



# Demand for different types of public goods: evidence from Nigeria

Alisha A. Kim and Jonas B. Bunte

Department of Public Policy and Political Economy, University of Texas at Dallas, Richardson, TX, USA

## ABSTRACT

Preferences of Nigerian households vary across different types of public goods. For example, some prefer roads while others favor education even after controlling for the existing supply of these goods. What explains this variation? We argue that the perceived distributional consequences of specific public goods differ conditional on the personal characteristics of households. In particular, households demand the type of public good that (a) increases the utility of assets they already own and (b) resonates with their past experiences involving the lack of particular public goods. We test our argument with data on 123,000 Nigerian households. We find strong evidence for our argument across six types of public goods.

**ARTICLE HISTORY** Received 26 September 2016; Accepted 16 September 2017


**KEYWORDS** Public goods; preferences; developing countries; Nigeria; simultaneous estimation

**JEL CLASSIFICATIONS** H31; H41; H5

## 1. Introduction

Nigerian districts differ significantly in the types of public goods they demand from their government. Consider the top panel of Figure 1, which displays the percentage of citizens per district demanding higher spending on education. The map illustrates a puzzle: The geographical distribution of districts with extremely high demand for more education is not clustered in a particular region, but distributed widely all across Nigeria. In fact, districts in which more than 80% of surveyed citizens demand increased spending on schools are located directly next to districts where less than 30% of citizens demand more spending on this good. A similar heterogeneity exists with respect to demand for infrastructure, as illustrated by the bottom panel of Figure 1. Furthermore, the correlation between demand for schools and roads is not

**CONTACT** Alisha A. Kim  [alisha.kim@utdallas.edu](mailto:alisha.kim@utdallas.edu)

 Supplemental data for this article can be accessed at <https://doi.org/10.1080/00346764.2018.1424930>

particularly strong: some districts demand both education and roads, others demand neither, and yet others demand only one type of public good. What explains this heterogeneity in the public goods citizens demand? Why do citizens' preferences vary across different types of public goods?

We argue that differences in perceived distributional consequences shape citizens' preferences across different public goods, even after accounting for the existing level of public goods provision. For example, increased spending on education benefits primarily citizens with children, while those without children benefit only indirectly. Thus, parents perceive positive distributional consequences of increased expenditure on schools and consequently demand more of this public good.

We make two predictions: First, we argue that citizens demand the type of public good that increases the utility of assets they already own. For example, former Nigerian Minister of Finance Ngozi Okonjo-Iweala described the effect of homeownership on citizen preferences saying, 'After owning a home, many citizens tend naturally to be concerned about the provision of public goods in their communities – from schools, to clinics, to security.'<sup>1</sup> Second, we argue that past experience of lacking access to a particular public good strongly shapes citizens' current preferences. In fact, if citizens lacked access to schools in their past, the experience of under-provision will create strong preferences in favor of spending on education – even if the current supply of schools is adequate.

Testing a theory of preferences presents two challenges. First, preferences across public goods are often not directly observable. Propitiously, we analyze survey data on 123,000 Nigerian households that elicits information on preferences across public goods. These data are exceptionally well suited for studying the determinants of preferences across multiple public goods because the survey does not rely on the 'willingness to pay' concept to obtain information on preferences.

The second challenge concerns the methodological approach. Past studies examine citizens' preference for one particular type of public good *in isolation* of preferences for other goods. However, an individual's attitude toward education is likely related to her preferences regarding health. We account for the interdependence of preferences by analyzing the determinants of preferences across multiple types of public goods simultaneously.

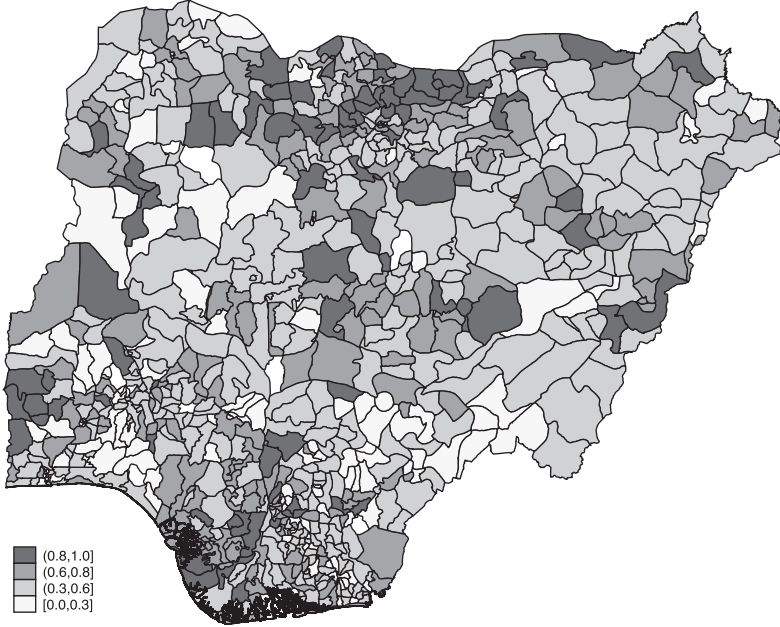
We find strong support that households are significantly more likely to demand the type of public good that (a) complements assets owned by that household and (b) resonates with past experiences involving the lack of particular public goods. Despite the non-rivalrous and non-exclusionary character of public goods, the *perceived value* of these goods differs in predictable ways.

Our results are surprising in two ways. First, conventional wisdom suggests that ethnic identity plays a large role in explaining individuals' preferences

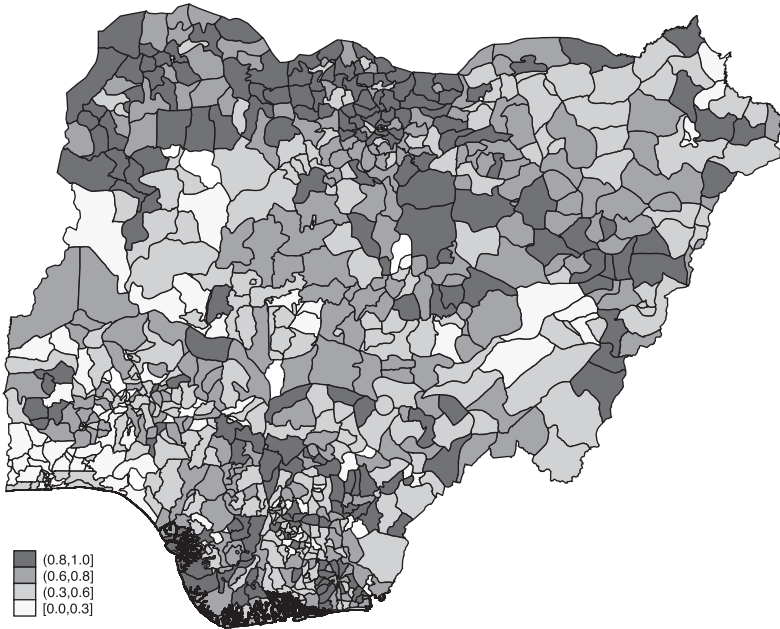
---

<sup>1</sup>The Vanguard, 'Housing as Tool for Economic Development', November 16, 2015.

## Demand for Schools



## Demand for Roads



**Figure 1.** Percentage of respondents in each district demanding different types of public goods.

Notes: The figure shows significant heterogeneity in preferences across districts and across types of public goods. Map is based on data from 123,000 Nigerian households.

in developing countries. Proponents argue that members of a specific ethnic group share the same preferences across public goods for historical and cultural reasons (Easterly and Levine 1997). This implies that areas dominated by the same ethnic group should be characterized by homogenous preferences for or against specific public goods. In contrast, our theory suggests that individuals' preferences might differ, even when they belong to the same ethnic groups.

There is *prima facie* evidence that ethnicity does not drive differences in preferences. Consider Figure 2, which displays geographical areas within Nigeria dominated by a specific ethnic group.<sup>2</sup> Following the ethnic identity argument, we would expect uniform preferences for particular public goods across all districts dominated by, say, the Yoruba. We would expect a similarly uniform distribution of preferences across regions dominated by Igbo, though possibly preferring a different good than the Yoruba. Yet, Figure 3 illustrates that this is not the case: In some districts within the Yoruba-dominated area, more than 80% of the population demands increased spending on education, while in other districts less than 30% of citizens demand this good. Heterogeneity in preferences is visible across multiple public goods and across different ethnic groups; there is variation in demand across different types of public goods, even when holding ethnicity constant.

Second, popular opinion suggests that demand for specific types of public goods is driven by the existing supply of those goods. After all, individuals might publicly demand more spending on a public good only if governments do not provide it. However, our findings suggest otherwise.

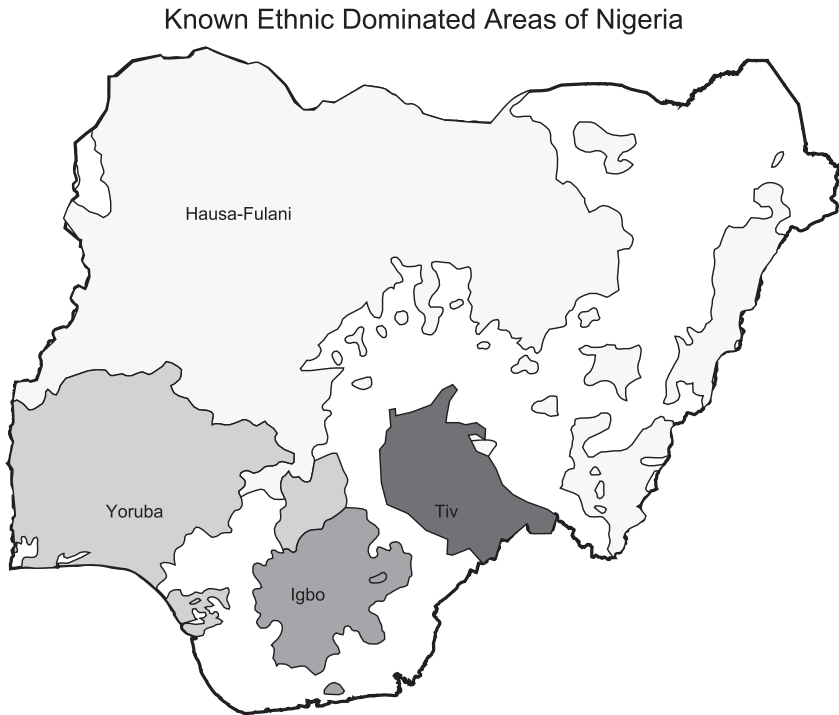
Consider the Nigerian cities of Abeokuta and Ikotun. These cities – separated by about 100 km (60 miles), both located in the areas dominated by the Yoruba – experienced public protests at roughly the same time. In Abeokuta, protesters called for increased spending on tertiary education at the expense of infrastructure spending.<sup>3</sup> In contrast, protesters in Ikotun demanded better electricity infrastructure to lower electricity prices, being willing to forego expenditures on education.<sup>4</sup> One might expect that protesters in Abeokuta want higher spending on education because local governments are not spending much on teachers or schools. Conversely, protesters in Ikotun might demand higher spending on electricity infrastructure because its local government neglected such investments in the past. The different demands cannot be explained by the existing levels of supply: Abeokuta's district actually spends a larger share of its budget on education than Ikotun's district, while Ikotun's district spends more on infrastructure than Abeokuta's district.

---

<sup>2</sup>Ethnic map polygons were derived from the GeoEPR 2014 dataset which geo-codes all politically relevant ethnic groups (Vogt et al. 2015).

<sup>3</sup>Equal Times, 'Nigeria Gears Up for Education Protests', September 18, 2013.

<sup>4</sup>Daily Trust, 'The Giant in the Dark', April 13, 2014; Vanguard, 'Outrageous Electricity Bills – Consumers Groan as Discos Smile to Banks', October 29, 2014.



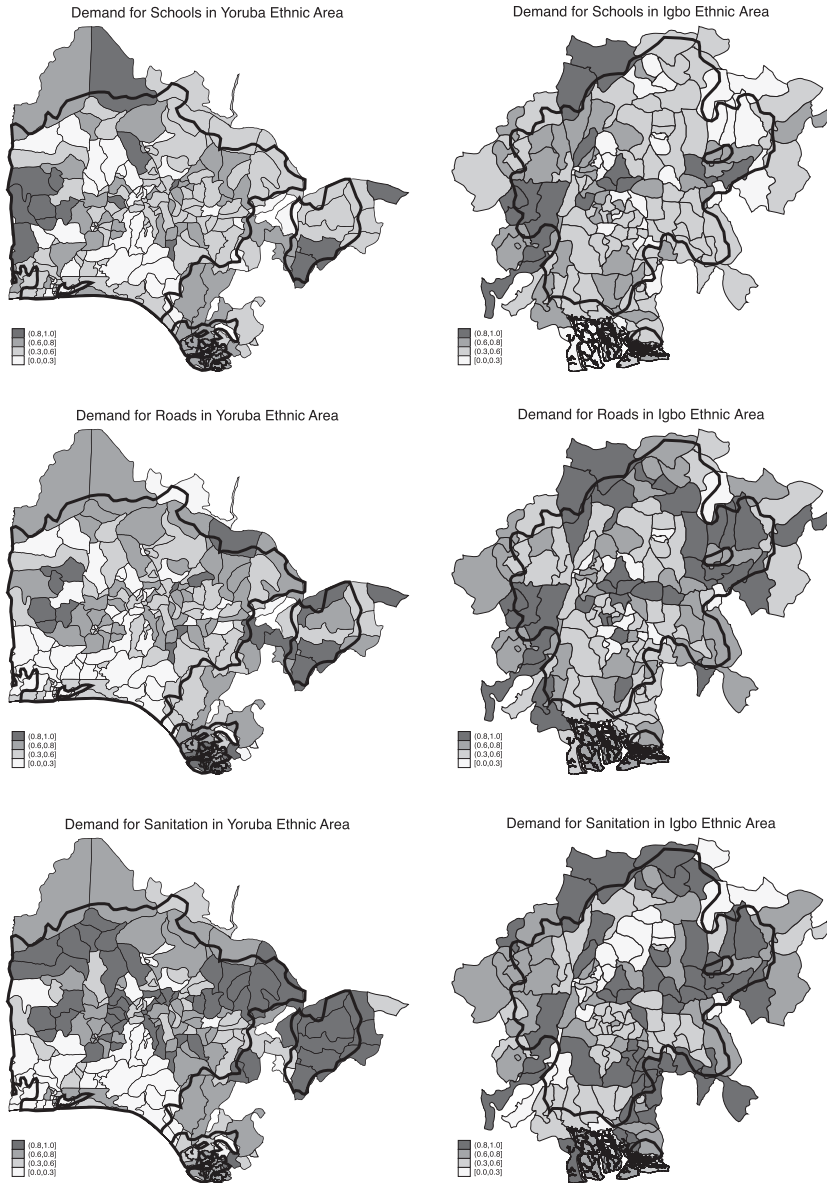
**Figure 2.** Location of areas dominated by a particular ethnic group in Nigeria.

The statistical analysis presented below builds upon these observations. We find that individual-level characteristics are a better explanation for the heterogeneity in preferences than either ethnicity or the existing level of supply.

## 2. Why do preferences differ?

In the developing country context, a number of scholars argue that the ethnic identity of an individual affects the demand for a certain public good. [Easterly and Levine \(1997: 1215–1216\)](#) review scholarly work that assumes politicians provide different public goods as a function of different preferences across ethnic groups. [Lieberman and McClendon \(2013\)](#) finds that preferences vary across ethnic groups in most sub-Saharan African countries. Moreover, ethnic groups systematically disagree over the kinds of public goods they want provided ([Habyarimana et al. 2009](#)).

However, the focus on ethnicity has two important drawbacks. First, these approaches are not generalizable. As different countries have different ethnic groups, it is challenging to apply findings from, say, Kenya to Nigeria. Second, the approach is descriptive as it refers to specific cultural and historical reasons.



**Figure 3.** Percentage of respondents in each district demanding different types of public goods.

Notes: The figure shows that significant heterogeneity in preferences exist across districts in homogeneous ethnic areas.

This precludes the possibility of causal mechanisms explaining *why* some individuals prefer one type of public good to another leading to contradictory findings. For example, [Lieberman and McClendon \(2013\)](#) argue that ethnicity

is a significant predictor for demand of public goods, while [Habyarimana et al. \(2009: 81\)](#) find that ethnic indicators are not jointly significant.

Scholarship focused on industrialized economies alternatively suggests that preferences vary with exposure to economic risk. Public goods are understood as insurance, providing security to individuals at risk ([Cusack et al. 2006](#)). For example, [Rodrik \(1998\)](#) and [Mughan \(2007\)](#) argue that exposure to globalization increases workers' sense of economic insecurity, intensifying support for government public good provisioning. Furthermore, the perception of risk is conditional on individual-level characteristics. [Iversen and Soskice \(2001\)](#) argue that workers with specific skills are at higher risk of facing long periods of unemployment in the event of job loss, resulting in higher demand for public goods. [Rehm \(2009\)](#) adds that an individual's occupation shapes preferences. Occupations requiring specific skills that are less transferrable across different industries increase exposure to risk, thereby shaping preferences in favor of redistribution.

We extend this literature in several ways: First, we examine whether the effect of asset ownership on preferences identified in established democracies also operates in emerging democracies. We argue that this approach might circumvent the generalization challenge that plagues ethnicity based explanations. Second, our analysis differentiates between different types of public goods instead of analyzing the overall level of public goods spending. This follows existing work that also disaggregates public spending. For example, [Ichoku and Leibbrandt \(2003\)](#) and [Anyanwu \(2007\)](#) study the demand for health services, while [Ogundari and Abdulai \(2014\)](#) analyze the demand for education. However, these studies analyze demand for a single type of good in isolation, assuming that preferences for one type of public good are completely independent from preferences for others. We argue that this assumption does not hold: an individual's preferences for education are likely related to her preferences for health care. We account for this interdependence by analyzing citizens' preferences for *multiple types of public goods* simultaneously.

### **3. Explaining the variation in preferences across public goods**

Researchers commonly assume that public goods benefit everyone equally because of their non-rivalrous and non-exclusionary properties: [Bueno de Mesquita et al. \(2002\)](#) write, 'Imagine that the leader has a pool of \$1000 with which to provide goods and that spending the entire \$1000 would produce a public good worth \$20 to everyone in society' ([Bueno de Mesquita et al. 2002: 562](#)). We disagree with this view. While public goods are non-rivalrous and non-exclusionary, their *perceived distributional consequences* differ across citizens. Schools might only benefit citizens with children, providing minimal value to those without children. Similarly, vehicle owners might perceive public

spending on roads as useful, while those without cars or motorcycles might not value it as highly.

We build on this reasoning to predict how preferences differ across citizens by connecting individual-level characteristics (instead of non-generalizable attributes such as ethnicity) to the perceived distributional consequences of specific types of public goods (rather than a single generic public good). We focus on two types of individual characteristics – asset ownership and past experiences – that systematically affect household demands for certain public goods.

### **3.1. Asset ownership**

Houses are often the most valuable asset citizens own; consequently, scholars argue that homeownership might shape political preferences. Analyzing homeowner expenses over time, [Kemeny \(2005\)](#) suggests that homeowner expenses are more front-loaded than those of renters, due to an initial down payment and monthly mortgage payments. Facing a trade-off between cash income for a home purchase and taxes for social welfare services, homeowners exhibit strong preferences against higher taxes for public services. [Castles \(1998\)](#) adds that homes and old-age pensions can be understood as functional equivalents. Consequently, homeowners resist high taxes intended to fund public pension systems. [Ansell \(2014\)](#) follows this line of reasoning, suggesting that rising home values are viewed as an insurance against income loss. Therefore, homeowners experiencing house price appreciation are less supportive of social insurance policies.

While homeowners resist government policies that do not benefit them, they do favor policies that *increase* home values. For example, [Scheve and Slaughter \(2001\)](#) show that homeowners in regions with declining industries strongly favor trade barriers. Continued industry exposure to competition would increase unemployment due to decreased economic activity, thus decreasing overall income, lowering demand for houses and subsequently lowering home values.

We extend this reasoning to public goods. We argue that homeowners prefer public goods that increase the value of their assets. For example, homeowners favor roads that provide better access to their home. Extending sanitation and electricity networks is also in the interest of homeowners currently without these benefits. Even though we use the example of homeowners, this reasoning extends to owners of other assets as well.

Note that the impact of assets differs from that of general wealth or income. One might argue that wealthier individuals demand different public goods than those at lower income levels because their basic needs are met. This suggests that both high and low income earners have the same preferences, but that these demands are already satisfied for the rich. In contrast, we

argue that the distribution of preferences is *not* uniform. Rather, the demand for a particular public good differs across owners and non-owners of assets, irrespective of whether the individual is rich or poor.<sup>5</sup> With these qualifications in mind, we hypothesize that

**Hypothesis 1:** *Households prefer public goods that increase the value, productivity, and usefulness of assets they already own.*

### 3.2. Past experience and current preferences

Arguments about the importance of past experiences are ubiquitous in political science. Huntington (1991: 21) and Pevehouse (2002: 534) argue that authoritarian countries with previous democratic history are more likely to democratize again. Citizens' preferences are shaped by past experience with democracy, so that the absence of democracy is felt intensely. Similarly, Alesina and Fuchs-Schündeln (2007) and Svallfors (2010) analyze the preferences of citizens that grew up in Communist regimes. They find that lack of exposure to capitalism and democracy has lasting effects on political preferences – even decades after the collapse of the USSR and the re-unification of Germany. Others show that experiences of price volatility shape economic preferences. For example, 'the historical experience of a hyperinflation in Germany may have raised the German public aversion to inflation' (Alesina and Summers 1993: 159).

We extend this literature toward public goods. Just like the absence of democracy or stable prices affects preferences, we argue that the absence of a particular public good affects preferences. We suggest that experiencing insufficient supply in the past causes households to pay particular attention to provision of this good today. For example, fortunate individuals with higher levels of schooling are less likely to perceive a lack of education services when compared to a less privileged person. For this reason, we expect individuals without schooling to be more acutely aware of the lack of this particular public good and hypothesize that

**Hypothesis 2:** *Households exhibit strong preferences for provision of goods that they lacked in the past.*

## 4. Data

### 4.1. Description of survey

To test these hypotheses, we analyze data from the 2006 National Core Welfare Indicators Question Survey (CWIQ) conducted by the Nigerian National Bureau

---

<sup>5</sup>We account for possible wealth effects by controlling for levels of income in the empirical analysis. We nevertheless obtain statistically significant results for asset ownership, suggesting that asset ownership is not just a proxy for wealth.

of Statistics. Like the primary household survey conducted in Mozambique by Arora (2015), this survey was administered *in-person* to 123,000 Nigerian households, preventing inconsistent and missing answers. In addition, the World Bank funded interviewer training in order to minimize bias.

The survey employed two-stage cluster sampling to obtain a representative picture of preferences across districts. Researchers first randomly selected ten Enumeration Areas (similar to election districts in the United States) in each district. Then researchers randomly sampled ten housing units within each Enumeration Area. This resulted in 100 housing units per district, with all households in each housing unit interviewed *in-person*. There is a high degree of heterogeneity within clusters on the dependent variables (demand for public goods), as well as explanatory and control variables (i.e. asset distribution, educational attainment, etc.).<sup>6</sup>

#### **4.2. Properties of the resulting data**

The resulting data are particularly well suited for our purposes. Elinor Ostrom exemplifies why obtaining information on citizens' preferences across public goods is a challenge: producers of private goods can use customers' willingness to pay as a proxy for their preferences. However, this is not possible with public goods due to the non-rivalrous and non-exclusionary nature. Our data circumvents this problem with direct measures of preferences across a wide range of public goods. The survey elicits citizens' preferences with respect to public goods such as roads, electricity, schools, health facilities, and access to water. These data serve as the dependent variables for our analysis. In addition to the direct measure of citizens' preferences, the design of the survey provides three advantages.

First, the data allow addressing endogeneity concerns that might arise from the fact that current vehicle owners want roads to be improved, but that the existence of roads might also incentivize citizens to buy vehicles. The data can partially address this issue by distinguishing between households that want roads to be *improved* vs. those that want roads to be *provided*. This distinction allows careful coding of the dependent variable to only consider answers that want roads provided (because they do not currently exist), partially interrupting the potential two-way causal arrow.

Second, the question wording corresponds closely to the difference between public and private goods. The survey asks 'which type of facility would you like provided or improved in this community?' Respondents can then pick any or all, or any combination of the following indicating their preference for a particular public good: school facilities, health facilities, all-seasons roads, well/borehole water, pipe borne water, transport facilities, sanitation facilities,

---

<sup>6</sup>Gender is an exception, with most respondents being male.

police services, and electricity. Given that public goods are non-rivalrous and non-exclusionary, it is meaningful that the survey did not conceptualize types of public goods as competing. As respondents did not face a penalty for demanding many public goods, nor were respondents required to rank their choices, we expect to find a high overall level of demand for public goods. This implies that statistically significant differences in preferences for particular public goods between households with different characteristics, if they exist, are substantively meaningful.

Lastly, the survey addresses concerns over households deliberately misrepresenting their preferences. For example, [Throsby and Withers \(1986\)](#) argue that individuals have the incentive to understate their preferences with respect to public goods if the survey asks how much individuals would be willing to pay (via taxes). Our data do not measure the ‘willingness-to-pay’ as a continuous variable; rather, we have discrete information on whether a household considers the perceived benefit of a public good as more or less worthy of its price. This operationalization reduces the bias of answers affected by free-riding considerations in this study. In the words of [Schokkaert \(1987: 187\)](#), ‘In the choice between ‘yes’ and ‘no’ in a system of general fund financing, the respondent has no incentive to lie, since this reduces the probability that his personal preference will be followed, while, at the same time when a project would be executed, he has to pay the tax price, independent of his own answer.’

## 5. Method

### 5.1. Simultaneous estimation

We begin our analysis by assuming that respondent  $j$  is willing to pay for good  $i$  if the perceived benefits of the good  $B_{ij}$  exceed the good tax price of  $t_{ij}$ :

$$B_{ij} > t_{ij} \quad (1)$$

Furthermore, we hypothesize that household characteristics play a significant role in explaining variation in the perceived benefit of particular types of public goods. Hence

$$B_{ij} = x_j' \beta_i + \epsilon_{ij}, \quad (2)$$

where  $x_j$  is a vector of characteristics of individual  $j$ ,  $\beta_i$  a vector of coefficients specific for good  $i$ , and  $\epsilon_{ik}$  is a random term, with a continuous logistic probability distribution  $F(\epsilon)$ . We further assume that the perceived benefits  $B_{ij}$  are continuous, but the recorded preference for or against a particular type of public good is a categorical response variable. For this reason, we assume that

$$\begin{aligned} y_{ij}^* &= 1 \text{ if } B_{ij} > t_{ij} \\ &= 0 \text{ if } B_{ij} \leq t_{ij} \end{aligned} \quad (3)$$

The binary nature of the dependent variable and the distributional assumptions noted above require logistic estimations of the following form:

$$y_{ij} = \beta_1 + \beta_2 \times \alpha_h + \beta_3 \times \delta_h + \beta_4 \times \gamma_{h,d} + \epsilon, \quad (4)$$

where  $y_{ij}$  represents household preference for a particular type of public good,  $\alpha_h$  are the household characteristics affecting demand for the public good,  $\delta_h$  denote controls for already existing supplies of that public good, and  $\gamma_{h,d}$  are additional control variables.

Implementing Equation (4) implies estimating separate logistic regressions for each type of public good  $j$ ; however, as argued above, the preferences across a range of public goods are likely interdependent. Moreover, the data on preferences comes from a single question where respondents choose from among many non-rank ordered choices. Both issues make simultaneous estimation necessary.

Consequently, we estimate a multivariate probit model – a variation of the seemingly unrelated regressions (SUR) approach – that analyzes the preferences for multiple goods simultaneously. While SUR approaches require continuous dependent variables, multivariate probit methods are appropriate for binary dependent variables, where the dependent variable allows for ‘ $M$  different choices at the same point in time’ (Cappellari and Jenkins 2007: 279). The multivariate probit model takes this simplified form:

$$\begin{aligned} y_{mj}^* &= \beta'_m X_{mj} + \epsilon_{mj}, m = 1, \dots, M \\ y_{mj} &= 1 \text{ if } y_{mj}^* > 0 \text{ and } 0 \text{ otherwise,} \end{aligned} \quad (5)$$

where  $y_{mj}$  represents the outcomes of respondents’ choosing any combination of  $M$  different public goods, at the same point in time. This allows us to estimate the effect of personal characteristics on preferences for one public good while accounting for their simultaneous preference for other public goods (Freedman and Sekhon 2010). The multivariate probit regressions are estimated with Huber–White standard errors to address potential heteroskedasticity.<sup>7</sup>

## 5.2. Control variables

To facilitate comparisons across the different models presented below, we use the identical set of control variables,  $\gamma_{h,d}$ . We indicate urban or rural household location, as the supply of public goods might differ across these two types of locations. We also control for the household’s welfare quintile to ensure that effects are independent of wealth. We control for the possibility that women’s household roles warrant demanding different types of public goods than men. We use a continuous measure for age as younger heads of households might

<sup>7</sup>We also estimate the model with standard errors clustered on the district level. The results are robust to this methodological change. See Section 2 of the Online Appendix.

demand different public goods than older ones nearer to the end of their family's life cycle. We also control for the marital status of the head of household as a household with husband, wife, and children is likely to have different demands than a household of a single man. Finally, we include a variable capturing whether the household owns or rents their home.

Besides these control variables on the household level,  $\gamma_h$ , we also include two variables on the district level,  $\gamma_d$ : The total population, as well as the land size for each district, account for possible scale effects. We also want to control for unobserved heterogeneity across the 774 districts in our sample. However, the inclusion of fixed effects into non-linear regressions will introduce the incidental parameters problem: The coefficient estimates as well as standard errors will become increasingly biased the larger the number of dummies included (Greene 2002). We construct a Chamberlain–Mundlak device to circumvent this problem. This represents a second-best approach for including quasi-fixed effects in a probit estimation by including the mean of each independent variable by district in the analysis. This accounts for any intra-class correlation between observations within districts, as respondents within a district are more likely to have similar preferences than respondents between districts.

### 5.3. Endogeneity

The presence of endogeneity might confound our analyses because asset ownership could be endogenous to existing public goods. While we argue that a household will demand roads to increase the utility of a motorcycle, it might be the case that the household only purchases a motorcycle once a road is available.

In light of this possibility, we take two precautions. First, we control for the existing stock of the public good. For example, when estimating the effect of owning a motorcycle on the preferences for road construction, we include indicators for whether a road construction project has been completed within the last five years. Conditioning the effect of owning a motorcycle on the preferences for roads on the stock of existing roads helps with addressing one direction of the potential endogeneity, i.e., the causal arrow from 'because roads exist, I will buy a motorcycle.'

We address the reverse arrow from 'because I have a motorcycle, I will demand roads' with careful coding of our dependent variable. Recall that we code only responses that demand a particular type of public good be *provided*, but exclude answers where respondents called for the public good to be *improved*. The improvement responses suggest that the roads already exist; eliminating these responses tightens the empirical tests of the proposed causal mechanisms. While imperfect, these precautions eliminate most potential avenues through which endogeneity could operate.

## 6. Results

### 6.1. Asset ownership and public good preferences

Hypothesis 1 suggests that households demand those types of public goods that increase the utility of the assets they already own. We argue that the ownership of certain long-term assets require complementary public goods to provide utility to owners.

We offer four operationalizations of this hypothesis. First, we examine the difference between owners and non-owners of motorcycles. The perceived value of owning this particular type of asset – a vehicle – depends on the existence of paved roads. Without the complementary public good, the ownership of a motorcycle *in itself* does not guarantee a sufficient degree of mobility. Therefore, we expect more pronounced preferences for transportation infrastructure among motorcycle owners.

We also operationalize the hypothesis using home ownership. Individuals that own a home – as opposed to renting a dwelling – are less mobile. Homeowners may lack an exit option when selling a house in difficult market conditions; therefore, we assume that homeowners have stronger preferences with respect to public goods. For example, property owners might highly value access to electricity services as absence of electricity surely negatively affects the utility of owning a house. Similarly, we expect the preferences of homeowners to exhibit a strong preference for attachment of their dwelling to the community's sewer system or for sufficient protection by a community police presence. In contrast, renters experiencing the lack of these public goods have less incentive to voice their preferences because they are more mobile. In sum, we test Hypothesis 1 using four operationalizations: ownership of motorcycles affecting preferences for roads, as well as homeownership shaping demand for electricity, sanitation, and police services.

As argued above, the preferences for roads are likely not independent from the preferences for other infrastructure demands such as sanitation facilities or electricity; therefore, we estimate the effect of various assets on multiple types of public goods *simultaneously*. Table 1 presents the results of a single multivariate probit estimation with these four equations.<sup>8</sup> Note the positive and statistically significant coefficients on motorcycle and dwelling ownership. These coefficients indicate that households owning these long-term assets are significantly more likely to state that complementary public goods should be provided than households not owning those assets. For example, the odds of motorcycles owners demanding roads are about 9% higher ( $e^{0.088} = 1.091$ ) than the odds of households without motorcycles. Similarly, the odds of homeowners exhibiting preference for electricity infrastructure are 28% higher than renters.

---

<sup>8</sup>For space considerations, tables presented in the article omit the set of control variables. The full tables are available in Section 1 of the Online Appendix.

**Table 1.** Multivariate probit regression *simultaneously* testing four operationalizations of Hypothesis 1.

	Should all seasons roads be provided?	Should sanitation facilities be provided?	Should police services be provided?	Should electricity be provided?
Owns motorcycle	0.088* (0.010)			
Homeowner	0.184* (0.011)	0.082* (0.011)	0.140* (0.011)	0.247* (0.012)
Road construction in last 5 years	-0.358* (0.014)			
Roads tarring in last 5 years	-0.225* (0.011)			
Transportation services project in last 5 years	-0.184* (0.013)			
Sanitation project in last 5 years		-0.880* (0.012)		
Police services improved in last 5 years			-1.039* (0.012)	
Electrification project in last 5 years				-1.071* (0.013)
Constant	0.534* (0.067)	0.674* (0.069)	0.992* (0.068)	1.630* (0.072)
Control variables?	Yes	Yes	Yes	Yes
Fixed effects?	Yes	Yes	Yes	Yes
N			115106	

Notes: The results indicate that the type of asset owned affects preferences across public goods. Full tables with control variables available in the appendix.

\* $p < 0.05$ . Standard errors in parentheses.

## 6.2. Past experience shapes current preferences

Hypothesis 2 suggests that prior experience with public goods shapes current preferences regarding these goods. We operationalize this hypothesis with references to past educational experience. If an individual obtains secondary education, personal experience tells her that education is not an under-provided public good; conversely, the experience of missing education increases awareness of the lack of this particular public good. The less educated are acutely aware that their economic immobility is at least in part a function of lack of education and therefore support public education for others in their household (Stoddard 2009; Thurow 1972). We expect to find that individuals previously unable to attend school are more likely to demand public education.<sup>9</sup>

The lack of schooling might not only affect preferences for schools today, but also shape demand for other public goods. Existing research shows that education might be inversely related to health outcomes. Hollingsworth and

<sup>9</sup>As education is likely to be highly correlated with income, there is the possibility that education is simply a proxy for wealth. Our empirical strategy accounts for this with controls for the welfare quintile of the household to test if – when controlling for wealth – the level of education has an independent effect on the demand for public goods.

**Table 2.** Multivariate probit regression *simultaneously* testing three operationalizations of Hypothesis 2.

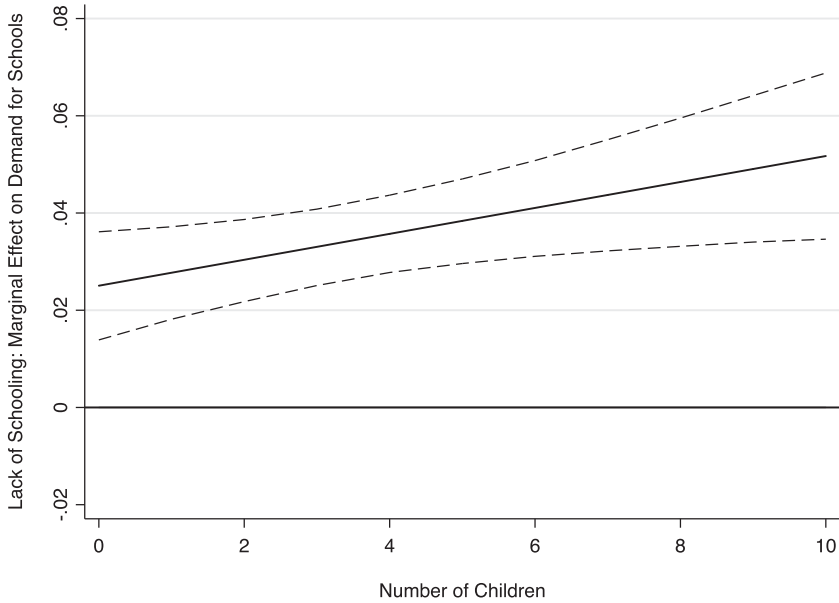
	Should school facilities be provided?	Should health facilities be provided?	Should sanitation facilities be provided?
No schooling	0.070* (0.010)	0.081* (0.011)	0.030* (0.011)
School construction in last 5 years	-0.551* (0.009)		
School rehabilitation in last 5 years	-0.318* (0.008)		
Health facility construction in last 5 years		-0.736* (0.011)	
Health facility rehabilitation in last 5 years		-0.472* (0.010)	
Sanitation project in last 5 years			-0.944* (0.013)
Constant	-0.373* (0.066)	0.143* (0.071)	0.628* (0.070)
Control variables?	Yes	Yes	Yes
Fixed effects?	Yes	Yes	Yes
N		115394	

Notes: The results indicate that lack of education affects preferences across public goods. Full tables with control variables available in the appendix.

\* $p < 0.05$ . Standard errors in parentheses.

Wildman (2003) and Grignon (2008) show that returns of education on health diminish rapidly with increases in education. Altindag et al. (2011) find no relationship between health and education among individuals having completed high school, but a positive impact for individuals with less schooling. In other words, the impact of an additional year of schooling on health is important during primary school but not during secondary education. Based on this research, we expect a higher preference for the supply of health and sanitation facilities from less-educated heads of household.

In sum, we test Hypothesis 2 using three different operationalizations: lack of education in the past should lead to strong demands on the government to provide education, health, and sanitation facilities. We estimate the three operationalizations of H2 simultaneously and find strong evidence supporting H2. The results of this three-equation multivariate probit model are presented in Table 2, with the positive and statistically significant coefficients indicating that households without schooling are more likely to prefer provision of school, health, or sanitation facilities than households whose head has some level of education.



**Figure 4.** Marginal effect of past experience on the demand for schools, conditional on the number of children.

Notes: Note that the confidence interval of the coefficient estimates at zero children overlap with those at ten children, indicating no statistically significant difference at different levels of need.

## 7. Summary of robustness tests

We summarize the findings of several robustness checks in this section; full details are available in Section 3 of the Online appendix.

### 7.1. Differences in wealth driving demand?

It might be the case that the determinants of preferences for specific public goods differ across rich and poor Nigerians. While our analysis controls for the welfare quintile of households, combining all households into the same analysis might provide inaccurate estimates if likes and dislikes cancel each other out. Therefore, we test our hypotheses on the subset of poor and rich Nigerians. The results for both H1 and H2 are identical among the rich and the poor, indicating that differences in wealth are not driving our results.

### 7.2. More accurate measures of wealth?

We recognize that the welfare quintile is a self-reported measure of wealth and thus might be inaccurate. Consequently, we re-estimate our models with more objective measures of household wealth, specifically whether the household

owns a television or whether the household owns a refrigerator. The results are not affected when controlling for wealth with these alternative variables.

### **7.3. Are homeowners different from renters?**

Our theory suggests that households prefer public goods complementing the value of assets they already own. For example, we expect homeowners to prefer all goods that improve home values, while renters might be primarily interested in portable public goods. We test this implication in the context of H2: The findings indicate that homeowners demand increased spending on education, health, and sanitation facilities as these goods increase home values. In contrast, non-homeowners want increased spending on education (because its effects are portable should the renter move to a different location), while they do not care for increased spending on health and sanitation. This test provides additional evidence consistent with our theory.

### **7.4. Past experience vs. current needs?**

One might wonder if H2 (Households exhibit strong preferences for provision of goods that they lacked in the past) can be distinguished from a related hypothesis: People simply demand public goods that they currently need. We argue that these hypotheses are distinct and conduct the following analysis to examine their relative importance. When estimating the demand for schools, we include an interaction between our indicator of past experience ('no schooling') and the number of children in the household. Presumably, a higher number of children would imply higher current need for schools. Figure 4 displays the marginal effect of past experience conditional on the number of children. We find that past experience is positive and statistically significant irrespective of the number of children. Moreover, the confidence intervals of the marginal effects at zero and ten children overlap, suggesting that the number of children does not significantly affect preferences.

### **7.5. Joint estimation of both hypotheses**

H1 and H2 test the effect of assets and past experience on preferences for several types of public goods. We implemented *separate* multiple equation models for each hypothesis; yet, we argue above that households' preferences are likely to be interdependent. Consequently, we estimate H1 and H2 jointly in a six-equation multivariate probit model. The findings are not affected by this change.

## 8. Conclusion

We explain how and why preferences for public goods vary across households, arguing that the distributional consequences of particular public goods differ across citizens. Our argument connects individual-level attributes to the distributional consequences of specific public goods, showing that individuals value particular public goods in predictable ways. We show that households are significantly more likely to demand the type of public good that (a) complements assets owned by that household and (b) resonates with their past experiences involving the lack of particular public goods, with consistent results across a wide range of public goods.

Our research makes several contributions to the literature on public goods. First, we show that citizens prefer specific, definable public goods that benefit them personally, rather than just a general level of public good provision. Second, we utilize unique data that allows for the analysis of preferences across multiple types of public goods. Third, we methodologically expand public goods analysis with simultaneous estimation of a wide variety of public goods choices based on multiple causal mechanisms. This method accounts for the fact that citizens may prefer many different types of public goods according to their own characteristics.

Our work has normative implications. As noted in the introduction, conventional wisdom suggests that ethnic identity determines preferences across public goods. Our results disagree with this view. [Carbone \(2012: 157\)](#) argues that ‘democratic reform processes are often supplemented by expectations of tangible improvements in social welfare.’ If we truly care about the rights and voices of citizens in new democracies, our work provides a way to identify what people want even lacking direct data on citizens’ preferences.

Lastly, our work has policy relevance. The findings can inform policy makers to better target public goods. This is particularly important in the context of developing countries’ limited budgets. Similarly, the findings could help improve foreign aid allocations. After all, international donors differ in their comparative advantages – Germany’s aid program emphasizes clean energy, while the U.S. is renowned for infrastructure support – which should be made available to those citizens that value the respective expertise most.

## Acknowledgements

This paper greatly benefited from the comments of Vito D’Orazio, Shelby Grossman, Asli Leblebicioglu, Clint Peinhardt, David Samuels, and Todd Sandler. Any remaining errors are our own.

## Disclosure statement

The authors note that no financial interest or benefit that have arisen from the direct applications of our research.

## Notes on contributors

**Alisha A. Kim** (Ph.D. The University of Texas at Dallas, 2017) is a Lecturer of Political Economy at the University of Texas at Dallas.

**Jonas B. Bunte** (Ph.D. University of Minnesota, 2013) is an Assistant Professor of Political Economy at the University of Texas at Dallas. His previous work can be found in the *Journal of Peace Research*, *International Studies Quarterly*, *British Journal of Political Science*, and *World Development*.

## References

- Alesina, A. and Fuchs-Schündeln, N. (2007) "Good-bye Lenin (or Not?): The Effect of Communism on People's Preferences," *The American Economic Review* 97(4): 1507–1528.
- Alesina, A. and Summers, L. H. (1993) "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence," *Journal of Money, Credit and Banking* 25(2): 151–162.
- Altindag, D., Cannonier, C., and Mocan, N. (2011) "The Impact of Education on Health Knowledge," *Economics of Education Review* 30(5): 792–812.
- Ansell, B. (2014) "The Political Economy of Ownership: Housing Markets and the Welfare State," *American Political Science Review* 108(2): 383–402.
- Anyanwu, J. C. (2007) "Demand for Health Care Institutions' Services: Evidence From Malaria Fever Treatment in Nigeria," *African Development Review* 19(2): 304–334.
- Arora, D. (2015) "Gender Differences in Time-poverty in Rural Mozambique," *Review of Social Economy* 73(2): 196–221.
- Bueno de Mesquita, B., Morrow, J. D., Siverson, R. M., and Smith, A. (2002) "Political Institutions, Policy Choice and the Survival of Leaders," *British Journal of Political Science* 32(04): 559–590.
- Cappellari, L. and Jenkins, S. P. (2007) "Multivariate Probit Regression Using Simulated Maximum Likelihood," *The Stata Journal* 3(3): 278–294.
- Carbone, G. (2012) "Do New Democracies Deliver Social Welfare? Political Regimes and Health Policy in Ghana and Cameroon," *Democratization* 19(2): 157–183.
- Castles, F. G. (1998) "The Really Big Trade-off: Home Ownership and the Welfare State in the New World and the Old," *Acta Politica* 33: 5–19.
- Cusack, T., Iversen, T., and Rehm, P. (2006) "Risks at Work: The Demand and Supply Sides of Government Redistribution," *Oxford Review of Economic Policy* 22(3): 365–389.
- Easterly, W. and Levine, R. (1997) "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics* 111(4): 1203–1250.
- Freedman, D. A. and Sekhon, J. S. (2010) "Endogeneity in Probit Response Models," *Political Analysis* 18(2): 138–150.
- Greene, W. (2002) "The Bias of the Fixed Effects Estimator in Nonlinear Models," NYU Working Paper.

- Grignon, M. (2008) "The Role of Education in Health System Performance," *Economics of Education Review* 27(3): 299–307.
- Habyarimana, J., Humphreys, M., Posner, D. N., and Weinstein, J. M. (2009) *Coethnicity: Diversity and the Dilemmas of Collective Action*, New York: Russell Sage Foundation.
- Hollingsworth, B. and Wildman, J. (2003) "The Efficiency of Health Production: Reestimating the WHO Panel Data Using Parametric and Nonparametric Approaches to Provide Additional Information," *Health Economics* 12(6): 493–504.
- Huntington, S. P. (1991) "Democracy's Third Wave," *Journal of Democracy* 2(2): 12–36.
- Ichoku, H. E. and Leibbrandt, M. (2003) "Demand for Healthcare Services in Nigeria: A Multivariate Nested Logit Model," *African Development Review* 15(2–3): 396–424.
- Iversen, T. and Soskice, D. (2001) "An Asset Theory of Social Policy Preferences," *American Political Science Review* 95(4): 875–893.
- Kemeny, J. (2005) "The Really Big TradeOff' between Home Ownership and Welfare: Castles' Evaluation of the 1980 Thesis, and a Reformulation 25 Years on," *Housing, Theory and Society* 22(2): 59–75.
- Lieberman, E. S. and McClendon, G. H. (2013) "The Ethnicity-policy Preference Link in Sub-Saharan Africa," *Comparative Political Studies* 46(5): 574–602.
- Mughan, A. (2007) "Economic Insecurity and Welfare Preferences: A Micro-level Analysis," *Comparative Politics* 39(3): 293–310.
- Ogundari, K. and Abdulai, A. (2014) "Determinants of Household's Education and Healthcare Spending in Nigeria: Evidence from Survey Data," *African Development Review* 26(1): 1–14.
- Pevehouse, J. C. (2002) "Democracy from the Outside-In? International Organizations and Democratization," *International Organization* 56(3): 515–549.
- Rehm, P. (2009) "Risks and Redistribution: An Individual-level Analysis," *Comparative Political Studies* 42(7): 855–881.
- Rodrik, D. (1998) "Why Do More Open Economies Have Bigger Governments?" *Journal of Political Economy* 106(5): 997–1032.
- Scheve, K. F. and Slaughter, M. J. (2001) "What Determines Individual Trade-policy Preferences?" *Journal of International Economics* 54(2): 267–292.
- Schokkaert, E. (1987) "Preferences and Demand for Local Public Spending," *Journal of Public Economics* 34(2): 175–188.
- Stoddard, C. (2009) "Why Did Education Become Publicly Funded? Evidence from the Nineteenth-century Growth of Public Primary Schooling in the United States," *The Journal of Economic History* 69(1): 172–201.
- Svallfors, S. (2010) "Policy Feedback, Generational Replacement, and Attitudes to State Intervention: Eastern and Western Germany, 1990–2006," *European Political Science Review* 2(01): 119–135.
- Throsby, C. D. and Withers, G. A. (1986) "Strategic Bias and Demand for Public Goods: Theory and an Application to the Arts," *Journal of Public Economics* 31(3): 307–327.
- Thurow, L. C. (1972) "Education and Economic Equality," *The Public Interest* 28: 66–81.
- Vogt, M., Bormann, N.-C., Ruegger, S., Cederman, L.-E., Hunziker, P., and Girardin, L. (2015) "Integrating Data on Ethnicity, Geography, and Conflict: The Ethnic Power Relations Dataset Family," *Journal of Conflict Resolution* 59(7): 1327–1342.