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Trust in Government and Willingness to Pay Taxes in Transition Countries

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This paper examines citizen trust in government institutions and the effect of trust on willingness to pay taxes for public goods/services in transition countries. Empirical models are estimated to test whether trust in government has a positive effect on WTP for improved public education, improved public health system, combating climate change, and helping the needy. Data are from the European Bank for Reconstruction and Development's Life in Transition Survey, 2010. Results indicate that trust in government generally has a significant positive effect on WTP for public goods, although differences are found among government institutions and across public goods.
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JEL Classification: H11, H31, H41

INTRODUCTION AND BACKGROUND

Introduction

This paper addresses the research question of how citizens' trust in their government institutions affects their willingness to pay (WTP) taxes for public services in the context of transition economies. This issue is particularly relevant for citizens in countries where government institutions have a legacy reflecting a former regime of a planned economy and authoritarianism with strong central government control and limited political and economic freedoms. A taxpaying culture did not exist in the former regimes because

the government owned all of the means of production, including enterprises, and extracted resources directly rather than relying directly on taxation. As transition countries have moved to more liberal economic regimes and political freedoms, it is important to consider how citizens' attitudes and trust in institutions have changed. The evidence provided here on how trust in government institutions affects citizen WTP for public goods and services contributes to advancing the literature on tax morale.

Empirical models are estimated in this paper explaining WTP by survey respondents in transition countries for a variety of public goods/services including public education, public health services, combatting climate change, and helping the needy. The empirical models estimated here test the fundamental hypothesis from the literature that higher levels of citizen trust in government institutions is associated with greater WTP for public goods and services. Two-step probit models are estimated which endogenize the trust in government measures and explain WTP additional taxes for various public services. In the first step, probit models are estimated explaining survey respondent's expressed trust in government institutions as a function of respondent characteristics and country fixed effects. Binary variables indicating trust, or lack thereof, are regressed on individual characteristics and country fixed effects. The estimated likelihood of trust in government institutions from the first-step probit models is then used as explanatory variables in second-step probit models explaining WTP additional taxes for public services. The specific public services modeled include public education, public health services, combatting climate change, and help for the needy. This modeling approach has not yet been used in the tax morale literature.

Data used in this study are from the European Bank for Reconstruction and Development (EBRD) Life in Transition Survey (LITS II) for the year 2010. The LITS II survey provides a cross-sectional data set on a wide range of variables covering 29 countries plus Kosovo and 5 Western European comparator countries. The survey includes a number of specific questions on citizen attitudes and values (Section 3 of the survey), including WTP for a variety of enhanced public services. In addition, there are a number of questions regarding governance (Section 6). These data are used to examine citizens' trust in government and their expressed WTP taxes for improvements in public services.

The paper proceeds as follows. The next sub-section provides an overview of related literature culminating in the testable hypothesis that increased trust is associated with greater WTP for public goods and services. "Life in Transition Survey Data" section describes the LITS II data that is used in the empirical analysis. "Empirical Models of Willingness to Pay Taxes" section reports estimation results for trust in government and WTP for public services.

"Summary and Conclusions" section concludes with a summary and policy discussion.

Related literature

This paper is intended to make a contribution to the growing literature on tax morale, with a specific focus on morale in transition countries. In recent years, a number of researchers have examined conditions of tax morale in various country contexts. For example, Lago-Peñas and Lago-Peñas (2010) examined tax morale in Europe, Alm and Torgler (2006) compared tax morale in the USA and Europe, Frey and Torgler (2007) examined morale in Western and Eastern European countries, and Torgler (2005) analyzed morale specifically in Switzerland. Each of these studies contributes to our knowledge of tax morale in the specific countries analyzed, but as yet Torgler (2003) is the only study with an exclusive focus on transition countries. The present paper is intended to fill this gap in the literature. This paper models citizen trust in government and their WTP for a variety of public goods and services. In order to do that, essential aspects of the linkage between trust and WTP are explored based on the existing results in the literature.

Trust, tax morale, and economic performance

An essential aspect of a country's tax morale, and the WTP of citizens for public goods and services, is the underlying trust that citizens have in their government. The issue of trust in government is important because authors such as Fukuyama (1995) and Zak and Knack (2001) have suggested that there is a link between trust and economic growth. Greater trust in society is associated with stronger economic growth. Of course, there are measurement difficulties to be sure, as noted in Glaeser *et al.* (2000), complex underpinnings as delineated in Uslaner (2002), and institutional/organizational contexts that are important to understand as indicated in LaPorta *et al.* (1997). Nevertheless, a growing literature has developed with a wide variety of approaches used to analyze the determinants and consequences of trust because trust ultimately affects growth.

Not only is growth affected by trust, but there is evidence that trust can smooth over economic fluctuations. Bursian *et al.* (2012) find that better-governed countries with higher levels of trust and credibility have less severe business cycles. They attribute this finding to the fact that high trust governments are able to defer fiscal consolidation to years when there is higher growth, thus dampening cycles.

In a public choice model of trust in government, Clark and Lee (2001) show that up to some level increased trust improves government performance, but beyond that level added trust gives too much latitude to interest

groups and negatively affects government performance. Their model is solved for an optimal level of trust, taking advantage of the initial beneficial effect of increasing trust, but avoiding the negative effects of excessive trust. But the ways in which trust enhances economic performance are, as yet, little studied. One exception is the work of Dawid and Deissenberg (2005) who develop a dynamic model in which some private agents believe the policy announcements of government officials. Other agents follow an optimizing strategy that includes the possibility that the announcements may be false. The fraction of agents that believe the announcements is modeled as following a word-of-mouth learning process. They show that, in such a model, the initial number of agents that believe the government announcement and the speed of the learning process are critical in the efficiency outcomes generated.

Individual and country characteristics matter

Both country and individual citizen characteristics can affect citizen trust and thereby influence their WTP for public services. Musgrave (1999a, b) and Steurele (1999) provide a set of observations on trust in government from an economic point of view that makes distinctions between individual and collective aspects of trust. Musgrave (1999b) makes a fundamental distinction between micro-level trust between agents in the private sector and macro-level trust in government. He argues that abuse of trust in the private sector is countered in a unilateral way by the victim, with trust supported by a legal framework of guarantees. In the public sector, however, trust involves communal action which makes its development much more difficult. He argues that trust in government is a form of social capital necessary to democracy.

In addition to trust being a form of general social capital associated with a society, there are a number of specific country characteristics have an influence on trust. Those characteristics include: overall macroeconomic conditions, government time consistency, the size of government, the extent of government decentralization, and corruption. Musgrave (1999a) connects public opinion on trust in government with general economic conditions, arguing that when a country's economy is strong, its citizens generally express more trust in their government. Steurele links the likelihood of government reneging on promises with citizen trust, indicating that reputation matters. Phelan (2006) provides a sophisticated model of government reputation in which the type of government (trustworthy or betraying) is not permanent, but follows an exogenous Markov process. His model captures three salient aspects of reputation: (1) governments that betray public trust do so erratically, (2) public trust in government can only be regained after a betrayal, and (3) governments with recent betrayals have a higher probability of betraying than do other governments. Yamamura (2012) examines the

relationship between the size of government and citizens' trust. He finds that larger government negatively affects generalized trust among workers, but has no effect among non-workers in Japan. Ligthart and van Oudheusden (2015) examine the relationship between fiscal decentralization and trust in government. They use repeated cross-country survey data over the period 1994–2007, estimated ordered response models of government trust and decentralization. Their findings indicate that fiscal decentralization increases trust in government. Sollé-Ollé and Sorribas-Navarro (2014) investigate whether corruption erodes trust in government using data on local scandals in Spain. They use survey data collected in 2009 and matching methods to identify the effect of corruption scandals on trust. Their results indicate that corruption has a significant negative effect on trust in local government politicians in Spain. Finally, Torgler (2003) reports that using the World Values Survey data, he finds evidence that tax morale in Central and Eastern European countries is stronger than in former Soviet Union countries.

Besides country characteristics that affect trust, there are individual characteristics that affect citizen trust in institutions. Price (2012) provides evidence that both race and employment status of individuals may have impacts on their trust in government. He models the decision to be self-employed finding that among black Americans the decision to be self-employed and the returns from that decision are sensitive to trust in the federal government. Measures of trust in the federal government increase both the likelihood of self-employment and the return to self-employment. Hence, employment status is linked to trust in institutions. Oh and Hong (2012) summarize that the existing literature has found that WTP may be a function of gender, income, education, parental status, and risk perception. In the estimations that follow, a number of these factors will be used, as suggested in the literature.

Testable hypotheses

In order to develop a model of trust and WTP, the approach taken here is to use the model of trust in government and citizen WTP that has been developed by Oh and Hong (2012) and use a number of explanatory variables capturing both country and individual characteristics as suggested in the literature review above. The Oh and Hong model incorporates a trust parameter for citizen i, denoted $\delta_i \in [0, 1]$, where a value of the parameter closer to one indicates greater trust. Their concept of δ_i is that trust is stochastic, reflecting citizen expectations. That is, δ_i captures the subjective probability that a citizen attaches to the government's announced intention of improving the quantity or quality of a public good or service. If δ_i is near zero, the citizen's stated WTP is lower than the desired WTP to support the government's announced project. The citizen is being rational with this stated

WTP because in the citizen's experience, the expected change in the quantity of the public good is not sufficient to compensate for the loss of income required to pay for the improvement.

Oh and Hong derive an expression for citizen WTP for an (ex post) improvement in the public good (self-assessed) using a conventional expenditure function approach and show that for greater values of the trust parameter, WTP is higher. Hence, the fundamental testable hypothesis flowing out of that model is that greater trust in institutions increases WTP. The size of the citizen's WTP is determined by preference parameters of the individual in that model. For example, the smaller the person's elasticity of substitution between private goods and the public good, the less likely the person will be to support paying additional taxes for an enhanced level of the public good. Of course, survey information does not provide estimates of the elasticity of substitution, but it does provide a number of personal characteristics that may affect WTP, as indicated in the literature review. In what follows, models of WTP are estimated using both individual characteristics contributing to trust and country characteristics that have been shown to be relevant in the literature cited above.

LIFE IN TRANSITION SURVEY DATA

LITS II survey

The European Bank for Reconstruction and Development (EBRD) is responsible for supporting the transition process among the 29 countries and territories of Central and Eastern Europe in which it operates. In order to better understand the perceptions and attitudes of citizens in these areas, the EBRD commissioned the first Life in Transition Study (LITS) in 2006. A second round survey, Life in Transition II (LITS II), was commissioned in 2010. The LITS II survey involved face-to-face interviews with 38,864 households. Ipsos MORI (2011) provides a technical explanation of the survey methodology used. In what follows, the 2010 survey responses are used in empirical modeling.

Countries included in the LITS II survey include: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyzstan, Latvia, Lithuania, FRY Macedonia, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkey, Ukraine, and Uzbekistan.

Questions used in empirical analysis

The survey instrument contains eight sections of questions. "Household Roster" section provides basic demographic information on the household,

including location, age of primary head of household, and other information. "Attitudes and Values" section includes a number of questions regarding attitudes and values. A key question from this section is used in the empirical estimation of trust in government. Question 3.03 asks, "To what extent do you trust in the following institutions? (a) the Presidency/Monarchy, (b) the government/cabinet of ministers, (c) regional government, (d) local government, (e) the parliament, (f) courts, (g) political parties, (h) armed forces, (i) the police, (j) banks and the financial system, (k) foreign investors, (l) non-governmental organizations, (m) trade unions, and (n) religious institutions." Survey respondents are given choices ranging from complete distrust (1), somewhat distrust (2) neither trust nor distrust (3), some trust (4), complete trust (5), not applicable (6), and do not know (7). Survey responses recording 6 or 7 were omitted from the sample used in estimation. Hence, the trust variable used in the empirical analysis uses a scale from 1 to 5, with 1 representing complete distrust and 5 representing complete trust.

A second key question used in the analysis is Question 3.06 which asks, "Would you be willing to give part of your income or pay more taxes, if you were sure that the extra money was used to: (a) improve public education, (b) improve the public health system, (c) combat climate change, or (d) help the needy." Responses to this question were recorded as simple yes or no.

The income question (Question 2.27) asks the respondent to, "Please imagine a ten-step ladder where on the bottom, the first step, stand the poorest 10% of people in our country, and on the highest step, the tenth, stand the richest 10% of people in our country. On which step of the ten is your household today?" Given the way this question is framed, it provides an indication of the relative income of the household within the context of the respondent's country-specific income distribution.

Descriptive statistics

Table 1 reports descriptive statistics for the LITS II survey data-selected sample that is used in the subsequent empirical models. The top panel of the table reports statistics for the demographic variables used as controls in the empirical models. The average age of household responder is just under 49 years. Current income, measured on a ten-step ladder (deciles), is reported to be 4.74, nearly in the middle. In terms of sources of income, the majority of respondents earn a salary (69%), followed by pensions (33%), self-employed (25%), and farm production (13%). Most respondents are married (70%).

While the full LITS II sample includes approximately 33,000 survey responses, there are a large number of missing observations for particular questions. A consistent set of comprehensive survey responses that includes answers to all of the trust questions is much smaller, with sample size 5,284.

Table 1: LITS II descriptive statistics—selected sample ($n = 5{,}284$)

Variable	Mean	Minimum	Maximum	SD
Demographic variables				
Age	48.95	17	97	14.21
Education	4.24	1	7	1.39
Income	4.74	1	10	1.65
Salary income	0.69	0	1	0.46
Self-employed income	0.25	0	1	0.43
Farm production income	0.13	0	1	0.33
Pension income	0.33	0	1	0.47
Married	0.70	0	1	0.46
Divorced	0.03	0	1	0.18
Widow	0.03	0	1	0.16
Life satisfaction	5.61	1	10	1.98
Orthodox Christian	0.31	0	1	0.46
Trust in government responses				
President/monarch	3.09	1	5	1.31
Government/cabinet	2.68	1	5	1.26
Regional government	2.84	1	5	1.21
Local government	2.90	1	5	1.22
Parliament	2.60	1	5	1.22
Courts	2.71	1	5	1.21
Political parties	2.42	1	5	1.15
Armed forces	3.32	1	5	1.18
Police	3.10	1	5	1.18
Banks and financial system	3.07	1	5	1.17
Foreign investors	2.86	1	5	1.11
Non-governmental organizations	2.90	1	5	1.11
Trade unions	2.86	1	5	1.12
Religious institutions	3.02	1	5	1.21
Willingness to pay taxes responses				
Improve public education	0.45	0	1	0.50
Improve the public health system	0.51	0	1	0.50
Combat climate change	0.30	0	1	0.46
Help the needy	0.50	0	1	0.50

Twenty-three countries are represented in the selected sample. LITS II countries not represented in the selected sample are: Hungary, Kosovo, Latvia, FRY Macedonia, Montenegro, Slovenia, and Uzbekistan. For comparison, Table 6 in "Appendix" reports descriptive statistics for the full sample of LITS II and the selected sample with complete trust question responses (for all respondents at least 17 years of age but no more than 97). While the samples are similar in several respects, there are differences worth noting. Comparing demographic descriptors of the selected sample with the full sample indicates that the selected sample is somewhat younger (48.95 vs. 50.73 years), higher income (4.74 on the 10-step income ladder vs. 4.32), more likely to have salary income (69 vs. 59%), more likely to be self-employed (25 vs. 20%), less likely to have pension income (33 vs. 41%), and so on. The differences in means and

proportions reported for demographic variables are all statistically significant at usual levels. Hence, we know that the survey respondents that answered all of the trust questions are somewhat different from other respondents. The two-step estimation approach using binary choice models that follows endogenizes trust measures and accounts for systematic differences based on survey respondent characteristics as well as country characteristics.

The second panel of the table reports statistics related to the trust in government questions. Of the fourteen categories of social institutions listed, the armed forces receive the highest reported trust, 3.32. The second tier of institutions in the ranking includes the president/monarch, the police, and banks and the financial system. Each of those institutions received similar scores of 3.09, 3.10, and 3.07, respectively, on the five-point trust scale. It should be recognized, however, that the numerical score of 3 on this scale is associated with the response "neither trust nor distrust." Religious institutions received the next highest score of 3.02. All the other institutions receive scores below 3. The social institution receiving the lowest trust score is political parties, with a score of 2.42. In the analysis to follow only trust in the first five government institutions are used: trust in the president or monarchy, trust in government or cabinet, trust in regional government, trust in local government, and trust in parliament.

Finally, Table 1 reports statistics for the WTP taxes questions in the bottom panel. For each of the public goods/services, a dichotomous variable is created that takes on the value one if the survey response indicates some or complete trust. Otherwise, the variable takes on the value zero. Of the four purposes listed for additional tax money to be used, respondents are most supportive of paying additional taxes to improve the health system and help the needy. Those public goods receive mean scores of 0.51 and 0.50, respectively, indicating that about half of the survey respondents said they would support higher taxes for those purposes. Higher taxes to improve public education are supported by 45% of the respondents. Only 30% support higher taxes to combat climate change.

These five trust measures are correlated, as one might expect. Table 7 of "Appendix" reports the pairwise correlations among the five variables. Those correlations range from 0.49 (trust in the president/monarch and parliament) to 0.72 (trust in regional and local governments). As a consequence of the relatively high degree of correlation among trust measures, they are used independently in the modeling that follows. While the five trust measures could be aggregated or combined into one or several composite measures, perhaps using principle components, doing so would eliminate the possibility of discerning distinct trust effects for each government institution. Hence, the models estimated below use each of the five trust measures independently.

EMPIRICAL MODELS OF WILLINGNESS TO PAY TAXES

In this section, results of estimation of WTP for public goods are presented. The LITS II survey asks respondents about WTP for improved public education, improved public health system, combating climate change, and help for the needy. Tables 2, 3, 4, and 5 report estimation results for probit models where the dependent variable is dichotomous (respondent says yes or

Table 2: Willingness to pay additional taxes for public education

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	−0.40***	−0.43***	−0.44***	−0.42***	−0.41***
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Age	−0.30E−02**	−0.24E−02	−0.26E−02*	−0.28E−02**	−0.24E−02*
	(0.14E−02)	(0.14E−02)	(0.14E−02)	(0.14E−02)	(0.14E−02)
Education	0.52E−01***	0.35E−01***	0.42E−01***	0.54E−01***	0.42E−01***
	(0.13E−01)	(0.13E−01)	(0.13E−01)	(0.13E−01)	(0.13E−01)
Income	0.34E−03	−0.37E−02	−0.61E−02	−0.26E−02	−0.30E−02
	(0.15E−01)	(0.15E−01)	(0.15E−01)	(0.15E−01)	(0.15E−01)
Income × salary	0.11E−01	0.17E−01*	0.16E−01*	0.13E−01	0.16E−01*
	(0.91E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)
Income × self-employed	0.38E−01***	0.36E−01***	0.36E−01***	0.38E−01***	0.36E−01***
	(0.83E−02)	(0.84E−02)	(0.83E−02)	(0.83E−02)	(0.80E−02)
Income × farm production	0.41E−01***	0.32E−01**	0.33E−01***	0.37E−01***	0.31E−01***
	(0.11E−01)	(0.12E−01)	(0.12E−01)	(0.11E−01)	(0.11E−01)
Income × pension	−0.17E−02	−0.17E−02	−0.20E−02	−0.25E−02	0.24E−02
	(0.92E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)
Married	−0.92E−01**	−0.82E−01**	−0.88E−01**	−0.87E−01**	−0.83**
	(0.41E−01)	(0.41E−01)	(0.41E−01)	(0.41E−01)	(0.41E−01)
Divorced	−0.41***	−0.38***	−0.40***	−0.42***	−0.39***
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Widow	−0.76E−01	−0.73E−01	−0.74E−01	−0.75E−01	−0.74E−01
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Trust in president or monarchy	0.36***				
	(0.75E−01)				
Trust in government or cabinet		0.81***			
		(0.88E−01)			
Trust in regional government			0.73***		
			(0.99E−01)		
Trust in local government				0.46***	
				(0.11)	
Trust in parliament					0.72***
					(0.98E−01)
Chi-square	126.95	190.30	160.97	122.51	160.24
McFadden pseudo R^2	0.02	0.03	0.02	0.02	0.02
n	5,284	5,284	5,284	5,284	5,284

Note: ***, **, and * indicate significance with *p* values of 0.01, 0.05, and 0.10, respectively. E−*n* indicates multiply by 10^{-n}. Standard errors are reported in parentheses.

Table 3: Willingness to pay additional taxes for public health

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	−0.22**	−0.23**	−0.23**	−0.21**	−0.21**
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Age	−0.25E−02*	−0.22E−02	−0.24E−02*	−0.25E−02*	−0.24E−02
	(0.14E−02)	(0.14E−02)	(0.14E−02)	(0.14E−02)	(0.14E−02)
Education	0.47E−01***	0.39E−01***	0.43E−01***	0.48E−01***	0.45E−01***
	(0.13E−01)	(0.13E−01)	(0.13E−01)	(0.13E−01)	(0.13E−01)
Income	−0.93E−02	−0.11E−01	−0.11E−01	−0.98E−02	−0.98E−02
	(0.14E−01)	(0.14E−01)	(0.15E−01)	(0.15E−01)	(0.14E−01)
Income × salary	0.22E−01**	0.24E−01***	0.24E−01***	0.23E−01**	0.23E−01**
	(0.91E−02)	(0.91E−02)	(0.91E−02)	(0.91E−02)	(0.91E−02)
Income × self-employed	0.40E−01***	0.39E−01***	0.39E−01***	0.40E−01***	0.40E−01***
	(0.83E−02)	(0.83E−02)	(0.83E−02)	(0.83E−02)	(0.83E−02)
Income × farm production	0.10E−01	0.61E−02	0.71E−02	0.90E−01	0.74E−02
	(0.11E−01)	(0.11E−01)	(0.11E−01)	(0.11E−01)	(0.11E−01)
Income × pension	0.24E−01***	0.24E−01***	0.24E−01***	0.24E−01***	0.24E−01***
	(0.92E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)
Married	−0.21E−01	−0.19E−01	−0.21E−01	−0.21E−01	−0.20E−01
	(0.41E−01)	(0.41E−01)	(0.41E−01)	(0.41E−01)	(0.41E−01)
Divorced	−0.21**	−0.19*	−0.20*	−0.21**	−0.20*
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Widow	−0.10	−0.10	−0.10E−01	−0.10E−01	−0.10
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Trust in president or monarchy	0.14*				
	(0.75E−01)				
Trust in government or cabinet		0.36***			
		(0.86E−01)			
Trust in regional government			0.29**		
			(0.97E−01)		
Trust in local government				0.14	
				(0.11)	
Trust in parliament					0.22**
					(0.96E−01)
Chi-square	71.94	86.14	77.49	70.20	73.54
McFadden pseudo R^2	0.01	0.01	0.01	0.01	0.01
n	5,284	5,284	5,284	5,284	5,284

Note: ***, **, and * indicate significance with *p* values of 0.01, 0.05, and 0.10, respectively. E−*n* indicates multiply by 10^{-n}. Standard errors are reported in parentheses.

no), and the independent variables are survey respondent characteristics. For each of the four public goods, five models are estimated and reported in Tables 2, 3, 4, and 5. Each of the probit models reported uses one of the five measures of trust in government institutions.

Modeling approach

A naive approach in modeling the effect of trust on willingness to pay for public services would begin with estimating models that include an independent variable measuring trust in government. The problem with

Table 4: Willingness to pay additional taxes to combat climate change

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	−0.50***	−0.53***	−0.51***	−0.45***	−0.51***
	(0.11)	(0.11)	(0.11)	(0.12)	(0.11)
Age	−0.23E−02	−0.20E−02	−0.22E−02	−0.23E−02	−0.22E−02
	(0.15E−02)	(0.15E−02)	(0.15E−02)	(0.15E−02)	(0.15E−02)
Education	0.29E−01**	0.20E−01	0.28E−01**	0.33E−01**	0.27E−01**
	(0.14E−01)	(0.14E−01)	(0.14E−01)	(0.14E−01)	(0.14E−01)
Income	−0.18E−01	−0.21E−01	−0.19E−01	−0.14E−01	−0.10E−01
	(0.15E−01)	(0.15E−01)	(0.15E−01)	(0.15E−01)	(0.15E−01)
Income × salary	0.20E−01**	0.22E−01**	0.20E−01**	0.18E−01*	0.20E−01**
	(0.95E−02)	(0.96E−02)	(0.96E−02)	(0.96E−02)	(0.96E−02)
Income × self-employed	0.19E−01**	0.18E−01**	0.19E−01**	0.20E−01**	0.19E−01**
	(0.86E−02)	(0.86E−02)	(0.86E−02)	(0.86E−02)	(0.86E−02)
Income × farm production	0.39E−02	−0.36E−03	0.28E−02	0.490E−02	0.24E−02
	(0.12E−01)	(0.12E−01)	(0.12E−01)	(0.12E−01)	(0.12E−01)
Income × pension	0.15E−01	0.145−01	0.15E−01	0.15E−01	0.15E−01
	(0.95E−02)	(0.95E−02)	(0.95E−02)	(0.95E−02)	(0.95E−02)
Married	−0.13***	−0.13***	−0.13***	−0.13***	−0.13***
	(0.42E−01)	(0.42E−01)	(0.42E−01)	(0.42E−01)	(0.42E−01)
Divorced	−0.25**	−0.24**	−0.25**	−0.25**	−0.25**
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Widow	−0.14	−0.14	−0.14	−0.13	−0.14
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Trust in president or monarchy	0.06				
	(0.77E−01)				
Trust in government or cabinet		0.30***			
		(0.89E−01)			
Trust in regional government			0.10		
			(0.10)		
Trust in local government				−0.15	
				(0.11)	
Trust in parliament					0.12
					(0.10)
Chi-square	32.73	43.09	33.11	33.76	33.40
McFadden pseudo R^2	0.01	0.01	0.01	0.01	0.01
n	5,284	5,284	5,284	5,284	5,284

Note: ***, **, and * indicate significance with *p* values of 0.01, 0.05, and 0.10, respectively. E−*n* indicates multiply by 10^{-n}. Standard errors are reported in parentheses.

that approach is that trust in government may be endogenous, depending on some of the same factors that affect WTP. To account for that possibility, the approach taken in this research is to explicitly endogenize the trust measures. Two-step probit models are estimated which endogenize the trust in government measures and explain WTP additional taxes for various public services. In the first step, probit models are estimated explaining survey respondent's expressed trust in government institutions as a function of respondent characteristics and country fixed effects. Binary variables indicating trust, or lack thereof, are regressed on individual characteristics

Table 5: Willingness to pay additional taxes to help the needy

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.87E−02	0.24E−01	−0.21E−01	0.12E−01	−0.82E−01
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Age	−0.35−02**	−0.32E−02**	−0.33E−02**	−0.35E−02***	−0.33E−02**
	(0.14E−02)	(0.14E−02)	(0.14E−02)	(0.14E−02)	(0.14E−02)
Education	0.12E−01	−0.20E−02	0.73E−02	0.15E−01	0.72E−02
	(0.13E−01)	(0.13E−01)	(0.13E−01)	(0.13E−01)	(0.13E−01)
Income	−0.45E−02	−0.69E−02	−0.74E−02	−0.39E−02	−0.59E−02
	(0.14E−01)	(0.15E−01)	(0.15E−01)	(0.15E−01)	(0.15E−01)
Income × salary	0.20E−01**	0.23E−01**	0.22E−01**	0.20E−01**	0.22E−01**
	(0.91E−02)	(0.91E−02)	(0.91E−02)	(0.91E−02)	(0.91E−02)
Income × self-employed	0.29E−01***	0.28E−01***	0.28E−01***	0.30E−01***	0.28E−01***
	(0.83E−02)	(0.83E−02)	(0.83E−02)	(0.83E−02)	(0.83E−02)
Income × farm production	0.37E−01***	0.232−01***	0.33E−01***	0.36E−01***	0.32E−01**
	(0.11E−01)	(0.11E−01)	(0.11E−01)	(0.11E−01)	(0.11E−01)
Income × pension	0.32E−01***	0.32E−01***	0.32E−01***	0.32E−01***	0.32E−01***
	(0.92E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)	(0.92E−02)
Married	−0.13***	−0.12***	−0.13***	−0.13***	−0.12***
	(0.41E−01)	(0.41E−01)	(0.41E−01)	(0.41E−01)	(0.41E−01)
Divorced	−0.34***	−0.32***	−0.33***	−0.34***	−0.33***
	(0.10)	(0.10)	(0.10)	(0.10)	(0.101)
Widow	−0.26**	−0.26**	−0.26**	−0.26**	−0.26**
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Trust in president or monarchy	0.19**				
	(0.75E−01)				
Trust in government or cabinet		0.45***			
		(0.87E−01)			
Trust in regional government			0.36***		
			(0.98E−01)		
Trust in local government				0.12	
				(0.11)	
Trust in parliament					0.36***
					(0.97E−01)
Chi-square	74.78	95.21	81.84	69.54	82.08
McFadden pseudo R^2	0.01	0.01	0.01	0.01	0.01
n	5,284	5,284	5,284	5,284	5,284

Note: ***, **, and * indicate significance with *p* values of 0.01, 0.05, and 0.10, respectively. E−*n* indicates multiply by 10^{-n}. Standard errors are reported in parentheses.

and country fixed effects. The individual characteristics include age, educational attainment, a measure of overall life satisfaction (using responses to Question 722 which asks respondents to report their satisfaction or dissatisfaction with life as a whole using a ten-point scale; 1 = completely dissatisfied; 10 = completely satisfied), and religion (Orthodox Christian = 1; zero otherwise). First-stage model estimates are reported in Table 8 in "Appendix". The age and education variables are only positive

and significant in one of the five trust equations, but the life satisfaction variable is positive and significant across all five trust equations. The Orthodox Christian variable is positive and significant in three of the five trust equations. The country fixed effect variables are almost always highly significant across all five trust equations.

The estimated likelihood of trust in government institutions from the first-step probit models is then used as an explanatory variable in each of the second-step probit models explaining WTP additional taxes for public services. The specific public services modeled include public education, public health services, combatting climate change, and help for the needy. The advantage of this two-step modeling approach is that it endogenizes the trust in government and provides more accurate estimates of the impact of trust on WTP. This two-step binary choice modeling approach has not yet been used in the literature on trust and WTP.

The two-step estimation method using binary choice models employed in this study is described in Greene (2012). While there are a number of parametric models for binary choice that may be used, including probit and logit, Greene (2012) reports that, "None of these is obviously best for any situation." However, he also indicates that there is a clear advantage of the probit model when the binary choice is part of a more elaborate multiple equation structure. Hence, in the models reported below, probit estimation is used. As a further check, these models have also been estimated using logit, but the results are qualitatively identical to those using probit.

Willingness to pay for improved public education

Willingness to pay additional taxes for improved public education is reported in Table 2. Five model estimates are reported, with each model including one of the institutions of government (president or monarch, government or cabinet, regional government, local government, and parliament). Respondent age has a negative and significant effect on WTP for improved public education across all but one of the model specifications. Hence, older citizens appear to be generally less willing to pay for improved public education, regardless of their trust in government institutions. Education has a strong positive effect on WTP across all five models. Respondents with higher educational attainment are willing to pay more for improved quality of public education.

The level of respondent's income has an insignificant effect on WTP for public education, but when the source of that income is taken into account, differences appear. Salaried employees, self-employed respondents, and those receiving farm-related income are more likely to support improved public

education, although the magnitudes of the coefficients differ. Self-employed and farm income have stronger effects across all five models, compared to salary income. The marginal effect for the salary variable is 0.006, while that for self-employed is 0.014 in Model 2, for example, indicating that the self-employment effect on WTP is more than twice as strong. Other things being equal, salaried respondents are 0.6% more likely to indicate WTP for improved public education, while self-employed respondents are 1.4% more likely. In addition, respondents earning income from farm production are about 1.2% more likely to indicate a WTP. Marital status also matters as married respondents are about 3% less likely and divorced respondents are about 14% less likely to indicate WTP.

All five endogenous measures of trust in government are positive and significantly different from zero in their effect on WTP for improved public education. These results are consistent with the theoretical model prediction that greater trust in government institutions is associated with greater WTP to pay taxes. The strength of the trust effect differs, however, depending on the government institution included in the estimating model. For Models 1 and 4, the probit model coefficients, when converted into marginal effects, are 14 and 18%, respectively. Hence, increase in the trust variable for the president/monarchy or local government increases WTP by approximately 14–18%. The effect is stronger for trust in the government or cabinet, regional government, and parliament where the marginal effects are 31, 28, and 28%, respectively.

Willingness to pay for an improved public health system

Table 3 reports the estimation results for probit models of WTP for an improved public health system. The five sets of model estimates again reflect the inclusion of five government trust measures. In this case, the respondent's age has a negative but weakly significant effect on WTP across all five models. In two of the models, age is insignificant. Educational attainment has a strong positive effect on WTP across the board. Income has a statistically insignificant effect on WTP. Sources of income do matter, however, once again. Salary and self-employment income have positive and significant effects on WTP for improved public health services. Farm production as a source of income has no effect on WTP for this public good. Pension income, however, has a strong significant positive effect on WTP. Among the marital status variables, only the divorce variable is significant, reducing WTP.

Four of the five measures of trust in government have a positive and significant effect on WTP for an improved public health system. The exception is trust in local government, which in the countries represented in the data set

are not typically responsible for public health. The marginal effect of a unit increase in the trust variable is strongest at approximately 14% for trust in the government/cabinet. The trust effect is somewhat weaker for regional government (with a marginal effect of 12%), and weaker still for parliament (marginal effect 9%), and the president or monarchy (marginal effect 5%).

Willingness to pay for combating climate change

Table 4 reports the estimation results for probit models of WTP for combating climate change. Once again, the five model specifications include each of the five trusts in government measures. These results are weaker than the previous results for improved public education and public health. Age of respondent has an insignificant negative effect on WTP across all five models. Educational attainment has a positive and generally significant effect on WTP to combat climate change. Income has no statistically significant effect on WTP. Among the income source variables, salary and self-employment income interaction terms have positive and statistically significant effects on WTP. Farm production income has no effect indicating that farmers express no WTP for climate change. Married respondents are significantly less likely to indicate WTP, and divorced status has a significant and even stronger negative effect.

Among the trust in government variables included in the models, only the effect of trust in the government or cabinet in Model 2 is statistically discernible. The marginal effect in that case is 10%. None of the other trust measures have a discernible effect on WTP to combat climate change.

Willingness to pay to help the needy

Table 5 reports results for the estimation of probit models of WTP to help the needy. Age of respondent has a negative effect, as does married, divorced, and widowed status. Educational attainment has an insignificant effect on WTP. Income also has a negative but insignificant effect. Income sources from salary, self-employment, farm production, and pension income all increase WTP to help the needy significantly.

Among the trust in government variables included in Models 1–5, four of the five measures of trust have significant positive effects on WTP to help the needy. The strongest effect is trust in the government or cabinet, with a marginal effect of 18%. Trust in the regional government and parliament has similar positive effects, with marginal impacts 14%. Trust in the president or monarchy has a marginal effect of 8%. Trust in local government is not statistically discernible.

SUMMARY AND CONCLUSIONS

This paper presents tests of the implications of a model of willingness to pay (WTP) for public goods that incorporates trust in government institutions. Empirical tests reported here use survey data from a wide range of transition countries. The empirical results confirm the theoretical model's testable hypothesis that greater trust in government institutions has a positive effect on citizens' expressed willingness to pay. A two-stage modeling approach is used in which trust in government institutions is made endogenous. First-stage probit models estimate trust in government institutions as a function of individual survey respondent characteristics and country fixed effects. Estimated probabilities of trust from the first-stage models are then used as explanatory variables in the second-stage models explaining WTP as a function of individual characteristics, country fixed effects, and trust in government institutions. Second-stage probit models of WTP for improved public education find that all five measures of trust in government (trust in president/monarchy, trust in government/cabinet, trust in regional government, trust in local government, and trust in parliament) have significant positive effects. The effects are stronger for trust in higher-level government institutions, however, compared to lower-level governments (regional and local). Models of WTP for an improved public health system similarly reveal significant positive effects of trust in government measures. Four of the five measures of trust in government have significant positive effects on WTP (with local government the exception). The marginal effects of trust in government on WTP for public health are smaller, however, than for public education. Models of WTP for combating climate change reveal significantly weaker effects of trust in government. Trust in the government or cabinet is the only trust measure with a significant effect. Trust in other government institutions has no effect on WTP for combating climate change. For helping the needy, trust in four of the five government institutions has positive effects on WTP (trust in local government is the exception).

In summary, these results provide strong indications that trust in government institutions has direct positive effects on WTP for public goods and services. The strength of the link between trust and WTP varies, however, across the range of public services provided and across government institutions in the transition economies analyzed. The marginal effects of trust are strongest for public education. Trust in higher levels of government generally has more effect than trust in local government, which only has a significant effect in the case of public education.

These results are based on a sample of more than 5,200 complete LITS II household survey responses across 23 transition countries. That survey was

conducted using appropriate probability sampling methods in each country to assure quality, reliability, and comparability of the data collected. All residents had equal chances of being selected in order to guarantee representative samples in each country. Based on the LITS II sampling procedure and the sufficiently large sample of complete responses analyzed in this research, we have strong evidence regarding tax morale in transition countries generally.

The policy implications that follow are straightforward if not easy to implement. Governments in transition countries that wish to facilitate economic growth and solidify or stabilize their fiscal foundations must build trust with their citizens. The evidence provided in this research indicates that trust-building will enhance citizen willingness to support government institutions financially. Support for public education can be enhanced by building trust in all five government institutions studied (the president or monarch, the government or cabinet, regional governments, local governments, and parliament), although the strongest effects come from trust in the government or cabinet, parliament, and regional governments. Support for public health programs is best built by trust-building by the government or cabinet and regional governments. For climate change initiatives, there is a distinctly lower level of willingness to pay. In this case, only trust in the government or cabinet appears to matter. Help for the needy in society is best supported by trust-building with the government or cabinet, parliament, and regional governments. The question of how governments in transition countries can build trust is beyond the scope of this study, but surely involves predictability, responsiveness, transparency, and other characteristics that support strong and healthy relationships between government institutions and the citizenry.

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APPENDIX TABLES

Table 6: LITS II descriptive statistics—full sample ($n = 32{,}768$)

Variable	Mean	Minimum	Maximum	SD
Demographic variables				
Age	50.73	17	97	15.64
Education	4.14	1	7	1.43
Income	4.32	1	10	1.67
Salary income	0.59	0	1	0.49
Self-employed income	0.20	0	1	0.40
Farm production income	0.12	0	1	0.32
Pension income	0.41	0	1	0.49
Married	0.60	0	1	0.49
Divorced	0.07	0	1	0.25
Widow	0.12	0	1	0.33
Life satisfaction	5.27	1	10	2.06
Orthodox Christian	0.38	0	1	0.49

Table 7: Trust in government measures—pairwise correlations

	Trust in the president or monarch	Trust in government or cabinet	Trust in regional government	Trust in local government	Trust in parliament
Trust in the president or monarch	1.00				
Trust in government or cabinet	0.61	1.00			
Trust in regional government	0.54	0.67	1.00		
Trust in local government	0.50	0.57	0.72	1.00	
Trust in parliament	0.49	0.67	0.60	0.55	1.00

Table 8: First-stage models

Variable	Trust in president or monarchy	Trust in government or cabinet	Trust in regional government	Trust in local government	Trust in parliament
Age	0.22E−02	0.59E−03	0.16E−02	0.233E−02*	0.22E−03
	(0.14E−02)	(0.15E−02)	(0.14E−02)	(0.13E−02)	(0.15E−02)
Education	0.32E−01**	0.25E−01	0.13E−01	−0.13	0.68E−02
	(0.15E−01)	(0.16E−01)	(0.15E−01)	(0.14E−01)	(0.16E−01)
Life satisfaction	0.85E−01***	0.99E−01***	0.93E−01***	0.90E−01***	0.90E−01***
	(0.10E−01)	(0.11E−01)	(0.10E−01)	(0.10E−01)	(0.11E−01)
Orthodox Christian	−0.17E−01	0.16**	0.20***	0.19***	0.11
	(0.69E−01)	(0.72E−01)	(0.69E−01)	(0.67E−01)	(0.73E−01)
Albania	−1.11***	−1.50***	−1.24***	−1.13***	−1.36***
	(0.14)	(0.15)	(0.14)	(0.14)	(0.15)
Armenia	−1.36***	−1.54***	−1.53***	−1.36***	−1.49***
	(0.17)	(0.18)	(0.17)	(0.17)	(0.18)
Azerbaijan	0.57***	−0.31***	−0.48***	−0.36***	−0.51***
	(0.15)	(0.14)	(0.13)	(0.13)	(0.14)
Belarus	−0.88***	−0.82***	−0.96***	−0.78***	−0.65***
	(0.17)	(0.18)	(0.17)	(0.17)	(0.18)
Bosnia and Herzegovina	−1.80***	−1.70***	−1.70***	−1.49***	−1.66***
	(0.13)	(0.14)	(0.13)	(0.13)	(0.14)
Bulgaria	−1.31***	−1.59***	−1.41***	−1.34***	−1.80***
	(0.17)	(0.18)	(0.17)	(0.17)	(0.19)
Croatia	−1.02***	−2.53***	−2.17***	−1.96***	−2.32***
	(0.15)	(0.20)	(0.18)	(0.17)	(0.20)
Czech Republic	−0.67***	−1.63***	−1.25***	−0.74***	−1.60***
	(0.13)	(0.14)	(0.13)	(0.12)	(0.14)
Estonia	−0.20	−1.03***	−0.54***	−0.57***	−1.09***
	(0.16)	(0.16)	(0.15)	(0.15)	(0.16)
Georgia	−0.15	−0.76***	−0.79***	−0.56***	−0.85***
	(0.18)	(0.19)	(0.18)	(0.18)	(0.19)
Kazakhstan	0.16	−0.45***	−0.59***	−0.49***	−0.33***
	(0.15)	(0.15)	(0.14)	(0.14)	(0.15)
Kyrgyzstan	−1.37***	−1.37***	−1.04***	−0.81***	−1.08***
	(0.14)	(0.15)	(0.14)	(0.13)	(0.14)

Table 8: continued

Variable	Trust in president or monarchy	Trust in government or cabinet	Trust in regional government	Trust in local government	Trust in parliament
Lithuania	−0.35**	−1.71***	−1.94***	−1.31***	−1.83***
	(0.16)	(0.19)	(0.20)	(0.17)	(0.20)
Moldova	−1.35***	−1.45***	−1.27***	−1.23***	−1.42***
	(0.19)	(0.19)	(0.19)	(0.18)	(0.20)
Mongolia	−1.03***	−1.24***	−0.99***	−0.78***	−1.12***
	(0.14)	(0.15)	(0.14)	(0.14)	(0.15)
Poland	−1.01***	−1.27***	−0.97***	−0.79***	−1.18***
	(0.13)	(0.13)	(0.13)	(0.12)	(0.13)
Romania	−1.80***	−2.38***	−1.82***	−1.40***	−2.12***
	(0.16)	(0.19)	(0.16)	(0.15)	(0.18)
Russia	−0.91***	−1.11***	−1.46***	−0.91***	−0.84***
	(0.23)	(0.23)	(0.24)	(0.23)	(0.23)
Serbia	−1.37***	−2.12***	−1.89***	−1.72***	−1.99***
	(0.14)	(0.16)	(0.15)	(0.14)	(0.16)
Slovakia	−0.96***	−1.74***	−1.53***	−1.20***	−1.60***
	(0.12)	(0.14)	(0.13)	(0.12)	(0.14)
Tajikistan	0.39***	0.11	0.75E−01	−0.36E−01	−0.64E−03
	(0.14)	(0.14)	(0.14)	(0.13)	(0.14)
Turkey	−0.12	−0.35	−0.28	−0.40*	−0.42*
	(0.22)	(0.22)	(0.22)	(0.21)	(0.22)
Ukraine	−1.23***	−1.56***	−1.45***	−1.03***	−1.65***
	(0.18)	(0.19)	(0.18)	(0.17)	(0.20)
Chi-square	1,305.69	1,123.22	852.64	649.18	939.06
McFadden pseudo R^2	0.18	0.18	0.13	0.09	0.15
n	5,284	5,284	5,284	5,284	5,284

Note: ***, **, and * indicate significance with p values of 0.01, 0.05, and 0.10, respectively. E−n indicates multiply by 10^{-n}. Standard errors are reported in parentheses.