**	0.115***	0.077*	0.100***	0.063
	(0.036)	(0.039)	(0.037)	(0.040)	(0.037)	(0.040)
Demographic characters						
State population (million)	-0.003***	-0.004***	-0.003***	-0.004***	-0.003***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP per capita (thousand)	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Non-white population (%)	0.102*	0.182***	0.106	0.151**	0.155**	0.202**
	(0.061)	(0.065)	(0.070)	(0.075)	(0.076)	(0.081)
Theil inequality index (regional)	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Children aged 0 to 18	0.042	0.176*	0.136	0.253**	0.103	0.209*
	(0.094)	(0.101)	(0.100)	(0.107)	(0.113)	(0.120)
Elderly aged 65+	0.011	0.214**	0.007	0.172*	0.016	0.201*
	(0.085)	(0.092)	(0.094)	(0.101)	(0.106)	(0.114)

Citizen (%)	0.057 (0.082)	0.167* (0.090)	0.044 (0.084)	0.145 (0.092)	0.026 (0.092)	0.104 (0.100)
Non-white children (%)	0.043 (0.042)	0.019 (0.046)	0.033 (0.043)	0.026 (0.046)	-0.002 (0.045)	0.001 (0.049)
Educational attainment						
Less than 9 th grade (%)			0.002 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.003)
High school graduate (25 years & over)			-0.003* (0.001)	-0.003* (0.002)	-0.003** (0.002)	-0.003* (0.002)
Associate degree (%)			-0.006*** (0.002)	-0.006*** (0.002)	-0.005** (0.002)	-0.006** (0.002)
High school or higher (%)			0.003** (0.001)	0.005*** (0.002)	0.004** (0.002)	0.005*** (0.002)
Bachelor or higher (%)			-0.002 (0.001)	-0.004*** (0.001)	-0.003* (0.002)	-0.006*** (0.002)
Government expenditure						
Revenue/GDP					-0.043 (0.032)	-0.032 (0.034)
Public expenditure/GDP					-0.038* (0.022)	-0.042* (0.024)
Per capital temp. assistance for needy family (\$100)					-0.002 (0.001)	-0.001 (0.001)
Per capita other cash assistance (\$100)					-0.003** (0.001)	-0.003* (0.001)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.038 (0.092)	-0.171* (0.100)	-0.160 (0.166)	-0.323* (0.190)	-0.127 (0.182)	-0.225 (0.203)
<i>Within group R²</i>	0.77	0.73	0.77	0.73	0.79	0.75
<i>Number of observations</i>	561	561	561	561	550	550

Note: Standard errors are in parenthesis. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Variations in space and economic development can potentially determine poverty (Glasmeier, 2002). Since spatial differences between states are likely to be fixed at least during our study periods and are accounted for by FE estimates, I control for within-state spatial economic inequality measured as Theil regional inequality along with GDP per capita. Higher GDP per capita is negatively associated with poverty and is statistically significant, while Theil local inequality index is not statistically significant. Regional

inequality is insignificant, and the coefficient is small because regional inequality within states has been stable for the duration of this study period (Siddique & Khan, 2021). Although higher GDP per capita is negatively associated with the poverty rate, the relationship between the two is weak in terms of the effect size. This finding is consistent with earlier literature in the USA and across countries; it is likely because of rising inequality and limited job market opportunities (Adams, 2004; Hoynes et al., 2006).

The share of non-management/professional jobs is also another predictor of higher poverty but is less consistent. On average, 62% of employment falls in this occupational category. I also controlled for a substantial number of human capital or educational attainment and government expenditure measures. Human capital has always been a critical factor in explaining growth and poverty. Human capital directly determines the employment and growth pattern by supplying the skills required by the growth process and then impacts the poverty level (Gutierrez, 2007). Control of human capital accounts for the reverse impact of poverty on employment. Many low-income families may not find a good job because of limited human capital. Controlling human capital or educational attainment should absorb the impact of poverty on employment if there is any. Measures of most educational accomplishments are negatively associated with the poverty rate except less than 9th grade and share of high school graduates or higher. Education of 9th grade is likely to be too little human capital to avoid poverty. While increasing the percentage of high-school graduates among people aged 25 years and above (who are likely to be in the workforce) helps prevent poverty, the share of high-school graduates among all people do not since many of these people are not in the labor forces. People who are not in the labor

force do not use their human capital for earnings. Overall, the relationship between educational attainment and poverty is consistent with the existing literature as that higher education, such as a bachelor's degree and associate degree, helps people escape poverty (Assari, 2018).

Government taxes and transfers are essential sources of income for the poor. While a higher share of public expenditure is negatively associated with the poverty rate, a higher percentage of public revenues is not (models 2.5-6). This relationship between public spending and poverty is an established one in the literature (Hidalgo-Hidalgo & Iturbe-Ormaetxe, 2018); however, there are debates on what types of public expenditures help the poor to escape poverty (Fan et al., 2000; Jung et al., 2009). Additionally, I controlled for two different welfare expenditure-related measures: The Temporary Assistance to Needy Families (TANF) program and other cash assistance³⁴. While the TANF program has no significant impact on poverty reduction, the other cash assistance program has a significant negative effect on the poverty rate. Government transfers may carry both direct and indirect consequences on family earnings. The immediate impact is that government transfers provide households with cash and other benefits which should directly impact income and poverty. The indirect effect is that they may change their behavior as that government transfer makes it less attractive to work, leading to a decline in their incomes (Schoeni & Blank, 2000). Therefore, the indirect impact can offset the direct effect. Moreover, the

³⁴Controlling for welfare expenditure is important to avoid endogeneity because generosity of welfare expenditure may lead some households choose to be unemployed and then to be poor (Saunders, 2002). On the other hand, generous welfare expenditure can lift many poor American families out of poverty.

immediate impact may be difficult to estimate due to the types of government benefits and the way we define the poverty level. The TANF provides cash benefits to low-income households with children. Assuming there is no behavioral change due to TANF, it should directly increase the incomes of poor families. Nevertheless, it may carry little effect on poverty reduction since the TANF transfers are phased out at income levels around the poverty line (Hoynes et al., 2006). Therefore, we do not see any effects of TANF on the poverty rate in these estimates.

5.2. The job quality and poverty

Table 4 presents the impact of job quality measures on the overall poverty rate at the states level. While GQJs have a significant effect on poverty reduction, PQJs have a significant opposite effect on poverty increase across all model specifications in Table 4. As defined earlier, GQJs are those jobs that offer full-time employment and PQJs are those jobs that offer appointments on a part-time basis only. Model specifications in Table 4 are identical to model specifications in Table 3, except here, I replaced UJD-1 and UJD-2 with GQJs and PQJs measures. The interpretation of this result is again simple: a one percentage point increase in the share of households with GQJs reduces the poverty rate by 0.42 to 0.44 percentage points. On the other hand, a one percentage point increase in the share of households with PQJs increases the poverty rate by 0.35 to 0.38 percentage points. This evidence demonstrates that JQ matters for poverty reduction. The existence of a substantial share of PQJs in the economy concentrated in households that have no other good jobs is primarily responsible for the higher persistent poverty rate in the country. In addition to UJD, as we have seen in the earlier section, job quality is another factor that can explain

the persistent level of poverty in the USA more than most other macro-level variables such as growth, human capital, and public expenditures. The significance level and size of coefficients are consistent, and the estimated model has excellent goodness of fit measures (R-square = 0.81 and 0.76 in models 4.5-6). After controlling for both state and year FE and gradual inclusion of control variables, we did not notice any inconsistency in impacts in terms of the size of the coefficients and their significance levels. These findings provide robust support for partial causal evidence that job quality has a critical role in determining the poverty rate in the country: bad jobs increase poverty, and good jobs reduce the poverty rate.

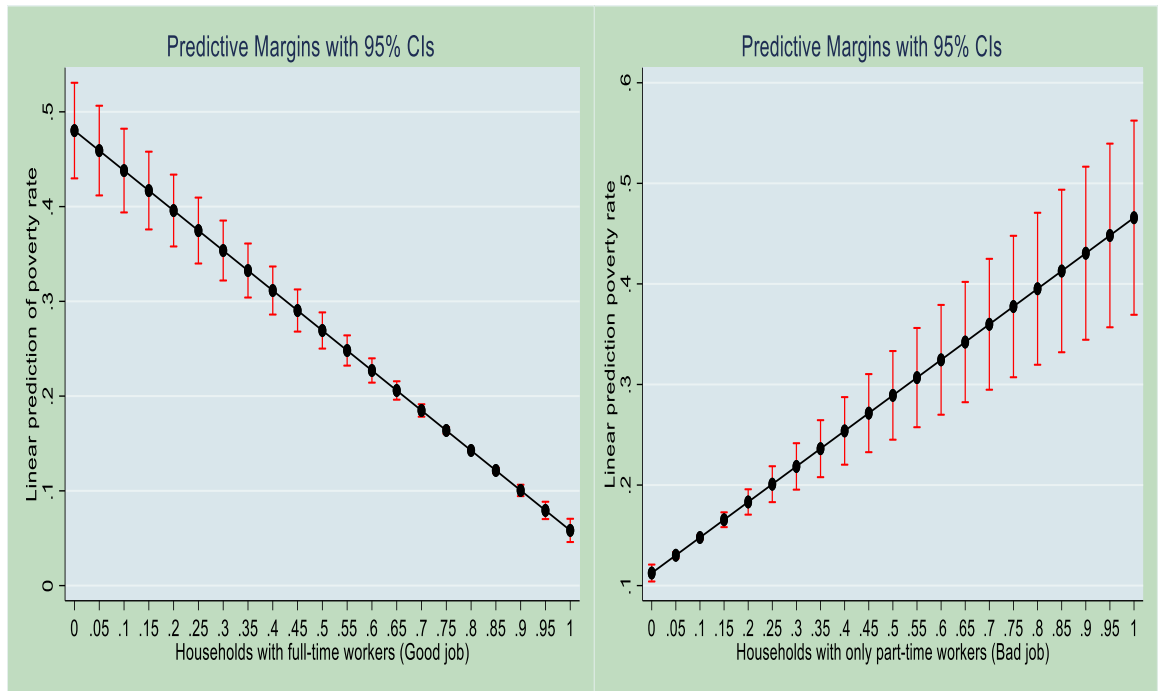


Figure 5: Marginal effects of JQ on the poverty rate

Note: Marginal effects of both good and bad jobs on the poverty rate have been adjusted for all the covariates in models 4.5-6.

When people are in work but still under the poverty line is called poverty in work, as we see in the case of households with bad jobs, which is consistent with earlier evidence (Burkhauser & Finegan, 1989). In the absence of large-scale unemployment insurance, minimum wage protections, and the declining trend of trade unions in the USA, most poor people are too poor to remain unemployed and wait for an offer of good jobs. Poor people are then forced to accept these bad jobs irrespective of quality and remuneration levels (Acemoglu, 2001; Berry & Sabot, 1978; Saunders, 2002; Visaria, 1981). Bad jobs exist because employers find enough labor supply to fill out their bad job positions. Therefore, the existence of bad jobs and higher poverty rates are strongly connected. It is unlikely that poverty will be disappeared from the economy if these bad jobs stay in the labor market.

Table 4: Impact of JQ on the poverty rate

	Model 4.1	Model 4.2	Model 4.3	Model 4.4	Model 4.5	Model 4.6
	Poverty	Poverty	Poverty	Poverty	Poverty	Poverty
Job Quality						
Households with full-time workers (GQJ)	-0.442***		-0.444***		-0.422***	
	(0.031)		(0.031)		(0.032)	
Households with only part-time workers (PQJ)		0.387***		0.388***		0.353***
		(0.053)		(0.054)		(0.054)
Non-management/professional	0.087***	0.093**	0.085**	0.071*	0.069*	0.054
	(0.034)	(0.038)	(0.035)	(0.039)	(0.035)	(0.040)
Demographic Characters						
State population (million)	-0.003***	-0.004***	-0.003***	-0.004***	-0.003***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP per capita (thousand)	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Non-white population (%)	0.065	0.181***	0.051	0.114	0.087	0.171**
	(0.057)	(0.064)	(0.066)	(0.074)	(0.073)	(0.081)
Theil inequality index (regional)	-0.000	0.001	-0.000	0.000	-0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Children aged 0 to 18	0.100	0.299***	0.155*	0.315***	0.133	0.288**
	(0.087)	(0.098)	(0.093)	(0.105)	(0.107)	(0.119)
Elderly aged 65+	0.073	0.201**	0.043	0.118	0.033	0.146
	(0.079)	(0.090)	(0.088)	(0.099)	(0.101)	(0.112)
Citizen (%)	-0.007	0.034	-0.021	-0.018	-0.036	-0.046
	(0.078)	(0.088)	(0.079)	(0.090)	(0.088)	(0.098)
Non-white children (%)	0.075*	0.017	0.074*	0.037	0.043	0.008
	(0.040)	(0.045)	(0.040)	(0.045)	(0.043)	(0.048)
Human capital/education						

Less than 9 th grade (%)	0.002 (0.002)	-0.002 (0.002)	0.002 (0.002)	-0.001 (0.002)
High school graduate (25 years & over)	-0.002 (0.001)	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)
Associate degree (%)	-0.004* (0.002)	-0.005** (0.002)	-0.004* (0.002)	-0.004* (0.002)
High school or higher (%)	0.003* (0.001)	0.000 (0.002)	0.003** (0.001)	0.001 (0.002)
Bachelor or higher (%)	-0.002* (0.001)	-0.003** (0.001)	-0.003* (0.002)	-0.004** (0.002)
Government expenditures				
Revenue/GDP			-0.033 (0.030)	-0.024 (0.034)
Public expenditure/GDP			-0.026 (0.021)	-0.043* (0.024)
Per capital temp. assistance for needy family (\$100)			-0.002 (0.001)	-0.000 (0.001)
Per capita other cash assistance (\$100)			-0.002* (0.001)	-0.003* (0.001)
State FE.	Yes	Yes	Yes	Yes
Year FE.	Yes	Yes	Yes	Yes
Constant	0.416*** (0.093)	-0.088 (0.097)	0.354** (0.156)	0.138 (0.175)
Within group R ²	0.79	0.74	0.80	0.74
Number of observations	561	561	561	550

Note: Standard errors are in parenthesis. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Figure 5 the marginal effect of good and poor quality jobs on poverty with a precise confidence interval. The size of the impact of job quality is large, and other statistically significant determinants such as the share of the non-white and non-working age population (children and elderly), public expenditure, and others are small. Earlier literature attempted to explain why the poverty rate remained persistent in the USA even after most economic indicators were doing so well (Hoover et al., 2004; Hoynes et al., 2006). Disentangling this puzzle was not well done since they did not account for the quality and distribution of employment through which poor people mainly derive their incomes. If jobs are not distributed evenly, and available jobs are poor quality jobs, it is unlikely a high-growing economy would help poor people escape poverty. One thousand dollar increase in GDP per capita can reduce the poverty rate by 0.001

percentage points, which is quite nominal compared to the magnitude of the impact of UJDs and job quality on poverty, as we see in Tables 3 and 4. These results indicate that the trickle-down economy does not work for the poor if employment, the primary source of earnings for the poor, is not designed to help them. The role of UJDs and job quality in determining poverty is more relevant in the USA than in other developed economies since alternative ways to help the poor are transfers and redistribution, which are relatively small in this country. Therefore, with no sufficient redistribution programs, higher UJDs and the prevalence of bad jobs are possible explanations behind why the income poverty rate is so high in the country and is persistent over time even when the economy experienced high economic growth and low unemployment.

6. Conclusions

The poverty rate has been persistent in the USA for a long time; however, what can explain this persistent poverty has been a challenge. In this paper, I attempted to comprehend whether higher UJD and PQJs are responsible for higher poverty in the country. I find that both UJD and PQJ can explain a significantly large part of poverty in the USA. While one percentage point increase in UJD-1 (workless households) increases the poverty rate by almost 0.48 percentage points, one percentage point increase in the share of households with PQJs can increase the poverty rate by 0.35 percentage points. On the other hand, we see that a one percentage point increase in the share of households with GQJs can reduce poverty by 0.42 percentage points. Compared with other commonly identified variables in the literature, such as GDP per capita, public

expenditure, human capital, etc. that should influence the poverty rate, the role of UJD and PQJ is considerably large and important.

Evidence from this paper can be new sources for public policy debates that aim to reduce poverty in developed economies. Now we understand better why poverty reductions have been so stagnant in the USA. Both the UJD and PQJ are structural problems that are halting any progression in the poverty reduction targets. It is not that safety-net programs and other measures do not reduce poverty, they probably lift millions of households above the poverty line every year. Still, we find that effective antipoverty solutions are in good quality jobs and their even distribution across households. In the absence of policy guidance, the UJD is likely to be worse in the future, and thereby poverty reduction goals may not be achieved. Generally, when the first person of a family enters the labor market, that first person is more likely to be male unless the family is a single mother family. And the second person from a family who enters the labor market is more likely to be a woman. When a woman enters the labor market as a second earning person and if she enters the labor market due to financial hardship, her family's economic abilities improve, and more likely to overcome the poverty threshold (Blackburn & Bloom, 1994). However, in recent decades, a large portion of the female labor force who are married to well-paid men have been drawn into the labor market (Averett et al., 2021; Stier & Lewin, 2002). The husband's income is positively correlated to the wife's income (Averett et al., 2021). Female labor market opportunities are on the rise, and high-earning women tend to marry another high-earning man; thus, the number of households with two high-earning people increases. Since structural forces determine the employment

opportunities, the chances that in some families, both spouses will be unemployed, may increase (De Graaf & Ultee, 2000; Stier & Lewin, 2002). Therefore, public policy guidelines for the recruitment process are essential to advance common benefits over private benefits to reduce poverty in society. One of the most effective policies would be, as the veteran preference policy, job applicants from a workless family should be entitled to preferences over applicants from households with the already employed person both in recruitment from competitive lists and in retention during downsizing in employment. This preference system can be practiced in the job market without any efficiency loss since candidates must meet the minimum qualifications. It can be further enhanced by limiting job offers to employees' spouses which many institutions such as universities are promoting recently discarding the overall societal benefits. While comprehensive job distribution efforts can be challenging to be materialized in the short term, a limited success would even bring large society-level equity gains. As part of the long-term efforts, promotion of strong skill-based vocational education system can be helpful to reduce the rate of workless families since higher number of jobless households can be due to the lack of right skills or skill mismatches.

Similarly, in the absence of minimum wage, unemployment insurance, and trade unions, the proportions of PQJs will continue to rise and coexist with good jobs, and therefore, a high poverty rate will also continue to exist. There is a big disconnect between the booming labor market and the well-being of the people, particularly people at the bottom. The labor market is trapped in bad jobs. The continuous rise of employment in gig economies will make the employment rate very impressive, but

without regulation and policies, the economy will keep producing more PQJs. Such growth in PQJs is a byproduct of the massive scale service sector development such as health services, entertainment, and cafes, which hire people mostly on a part-time basis and pay low wages. This trend also coincides with declining manufacturing sectors. It is not only important to stop creating new PQJs but also needs to replace current PQJs with GQJs. Both direct and indirect policy guidance is necessary. The direct approach may include policy guidance through setting minimum conditions of work terms and wages for all jobs that are out in the market. Setting higher standards and higher minimum wage would not only directly regulate the job qualities but also reduce incentives for firms to create more PQJs since PQJs will be less beneficial for them than creating more GQJs. The indirect method should consist of increasing coverage of unemployment insurance, investing in education to ensure equitable access to higher education for all, and allowing trade unions to function within each institution. Unemployment insurance should allow people to wait for a better job offer than immediately accepting a PQJ. Unemployment insurance will also reduce labor supply in the market which further pushes firms to raise the pay and improve the quality of jobs. Similarly, increasing access to higher education is another way to create demand for GQJs and reduce the supply of recipients of PQJs, which will leave firms with no choice but to produce more GQJs. Highly skilled workers will demand higher qualities of jobs than low-skilled workers (Cortés & Tessada, 2011). Historically unions played a significant role to protect workers' interests, and strengthening worker's unions can extend institutional regulations to represent worker interests and generate collective pressure to improve job qualities (Simms, 2017).

There are more full-time GQJs than the total number of households in the USA as we have seen in this paper, so their even distributions across families can significantly eradicate poverty. While full evenly distribution of jobs across households may not be possible immediately due to the structural constraints, therefore, combined simultaneous efforts to distribute jobs from individuals to households and policies to improve the quality of jobs would help reduce poverty. Future research should explore how to improve job distribution across households and move job composition from bad jobs to good jobs with no efficiency loss, which this paper did not adequately address and is beyond the scope of this paper.

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