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Articles

Effectiveness of macroprudential policies in Central and Eastern European countries

MIRNA DUMIČIĆ, Ph.D.*

Article**
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Mirna DUMIČIĆ
Croatian National Bank, Trg hrvatskih velikana 3, 10000 Zagreb, Croatia
e-mail: mdumicic@gmail.com
ORCiD: 0000-0003-1893-5456

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Abstract

This paper extends the available datasets on the use of macroprudential policies in CEE countries, and provides an econometric assessment of the effectiveness of these policies in mitigating financial stability risks associated with excessive credit growth before the global financial crisis. The model results imply that macroprudential policies were more effective in slowing credit to households than credit to the non-financial corporate sector, mainly because the latter had access to non-bank and cross-border credit in addition to domestic bank credit.

Keywords: macroprudential policy, financial stability, credit growth, systemic risk, CEE countries

1 INTRODUCTION

Despite the growing interest in macroprudential policy, we know very little about its effectiveness in preserving financial stability and mitigating systemic risks. This is largely because only a small number of countries have practical experience in conducting macroprudential policy, particularly during the boom stage of the cycle. Central and Eastern European (CEE) countries belong to the relatively small group that did use macroprudential policy in the run-up to the global financial crisis. As they are also relatively homogeneous in terms of financial sector structure, notably in the importance of foreign-owned banks as suppliers of credit to the private sector, CEE countries are an excellent case study for the analysis of macroprudential policy effectiveness.

Most empirical analysis that have considered CEE countries' macroprudential policies so far did so within larger country samples, and without analysing the impact of such policies on credit to specific sectors. Table A1 in the appendix summarises the findings of the main studies, which differ significantly in terms of analytical focus, data coverage, empirical frameworks and their most important findings. This paper examines CEE countries only, and distinguishes between credit to households and to non-financial corporate sectors. The sample covers 11 countries – Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia – over the period from Q1 2000 to Q3 2013. Due to the small number of country relative to time observations, we estimate panel regressions using the OLS method and cross-section SUR panel-corrected standard errors, as suggested by Beck and Katz (1995).

To conduct this analysis, we compiled a dataset on the use of macroprudential policies in CEE countries. We supplemented data from official sources with findings from a central bank questionnaire specially designed for this purpose and several research papers dealing with these countries. Because of the great variety of macroprudential tools within and across countries, we had to construct special variables to capture the timing and intensity of the use of such tools.

Our main finding is that, in the run-up to the global financial crisis, macroprudential policies were probably more successful in slowing down credit growth to

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households than to the non-financial corporate sector. The reason is that household credit growth was more significantly affected by a larger number of macroprudential tools than the growth of credit to non-financial corporations. For the latter, it was also much easier to get funding from sources that were not subject to macroprudential measures, such as non-bank financial institutions and direct cross-border credit.

Considering the relatively risky lending policy in some of the CEE banks in the observed period, these findings also imply that their active macroprudential policies helped these countries to preserve the stability of their banking systems. This additionally confirms the relevance of macroprudential measures for mitigating systemic crisis episodes. From the public policy perspective, this is especially important because such episodes usually result in huge fiscal costs, which in some cases could exceed 55% of GDP (Laeven and Valencia, 2012), while the average decline in GDP per capita amounts to 11.5% (Reinhart and Rogoff, 2014). In that context, another important aspect of countercyclical macroprudential policy is that it also reduces the duration of crisis episodes (Gupta, Mulas-Granados and Baldacci, 2009).

The paper is divided in four parts. Section 2 describes data sources and model variables, in particular macroprudential variables constructed for panel regressions. Section 3 lays out the empirical framework and discusses the estimation results. Section 4 concludes.

2 MODEL VARIABLES AND DATA

The variable whose behaviour we are trying to explain is credit to the private sector in CEE countries. We look separately at total credit to households and total credit to the non-financial corporate sector. Total credit to individual sectors includes not only domestic bank credit but also that provided by domestic non-bank financial institutions and banks from other countries. For households, domestic banks provide the bulk of credit, while for the corporate sector the latter two sources are also important. These variable are expressed as either quarterly rates of change (in real terms and seasonally adjusted), or as ratios to GDP.

The main variables with which we are trying to explain credit growth are lagged credit growth, GDP growth, changes in interest rates, and the use of various macroprudential tools, which are the focus of this study. Lagged credit growth accounts for inertia in the evolution of credit; GDP growth is a proxy for fundamental determinants of credit growth such as real income; interest rates are a proxy for the price of credit; and macroprudential tools are exogenous regulatory interventions aimed at limiting the pace of credit growth for financial stability reasons. We expect higher credit growth in the past and stronger GDP growth to be positive correlates of credit growth, and higher interest rates and tighter macroprudential tools to be negative correlates. We collected the macroeconomic data from central banks (official sources and direct communication), the ECB, Eurostat and the IMF.

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Unlike monetary policy instruments such as interest rates, macroprudential tools come in a much greater variety. Most are not continuously adjusted over time. Using them in an empirical analysis therefore requires two related tasks: first, constructing time series for different macroprudential instruments that would reflect, to the greatest extent possible, their "intensity"; and second, aggregating instruments of disparate nature into a small number of composite indicators that affect economic behaviour on similar margins.

Underlying this exercise is the even deeper issue of the availability of information and data on different macroprudential tools, many of which were not even known under this name ten or more years ago. To overcome this initial problem, we collected information through direct communication with central banks, asking them to fill a questionnaire on the use of different macroprudential tools through time from Q1 2000 to Q1 2013. The starting point for designing the questionnaire was the database presented by Lim et al. (2011) that asked questions about the time of introduction, tightening, loosening, other adjustments and termination of different tools, meaning that we obtained the information about these measures through time. We requested information specifically about instruments such as loan-to-value ratios, debt-to-income ratios, limits on foreign currency lending, credit growth restrictions, maturity mismatch restrictions, general reserve requirements, other reserve requirements, capital requirements, risk weights, and provisioning requirements. According to Lim et al. (2011, 2013) and our own analysis of macroprudential policy in individual CEE countries, these measures are the ones that been most often used for preventing systemic risks and increasing financial systems' resilience. Finally, we supplemented the questionnaire answers with data from the IMF, central banks' annual reports and the analysis by Lim et al. (2011) and Geršl and Jašova (2014).

To use these data in panel regressions, we identified similar measures from different countries and created three groups of indicators:

1) Binary variables, which take on the value of 1 in periods when a given measure is used, and 0 otherwise. If all countries use a given measure, the variable takes the value of 1 when a given measure is "tighter" than average, and 0 otherwise. One shortcoming of this approach is that it cannot differentiate the intensity of a measure beyond a binary above/below average value. Another is that it cannot account for tightening or loosening of measures.
2) "Step function" variables, which increase or decrease depending on whether a given measure is getting tighter or looser. For instance, for minimum reserve requirements (RR) we set the value of the step function at zero for $RR \leq 2\%$, which is a typical value in CEE, and then increase it in steps of 25 basis points for each percentage point increase in the minimum RR set by authorities. For capital adequacy ratios (CAR), we set the value of the step function at zero for $CAR \leq 8\%$, and then increase it in steps of 50 basis points for each percentage point increase in the minimum CAR. The resulting step function is a relatively good proxy for the intensity of given macroprudential measures. Medas et al. (2013) used a similar approach.

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3) Actual values, in percent or percentage points, for prudential tools such as general reserve requirements, loan-to-value, or debt-to-income ratios.

A further complication in comparing macroprudential tools across countries is the varying scope, calculation basis, and other features of different instruments. For instance, the coverage, allocation basis, calculation method and other details differ greatly for reserve requirements, and even more so for capital adequacy ratios. To reduce the bias these subtle but important differences might induce in regression estimates, the panels assessing the impact of macroprudential tools on credit growth use binary and step function variables (table 1), while the panels assessing the impact of macroprudential tools on different types of credit use the step variables and actual values of individual tools (table 2).

In addition to constructing the variables assessing the intensity of macroprudential tools by type, we aggregated them in individual countries in order to assess how the total intensity of macroprudential policy may have evolved over time. Instruments included in the calculation were administrative credit growth restrictions, capital requirements, limitations on foreign currency lending, limits on maturity mismatches, marginal reserve requirements, general reserve requirements, and provisioning requirements. In the panels assessing the impact of macroprudential policy on credit to households, we also included loan-to-value ratios and debt service ratios.

We constructed two aggregate indicators of macroprudential policy intensity: first a simple sum of the values of binary variables, indicating the number of measures used at a given point in time (solid line in figure 1); and second, a sum of the step function variables, indicating changes in overall intensity of underlying measures (dashed line). In the pre-crisis period, Croatia leads in terms of both categories, followed by Bulgaria, Hungary and Romania. The Czech Republic used no macroprudential instruments in this period, while Slovenia only used the reserve requirement higher than 2% before adopting the euro in 2007.

The same picture emerges from other databases on macroprudential policy, such as the one based on the IMF's Financial Stability and Macroprudential Policy Survey presented by Lim et al. (2011).

Greater use of macroprudential policies in CEE than elsewhere in Europe can be largely explained by the financial sector structure and the overall level of financial development in this region. The financial sector in CEE is characterised by foreign ownership of domestic banks: foreign bank subsidiaries account for up to 95% of domestic banking sector assets. This share increased rapidly in the late 1990s and the early 2000s. Prior to that, banks in CEE had little experience with risk assessment and financial markets were repressed or non-existent. Financial liberalisation, which included banking deregulation (or, in some countries, the establishment of commercial banking in the first place) and the removal of capital controls, led to a surge in credit growth. For countries in the sample, credit to the private sector increased on average by 13-47% per annum from 2000 to 2008.

FIGURE 1

Aggregate indicators of macroprudential policy intensity in CEE, 2000-13

Note: BG = Bulgaria, CZ = Czech Republic, EE = Estonia, HR = Croatia, HU = Hungary, LT = Lithuania, LV = Latvia, PL = Poland, RO = Romania, SI = Slovenia, SK = Slovak Republic.

Source: Author's calculations.

As domestic saving rates were low and credit demand was high due to rapid economic growth, much of the credit was sourced from parent banks in Western Europe. According to the BIS consolidated banking statistics, gross cross-border bank flows to CEE countries in the sample thus amounted on average to 9% of GDP per year during 2002-07, or, in cumulative terms, 38% of GDP on average over this period. Apart from being attracted by the relatively strong economic activity in these countries, foreign banks were willing to supply so much credit to the region also partly because CEE countries were in the process of EU accession, which strengthened investors' confidence in local legal systems and economic policies.

Large capital inflows in an environment of shallow financial markets quickly led to macroeconomic and financial stability imbalances, including high current account deficits (often in the range of 10-15% of GDP) and very rapid growth of property prices (Rohatinski, 2009). The solution was to try to control credit growth with alternative tools, ranging from administrative credit controls, to reserve requirements or to prudential measures aimed at specific groups of borrowers. Macroprudential policy in CEE was thus born out of necessity, to manage a credit boom rapidly getting out of hand.

3 EMPIRICAL FRAMEWORK AND ESTIMATION RESULTS

Unlike traditional panels, where the country sample is large and time period short, our panels are longitudinal, as they have more period than country observations. According to Beck and Katz (1995), using the FGLS to estimate parameters in such cases can result in a significant underestimation of parameter variability, i.e. "overconfidence". Following their approach, we estimate our panels using the OLS method and calculate cross-section SUR panel-corrected standard errors, which are more reliable than standard errors computed using the FGLS method.

Two other econometric problems were the use of a lagged dependent variable and country fixed effects. The standard tests commonly used for panels with a larger number of cross-sections are not reliable for longitudinal panels. The literature dealing with this type of panel (i.e. Kristensen and Wawro, 2003; and Beck and Katz, 2004) shows that in such cases it is appropriate to apply the lagged variable as the method for removing serial correlation, while the problem of accounting for the unobserved heterogeneity across countries and controlling for omitted, time-invariant macroeconomic variables that may differ from country to country could be solved by using fixed effects and calculating panel-corrected standard errors.

The main estimating equation is:

$$y_{i,t} = \alpha + \mu_i + X_{it}\beta + \varepsilon_{i,t}, \quad (1)$$

where

y = quarterly growth rate of household or non-financial corporate sector credit;
i = 1...11 countries;
t = Q1 2000 – Q3 2008;

μ = country fixed effects;
α = constant term;
$\boldsymbol{X}_{it}$ = matrix of control variables, with
x_1 = lagged credit growth (households or corporate sector);
x_2 = GDP growth (quarterly rate);
x_3 = interest rate on loans (households, or corporate sector), change of quarterly average;
x_4 = macroprudential variables (level and/or step variables described above);
ε = error term.

Any attempt to explain dynamics of credit growth with adjustments in interest rates and macroprudential measures raises the issue of endogeneity, as policy adjustments depend on the evolution of credit growth. To mitigate this problem, we lagged interest rate and macroprudential variables by one quarter and compared coefficients from regressions with and without lagged macroprudential variables, as proposed by Nier et al. (2012). The signs, levels and significance of estimated coefficients did not differ much. We interpret these results as evidence that endogeneity between credit growth and adjustments of macroprudential instruments is not a major problem in our sample. Nevertheless, following Nier et al. (2012), we interpret the estimated coefficients on macroprudential variables with caution, paying greater attention to their sign than magnitude, especially in the case of composite indicators.

Regression results are presented in tables 1 and 2, and tables A2 and A3 in the appendix.

Table 1 presents estimates of the overall impact of macroprudential policy on credit growth. The estimated coefficients on lagged credit growth and real GDP growth are both positive and statistically significant, in line with theoretical predictions. The coefficients on lagged interest rates are negative but not statistically significant. In other words, past changes of interest rates do not seem to be significant determinants of current credit growth. To measure the overall impact of macroprudential policy on credit growth we used the binary and step function variables described above. When macroprudential policy was tighter than average in the past quarter (i.e. the binary variable took on the value of 1), credit growth slowed significantly only in the case of household loans. When macroprudential policy was tightening in the previous quarter (i.e. the step function was increasing), credit growth slowed significantly in the case of household loans.

Table 2 presents estimates of the impact of individual macroprudential tools on credit growth. We consider nine macroprudential tools: administrative limits on credit growth, capital requirements, limits on currency mismatches, marginal reserve requirements, provisioning requirements, general reserve requirements, increased risk weights, debt-to-income ratios, and loan-to-value ratios. With the exception of risk weights and capital and provisioning requirements, which enter

the regression as step variables as they are difficult to compare due to their specific nature, the remaining six macroprudential tools are used in levels (i.e. per cent or percentage points). Growth of credit to households responds, with varying degrees of significance, to changes in administrative limits on credit growth, general reserve requirements, debt-to-income ratios, and loan-to-value ratios. Growth of credit to the non-financial corporate sector responds significantly to changes in administrative limits on credit growth, limits on currency mismatches, as well as provisioning and general reserve requirements.

Table 1

Impact of overall macroprudential policy on credit growth

	Loans to household sector		**Loans to corporate sector**	
	Spec. 1	**Spec. 2**	**Spec. 3**	**Spec. 4**
Constant	3.1541 (0.8938)**	2.9472 (0.7543)*	2.8112 (0.5792)*	2.8919 (0.5257)**
Loan (–1)	0.6637 (0.0681)*	0.6655 (0.0701)*	0.2618 (0.0669)*	0.2602 (0.0669)**
GDP	0.4432 (0.1567)*	0.3302 (0.1140)*	0.7261 (0.2003)*	0.7290 (0.2000)**
Interest rate (–1)	–1.1239 (0.4253)*	–1.0660 (0.4292)**	–0.1613 (0.2490)	–0.1763 (0.2490)
Total level of macroprudential policy – d (–1)	–0.4958 (0.2277)**		0.1538 (0.0572)	
Total level of macroprudential policy – step (–1)		–0.1694 (0.0775)**		0.0660 (0.0572)
Observations:	264	264	332	332
R^2:	0.75	0.75	0.33	0.33
F-statistic:	55.8	55.68	10.98	10.98

Note: Total level of macroprudential policy – d represents the sum of binary variables or the number of used macroprudential measures and instruments in a given moment. Total level of macroprudential policy – step represents the sum of constructed step indicators for individual macroprudential measures. All estimations are made using OLS; period SUR panel-corrected standard errors in parentheses.

** significant at 1%, ** significant at 5%, *** significant at 10%.*

Source: Author's calculations.

These results suggest that macroprudential policy was probably more effective in slowing the growth of credit to households than the growth of credit to non-financial corporations before the crisis: as can be seen from table 3, household credit growth responded significantly to a larger number of macroprudential measures. These findings are in line with findings presented by Cerutti, Claessens and Laeven (2015) who also show that the negative relationship between macroprudential policies is stronger for households than for the corporate sector. This result is not surprising when one considers that households in CEE generally had access predominantly to bank credit, while other sources of funding, such as domestic

non-bank financial institutions and banks in other countries, were much more easily available to non-financial corporations. In particular, domestic subsidiaries of foreign banks, which were subject to macroprudential regulation, often directed their corporate customers in CEE to their parent banks in home countries in Western Europe, or to domestic non-bank financial institutions in CEE, which were often established as separate entities operated by parent banks.

Table 2

Impact of individual macroprudential measures on credit growth

	Credit growth limit – level (–1)	Capital requir. – level (–1)	Limited currency mismatch – level (–1)	Marginal reserve require. – level (–1)	Increas. provis. requir. – step (–1)	General reserve requir. – level (–1)	Increas. risk weights – step (–1)	DSI – level (–1)	LTV – level (–1)
Loans to household sector	–0.0780 (0.0440)***	–0.6255 (1.5199)	–1.3082 (0.8867)	0.0011 (0.0131)	–0.5950 (0.5827)	–0.2438 (0.1424)***	–0.2339 (0.4523)	–0.0920 (0.0397)**	–0.0360 (0.0108)*
Loans to corporate sector	–0.0956 (0.0561)*	–0.2122 (0.7119)	3.2680 (1.3952)*	0.0201 (0.0144)	0.9993 (0.4000)**	0.0268 (0.0691)	0.6130 (0.5168)		

Note: This table presents only the estimated coefficients on macroprudential variables; for complete results see appendix tables A2 and A3.
Level presents the actual value of a specific instrument (i.e. general reserve requirement of 2%).
All estimations are made using OLS; period SUR panel-corrected standard errors in parentheses.
** significant at 1%, ** significant at 5%, *** significant at 10%.*

Source: Author's calculations.

4 CONCLUSION

Findings in this paper indicate that, contrary to the widespread belief that they have limited practical experience with macroprudential policy, countries in CEE used a wide variety of macroprudential tools before the global financial crisis – and before these tools were even known as "macroprudential". To show this, we compiled a quarterly database of macroprudential measures used in 11 CEE countries from 2000 to 2013, and compared it with existing macroprudential policy databases for other European countries.

The main motivation for the use of macroprudential tools in CEE was to slow credit growth in an environment of heavy capital inflows and monetary policy frameworks largely focusing on exchange rate stability. In the language of the external policy "trilemma", with free capital flows and not always very flexible exchange rates, many CEE countries could not use domestic interest rates to try to offset the macroeconomic and financial stability effects of capital inflows, and therefore had to rely on alternative, more direct tools to control credit growth.

In using macroprudential tools, CEE countries seem to have been more successful in slowing credit growth to the household sector than to non-financial corporations. The main reason seems to be that the latter could turn to financial institutions other than banks, which were not affected by restrictive credit growth meas-

ures, or to banks abroad. Both these sources were often institutionally related to foreign-owned bank subsidiaries in CEE. This points to the issue of financial institutions' attempts to circumvent macroprudential measures through less regulated segments of the financial system. To be effective, macroprudential tools would thus have to cover comprehensively all key segments of the domestic financial system, and would even require some international cooperation by relevant policymakers.

Disclosure statement

No potential conflict of interest was reported by the author.

APPENDIX

Table A1

Summary of the empirical literature on the effectiveness of macroprudential policies

Study	Sample	Period	Research questions	Main findings
Lim et al. (2011)	49 countries actively using macroprudential instruments	2000-10	Effectiveness of macroprudential instruments in achieving their objectives. Factors affecting the choice of instruments. Circumstances in which instruments are used.	Many instruments can effectively reduce systemic risk in the financial sector. Their effectiveness does not necessarily depend on the stage of economic development or the type of exchange rate regime. Emerging markets with fixed exchange rate regimes or managed floats use macroprudential measures more often. Emerging markets facing large capital inflows, with shallow financial markets, and those with bank-centric systems also use macroprudential tools more often. Macroprudential instruments can be just as effective when used in advanced economies with flexible exchange rate regimes.
Quereshi et al. (2011)	51 EMEs	1995-2008	Can macroprudential policy and capital controls help enhance financial stability in periods of large foreign capital inflows? Construct new indices for macroprudential measures dealing with currency risk and capital controls for the financial sector.	Macroprudential policy and capital controls reduce the riskiness of external borrowing and domestic foreign currency lending. Policies that do not discriminate on the basis of currency or residency can also be effective in mitigating excessive credit growth.
Schou-Zibell, Albert and Song (2012)	41 EMEs in Asia, Latin America and Europe, plus 18 advanced economies	1993-2008	Identify most important determinants of financial soundness and stability (capital adequacy, asset quality, earnings, profitability) in EMEs.	The relationship between financial soundness indicators and macroeconomic indicators varies depending on the stage of economic and financial development.

Study	Sample	Period	Research questions	Main findings
Tovar, Garcia-Escribano and Martin (2012)	Five Latin American economies	January 2003 – April 2011	Effectiveness of reserve requirement in reducing credit growth. Construct a composite indicator of reserve requirements used in different countries. Study how credit to the private sector, market and policy interest rates, and exchange rates react to changes in average reserve requirements, marginal reserve requirements and other macroprudential instruments.	Reserve requirements and other macroprudential instruments led to a slowdown in growth of bank credit to the private sector. Panel data VAR including a binary macroprudential policy variable, industrial production and private credit growth also suggests that macroprudential tools limit credit growth.
Vandenbussche, Vogel and Detragiache (2012)	16 countries in Central, Eastern and Southeastern Europe	Early 2000s – 2011 Q1	On a panel of 16 countries, the authors explore the impact of macroprudential policy measures on housing price inflation.	Tightening of minimum capital adequacy requirements and nonconventional measures used to guarantee liquidity, such as marginal reserve requirements on foreign funding sources and excessive credit growth, contributed to a slowdown in housing prices.
Nier et al. (2012)	15 developed economies and 21 emerging market economies		How macroprudential measures affect credit activity, house prices, economic activity and capital inflows? How these effects depend on the stages of economic cycle?	Capital requirements and reserve requirements contribute to a slowdown in credit growth. Loan-to-value and debt-to-income ratios effective in EMEs.
Medas et al. (2013)	25 economies	2000-11	Effectiveness of loan-to-value and debt-to income ratios; greater risk weights; and higher provisioning requirements in restraining credit growth and real estate prices. Construct variables that reflect the intensity of use of individual macroprudential measures as these are tightened or loosened.	Greater risk weights and higher loan-to-value and debt-to income ratios are successful in dampening growth of credit and real estate prices.
Cerutti, Claessens and Laeven (2015)	119 countries	2000-13	Relationship between the use of macroprudential policies and developments in credit and housing markets. Effectiveness of macroprudential policies in dampening financial cycles.	Emerging countries use macroprudential policies more often, especially FX related measures, while advanced countries primarily rely on borrower-based measures. These policies generally result with lower credit growth, primarily for households. Macroprudential policies can help manage financial cycles, but they work better in the boom than in the bust phase.

Table A2

Impact of macroprudential measures on credit to households

Dependant variable	**Total loans to households, quarterly rate of change**										
Independent variables	**Spec. 1**	**Spec. 2**	**Spec. 3**	**Spec. 4**	**Spec. 5**	**Spec. 6**	**Spec. 7**	**Spec. 8**	**Spec. 9**	**Spec. 10**	**Spec. 11**	**Spec. 12**
Constant	2.1445 (0.6331)***	7.3095 (12.6094)	3.2270 (0.7506)***	2.1130 (0.6504)***	3.4908 (0.7629)***	2.0969 (0.6423)***	2.7606 (0.7940)***	4.8425 (1.6484)*	2.1485 (0.6482)*	3.6955 (0.7852)*	3.1541 (0.8936)*	2.9472 (0.7544)**
Total bank loans to households (–1)	0.689206 (0.0691)***	0.6818 (0.0697)***	0.60624 (0.0731)***	0.6875 (0.0684)***	0.6208 (0.0705)***	0.6880 (0.0691)***	0.6865 (0.0691)***	0.6392 (0.0712)*	0.6886 (0.0691)*	0.6017 (0.1100)*	0.6637 (0.0681)*	0.6655 (0.0701)**
GDP	0.3231 (0.1178)***	0.3250 (0.1159)***	0.3263 (0.1127)***	0.3293 (0.1172)**	0.3087 (0.1105)**	0.3296 (0.1171)**	0.3326 (0.1179)**	0.3644 (0.1165)*	0.3244 (0.1188)*	0.3104 (0.4110)**	0.4432 (0.1567)*	0.3303 (0.1140)**
Interest rate (–1)	–1.1365 (0.4285)***	–1.1136 (0.4309)**	–1.0755 (0.4182)**	–1.1424 (0.4365)*	–1.0422 (0.4123)**	–1.1470 (0.4283)*	–1.1531 (0.4275)*	–0.9861 (0.4294)**	–1.1264 (0.4406)**	–1.0315 (0.4706)*	–1.1239 (0.4253)*	–1.0660 (0.4292)
Credit growth limit – level (–1)	**–0.0780** **(0.0444)****											
Capital requirements – level (–1)		–0.6254 (1.5199)										
DSI – level (–1)			**–0.09203** **(0.0396)****									
Limited currency mismatch – level (–1)				–0.0681 (1.4510)								
LTV – level (–1)					**–0.0360** **(0.0107)*****							
Marginal reserve requirement – level (–1)						0.0011 (0.0130)						
Increased provisioning requirement – step (–1)							–1.3082 (0.8867)					
General reserve requirement – level (–1)								–0.2438 (0.1423)***				
Increased risk weights – step (–1)									–0.2339 (0.4523)			

Dependant variable	Total loans to households, quarterly rate of change											
Independent variables	**Spec. 1**	**Spec. 2**	**Spec. 3**	**Spec. 4**	**Spec. 5**	**Spec. 6**	**Spec. 7**	**Spec. 8**	**Spec. 9**	**Spec. 10**	**Spec. 11**	**Spec. 12**
LTV – DSI – step (–1)										–1.5683 (0.4706)*		
Total level of macroprudential policy – d (–1)											–0.4958 (0.2277)**	
Total level of macroprudential policy – step (–1)												–0.1695 (0.0775)**
Observations:	264	264	264	264	264	264	264	264	264	264	264	264
R2:	0.7561	0.7559	0.7620	0.7554	0.7653	0.7555	0.7559	0.7615	0.7556	0.7663	0.7579	0.7559
F-statistic:	55.1444	55.0802	56.9440	54.9450	58.0034	54.9443	55.0799	59.7977	54.9866	58.3142	55.6793	55.6801
Prob(F-statistics)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

All estimations are made using OLS; period SUR panel-corrected standard errors in parentheses.
** significant at 1%, ** significant at 5%, *** significant at 10%.*

Source: Author's calculations.

TABLE A3

Impact of macroprudential measures on credit to the non-financial corporate sector

Dependant variable	**Total loans to corporate sector, quarterly rate of change**								
Independent variables	**Spec. 1**	**Spec. 2**	**Spec. 3**	**Spec. 4**	**Spec. 5**	**Spec. 6**	**Spec. 7**	**Spec. 8**	**Spec. 9**
Constant	3.1887 (0.4945)*	4.8499 (5.7966)	2.9284 (0.4770)*	3.0756 (0.4851)***	3.0066 (0.4817)*	2.8570 (0.8403)*	3.0828 (0.5016)*	2.8113 (0.5792)*	2.8920 (0.5257)*
Total loans to corporate sector (–1)	0.2611 (0.0690)*	0.2662 (0.0676)*	0.2566 (0.0663)*	0.2619 (0.0669)***	0.2512 (0.0671)*	0.2625 (0.0667)*	0.2519 (0.0692)*	0.2618 (0.0670)*	0.2602 (0.0669)*
GDP	0.7025 (0.2058)*	0.7105 (0.1999)*	0.7101 (0.1986)*	0.7196 (0.1994)*	0.7179 (0.1981)*	0.7161 (0.1997)*	0.7152 (0.2567)*	0.7261 (0.2003)*	0.7290 (0.2000)*
Interest rate (–1)	–0.2158 (0.2474)	–0.2166 (0.2481)	–0.0398 (0.2496)	–0.1995 (0.2476)	–0.1454 (0.2465)	0.1867 (0.2503)	0.2017 (0.2587)	0.1613 (0.2521)	0.1763 (0.2490)
Credit growth limit – level (–1)	–0.0956 (0.0561)***								
Capital requirements – level (–1)		–0.2122 (0.7119)							
Limited currency mismatch – level (–1)			3.2680 (1.3952)**						
Marginal reserve requirement – level (–1)				0.0201 (0.0144)					
Increased provisioning requirement – step (–1)					0.9993 (0.4000)**				
General reserve requirement – level (–1)						0.0268 (0.0691)			
Increased risk weights – step (–1)							0.6130 (0.5168)		
Total level of macroprudential policy – d (–1)								0.1538 (0.1617)	
Total level of macroprudential policy – step (–1)									0.0660 (0.0572)

Dependant variable	Total loans to corporate sector, quarterly rate of change								
Independent variables	**Spec. 1**	**Spec. 2**	**Spec. 3**	**Spec. 4**	**Spec. 5**	**Spec. 6**	**Spec. 7**	**Spec. 8**	**Spec. 9**
Observations:	332	332	332	332	332	332	332	332	332
R2:	0.3272	0.3252	0.3436	0.3265	0.3322	0.3254	0.3313	0.3264	0.3264
F-statistic:	11.0096	10.9180	11.8549	10.9770	11.2630	10.9201	10.9329	10.9763	10.9726
Prob(F-statistics)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

All estimations are made using OLS; period SUR panel-corrected standard errors in parentheses.
** significant at 1%, ** significant at 5%, *** significant at 10%.*

Source: Author's calculations.

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Fertility and population policy

ABDOULAYE OUEDRAOGO, Ph.D.*
MEHMET S. TOSUN, Ph.D.*
JINGJING YANG, Ph.D.*

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Abdoulaye OUEDRAOGO
The World Bank, 1818 H St NW, Washington, DC 20433, USA
e-mail: aouedraogo3@worldbank.org
ORCiD: 0000-0002-8384-4908

Mehmet S. TOSUN
University of Nevada, Reno, Department of Economics, College of Business, University of Nevada-Reno, Reno, Mail Stop 0030. Nevada 89557, USA
e-mail: tosun@unr.edu
ORCiD: 0000-0002-7034-6838

Jingjing YANG
University of Nevada, Reno, Department of Economics, College of Business, University of Nevada-Reno, Reno, Mail Stop 0030. Nevada 89557, USA
e-mail: jingjingy@unr.edu
ORCiD: 0000-0001-7566-8089

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Abstract

There have been significant changes in both the fertility rates and fertility perception since 1970s. In this paper, we examine the relationship between government policies towards fertility and the fertility trends. Total fertility rate, defined as the number of children per woman, is used as the main fertility trend variable. We use panel data from the United Nations World Population Policies database, and the World Bank World Development Indicators for the period 1976 through 2013. We find a significant negative association between a country's fertility rate and its anti-fertility policy. On the other hand, there is no significant and robust relationship between the fertility rate and a country's pro-fertility or family-planning policies. In addition we find evidence of spatial autocorrelation in the total fertility rate, and spatial spillovers from a government's policy on fertility.

Keywords: fertility rate, population, government policies

1 INTRODUCTION

Fertility rates have decreased substantially over the last few decades. While decreases are more profound in developed countries, developing countries have also experienced significant changes following, in some cases, specific government policies. While population control policies vary widely around the world, governments in developing countries tend to have a relatively negative view towards fertility, which often leads to the adoption of anti-fertility policies. It is not clear, however, whether there is indeed a significant or strong relationship between population policies and fertility rates.

In this paper, we examine the relationship between government policies towards fertility and the change in the total fertility rate using panel data on 133 countries over the 1976-2013 period. We use country-level data from the United Nations World Population Policies Database, and the World Bank's World Development Indicators.[1] In our analysis we consider different types of government policy. The first is to reduce fertility through education, health care, family planning, employment programs and the availability of low-cost contraception. We can refer to this as anti-fertility policy. The second is to raise fertility through a variety of government subsidies for childcare and housing, tax incentives, maternal and paternal leave and media campaigns. We can refer to this as pro-fertility policy.[2] In addition, within the anti-fertility policy category, we examine family planning policy separately to see if that policy is particularly strongly related to changes in fertility. We also control for country fixed effects and spatial autocorrelation in the data. We present results for different econometric specifications to understand the robustness of our results. Our main findings show a statistically significant, negative relationship between change in total fertility rate and anti-fertility policy. On

[1] The UN World Population Policies Database provides data for the years 1976, 1986, 1996, 2001, 2003, 2005, 2007, 2009, 2011, and 2013. Data for 2015 became available very recently but was excluded from our analysis due to lack of data for that year for other variables used in our regressions.

[2] The term "pro-natal policy" is also used in many studies.

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the other hand, there is no significant and robust relationship between change in total fertility rate and pro-fertility policy. We also do not find a significant and robust relationship with family planning policy. In addition we find evidence of spatial autocorrelation in the total fertility rate, and spatial spillovers from a government's policy on fertility.

In the next section, we start with a brief discussion of the previous literature and then present trends in the total fertility rate and government policies towards fertility. This is followed by a description of the empirical approach, models and variables used in our analysis. We present our results in section 4 and provide a summary and concluding remarks in the last section.

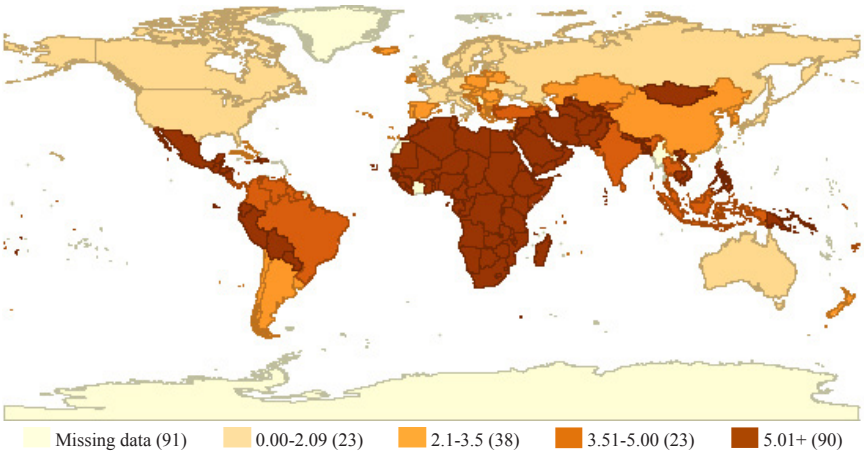
2 FERTILITY TRENDS AND POPULATION CONTROL POLICIES

Other studies that examined whether fertility responds to population policies have had mixed results. Pritchett (1994) argues and shows that the significant variation in fertility rates across countries is due to the desired fertility of couples, and is not driven by the availability of contraceptives or family planning policy by governments. At the same time, Haub (2010) argues that population control policy in South Korea not only worked but worked too well. South Korea now has one of the lowest fertility rates in the world. Singapore is another example where the population policy went from anti-natalist in 1960s and 1970s to pro-natalist after the mid-1980s (Yap, 2003). Yap (2003) notes that the total fertility rate in Singapore rose sharply from 1.6 to about 2 children per woman in 1988, soon after the introduction of the new pro-natalist policy in 1987. Feyrer, Sacerdote and Stern (2008) argue that there may be an increase in the fertility rates in high-income countries due to increased participation of males in the household, which is not necessarily driven by a specific government policy. A recent book by Takayama and Werding (2011) provides an overview of policy responses to low fertility with a particular focus on China, France, Japan, South Korea and Sweden. While there is no consensus on whether there are policies that have clearly worked to raise fertility rates, public involvement may be justified or required in some cases. Studies in the volume also point to difficulties with the available data and the complexity of studying fertility behavior. For example, Bradshaw and Attar-Schwartz (2011) examine the relationship between fertility and social policy using the European Social Survey data on sixteen European countries. They point to several problems, particularly with the measurement of social policy variables and do not find strong evidence of a relationship between social policy and fertility.

There have been significant decreases in fertility rates in recent decades. Figures 1 and 2 show the variation in total fertility rates in 1976 and 2013, respectively. Figure 1 shows very high fertility rates (over 5 children per woman) in 90 countries in 1976. Africa and the Middle East had the highest concentration of countries with very high fertility rates. Only 23 countries in Europe and North America had below replacement fertility. Figure 2 shows drastic changes in fertility. In 2013, the number of countries with very high fertility decreased to 15, and the

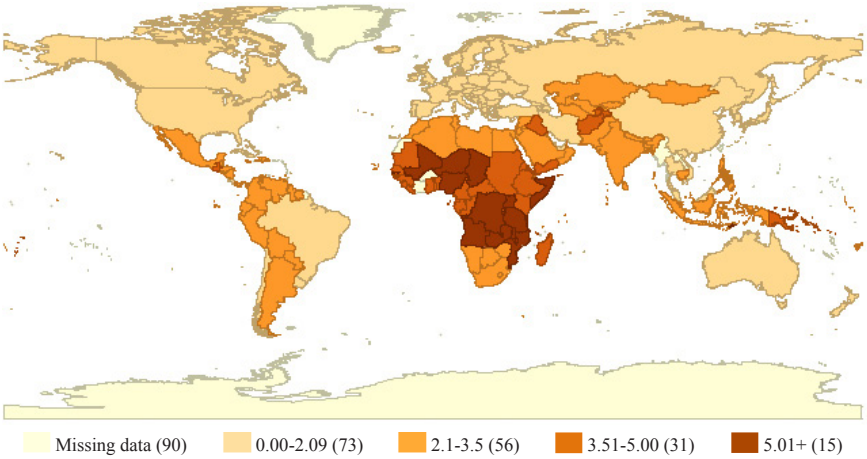
number of countries with below replacement fertility increased to 73. While the highest concentration of countries with very high fertility is still in Africa, none of the Middle Eastern countries had very high fertility. Many African countries experienced significant decreases in fertility. Unlike what we observed in the map for 1976, all other European countries (particularly Eastern European countries), and some emerging market economies such as Brazil, China and Turkey also moved to below replacement fertility in 2013.

Figure 1
Total fertility rate in 1976



Source: United Nations Population Policies Database, 1976.

Figure 2
Total fertility rate in 2013



Source: United Nations Population Policies Database, 2013.

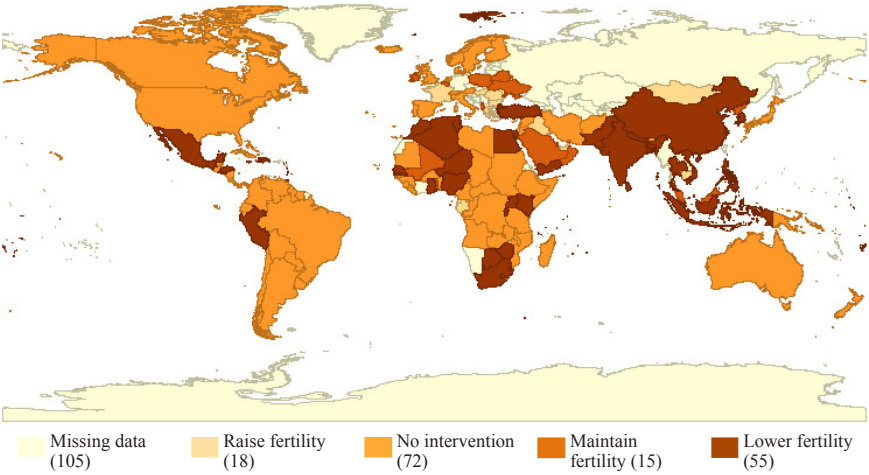
We now turn to government policies towards fertility. The United Nations World Population Policy database provides a comprehensive and rich dataset on govern-

ment attitudes towards fertility and other important demographic variables.[3] United Nations (2013) notes that the database uses four major sources of information. The first is the official response from the country governments to the inquiries directly sent by the United Nations. The second is government documents, publications, laws, regulations and proclamations. The third is the official materials provided by international and intergovernmental organizations, including other United Nations agencies. The final source is the materials provided by non-governmental organizations such as media outlets, academic and other research institutions.[4]

The key variable of interest in this database is the "policy on fertility level." United Nations (2013) describes this variable as "a Government's stated policy to influence the level of fertility in the country". Response categories for the variable are "raise", "maintain", "lower", and "no intervention". The map in figure 3 shows how government policies towards fertility differ for countries in our dataset. In 1976, only 55 countries had an anti-fertility policy. We see that a number of governments in Africa did not have an anti-fertility policy. It is also noteworthy that only 18 countries had a pro-fertility policy in 1976.

Figure 3

Government policy on fertility in 1976



Source: United Nations Population Policies Database, 1976.

While we see a similar pattern in 2013 in figure 4, significantly more governments have anti-fertility policies. At the same time, more governments have adopted pro-fertility policies from 1976 to 2013. This could be seen as an indication of

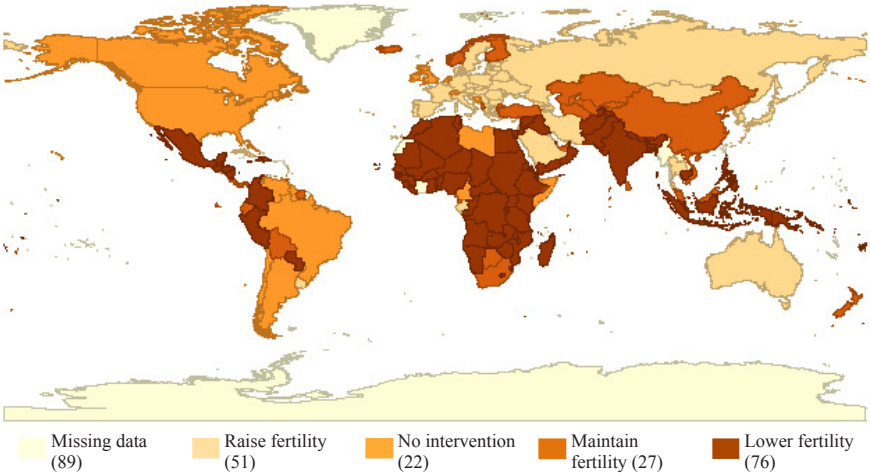
[3] See United Nations (2013) and https://esa.un.org/poppolicy/img/Definitions_Policy_Variables.pdf for a detailed description of the variables in the database.

[4] See United Nations (2013) for more on these data sources. Box I.1 on page 43 in that publication has a chart that shows both the inputs to the database and major outputs or publications from the database.

concerns regarding the impact of population aging on economies.[5] Figure 4 shows that the number of governments with an anti-fertility policy rose to 76, which is significantly greater than the number of governments with such a policy in 1976. In addition, most African countries now have policies to reduce fertility. The number of governments with pro-fertility policies also increased substantially, to 51. In figure 5, we also summarize the time trend in the percent share of countries with policies to reduce and raise fertility. We see a significant increase in the share of countries with policies to reduce fertility between 1986 and 2001 and then a sharp increase in the share of countries with policies to raise fertility after 2001.

Figure 4

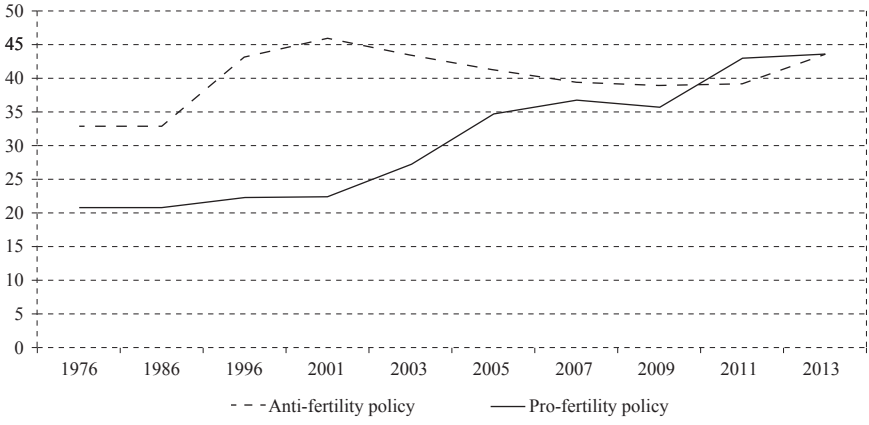
Government policy on fertility in 2013



Source: United Nations Population Policies Database, 2013.

Figure 5

Percent share of countries with anti-fertility and pro-fertility policies



Source: United Nations Population Policies Database, 1976-2013.

[5] Note that there are more countries added to the UN World Population Policies Database after 2000.

We also see in figures 3 and 4 that the spatial distribution of the government policies and the total fertility rates are not random. There seems to be a significant degree of spatial clustering among countries. The local indicators of spatial association (LISA) map in figure 6 shows that the spatial correlation in total fertility rates in 1976 is particularly strong among countries with high fertility rates, especially so for Africa and the Middle East. The LISA map in figure 7 shows that this significant spatial association persisted for countries in Africa. These two maps point to the presence of spatial autocorrelation in total fertility rates, which we examine in the next section.

Figure 6

Local indicators of spatial association (LISA Map), total fertility rate in 1976

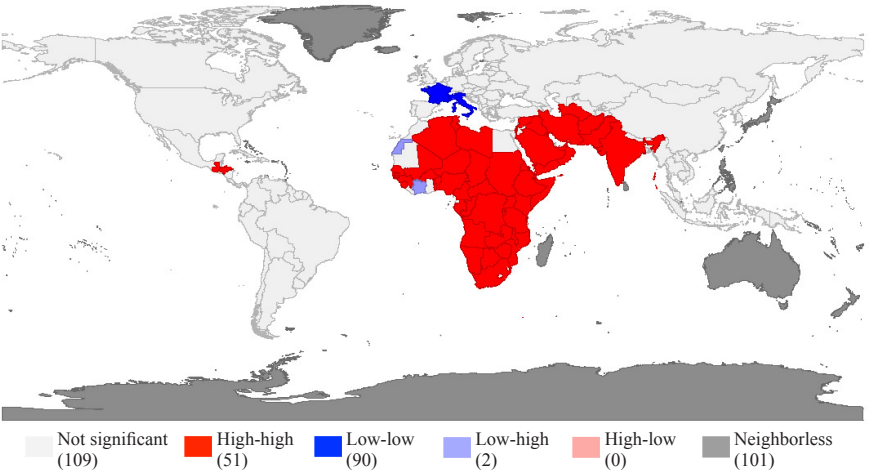
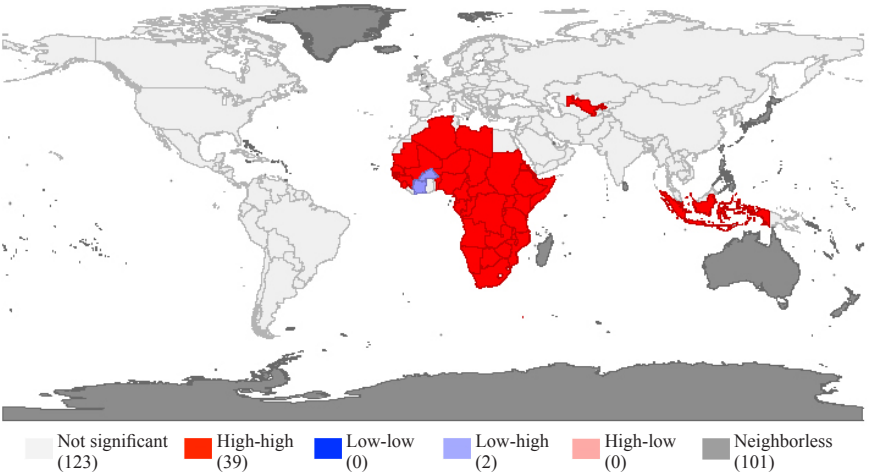


Figure 7

Local indicators of spatial association (LISA Map), total fertility rate in 2013



3 EMPIRICAL APPROACH AND METHODOLOGY

We examine empirically how fertility responds to government policies towards fertility. We use *Change in the total fertility rate* as the dependent variable. Data on total fertility rate come from the United Nations Population Division. The three key explanatory variables are *anti-fertility policy, pro-fertility policy*, and *family planning policy*, which are all constructed from the variables in the United Nations World Population Policies database. *Anti-fertility policy* is a dummy variable that takes the value 1 if the government has an anti-fertility policy, and 0 otherwise. As we explained in section 2, we used the variable "policy on fertility level" from the United Nations database and recoded the response category "lower" as 1 and other responses ("raise", "maintain", and "no intervention") as 0.

Pro-fertility policy is a dummy variable that takes the value 1 if the government has a pro-fertility policy, and 0 otherwise. For this variable, we used "policy on fertility level" from the United Nations database again, and this time recoded "raise", and "maintain" as 1 and other responses ("lower" and "no intervention") as 0.[6]

Family planning policy is also a dummy variable that takes the value 1 if the government has a policy that supports family planning directly or indirectly, and 0 otherwise. While family planning is mentioned as part of the definition of "policy on fertility level" in the United Nations database, the same database has a separate variable called "government support for family planning". For the variable *family planning policy*, we used "government support for family planning" from the United Nations database, and recoded "direct support" and "indirect support" as 1 and other responses ("no support" and "not permitted") as 0. Our three explanatory variables are related to each other. *Anti-fertility policy* is strongly and negatively correlated with *pro-fertility policy*. *Family planning policy* is positively correlated with *anti-fertility policy* but the correlation is not very high (about 0.24). *Family planning policy* is also negatively correlated with *pro-fertility policy*. We are using these variables in separate regressions, which gives us a way to compare results across different regressions.

We also use a number of other control variables that include *GDP per capita, health spending per capita*, *trade to GDP, share of urban population*, and country fixed effects. *GDP per capita* is gross domestic product divided by midyear population and measured in constant (2005) US dollars. The relationship between GDP and the fertility rate can be rather complex. While economic development in a country that is measured by GDP per capita can act like a contraceptive, countries at a high level of development may engage in promotion of higher fertility.[7] Hence we do not have a specific expectation regarding the relationship between the fertility rate and the GDP per capita. *Health spending per capita,* defined as the ratio of

[6] We coded "maintain fertility" response as 1 since a policy to maintain fertility or to prevent fertility from declining would still involve some pro-fertility intervention from the government. We have checked the robustness of our results by coding it as zero and found that our results did not change significantly and qualitatively.
[7] See also Becker (1960), and Razin and Sadka (1995) for theoretical arguments on the relationship between income and fertility.

the sum of public and private health expenditures to total population, is an important variable that controls for a potential impact of the level (and quality) of the health care provided to citizens on their fertility behavior. We might expect a negative relationship to total fertility rate since couples may likely decide to have fewer children if they know that they will receive good healthcare for themselves and their kids. *Trade to GDP*, defined as the ratio of the sum of exports and imports of goods and services to GDP, captures vulnerability of economies to external shocks. Kim and Prskawetz (2006) argue and show evidence that households use children (or fertility) as a consumption smoothing strategy in response to external shocks. Hence we would expect a positive relationship between *trade to GDP* and the total fertility rate. We use *share of urban population* as a control for the level of urbanization.

We apply the spatial econometric methods to estimate the relationship between the government policies towards fertility and change in the total fertility rate. Fertility behavior in one country could correlate with the fertility rates in adjacent countries. A lot of countries in our dataset have relatively open borders with a good degree of mobility among countries. For example, people in many African countries have ethnic, religious or tribal links with others across the border. This could lead to spatial correlation in the fertility behavior. Similarly, government policies on fertility could also have spillover effects on adjacent countries. Central and regional governments interact with those that are in close proximity, which could lead to spatial dependence in fertility policies. There may also be concern for spatial dependence if the policy of aid organizations in one country is driven by their experience in a neighboring country or region. Other studies have pointed to similar spatial or neighborhood effects in developing countries. For example, Parent and Zouche (2012) provide evidence that spatial dependence matters for growth outcomes in Africa and the Middle East. Easterly and Levine (1998) also give evidence of neighborhood effects in growth performance and growth-related policies in African countries.

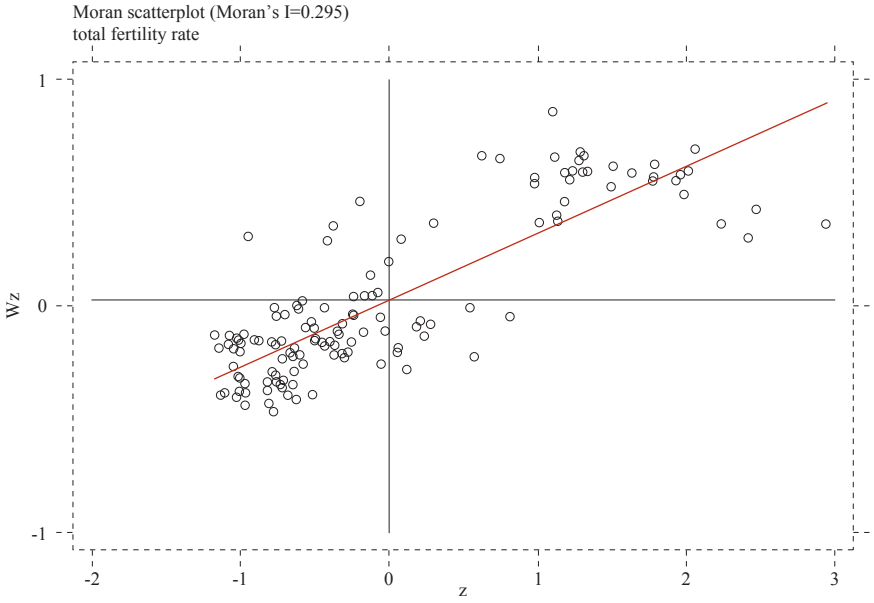
Statistically, we refer to the standard Moran I test statistic to understand the spatial correlation in the data. Figure 8 shows the Moran's I scatter plot of all countries.[8] The Moran I test statistic is equal to 0.295 and is statistically significant at the 0.05 level, which means the spatial autocorrelation is significant and cannot be neglected in our data. The x-axis is the value of the total fertility rate of each country, and the y-axis is the corresponding Moran's I values for the country with adjacent countries. The scatter plot shows that generally with the increase of the fertility rate, Moran's I tends to be positive, and vice versa. Most positive Moran's I values are for African countries, while most negative Moran's I values are for countries in Europe.[9]

[8] We included a different version of this graph (figure A1) with country codes and a list of countries used in the graph in the appendix section.

[9] We also conducted more detailed spatial diagnostic tests where we find that spatial autocorrelation is a concern in our data.

FIGURE 8

Moran scatterplot for total fertility rate



We examine spatial dependence by running spatial lag and spatial error regressions. Models of spatial dependence account for influences from places that are geographically close to each other. Failing to consider spatial dependence may lead to biased, inefficient, or inconsistent coefficient estimates (Cliff and Ord, 1981; Anselin, 1988). A spatial error model contains an autoregressive process in the error term, whereas a spatial lag model assumes a spatially lagged dependent variable. The linear spatial lag or spatial autoregressive model (SAR) can be expressed as:

$$Change\ in\ fertility\ rate_{it} = \alpha_0 + \rho\, W Fertilityrate_{it} + \beta X_{it} + \gamma_i + \tau_t + \varepsilon_{it} \qquad (1)$$

where W denotes the spatial weighting matrix that provides the spatial neighborhood information. There are different ways to generate the spatial matrices. Here we use the inverse distance matrix[10]. ρ denotes the spatial parameter. X includes the main explanatory and other control variables that are described at the beginning of this section. Finally, each year in the panel data set is controlled for by time fixed effects (τ), and γ represents the country fixed effects in the model. The spatial error model (SEM) can be expressed as:

$$Change\ in\ fertility\ rate_{it} = \alpha_0 + \beta X_{it} + \gamma_i + \tau_t + \varepsilon_{it}, \text{ where } \varepsilon_{it} = \beta W \varepsilon_{it} + v_{it}, \qquad (2)$$

[10] The inverse distance matrix is generated using the latitude and longitude information for countries: https://developers.google.com/public-data/docs/canonical/countries_csv. Note that we also ran regressions with a contiguity matrix. Results are largely similar but inverse distance weighting allows more observations particularly from island nations, which would clearly be dropped from the regression analysis that uses contiguity weighting.

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where the error process can be written as a spatially autoregressive process. We will be showing results from both the SAR model and SEM, in addition to the ordinary least squares (OLS) regression that does not include any spatial correction in the next section.[11]

4 EMPIRICAL RESULTS

In the first set of regressions we are using panel data to examine the relationship between a government's policy on fertility and change in the total fertility rate.[12] In table 1 we see a statistically significant negative association between change in the total fertility rate and government's anti-fertility policy. The results for *anti-fertility policy* show that an anti-fertility policy has both a negative direct and a negative indirect (or spatial spillover) association with the change in total fertility rate, which together lead to a strong negative total effect as indicated in column (3). The coefficient estimate for the SAR direct effect in column (1) shows that when there is an anti-fertility policy, change in total fertility rate is reduced by about 0.021 points. With an average total fertility growth rate of about -0.058 (or -5.8%) for the 1976-2013 period, this translates into about 35% of the fertility growth rate on average. We see similar but smaller coefficient estimates in the SEM and OLS regressions in columns (4) and (5). While we get a consistently negative and significant coefficient for *anti-fertility policy* in all three regression specifications, it is important to note that the magnitude of the association with change in total fertility rate is substantially greater when direct and indirect (spillover) results are combined together in the SAR model results. We also see that both spatial parameters (rho and lambda) are positive and statistically significant.

In tables 2 and 3, we do not see any significant relationship between the change in total fertility rate and *pro-fertility policy* or *family planning policy*. The latter result (in table 3) is consistent with the evidence from Pritchett (1994), in which evidence suggested the desired fertility of families mattered more than family planning policies.

[11] The OLS regression specification is very similar to the one shown in equation 2, with the exception that the error term is not subject to the spatially autoregressive process. That specification can be written as *Change in fertility rate*$_{it}$=α_0 + βX_{it} +γ_i + τ_t + ε_{it}.

[12] Please see the list of countries used in different regression specifications and the countries left out in tables A1-A3.

Table 1

Change in total fertility rate and government's anti-fertility policy

Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Change in total fertility rate	**SAR**	**SAR**	**SAR**	**SEM**	**OLS**
Variables	**Direct**	**Indirect**	**Total**		
Anti-fertility policy	-0.0205*** (0.0067)	-0.116* (0.0670)	-0.136* (0.0709)	-0.0183*** (0.0066)	-0.0317*** (0.0081)
GDP per capita ($ thousand)	0.00352*** (0.001)	0.0195** (0.01)	0.0230** (0.01)	0.00355** (0.002)	0.00803*** (0.002)
Health spending per capita ($ thousand)	-0.0128*** (0.004)	-0.0733* (0.04)	-0.0861** (0.042)	-0.0120*** (0.004)	-0.00817** (0.004)
Trade to GDP	0.000259** (0.0001)	0.00146 (0.0010)	0.00172 (0.0011)	0.000265** (0.0001)	0.000255** (0.0001)
Share of urban population	0.00323*** (0.0009)	0.0176** (0.0076)	0.0209*** (0.0080)	0.00324*** (0.0010)	0.00725*** (0.0009)
Spatial parameter (rho)	25.00*** (1.1740)				
Spatial parameter (lambda)				25.78***	
Constant					-0.514*** (0.0529)
Observations	798	798	798	798	798
Number of countries	133	133	133	133	133
Econometric model	SAR	SAR	SAR	SEM	FE
Country and time fixed effects	Yes	Yes	Yes	Yes	Yes

*Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Results for the remaining control variables are quite consistent across all three regressions. While the coefficients for GDP per capita, trade-to-GDP ratio and share of urban population are positive and mostly statistically significant, the coefficient for health spending per capita is negative and statistically significant. While we find a negative and significant relationship between health spending per capita and the change in total fertility rate, it is hard to say whether this is driven by the decision of the couples to have fewer children due to better healthcare for their kids and themselves. It is also not possible to know with the data we have whether the quality of healthcare has improved over time in those countries that experienced lower fertility rates. There is also some evidence of a positive and significant relationship between urbanization and change in fertility. While we

expect urbanization to have a negative association with change in fertility, it is possible that this happens after a certain threshold of urbanization is reached. Until that point we may still see an increase in fertility as less developed and less urbanized countries go through significant urbanization. Note that all regressions also control for time-invariant country fixed effects, which would include institutional differences between countries. It is also noteworthy that, in all three regressions, spatial dependence parameters (rho for the SAR and lambda for the SEM) are positive and significant. We have also examined spatial autocorrelation in total fertility rate and found a positive and significant Moran's I parameter, which we have already discussed in section 3. Hence, we indeed think spatial autocorrelation is a concern, which we control for in SAR and SEM regressions.

Table 2

Change in total fertility rate and government's pro-fertility policy

Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Change in total fertility rate	**SAR**	**SAR**	**SAR**	**SEM**	**OLS**
Variables	**Direct**	**Indirect**	**Total**		
Pro-fertility policy	-0.00077	-0.00598	-0.00675	-0.00384	0.00917
	(0.0060)	(0.0383)	(0.0438)	(0.0057)	(0.0072)
GDP per capita ($ thousand)	0.00383***	0.0234**	0.0272**	0.00366**	0.00825***
	(0.001)	(0.012)	(0.013)	(0.002)	(0.002)
Health spending per capita ($ thousand)	-0.0130***	-0.0825*	-0.0955*	-0.0119***	-0.00918**
	(0.004)	(0.048)	(0.05)	(0.004)	(0.004)
Trade to GDP	0.000249**	0.00154	0.00179	0.000251**	0.000242*
	(0.0001)	(0.0011)	(0.0012)	(0.0001)	(0.0001)
Share of urban population	0.00329***	0.0199**	0.0231**	0.00329***	0.00732***
	(0.0009)	(0.0097)	(0.0101)	(0.0010)	(0.0010)
Spatial parameter (rho)	25.30***				
	(1.1290)				
Spatial parameter (lambda)				25.92***	
				(0.9920)	
Constant					-0.535***
					(0.0532)
Observations	798	798	798	798	798
Number of countries	133	133	133	133	133
Econometric model	SAR	SAR	SAR	SEM	FE
Country and time fixed effects	Yes	Yes	Yes	Yes	Yes

*Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 3

Change in total fertility rate and government's family planning policy

Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Change in total fertility rate	**SAR**	**SAR**	**SAR**	**SEM**	**OLS**
Variables	**Direct**	**Indirect**	**Total**		
Family planning policy	0.00583 (0.0255)	0.0437 (0.1960)	0.0496 (0.2180)	0.00523 (0.0241)	0.00903 (0.0266)
GDP per capita ($ thousand)	0.00369* (0.002)	0.0236 (0.019)	0.0273 (0.021)	0.00359 (0.003)	0.00849*** (0.003)
Health spending per capita ($ thousand)	-0.0127** (0.006)	-0.0822 (0.063)	-0.0949 (0.066)	-0.0123** (0.006)	-0.00830 (0.005)
Trade to GDP	0.000254* (0.0001)	0.00179 (0.0021)	0.00204 (0.0022)	0.000258** (0.0001)	0.000246* (0.0001)
Share of urban population	0.00321** (0.0015)	0.0215 (0.0237)	0.0247 (0.0245)	0.00324* (0.0017)	0.00735*** (0.0014)
Spatial parameter (rho)	25.28*** (1.3270)				
Spatial parameter (lambda)				25.88*** (1.2090)	
Constant					-0.546*** (0.0808)
Observations	798	798	798	798	798
Number of countries	133	133	133	133	133
Econometric model	SAR	SAR	SAR	SEM	FE
Country and time fixed effects	Yes	Yes	Yes	Yes	Yes

*Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

While the results in table 1 may make one think that anti-fertility policy has been effective in reducing total fertility rate, these results do not necessarily indicate causal links. It is possible that government policies are also driven by the total fertility rate. As another robustness check, in the next set of regressions, we are moving away from the panel data structure and regressing the change in the fertility rate between 1976 and 2013 on the 1976 value of the policy and other control variables. Results for the policy variables in tables 4-6 are quite similar to the ones in tables 1-3.[13] We still see a negative and statistically significant association

[13] Note that we had to drop health spending per capita due to lack of data for that variable in 1976.

between change in fertility rate and anti-fertility policy in all three regression specifications, and there is generally no significant association for other policy variables.[14] Among the control variables, the only robust and significant relationship is for GDP per capita where the coefficient is positive. Also, the only robust and significant spatial parameter is for rho in the spatial lag (SAR) model, where the parameter is positive.

Table 4

Change in total fertility rate and government's anti-fertility policy

Variables	(1) SEM	(2) SAR	(3) OLS
Anti-fertility policy	-0.208***	-0.144**	-0.210***
	(0.0666)	(0.0603)	(0.0609)
GDP per capita ($ thousand)	0.0180***	0.0149***	0.0179**
	(0.00439)	(0.00431)	(0.00697)
Trade to GDP	0.0000679	-0.00049	0.0000846
	(0.000661)	(0.000612)	(0.000536)
Share of urban population	-0.00300*	-0.000645	-0.00303*
	(0.00163)	(0.0016)	(0.00181)
Constant	-0.406***	-0.625***	-0.394***
	(0.146)	(0.12)	(0.0805)
Spatial parameter (lambda)	-0.0404		
	(0.394)		
Spatial parameter (rho)		1.314***	
		(0.129)	
Observations	102	102	102
Wald chi2(4)	40.0463	31.5678	
Prob > chi2	0	0	
Econometric model	SEM	SAR	OLS

*Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 5

Change in total fertility rate and government's pro-fertility policy

Variables	(1) SEM	(2) SAR	(3) OLS
Pro-fertility policy	0.0176	-0.0338	0.0288
	(0.0877)	(0.0777)	(0.0936)
GDP per capita ($ thousand)	0.0201***	0.0166***	0.0193***
	(0.005)	(0.004)	(0.007)
Trade to GDP	0.000128	-0.000449	0.00022
	(0.0007)	(0.0006)	(0.0006)
Share of urban population	-0.00135	0.000492	-0.00144
	(0.0016)	(0.0016)	(0.0019)
Constant	-0.630***	-0.779***	-0.563***
	(0.1350)	(0.1070)	(0.0708)

[14] Note that it was not possible to break down the SAR results into direct and indirect components as these regressions are run as spatial cross-sectional regressions.

Variables	(1) SEM	(2) SAR	(3) OLS
Spatial parameter (lambda)	-0.245 (0.4170)		
Spatial parameter (rho)		1.335*** (0.1090)	
Observations	102	102	102
Wald chi2(4)	27.6384	24.6198	
Prob > chi2	0	0.0001	
Econometric model	SEM	SAR	OLS

*Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 6

Change in total fertility rate and government's family planning policy

Variables	(1) SEM	(2) SAR	(3) OLS
Family planning policy	0.118 (0.0927)	0.139* (0.0798)	0.116 (0.1240)
GDP per capita ($ thousand)	0.0207*** (0.005)	0.0161*** (0.005)	0.020*** (0.006)
Trade to GDP	0.000247 (0.0007)	-0.0000804 (0.0006)	0.000366 (0.0005)
Share of urban population	-0.00136 (0.0016)	0.000492 (0.0016)	-0.00146 (0.0019)
Constant	-0.754*** (0.1610)	-0.696*** (0.1120)	-0.676*** (0.1500)
Spatial parameter (lambda)	-0.277 (0.4050)		
Spatial parameter (rho)		2.453*** (0.3360)	
Observations	102	102	102
Wald chi2(4)	29.6418	19.8782	
Prob > chi2	0	0.0005	
Econometric model	SEM	SAR	OLS

*Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

5 SUMMARY AND CONCLUDING REMARKS

In this paper, we find significant negative association between change in the total fertility rate and anti-fertility policy. On the other hand, there is no significant relationship for the pro-fertility policy or family planning policy, which makes it hard to conclude that government policy with respect to fertility works. It is possible that pro-fertility policy may not have been as strong (or long-lasting) as the anti-fertility policy. It is true that pro-fertility policies have become popular more recently. We may not be seeing the full impact of those policies on fertility rates empirically yet and can expect more countries to adopt such pro-fertility policies in the near future. We also need to consider the possibility of a change in culture towards a life with fewer children particularly in more developed coun-

tries, which is hard to change with a pro-fertility policy. Additionally, as many scholars noted before, fertility behavior is quite complex which makes it hard to establish causal links between fertility and government policy. We also find evidence of spatial autocorrelation in the total fertility rate, and spatial spillovers from government's policy on fertility. It is noteworthy that there is significant spatial autocorrelation with fertility, which may explain the persistence of relatively high fertility in contiguous regions of Africa.

This study can be extended in a number of ways. Particularly, we find the data from the United Nations World Population Policies database to be quite rich. The dataset would allow one to examine government policies on other demographic variables such as population growth, population mobility and population aging, among others. At the same time, we should also caution that the database does not provide information specifically on the scope of government policies and data are not available annually. With this database, it is not possible to distinguish countries that pursue anti-fertility or pro-fertility policy more strongly than others. Having a policy may not be enough to impact fertility behavior, especially when the policy is seen as a relatively minor intervention by the government. One should also keep in mind that we had to drop a number of countries from our analysis due to lack of data in some regression specifications. We include a list of those countries in the appendix (see tables A1-A3 for a list of countries used in our regressions). This study can be followed by a micro study on a country or a group of countries, which may have more detailed information on individual or household characteristics.

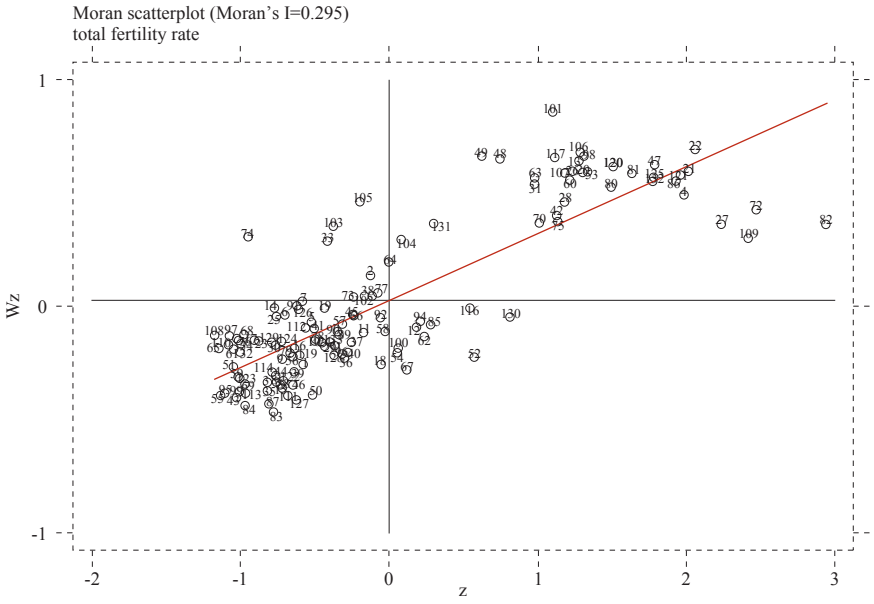
Disclosure statement

No potential conflict of interest was reported by the authors.

APPENDIX

FIGURE A1

Moran Scatterplot



List of countries and codes in the Moran's I graph

Africa	Code	Africa	Code	Oceania	Code	Northern America	Code
Algeria	2	Mauritania	75	Australia	6	Canada	17
Angola	4	Mauritius	74	Fiji	45	United States	124
Benin	13	Morocco	73	Kiribati	64		
Botswana	105	Mozambique	80	New Zealand	91		
Burkina Faso	125	Niger	82	Samoa	130		
Burundi	22	Nigeria	86	Tonga	116		
Cabo Verde	33	Rwanda	101	Vanuatu	85		
Cameroon	26	Senegal	106				
Central African Republic	31	Sierra Leone	107				
Chad	27	Somalia	109				
Comoros	28	South Africa	103				
Congo, Dem. Rep.	21	Swaziland	131				
Congo, Rep.	20	Tanzania	120				
Cote d'Ivoire	60	Togo	117				
Egypt, Arab Rep.	38	Tunisia	118				
Equatorial Guinea	40	Uganda	121				

List of countries and codes in the Moran's I graph

Africa	Code	Africa	Code	Oceania	Code	Northern America	Code
Ethiopia	42	Zambia	132				
Gabon	48						
Gambia, The	47						
Ghana	49						
Guinea	53						
Guinea-Bissau	98						
Kenya	63						
Lesotho	104						
Madagascar	70						
Malawi	81						
Mali	72						

List of countries and codes in the Moran's I graph (continued)

Europe	Code	Asia	Code	Latin Amer. & Caribbean	Code
Albania	3	Bahrain	7	Antigua and Barbuda	1
Austria	43	Bangladesh	10	Argentina	5
Belarus	69	Bhutan	24	Bahamas, The	9
Belgium	83	Brunei Darussalam	16	Barbados	8
Bulgaria	15	Cambodia	18	Belize	11
Denmark	35	China	23	Bolivia	12
Finland	44	Cyprus	34	Brazil	14
France	46	India	57	Chile	25
Greece	51	Indonesia	133	Colombia	29
Hungary	55	Israel	58	Costa Rica	30
Iceland	56	Japan	61	Cuba	32
Ireland	39	Jordan	62	Dominican Republic	36
Italy	59	Korea, Rep.	65	Ecuador	37
Luxembourg	84	Kuwait	66	El Salvador	41
Malta	76	Lao PDR	67	Grenada	50
Netherlands	87	Lebanon	68	Guatemala	52
Norway	88	Malaysia	79	Honduras	54
Poland	95	Mongolia	71	Mexico	78
Portugal	97	Nepal	89	Nicaragua	90
Romania	99	Oman	77	Panama	96
Spain	110	Pakistan	94	Paraguay	92
Sweden	112	Philippines	100	Peru	93
Switzerland	113	Saudi Arabia	102	St. Lucia	111
Ukraine	123	Singapore	108	St. Vincent and the Grenadines	127
United Kingdom	122	Sri Lanka	19	Trinidad and Tobago	114
		Thailand	115	Uruguay	126
		Turkey	119	Venezuela, RB	128
		Vietnam	129		

Table A1

Regions and names of countries included in table 1-3 regressions

Africa1	Africa2	Europe	Asia	Latin Amer. & Caribbean	Oceania
Algeria	Mauritius	Albania	Bahrain	Argentina	Fiji
Angola	Morocco	Austria	Bangladesh	Bahamas	Kiribati
Benin	Mozambique	Belarus	Bhutan	Barbados	New Zealand
Botswana	Niger	Belgium	Brunei Darussalam	Belize	Samoa
Burkina Faso	Nigeria	Bulgaria	Cambodia	Bolivia	Tonga
Burundi	Rwanda	Denmark	China	Brazil	Vanuatu
Cameroon	Senegal	Finland	Cyprus	Chile	Antigua and Barbuda
Cape Verde	Sierra Leone	France	India	Colombia	
Central African Republic	Somalia	Greece	Indonesia	Costa Rica	
Chad	South Africa	Hungary	Israel	Cuba	
Comoros	Swaziland	Iceland	Japan	Dominican Republic	
Congo	Togo	Ireland	Jordan	Ecuador	
Cote d'Ivoire	Tunisia	Italy	Korea, Republic of	El Salvador	
Congo, Dem. Rep.	Uganda	Luxembourg	Kuwait	Grenada	
Egypt	Tanzania	Malta	Lao	Guatemala	
Equatorial Guinea	Zambia	Netherlands	Lebanon	Honduras	
Ethiopia		Norway	Malaysia	Mexico	
Gabon		Poland	Mongolia	Nicaragua	
Gambia		Portugal	Nepal	Panama	
Ghana		Romania	Oman	Paraguay	
Guinea		Spain	Pakistan	Peru	
Guinea-Bissau		Sweden	Philippines	Saint Lucia	
Kenya		Switzerland	Saudi Arabia	Saint Vincent and the Grenadines	
Lesotho		Ukraine	Singapore	Trinidad and Tobago	
Madagascar		United Kingdom	Sri Lanka	Uruguay	
Malawi			Thailand	Venezuela	
Mali			Turkey		
Mauritania			Vietnam		

Table A2

Regions and names of countries included in table 4-6 regressions

Africa1	Africa2	Europe	Asia	Latin Amer. & Caribbean	Oceania	Northern America
Algeria	Mali	Austria	Bangladesh	Argentina	Australia	Canada
Benin	Mauritania	Belgium	Brunei Darussalam	Barbados	Fiji	United States
Botswana	Mauritius	Denmark	China	Bolivia	Kiribati	
Burkina Faso	Morocco	Finland	Cyprus	Brazil	Papua New Guinea	
Burundi	Niger	France	India	Chile		
Cameroon	Nigeria	Greece	Indonesia	Colombia		
Central African Republic	Rwanda	Iceland	Iran, Islamic Rep.	Costa Rica		
Chad	Seychelles	Ireland	Israel	Cuba		
Congo, Rep.	Sierra Leone	Italy	Japan	Dominican Republic		
Cote d'Ivoire	Somalia	Luxembourg	Jordan	Ecuador		
Congo, Dem. Rep.	South Africa	Malta	Korea, Rep.	El Salvador		
Egypt, Arab Rep.	Swaziland	Netherlands	Malaysia	Guatemala		
Gabon	Togo	Norway	Nepal	Guyana		
Gambia, The	Tunisia	Portugal	Oman	Honduras		
Ghana	Zambia	Spain	Pakistan	Mexico		
Guinea-Bissau	Zimbabwe	Sweden	Philippines	Nicaragua		
Kenya		United Kingdom	Saudi Arabia	Peru		
Lesotho			Sri Lanka	Suriname		
Liberia			Syrian Arab Republic	Trinidad and Tobago		
Madagascar			Thailand	Uruguay		
Malawi			Turkey	Venezuela, RB		

Table A3

Missing countries from the table 4-6 regressions

Africa	Europe	Asia	Latin Amer. & Caribbean	Oceania
Comoros	Belarus	Kuwait	Belize	Samoa
Cabo Verde	Hungary	Singapore	Antigua and Barbuda	Vanuatu
Senegal	Switzerland	Bahrain	St. Lucia	Tonga
Equatorial Guinea	Ukraine	Lao PDR	Panama	New Zealand
Uganda	Albania	Bhutan	Grenada	
Ethiopia	Romania	Lebanon	St. Vincent and the Grenadines	
Guinea	Poland	Mongolia	Bahamas, The	
Angola	Bulgaria	Cambodia	Paraguay	
Tanzania		Vietnam		
Mozambique				

Missing countries from the table 1-3 regressions

Africa	Europe	Asia	Latin Amer. & Caribbean	Oceania
Seychelles		Iran, Islamic Rep.	Guyana	Papua New Guinea
Liberia		Syrian Arab Republic	Suriname	
Zimbabwe				

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On the road again: traffic fatalities and auto insurance minimums

PAVEL A. YAKOVLEV, Ph.D.*
CHRISTINA M. ORR-MAGULICK*

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Pavel A. YAKOVLEV
Associate Professor, Department of Economics and Finance, Duquesne University, Rockwell Hall 909, 600 Forbes Ave, Pittsburgh, PA 15282, USA
e-mail: yakovlevp@duq.edu
ORCiD: 0000-0003-0447-1726

Christina M. ORR-MAGULICK
Associate, Gordon Rees Scully Mansukhani, 707 Grant Street, Suite 3800, Pittsburgh, PA 15219, USA
e-mail: cmagulick@grsm.com
ORCiD: 0000-0001-8420-0648

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Abstract

Prior research on policy-induced moral hazard effects in the auto insurance market has focused on the impact of compulsory insurance, no-fault liability, and tort liability laws on traffic fatalities. In contrast, this paper examines the moral hazard effect of a previously overlooked policy variable: minimum auto insurance coverage. We hypothesize that state-mandated auto insurance minimums may "over-insure" some drivers, lowering their incentives to drive carefully. Using a longitudinal panel of American states from 1982 to 2006, we find that policy-induced increases in auto insurance minimums are associated with higher traffic fatality rates, ceteris paribus.

Keywords: traffic fatalities, auto insurance, minimums, moral hazard

1 INTRODUCTION

In the United States, compulsory insurance laws mandate that drivers must purchase some minimal amount of liability coverage. These state-specific auto insurance minimums have remained unchanged in nominal value in most states since their enactment in 1967. The required insurance minimums contain three separate numbers. The first number specifies the per-person amount of medical liability, the second number specifies the maximum amount of medical liability per accident, and the third number specifies the amount of property liability. For example, Alaska's required auto insurance minimums of 50/100/25 (in thousands of dollars) are some of the highest in the nation, while Mississippi's insurance minimums of 25/50/25 are some of the lowest.

As the real value of these fixed insurance minimums continues to decline over time due to inflation, some drivers may find the reduced amount of insurance more appropriate for their risk level, while those who desire more coverage can easily choose to add more. In other words, the mandated auto-insurance minimum can be thought of as a price-floor, the binding value of which has been eroding over time due to inflation. In light of this, several states have increased their minimum liability insurance amounts in recent years. This mandated increase in coverage may effectively over-insure some drivers, reducing their incentive to drive carefully. Economists have long hypothesized that some features of auto insurance policy can create a perverse incentive, an effect commonly known as moral hazard.

To the best of our knowledge, this study is the first to examine whether the recent increases in state-level auto insurance minimums can increase the traffic fatality rate. The logic behind our hypothesis is rather simple: if the required insurance coverage exceeds the optimal amount preferred by some drivers, then they become over-insured and have less of an incentive to drive carefully. The expected result is a positive relationship between state traffic fatality rate and higher auto insurance minimums, holding everything else constant. We test for the presence of this moral hazard effect in a longitudinal panel of American states from 1982 to 2006. We find that the hypothesized moral hazard effect is statistically different from zero, but

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relatively small in magnitude: a one percent increase in the average state auto insurance minimum is associated with about 0.1 percent increase in the traffic fatality rate, *ceteris paribus*. Still, even this relatively small effect implies that increasing the average liability minimum by $6,000 would result in one extra traffic fatality, a questionable tradeoff given the average value of a statistical life of about $7 million. Our estimate is consistent with the recent findings showing significant improvements in traffic safety and social welfare from less generous insurance coverage (Jeziorski, Krasnokutskaya and Ceccariniz, 2015; Weisburd, 2015).

2 LITERATURE REVIEW

While insurance plays a valuable role in a market economy and may even be a viable alternative to government regulation according to Logue and Ben-Shahar (2012), it can be significantly undermined by asymmetric information. Early seminal work by Arrow (1963), Akerlof (1970), and Pauly (1968, 1974) demonstrates that competitive insurance markets can be inefficient in the presence of asymmetric information, which occurs when one party knows more about a product or service being traded than the other party and tries to gain from that knowledge. This can lead to adverse selection and moral hazard, both of which lower the social efficiency of a market. In the auto insurance market, asymmetric information implies a positive correlation between a policyholder's accident probability and insurance generosity (Rothschild and Stiglitz, 1976; Wilson, 1977). This positive correlation can be attributed to either adverse selection or moral hazard (Abbring et al., 2003). In the case of adverse selection, the free market is likely to under-provide insurance due to suboptimal risk allocations (Puelz and Snow, 1994). Compulsory insurance laws are often viewed as the solution to the adverse selection problem that plagues the insurance market (Pauly, 1974). Compulsory insurance laws require that all drivers obtain insurance, thereby reducing insurance risk and adverse selection.

However, compulsory insurance laws may exacerbate the moral hazard problem if insurance premiums and coverage amounts do not properly reflect a customer's risk level. Moral hazard occurs when individuals do not bear the full cost of their actions, giving them an incentive to act in a more reckless fashion. If widespread, this tendency increases the cost of providing insurance to all individuals. In the case of auto insurance, moral hazard may lead to non-trivial costs in terms of greater property damage and more frequent traffic collisions (Shavell, 1979; Holmstrom, 1979). Arrow (1970) and Pauly (1968) propose two partial solutions to the moral hazard problem in insurance: incomplete coverage or closer monitoring (observing). Shavell (1979) argues that the optimal amount of coverage lies somewhere between full and partial coverage. Much of the following research has focused on reconciling the theoretical insights with empirical evidence.

In a seminal paper, Peltzman (1975) develops the famous risk compensation theory where individuals seek some optimal level of risk, making them counteract the gains in safety (risk reduction) by driving more aggressively. For example, a

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rise in seat belt usage may lead to more careless driving, potentially increasing traffic accidents and fatalities. Similarly, drivers in airbag-equipped vehicles might feel safer and drive less carefully as a result. Several studies have confirmed the so-called Peltzman compensation effect.[1] For instance, Sen (2001) finds that Canadian mandatory seatbelt legislation did not reduce traffic fatalities by the predicted amount due to drivers offsetting some of the gains in safety from seat-belt usage by driving more aggressively. Harless and Hoffer (2003) show that the rise in personal injury claims after airbag adoption can be attributed to moral hazard and vehicle ownership pattern. They also find that rental car drivers are much more likely to commit grievous acts than other drivers. Some of the most conclusive evidence on the Peltzman compensation effect comes from the study of micro-level NASCAR data by Sobel and Nesbit (2007), who find that safety improvements in NASCAR racing have led to more reckless driving.

In contrast, the moral hazard effect stemming from auto insurance coverage has been more difficult to ascertain empirically. Abbring et al. (2003) demonstrate that a positive correlation between traffic fatalities and insurance coverage in static data can be interpreted as either moral hazard or adverse selection. Similarly, Cohen and Siegelman (2010) argue that the presence of a positive coverage-risk correlation in auto insurance markets can be indicative of both moral hazard and adverse selection because riskier drivers may buy more insurance (adverse selection), while more insurance coverage may also encourage reckless driving (moral hazard). Using dynamic experience-rated insurance data, Abbring, Chiappori and Pinquet (2003) claim to have been able to separate the moral hazard and adverse selection effects. Using non-parametric tests, they find no significant evidence of moral hazard in the French auto insurance market, but the coefficient's sign for younger policy holders is consistent with the moral hazard hypothesis despite not being statistically significant.

More recent studies, however, find increasing evidence of moral hazard in the auto insurance market. For example, Israel (2004) and Dionne et al. (2005) apply the Abbring, Chiappori and Pinquet (2003) methodology to longer data panels in the United States and Canada, respectively, and confirm the presence of moral hazard. Specifically, Dionne et al. show that the implementation of the new *bonus-malus* (experience-rating) scheme in Quebec's automobile insurance industry has lowered the moral hazard effect as evidenced by fewer collisions and traffic violations. Abbring, Chiappori and Zavadil (2008) study dynamic incentives of experience-rated policy and find evidence of moral hazard in the Dutch auto insurance market. Using data from the Quebec public insurance plan, Dionne et al. (2011) also find evidence that accumulated demerit points incentivize safer driving due to the threat of driver's license revocation. Furthermore, Dionne, Michaud and Dahchour (2013) use experience-rated, longitudinal survey data with dynamic information both on claims and accidents from France during the 1995-1997 period and find evidence of moral hazard among a subgroup of policyholders with

[1] See Garbacz (1990a, 1990b, 1991, 1992); Risa (1994); Calkins and Zlatoper (2001).

less than 15 years of driving experience. This result suggests that more coverage for less experienced policyholders leads to a higher probability of a future accident, *ceteris paribus*. In their study, Dionne et al. also claim to be able to separate moral hazard from adverse selection and learning, noting that policyholders with less driving experience have a combination of learning and moral hazard effects. Weisburd's (2015) instrumental variable analysis of Israeli employer-determined auto insurance data from the 2001-2008 period shows that a $100 reduction in accident costs for drivers results in a 1.7 percentage point increase in the probability of an accident or, equivalently, a 10 percent increase in auto accidents. Similarly, the Jeziorski, Krasnokutskaya and Ceccariniz (2015) analysis of data from a major Portuguese auto insurance company offers strong evidence of moral hazard. One of their key findings indicates that introducing a 20% deductible can reduce the annual number of accidents by 1,518. Their estimates suggest that switching from full to partial auto insurance coverage can significantly reduce the number of accidents and substantially improve social welfare. These findings are consistent with the standard theoretical conclusion that full insurance may not be optimal in the presence of moral hazard.

In contrast to the aforementioned literature, the moral hazard hypothesis examined in our paper is most closely related to a separate body of research on the aggregate-level safety effects of insurance policy changes. Several studies find that certain state auto insurance laws, like no-fault liability, may increase traffic collisions via the moral hazard effect. In a pure no-fault liability system, policyholders are reimbursed by policyholders' insurance companies without proof of fault and cannot seek extra damages through the justice system, which may introduce a perverse incentive to drive less carefully. Non-coincidentally, Landes (1982) finds that states with no-fault liability laws have more fatal accidents, holding everything else constant. However, Zador and Lund (1986) update Landes' study with more recent data and find no conclusive evidence that no-fault liability laws lead to more fatal accidents. Kochanowski and Young (1985) also arrive at the same conclusion. Cummins, Weiss and Phillips (2001) argue that the adoption of no-fault liability laws can be endogenous in traffic collisions, which could explain these different findings. Using the instrumental variable approach, Cummins, Weiss and Phillips find that fatal accident rates are higher in states with no-fault liability laws, holding everything else constant. Similarly, Cohen and Dehejia (2004) find that reductions in accident liability due to no-fault laws have led to more traffic fatalities, which is indicative of moral hazard. In this paper, we set out to test whether higher auto insurance minimums set by policymakers can effectively over-insure some drivers and lead to an analogous moral hazard effect that can manifest itself in higher traffic accidents or fatalities.

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3 DATA

We set out to estimate a relationship between state traffic fatality rate and auto insurance minimums using a balanced panel of 48 American states from 1982 to 2006. Data availability for some important control variables dictates the chosen time period and states. For example, historic average precipitation and temperature, key control variables, are not currently available for all years for Alaska and Hawaii, excluding these two states from our regression analysis.

The dependent variable in our analysis is the annual traffic fatality rate (total traffic-related fatalities divided by state population). Traffic fatality data were obtained from the Fatal Accident Reporting System (FARS) made available by the National Highway Traffic and Safety Administration. Traffic fatalities, as opposed to collisions, are chosen for two reasons. First, traffic collisions without fatalities tend to be under-reported.[2] States with higher insurance minimums tend to have more uninsured drivers, further accentuating the underreporting bias.[3] Support for this argument comes from Ma and Schmit (2000), who find that higher poverty rates are associated with more uninsured drivers. Second, not all states measure and report traffic collisions in the same way, making it a very unrepresentative and unbalanced panel of states. For these reasons, we follow many other studies and use traffic fatalities instead of collisions.

The key variable of interest in this study is the mandatory minimum of auto insurance liability coverage that an insured driver must purchase, which varies from state to state and over time. There are three categories of minimal liability coverage that are required by each state: per person medical liability, per accident medical liability, and per accident property liability. In the event of an accident, the insured individual may receive up to the full amount of minimum coverage to help pay for medical care and property damages. Since all three minimum categories are strongly collinear[4] within states, we use the inflation-adjusted per accident medical liability amount as the relevant measure of state auto insurance minimums (usually per accident amount is twice of per person amount).

Table 1 shows the nominal values, expressed in thousands, for the three categories of insurance minimums in each state in year 2006. First instituted in 1967, the insurance minimums have been increased by policymakers only in ten states during the studied time period (1982-2006). Inflation has significantly eroded the real value of these insurance minimums over time in most states, making them less binding for some drivers.[5] At the same time, significant improvements in vehicle

[2] The National Highway Traffic Safety Administration estimates that over 10 million crashes go unreported each year. Insurance Research Council's *Uninsured Motorists 2014 Edition* reports that about 13 percent of drivers were uninsured in 2012, with Oklahoma topping the list with 26 percent and Massachusetts at the bottom with 4 percent.

[3] Consumer Federation of America claims that most uninsured drivers have low incomes and struggle to afford the high-priced minimum liability coverage now required by all states, except for New Hampshire.

[4] Pairwise correlation is 0.99 between per person and per accident medical liability and 0.63 between per person/accident medical and property liability.

[5] We adjust the nominal value of insurance minimums for inflation using the GDP deflator.

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and road safety over the years have led to a pronounced general decline in traffic fatality rates as well. As can be seen in figure 1, the average real value of per accident medical liability minimum and the average state traffic fatality rate have both fallen from 1982 to 2006.

Table 1

State auto insurance minimums in 2006 (in thousands of U.S. dollars)

State	Per person liability	Per accident liability	Property liability	State	Per person liability	Per accident liability	Property liability
Alabama	20	40	10	Montana	25	50	10
Alaska	50	100	25	Nebraska	25	50	25
Arizona	15	30	10	Nevada	15	30	10
Arkansas*	25	50	25	New Hampshire	25	50	25
California	15	30	5	New Jersey	15	30	5
Colorado	25	50	15	New Mexico	25	50	10
Connecticut	20	40	10	New York*	25	50	10
Delaware*	15	30	10	North Carolina	30	60	25
Florida	10	20	10	North Dakota	25	50	25
Georgia*	25	50	25	Ohio	13	25	8
Hawaii	20	40	10	Oklahoma*	25	50	25
Idaho	20	50	15	Oregon	25	50	10
Illinois	20	40	15	Pennsylvania	15	30	5
Indiana	25	50	10	Rhode Island	25	50	25
Iowa	20	40	15	South Carolina*	15	30	10
Kansas	25	50	10	South Dakota	25	50	25
Kentucky	25	50	10	Tennessee	25	50	10
Louisiana	10	20	10	Texas	20	40	15
Maine	50	100	25	Utah*	25	50	15
Maryland	20	40	10	Vermont	25	50	10
Massachusetts*	20	40	5	Virginia	25	50	20
Michigan	20	40	10	Washington	25	50	10
Minnesota*	30	60	10	West Virginia	20	40	10
Mississippi*	25	50	25	Wisconsin	25	50	10
Missouri	25	50	10	Wyoming	25	50	20

** States that changed auto insurance minimums during the 1982-2006 period according to our research.*

Unsurprisingly then, the scatter plot in figure 2 depicts a statistically significant (at the 5% level) and strong positive correlation of 0.93 between fatality rate and auto insurance minimums. The significant positive correlation persists even after removing potential outlier observations in the lower, right-hand corner of the graph. However, this correlation does not necessarily imply causality as other factors, like improving vehicle and road safety, can be responsible for much of the observed decrease in the traffic fatality rate over time.

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FIGURE 1

Traffic fatality rate and real value of auto insurance minimums over time

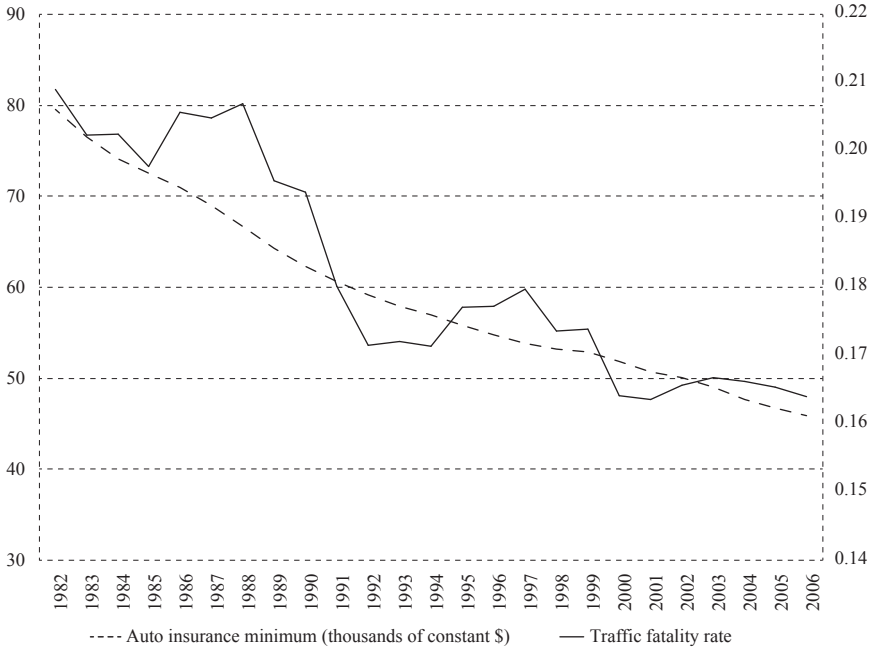
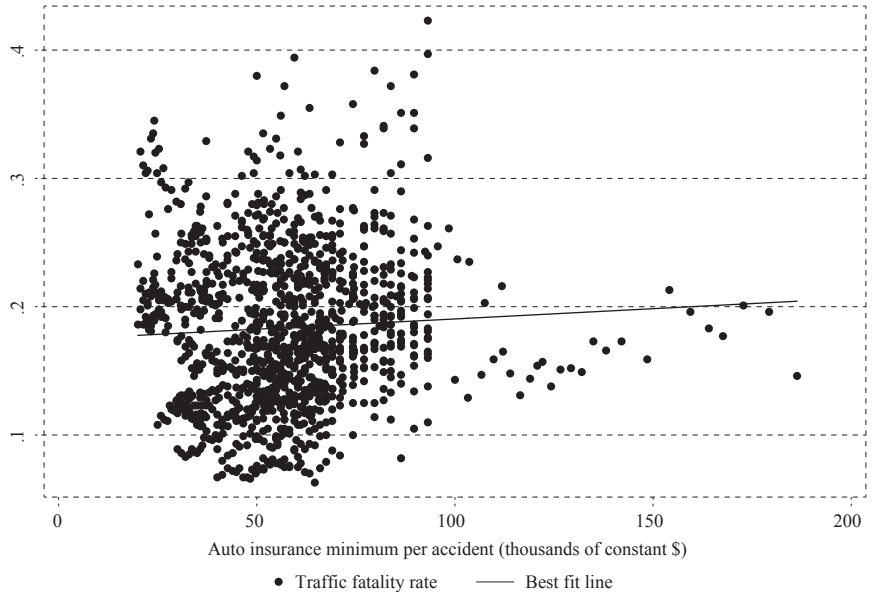


FIGURE 2

Traffic fatality rates and auto insurance minimums in 48 states (1982-2006)



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The empirical challenge of detecting the moral hazard effect requires separating the trend of declining traffic fatalities due to continual improvements in road and vehicle safety from policy-induced changes such as the increase in auto insurance minimums. Fortunately, policy-induced changes in auto insurance minimums that occurred in ten states during the studied time period can serve as a quasi-experiment, helping with the identification of the causal effect from policy changes. Namely, if there is a moral hazard effect, then the states that raised their auto insurance minimums should have experienced a higher traffic fatality rate than the control group, *ceteris paribus*.

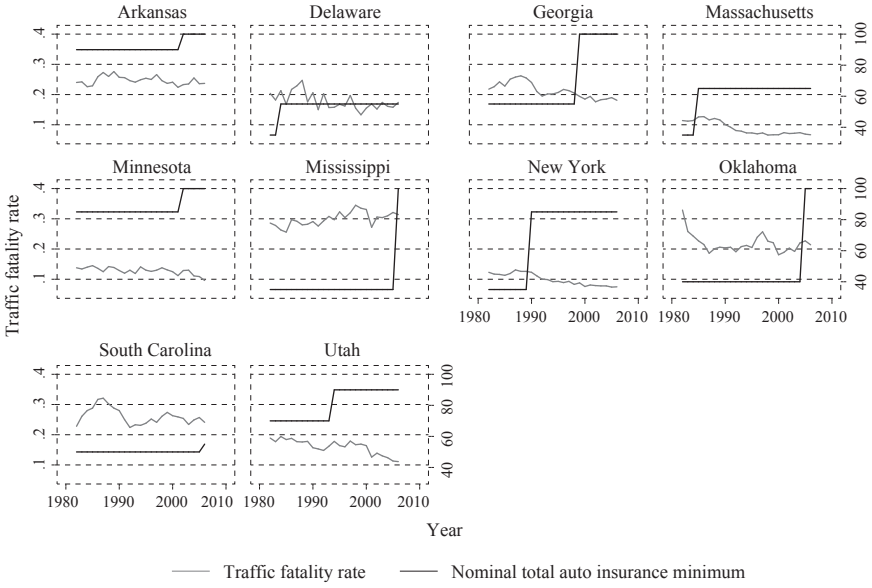
Figure 3

Traffic fatality rates fell less in states that raised auto insurance minimums

Figure 3 shows that the traffic fatality rate typically fell over time, but it fell significantly more in states that did not raise their auto insurance minimums than in those that did. The difference between the two groups' fatality rate means is statistically significant at the 5 percent level. As can be seen in the figure, the gap in traffic fatalities between the two groups of states widened more in the second half of the 1982-2006 period when several states increased their auto insurance minimums. Of course, this figure does not prove that lower auto insurance minimums cause an improvement in safety by reducing the moral hazard effect. In fact, one could argue that causality might work in the opposite direction: rising traffic fatalities may force policymakers to update their auto insurance minimums. However, we don't find any evidence in favour of the reverse-causality argument.

FIGURE 4

Traffic fatality rates and auto insurance minimum increases



In figure 4, we show the evolution of traffic fatality rates and auto insurance minimums (in total nominal value) in the ten states that increased their auto insurance minimums during the studied time period. None of the ten states in figure 4 show a clear-cut rise in the traffic fatality rate before the increase in state auto insurance minimums. In fact, most of the ten states show a downward trend in traffic fatalities over time. It is hard to imagine that policy makers would feel pressured to increase the state auto insurance minimums if their traffic fatality rates were falling rather than rising. In the next section of this paper, we also test for the exogeneity of auto insurance minimums and fail to reject it. This result is consistent with the findings by Jeziorski, Krasnokutskaya and Ceccariniz (2015), who note that the industry's practice of pricing premiums reflects the probability of an accident rather than its severity, implying that the amount of insurance coverage appears to be unrelated to risk.

We also have a good theoretical reason to suspect that auto insurance minimums are exogenous to the traffic fatality rate or the probability of a deadly accident. Unlike insurance premiums, which in theory should reflect the probability of an accident, the minimums are typically set to cover the expected expenses in the event of an accident. The increase or decrease in the odds of an accident should not affect the amount of optimally chosen coverage, which in theory should be equal to the value of the insured assets. In other words, auto insurance minimums should be exogenous to traffic fatality rates and policy makers probably set the auto insurance liability minimums in proportion to potential damages from an accident rather than the probability of an accident. The minimums would then be proportional to the amount of expected damages, which would probably depend

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on per capita wealth or income in a given state. For this reason, the policy-induced changes in auto insurance minimums are akin to a quasi-natural experiment, making the minimums exogenous to state traffic fatality rates.

Table 2
Variables and sources

Variable name	Variable description	Mean (std. dev.)
Traffic fatality rate[1]	Traffic fatalities divided by state population measured in thousands.	0.18 (0.06)
Auto insurance minimum[6]	Per accident minimum liability amount (in thousands of dollars) adjusted for inflation using GDP deflator.	59.36 (23.53)
Young population share[2]	Share of people 18-24 years of age in state population.	0.11 (0.01)
Old population share[2]	Share of people 65 and older in state population.	0.12 (0.02)
Minimum drinking age[2]	Minimum legal drinking age for spirits in years.	20.59 (0.93)
Gasoline price[3]	Per gallon gasoline price in constant dollars.	1.90 (0.41)
Income per capita[4]	Real GDP/total population (in thousands).	39.74 (10.38)
Population density[5]	Total population/square mile of land.	0.17 (0.24)
Alcohol consumption[7]	Alcohol consumption in gallons per capita for state population over the age of 17.	2.39 (0.56)
Precipitation[8]	Average weighted annual rain and snow fall in inches.	3.09 (1.26)
Air temperature[8]	Average weighted annual air temperature in Fahrenheit.	52.50 (7.61)
Speed limit[9]	Average (rural and urban) speed limit in miles per hour.	60.03 (6.15)
Crime rate[10]	Overall crime rate.	0.05 (0.01)
Primary seatbelt law[11]	Dummy variable: 1 if state has a primary seatbelt law, 0 if otherwise.	0.22 (0.42)
Compulsory insurance[12]	Dummy variable=1 if state has compulsory insurance (0 otherwise).	0.73 (0.44)
No-fault liability[12]	Dummy variable=1 if state has no-fault liability law (0 otherwise).	0.28 (0.45)

1) FARS (2009)
2) Ponicki (2004)
3) EIA (2009)
4) BEA (2009)
5) U.S. Census Bureau (2009)
6) State-by-State Insurability Requirements (2009)
7) The Beer Institute (2008)
8) NCDC (2017, 2017a)
9) IIHS (2017)
10) Bureau of Justice Statistics (2017)
11) NHTSA (2009)
12) Cohen and Dehejia (2004)

In order to isolate the effect of insurance minimums on the traffic fatality rate from the confounding factors, this study employs a large and diverse set of control variables suggested by previous research.[6] The control variables fall into the four main categories: economic (income, gasoline price, alcohol consumption), demographic (age, population density, crime rate), climatic (precipitation, temperature), and policy (compulsory, no-fault, speed limit, seatbelt, and legal drinking age laws). Variable definitions, sources, and descriptive statistics are shown in table 2. In the next section, we develop our empirical model and present the findings.

4 EMPIRICAL MODEL AND ESTIMATES

Analogously to Cohen and Dehejia (2004), we hypothesize that lowering the cost of personal accident liability through higher auto insurance minimums may over-insure some drivers, decreasing their incentives to drive carefully. We expect to find that states with policy-induced increases in insurance minimums should experience higher traffic fatality rates, holding everything else constant. Several assumptions need to hold for the hypothesized moral hazard effect to be observed empirically: (1) a sufficient fraction of drivers must be constrained by the minimum coverage, (2) drivers must be aware of their policy parameters, (3) higher minimums do not induce too many drivers to become uninsured, and (4) drivers respond to changes in coverage.

It has been reported that about 20 percent of drivers have minimum coverage, 13 percent are uninsured, and the median jury award for liability cases for vehicular accidents is about $20,000 (Lieber, 2012). Considering that the average per person liability minimum is about $23,000 (or $46,000 per accident), states with high liability minimums may "over-insure" some drivers. These numbers suggest that a sizeable increase in auto insurance minimums may constrain a non-trivial percentage of drivers, giving some support to the first assumption.

Regarding our second and fourth assumptions, a study by Dionne, Michaud and Dahchour (2013) suggests that changes in insurance premiums do affect some policyholders' driving and learning behavior. These findings imply that sufficiently many drivers are aware of and appear to respond to changes in their policy parameters.

As for the third assumption, it is possible that some drivers may drop their auto insurance in response to higher insurance minimums, driving more carefully in order to minimize the odds of getting caught driving without coverage. The uninsured drivers may introduce a downward bias in the estimate of the moral hazard effect, which is likely to be small considering the modest percentage of drivers that might be affected by policy-induced increases in auto insurance minimums.

[6] The variables were chosen largely based on the studies by Leigh (2009), Asch and Levy (1990), Nelson, Bolen and Kresnow (1998), Derrig et al. (2002), Kahane (2000), Glassbrenner (2005), Beck et al. (2007), Sen (2001), Cohen and Einav (2003), Cohen and Dehejia (2004), Pulito and Davies (2009), Friedman, Hedeker and Richter (2009), and Yakovlev and Inden (2010).

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Regardless of the real-world viability of the aforementioned assumptions, the paper's moral hazard hypothesis can only be rejected empirically. To test this hypothesis, we estimate the following linear regression model with state and year fixed effects:

$$y_{it} = \alpha + yM_{it} + X_{it}\beta + u_i + v_t + \varepsilon_{it}. \quad (1)$$

Where Y_{it} is the traffic fatality rate, M_{it} is the auto insurance minimum per accident, X_{it} is a vector of control variables that are discussed in more detail in the data section, u_i and v_t are state and year fixed effects, ε_{it} is the error term, while subscripts $i = 1, \ldots, 50$ and $t = 1982, \ldots, 2006$ represent states and years, respectively. State fixed effects help to control for unobserved time-invariant factors such as culture and geography, while year fixed effects control for common temporal effects such as improving vehicle safety and road conditions. The choice of the fixed-effects (within) estimator is supported by the Hausman random effects test, which rejects the null of no systematic difference in coefficients with 99.9 percent probability. This result implies that the model should be estimated using state fixed effects to control for unobserved heterogeneity, a common source of endogeneity bias.

In the first column of table 3, we report the OLS estimates of the model in equation (1) with standard errors robust to heteroskedasticity and autocorrelation (i.e. clustered standard errors). The coefficient estimates are reported as elasticities (calculated at variables' mean values) for ease of interpretation. The coefficient estimate for auto insurance minimum per accident is positive, as expected, and statistically significant at the ten percent level. Its elasticity value of 0.096 implies that a ten percent increase in the auto insurance minimum amount is associated with almost one percent rise in the traffic fatality rate, on average.

In column two of table 3, we report the OLS estimates of the model in equation (1) with Driscoll-Kraay (1998) standard errors that are robust to the general forms of autocorrelation, heteroskedasticity, and contemporaneous correlation, which have all been detected in our data.[7] This regression also yields a statistically significant (now at the one percent level) positive coefficient of 0.096 for auto insurance minimum per accident.

To correct for potential outlier bias we also estimate the model in equation (1) via "robust" regression, which is basically a re-weighted OLS. As can be seen in figure 2, there might be some outliers in the data that may bias the conventional OLS estimates.[8] The "robust" regression results shown in column three of table 3 yield a statistically significant (at the one percent level) and positive elasticity estimate of 0.109 for insurance minimums.

[7] A Breusch-Pagan/Cook-Weisburg test indicates the presence of groupwise heteroscedasticity. Arellano-Bond and Wooldridge tests indicate the presence of autocorrelation in the residuals. The Pesaran test detects contemporaneous correlation. The residuals were also tested for non-stationarity using the Pesaran, Shin W-stat, ADF-Fisher Chi-square, and PP-Fisher Chi-square tests, all of which rejected the null hypothesis of non-stationarity.
[8] According to the Hadi (1992, 1994) outlier test, about 9 percent of our observations could be considered as outliers.

TABLE 3

Determinants of traffic fatality rates in 48 states (1982-2006)

Estimator	**FE OLS**			**GMM**
standard error	**Clustered**	**Driscoll-Kraay**	**Weighted**	**robust**
Auto insurance minimum	0.096*	0.096***	0.109***	0.108**
	(0.052)	(0.026)	(0.026)	(0.051)
Compulsory insurance	0.01	0.01	0.019**	-0.005
	(0.017)	(0.012)	(0.008)	(0.014)
No-fault liability	0.023*	0.023***	0.023***	0.013
	(0.012)	(0.004)	(0.006)	(0.013)
Primary seatbelt law	-0.009*	-0.009***	-0.005**	-0.000001
	(0.005)	(0.003)	(0.002)	(0.003)
Speed limit	0.132	0.132**	0.179***	0.170**
	(0.123)	(0.059)	(0.047)	(0.084)
Minimum drinking age	0.179	0.179**	0.062	0.242
	(0.230)	(0.088)	(0.117)	(0.331)
Alcohol consumption	0.766***	0.766***	0.765***	0.610***
	(0.093)	(0.091)	(0.050)	(0.109)
Income per capita	0.870***	0.870***	0.676***	0.603***
	(0.169)	(0.090)	(0.076)	(0.101)
Gasoline price	0.238	0.238	0.238	-0.234
	(0.351)	(0.184)	(0.181)	(0.224)
Population density	-0.053	-0.053*	-0.058*	-0.070
	(0.086)	(0.027)	(0.035)	(0.053)
Young population share	0.07	0.07*	0.00737	0.139*
	(0.088)	(0.036)	(0.041)	(0.078)
Old population share	-0.082	-0.082*	-0.044	-0.177**
	(0.110)	(0.043)	(0.048)	(0.088)
Crime rate	0.0581	0.0581	0.055**	0.007
	(0.044)	(0.037)	(0.026)	(0.036)
Precipitation	-0.085***	-0.085***	-0.078***	-0.087***
	(0.019)	(0.019)	(0.018)	(0.020)
Air temperature	-0.125	-0.125	-0.258*	-0.008
	(0.158)	(0.165)	(0.151)	(0.179)
Lagged dependent variable	–	–	–	0.344***
				(0.051)
R-squared	0.62	0.62	0.95	–

**** Indicates significance at 1%, ** at 5%, and * at 10%. Dependent variable: traffic fatality rate. The reported coefficients are elasticities computed as d(lny)/d(lnx) at variables' means (dummies are treated as continuous variables for calculating the means). All models include state and year fixed effects, but their coefficients, along with a constant, are not reported. Due to the lack of consistent annual precipitation and temperature data, Alaska and Hawaii are excluded from the sample, resulting in 48 contiguous states over 25 years or 1,200 observations.*

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While the last three regression models have shown encouraging consistency in the estimates for auto insurance minimums, they could still suffer from another type of endogeneity bias – reverse causality. Fortunately, we have good theoretical and empirical reasons to argue that auto insurance minimums are exogenous. As discussed in more detail in the data section of this paper, economic theory suggests that the auto insurance minimums are likely to be set in proportion to the expected damages from an accident rather than accident probability, making them exogenous to past traffic fatalities. Similarly, Jeziorski, Krasnokutskaya and Ceccariniz (2015) find that the insurance premiums reflect the probability of accidents rather than their severity, implying that the damages are unrelated to an individual's ability or risk. We also perform a formal empirical test of exogeneity of auto insurance minimums in the following regression model, which is estimated via a dynamic general method of moments (GMM):

$$\Delta Y_{it} = \alpha + \rho \Delta Y_{it-1} + y \Delta \hat{M}_{it} + \Delta X_{it} \beta + v_t + \varepsilon_{it}. \quad (2)$$

This Arellano and Bond (1991) dynamic GMM model features robust standard errors and year dummies (i.e. time fixed effects) because the first-differencing procedure removes all time-invariant heterogeneity (i.e. state fixed effects) and first-order autocorrelation in the error term.[9] According to Roodman (2006), the general method of moments (GMM) estimator is well suited for dynamic models with small-T and large-N dimensions, heteroskedastic and endogenous error structure. Arellano and Bond (1991) and Holtz-Eakin, Newey and Rosen (1988) argue that the endogenous variables can sometimes be instrumented with their own lagged values as "internal" instruments. Similarly to Jeziorski, Krasnokutskaya and Ceccariniz (2015), we instrument for potentially endogenous insurance minimums with their own lagged values in levels (t-2 and deeper). The Sargan/Hansen test fails to reject the null hypothesis of instrument over-identification (p-value of 0.64), implying that the chosen instruments are sufficiently correlated with the possibly endogenous variables, but uncorrelated with the error term. Furthermore, we fail to reject the null hypothesis (p-value of 0.25) that the auto insurance minimums are exogenous.[10]

The GMM model yields a statistically significant (at the five percent level) and positive elasticity coefficient of 0.108, which further corroborates our hypothesis that higher auto insurance minimums increase the traffic fatality rate (see column 4 in table 3). While the estimated elasticity coefficients for auto insurance minimums are modest in magnitude (i.e. relatively inelastic) across all four models, ranging from 0.096 to 0.109, their impact on the traffic fatality rate is still noteworthy considering the non-trivial number of deadly collisions that occur every year. Our average elasticity estimate of about 0.1 implies that a $6,000 mandated

[9] It is important to point out that the Arellano-Bond test fails to reject (with p-value of 0.23) the null hypothesis of nonexistent second-order autocorrelation in the error term, a required assumption for GMM models.
[10] We use a generalized version of the Durbin-Wu-Hausman (DWH) test of the endogeneity of regressors, implemented as the Hansen/Sargan/C test statistic in the GMM model developed by Baum, Schaffer and Stillman (2003).

increase in the auto insurance per-accident liability minimum is likely to result in one extra death from traffic collisions, on average. This mandatory increase in coverage comes at a high social cost considering that the median value of a statistical life estimated in the wage-risk studies[11] to be about $7 million. A couple of recent papers find corroborating evidence of costly moral hazard responses to changes in auto insurance coverage for drivers. For example, Jeziorski, Krasnokutskaya and Ceccariniz (2015) estimate that a $50 rise in the cost of a claim for an average policy reduces the claim probability by roughly a 0.1 percentage point. Similarly, Weisburd (2015) estimates that a $100 reduction in accident claim costs for drivers results in a 1.7 percentage point increase in the probability of an accident or, equivalently, a 10 percent increase in auto accidents. These findings show that significant social welfare costs can arise due to moral hazard from over-generous auto insurance coverage.

Looking at all the models in table 3, it is clear that several control variables also have significant associative effects on the traffic fatality rate. Namely, alcohol consumption and income per capita have relatively large and statistically significant positive effects on the traffic fatality rate across all models. The positive coefficient for income per capita is consistent with the idea of driving being a normal good: rising real incomes may put more drivers on the road, increasing the probability of deadly collisions. Precipitation has a significant negative effect on the traffic fatality rate across all models. Primary seat belt law is negative and statistically significant in the first three out of four regression models. In some models, the shares of young and old populations appear to have the expected positive and negative, respectively, statistically significant relationships with the traffic fatality rate. No-fault liability law is positive and statistically significant also in the first three out of four regression models, supporting previous findings in the literature of possible moral hazard. While compulsory insurance appears statistically significant in only one regression model, it has a positive coefficient, which is also consistent with the moral hazard hypothesis.

5 CONCLUSION

This study examines empirically whether higher state auto insurance minimums create a moral hazard problem by effectively over-insuring some drivers and lowering their incentives to drive more carefully. After controlling for numerous contributing factors and possible endogeneity of auto insurance minimums, we find a statistically significant, positive relationship between the traffic fatality rate and state auto insurance minimums. This relationship retains its sign and statistical significant across all of our regression models. The estimated elasticity coefficient for auto insurance liability minimum per accident ranges from 0.096 to 0.109, implying that a ten percent increase in auto insurance minimums is associated with about one percent increase in the traffic fatality rate, on average. In other words, a $6,000 increase in per-accident liability minimum is likely to result in

[11] See Viscusi (2008) for a review of life valuation methods and findings.

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one more traffic fatality. With the average value of a statistical life of about $7 million, this seems like a questionable tradeoff.

Several American states are currently considering increasing their auto insurance minimums given that the dollar amounts have not been indexed to inflation for many years and have declined in real value over time. If our estimates are correct, higher auto insurance minimums may increase traffic collisions and fatalities and reduce social welfare. We also find that no-fault and compulsory insurance laws may have significant positive effects on traffic fatalities, which is consistent with previous findings. Generally speaking, our findings provide additional evidence for the existence of moral hazard in the auto insurance industry.

Disclosure statement
No potential conflict of interest was reported by the authors.

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Public participation in the budgetary process in the Republic of Croatia

GORDAN STRUIĆ, Ph.D. candidate*
VJEKOSLAV BRATIĆ, Ph.D.*

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Gordan STRUIĆ
Croatian Parliament, Committee on the Constitution, Standing Orders and Political System, Trg. sv. Marka 6, 10000 Zagreb, Croatia
e-mail: gordan.struic@gmail.com
ORCiD: 0000-0001-6528-4436

Vjekoslav BRATIĆ
Institute of Public Finance, Smičiklasova 21, 10000 Zagreb, Croatia
e-mail: vjekoslav.bratic@ijf.hr
ORCiD: 0000-0002-9295-0286

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Abstract

The International Monetary Fund's fourth review of the Fiscal Transparency Code from 2014 sets out the principle of participation according to which the government must provide citizens with a brief, simple and easily understandable overview of the implications of all budgetary measures and with an opportunity to participate in the budgetary decision-making process. The Fiscal Transparency Code must be implemented in Croatia, which is an IMF member state, so this paper uses an interdisciplinary approach to point out the importance and economic effects of public participation in the budgetary process, identify the normative mechanisms of public participation in the budgetary process, and look into what they comprise of and whether they can help in achieving "participation in budgetary decision-making", as provided for by point 2.3.3. of the Code in Croatia. It is assumed that the Croatian legal system provides various normative mechanisms of public participation in the budgetary process, which enables the implementation of the participation principle set out in the Code. These mechanisms are, however, not specific to the budgetary process itself, but rather represent general normative mechanisms of public participation, which apply in the legislative process as well.

Keywords: public, participation mechanisms, budgetary process, the Fiscal Transparency Code, Croatia

1 INTRODUCTION

Even though the roots of fiscal transparency[1] stem from texts written in ancient Greece[2] as early as the 4th and 5th centuries BC, some mediaeval documents found in England and Catalonia, and a number of European constitutions dating from late 18th to mid-19th century (e.g. the French Constitution of 1791 and the Belgian Constitution of 1831)[3], it was only in the 1990s that this idea was given more attention[4] and that international requests for fiscal transparency were gradually formulated, eventually leading to a definition of fiscal transparency.

The lack of fiscal transparency has been identified in professional literature as one of the causes of the financial crises of the 1980s and 1990s. The rise in interest in fiscal transparency issues has increased further because of problems in the functioning of the fiscal system, particularly in view of high deficit and public debt

[1] Kopits and Craig (1998:1) define fiscal transparency as "openness toward the public at large about government structure and functions, fiscal policy intentions, public sector accounts, and projections", while Petrie (2011:6) adds that fiscal transparency is a blanket term which comprises four main elements (dimensions): public availability of information, clarity of roles, accountability, and participation.

[2] According to Aristotle (1988:178): "(...) In order to avoid peculation of the public money, the transfer of the revenue should be made at a general assembly of the citizens, and duplicates of the accounts deposited with the different brotherhoods, companies, and tribes."

[3] E.g. Title V, Article 3 of the French Constitution of 1791 stipulates the obligation to provide "detailed accounts of the expenditure of ministerial departments". Under Article 116, paragraph 2 of the Belgian Constitution of 1831, "[The] Court [of Audit] is responsible for examining and validating the general administration accounts and the accounts of all accounting officers answerable to the public treasury." This provision is still found in the current Belgian Constitution, adopted in 2014. (For more information, see: Irwin, 2013:10-11 and 26-29.)

[4] According to Philipps and Stewart (2009:801), the reasons of such interest lie in "the neoliberal turn in economic policy, which emphasizes fiscal discipline" and "the movement to reform institutions to promote good governance", to achieve macroeconomic stability and economic growth.

levels in some countries. In order to overcome these problems, it is crucial to implement institutional reforms, improve fiscal transparency and adopt fiscal rules (for more information, see: Drezgić, 2006:25). According to de Renzio and Wehner (2015:4), the "positive view of the potential impact of transparency and participation in fiscal matters", such as effective fiscal management and accountability, reduced corruption, improved allocation of resources, more trust in the government and higher revenues, has "led to a growing set of international standards and norms", i.e. rules.

The IMF's Code of Good Practices on Fiscal Transparency, adopted in April 1998, is the first comprehensive attempt at shaping international standards for IMF members' fiscal policy management (for more information, see: Petrie, 1999:5). Four reviews of the document have been published so far (November 2017): in 1999, 2001, 2007 and 2014. One of the main novelties introduced in the final (fourth) 2014 version, when the document was officially renamed The Fiscal Transparency Code (translated into Croatian by the Institute of Public Finance, 2014; hereinafter: the FT Code) is the so-called *principle of public participation (involvement)*[5] according to which "the government provides citizens with an accessible summary of the implications of budget policies and an opportunity to participate in budget deliberations" (item 2.3.3. of the FT Code).

Soon after it was incorporated into the FT Code, the principle of participation was incorporated in other international documents such as the OECD Recommendation on Budgetary Governance (OECD, 2015)[6] and the Principles of Public Participation in Fiscal Policy (GIFT, 2015)[7]. For instance, according to item 10 of GIFT's High-Level Principles on Fiscal Transparency, Participation and Accountability (GIFT, 2012; hereinafter: High-Level Principles), citizens and all non-state actors should have the right and "effective opportunities to participate directly in public debate and discussion over the design and implementation of fiscal policies". GIFT's High-Level Principles have been endorsed by the United Nations General Assembly's Resolution 67/218 adopted on 21 December 2012, stating in item 2 that member states are encouraged "to intensify efforts to enhance transparency, participation and accountability in fiscal policies, including through the consideration of the principles set out by the [GIFT]" (for more information, see: United Nations, General Assembly, 2012).

Having in mind that the public participation principle, as one dimension of fiscal transparency, is being incorporated in an increasing number of international documents, this paper examines more closely the legal instruments of public participa-

[5] The two terms are used interchangeably herein.

[6] See principle no. 5 – "provide for an inclusive, participative and realistic debate on budgetary choices".

[7] See item no. 9 – the principle of complementarity which ensures mechanisms for public participation and to complement citizen engagement, as well as to "increase the effectiveness of existing governance and accountability systems", which stems from item no. 10 of GIFT's High-Level Principles on Fiscal Transparency, Participation and Accountability (GIFT, 2017b). The Principles of Public Participation in Fiscal Policy (GIFT, 2017a) have been translated into Croatian (IPF, 2017a), as have the GIFT's (2017b) High-Level Principles on Fiscal Transparency, Participation and Accountability (IPF, 2017b).

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tion[8] in the budgetary process in the Republic of Croatia. The primary goal of this interdisciplinary approach is to call attention to the significance and the economic effects of public participation in the budgetary process, identify the instruments of public participation in the budgetary process, as well as to explore their main elements and see if they can be instrumental to "participation in budget deliberations" as per item 2.3.3. of the FT Code in Croatia. It is assumed that Croatian law provides various legal instruments for public participation in the budgetary process that enable the realization of participation principles as established in the FT Code, but also that they are not specific to the budgetary process itself; rather, they are so-called general legal instruments of public participation applicable in the law-making process and the process of adopting other regulations.

Following the introduction, the second section offers definitions and a brief overview of the forms and levels of participation. We also show how participation is connected with fiscal transparency, which is here seen in the context of the state budget, as well as its significance and effects on a country's economy. The third section talks about the significance and practices of the budgetary process as provided by the FT Code and briefly discusses the open budget index as an international comparative indicator of budget transparency, participation and oversight. Section four identifies the instruments of public participation in the budgetary process in Croatia and analyses what constitutes them. Finally, our conclusions are set out in section five.

2 ABOUT PUBLIC PARTICIPATION

Public participation in the budgetary process is a manifestation of political participation, consisting of "taking part in the process of formulation, passage and implementation of public policies" concerned with "action by citizens which is aimed at influencing decisions which are, in most cases, taken by public representatives and officials" (Axford et al., 2002:102).

In the pages that follow, we will briefly introduce the notion of public participation, its forms and its levels, as well as its role within the framework of fiscal transparency.

[8] To use the definition contained in the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (the Aarhus Convention, the text of which is contained in the Act Ratifying the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters), the term "the public" means one or more natural or legal persons, their associations, organizations or groups. To find out more about the etymological, historical and theoretical approach to the public and its role and regulation in Croatian parliamentary law, see Struić: 2017. The budget process is a "system of rules, both formal and informal, governing the decision-making process that leads to the formulation of a budget by the executive, its passage through the legislature, and its implementation" (von Hagen and Harden, 1996:1), while the term *budget* means the state budget, or a "document estimating the state's revenues and receipts and determining its expenditure and outlays for a given year, in compliance with the law, which is adopted by the Croatian Parliament" as per Article 3 item 5 of the Budget Act.

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2.1 DEFINITION, FORMS AND LEVELS OF PUBLIC PARTICIPATION

The term *public participation* in the context of fiscal policy[9] has not been unambiguously defined in professional literature and is still vague (de Renzio and Wehner, 2015:4). The reasons for this could be the fact that the development of participation as a dimension of fiscal transparency is a relatively recent event and that there are numerous activities that fall under its scope (Petrie, 2011:26), but it could also be due to the fact that research dealing in this topic is scarce. For the purpose of this paper, we used the definition by de Renzio and Wehner (2015:9) who define public participation in the budgetary process as "a wide set of possible practices through which citizens, civil society organizations, and other non-state actors interact with public authorities to influence the design and execution of fiscal policies".

Forms and levels of participation. According to Bräutigam (2004:654) public participation in the budget can take many forms: it can be (a) *direct* (such as when citizens "meet, debate fiscal priorities, and forward their conclusions to decision-makers"), and (b) *indirect* (electing members of parliament). Fölscher (2010:41), furthermore, specifies the difference between consultative participation and empowered participation. In the case of the former, the government provides citizens and their representatives with "the opportunity to be heard, but there is no guarantee that participation will be heeded", meaning that "decision-makers have the freedom to agree with citizens or not". When it comes to the latter, the participants are "invested with decision-making power" (right) "and influence, such as having citizen representatives on boards that oversee local public services". Generally speaking, literature does not offer a list of forms of public participation in the budgetary process. This is partially due to their (growing) number, insufficiently clear differences, and scarce research on the topic.

Since the subject matter of this paper are the legal instruments of public participation in the budgetary process, some forms of public participation are noted only as an example (such as round tables and working groups), while the noted public participation levels (degrees) are in accordance with the Code of Good Practice on Consultation with Interested Public in Procedures of Adopting Laws, Other Regu-

[9] According to Jurković (1989:1-2) there is no unique definition of fiscal policy or a unique attitude regarding its role. He offers a broad definition of fiscal policy as "premeditated use of fiscal system instruments, i.e. public revenue and expenditure instruments in order to achieve any economic policy goals", noting that one must have in mind the various effects of taxation and public financing of final consumption on the "state and trends in the economy" when evaluating the role and efficiency of fiscal policies. According to Jurković, the easiest and "in fact the only way to comprehend fiscal policy is to observe it in the context of overall economic policy" (Jurković, 2002:184), noting the need to differentiate between its practical aspect which includes "actual economic policy measures undertaken in a specific moment" and its theoretical aspect which is concerned with the scientific discipline "investigating the role, character and effects of those measures in order to establish the principles and criteria guiding policy decision-makers in practice" (Jurković, 1989:1). Babić (1995:232) defines fiscal policy as "changes in public revenue and expenditure with a view of accomplishing a satisfactory rate of growth and price stability", while Blanchard (2011:48) concisely describes fiscal policy as "the choice of taxes and spending by the government".

lations and Acts (hereinafter: the Consultation Code) which specifies four levels (degrees)[10] of participation – information, consultation, involvement and partnership.

Before we set out to examine the significance of public participation in the budgetary process, we will clarify the relationship between public participation and fiscal transparency.

2.2 PUBLIC PARTICIPATION IN THE CONTEXT OF FISCAL TRANSPARENCY

Justice and Dülger (2009:263) note that there can be no meaningful, i.e. "authentic" public "participation in budgeting without effective transparency". They go on to explain that participation is meaningless if participants are not well informed, "and participants can only be well informed if there is effective transparency". Something similar is noted in Fölscher (2010:14), who observes that the "lack of transparency undermines accountability and prevents participation", as well as in Ott et al. (2016:10), who point out that "the public can effectively participate only if they have access to complete and timely information on the budget and budget process, and if mechanisms are in place to enable such participation." According to Petrie (2011:6), fiscal transparency is a category, an umbrella term that includes the public availability of information, the clarity of roles, accountability and participation as dimensions of transparency. It follows that fiscal transparency is a precondition for participation, its *conditio sine qua non*; however, public participation is, simultaneously, one dimension of fiscal transparency. All in all, without transparency there is neither inclusion nor participation, and also no accountability (Musa, Bebić and Đurman, 2015:420), meaning that a non-transparent government cannot be considered as legitimate, accountable or efficient (Musa, 2014:18).

The significance of public participation and its effects on the economy. Considering the close connection between public participation and fiscal transparency, Fornes (2014:16) points out that there is evidence that they improve a country's economy, since transparency and public participation "can help control leaks and improve allocation of public spending" as well as to "promote equality between resources and national priorities", where transparency can help the government "to obtain international credit at a lower cost". According to Ott et al. (2016:1) citizens who have obtained "complete, accurate, timely and understandable budget information" can "contribute to the more efficient collection of public funds and supply of public goods and services, thus increasing accountability of the Government and local government authorities and reducing opportunities for corruption".

Reviewing evidence on the impact of fiscal openness, which they consider to be a set of principles and practices concerning both transparency and participation in fiscal matters, de Renzio and Wehner (2015:33-35) list and elaborate a number of

[10] The International Association for Public Participation identifies five levels of participation: three are the same as those in the Consultation Code (inform, consult, involve), the fourth level – collaborate – corresponds to the partnership level from the Consultation Code. Empowerment is the highest level, where final decision-making is placed in the hands of the public (IAP2, 2014).

studies and findings regarding the macro-fiscal impacts of fiscal openness[11] and research on how fiscal openness is associated with changes in resource allocation, delivery of public services, and governance and development outcomes[12].

Moreover, Heimans (2002:9) points out that participation reduces corruption and clientelism, as well as that participation leads to citizens having more trust in institutions and to increased democratisation of the formulation of macroeconomic policy which may, by way of public learning about the key "resource allocation decisions facing governments", lead to "more realistic public expectations about what governments can deliver through budget policy". However, Heimans also notes that public participation can slow down the budgetary process, especially when the government lacks (expert) personnel and/or funds, which leads to "delays in the passage of the budget" – what is more, if the government is unable to provide the public with "timely, useful and accessible budget information, participation and external scrutiny of the budget will in fact be hindered" (Heimans, 2002:18-19), making participation truly counterproductive.

In a word, public participation is of exceptional importance not only because it enables the public to have a say in the design and execution of fiscal policy, but also because participation, along with fiscal transparency, has a substantial impact on a country's economy.

3 BUDGETARY PROCESS IN THE CONTEXT OF FISCAL TRANSPARENCY: THE EXAMPLE OF THE REPUBLIC OF CROATIA

According to Rubin (2006:140), the budgetary process requires clearly defined but neutral rules (independent of political interests), providing a "forum for the articulation, discussion and resolution of necessary policy issues". The significance of the budgetary process for a country and a country's economy is visible in at least three aspects: first, decisions on the collection and spending of public funds are made in the course of budget preparation and adoption; second, in the course of this process the government defines the overall budget plan and plans the allocation of funds; and third, the allocation of funds ensures efficient governance (The Treasury of the New Zealand, 1996:124). It is also important to consider its constitutional significance since, according to Article 104, par. 1 of the Croatian Constitution (hereinafter: the Constitution), the President of the Republic has the power of dissolution of the Croatian Parliament (hereinafter: the Parlia-

[11] For instance, they refer to the study by Alt and Lassen (2006:13) who "find large swings in the budget balance in low-transparency countries": in those countries, "deficits are more than 1% of GDP lower in a post-election year than in an election year", while the "dampening effect of transparency on electoral cycles over time leads to lower levels of public debt". According to Hameed (2005), who examines a sample of 32 countries, increasing transparency is associated with better credit rating and related variables such as external debt and deficit levels. Similar results were obtained by Arbatli and Escolano (2012:13-14) who confirmed, in a sample of 56 countries, the association between higher transparency and better ratings, and a correlation suggesting that budget transparency works indirectly through its effect on fiscal outcomes for developed countries, whereas the effect on credit ratings is direct for developing countries.

[12] They mention, for example, a study by Bellver and Kaufmann (2005) about the impact of fiscal openness on corruption reduction and a study by Gonçalves (2014), who posits that "citizen participation allows for better targeting of public policies and spending", which affects resource allocation and spending efficiency.

ment) if the Parliament fails to adopt a budget at the end of the budgetary process, within 120 days from proposing the budget[13]. According to Bratić (2010:136), since the budgetary process is carried out according to an "established pattern and strictly defined rules", it is of utmost importance that all taxpayers "understand the budgetary procedure in its entirety, so that they could have a say in the allocation of budget funds".

FT Code practices. Since "the fundamental precondition for citizen participation is the prompt accessibility of accurate and intelligible budgetary and fiscal information", in other words, the transparency or openness of the budget[14], the fiscal system and the whole of the public sector (Ott and Bronić, 2015:2), we will briefly explain the practices involved as described by the FT Code. Namely, in order to effectuate the principle of public participation – according to which "the government provides citizens with an accessible summary of the implications of budget policies and an opportunity to participate in budget deliberations" – the FT Code contains guidelines in the form of a description of basic, good, and advanced practices. In order to act according to basic practices, the "Government publishes an accessible description of recent economic and fiscal performance and prospects, as well as a summary of the implications of the budget for a typical citizen". To act according to good practices, the Government, in addition to the above, should publish an accessible and "detailed account of the implications of the budget for a typical citizen" and provide citizens with a "voice in budget deliberations". The third and highest level is advanced practice, pursuant to which the Government should publish "an accessible description of recent economic and fiscal performance and prospects and a detailed account of the implications of the budget for different demographic groups", as well as provide citizens with a "voice in budget deliberations".

The example of Croatia – open budget index. According to Ott and Bronić (2015a:95-96) "Croatia does not at present meet even the basic-practices criterion" when it comes to public participation. Namely, as a part of Government's commitments as per the Open Government Partnership (OGP)[15], one of the fundamental principles of which is citizen participation, the Ministry of Finance has since 2012 been publishing budget guides for citizens, but without providing a

[13] The budgetary process in the Republic of Croatia is implemented in accordance with the Budget Act and the Standing Orders of the Croatian Parliament (hereinafter: Parliament Standing Orders). All three stages of the process (preparation of the draft budget, adoption of the budget and budget execution) take approximately two and a half years. The steps involved in all three phases of the budgetary process are outlined in Articles 22-60 of the Budget Act.

[14] According to Baðun (2009:495) budget transparency is the "complete, timely and systematic publication of all relevant fiscal information". She notes that the IMF uses the notion of fiscal transparency and defines it as "being open to the public about the government's past, present, and future fiscal activities, and about the structure and functions of government that determine fiscal policies and outcomes".

[15] Open Government Partnership is a multilateral initiative that aims to ensure specific improvement in transparency and openness of public authorities, engage and empower citizens and civil society, fight against corruption, and use new technologies for the improvement of service quality provided to the citizens by the public administration; for more information, see: https://udruge.gov.hr/partnerstvo-za-otvorenu-vlast-271/271.

summary of the implications of the budget for the average citizen[16]. In that sense, Ott et al. (2016:9-10) note that, according to the Open Budget Index (OBI)[17] for 2015[18], calculated by the International Budget Partnership (IBP)[19] for 102 countries, "Croatia's central government budget transparency deteriorated". Namely, the average OBI score in 2015 was 45, meaning that the citizens of 102 countries have access to an average of only 45% of information on government revenue and expenditure in key budget documents; the OBI score for Croatia in 2015 was 53, or 8 less than in 2012[20], ranking Croatia among countries providing "limited budget information". This is mostly due to the fact that the 2014 budget proposal "failed to include information on revenue and expenditure outturns for the years preceding the budget year" under consideration, which seriously hampered the analysis of the budget proposal. This means that the Government has not made available sufficient information for the public to effectively monitor the state budget spending and can therefore be held accountable for the policies it implements (for more information, see: Bronić and Urban, 2015:2).

Aside from the OBI score, two more results of the 2015 Open Budget Survey (OBS) (IBP, 2015a) for Croatia stand out. The score for public participation is 38 (out of 100)[21], noting that the Government is weak in providing the public with opportunities to engage in the budget process[22]. In light of the above, Bronić and Urban (2015:4) note that the body that provides "the most opportunities for the public to participate" is the Parliament, through its committees (the score being 74 of 100), while "considerably less opportunities are provided by the State Audit Office" (the score being 25 out of 100) and the Executive (19 out of 100), pointing out that the State Audit Office, among other things, "failed to establish formal mechanisms for the public to indicate programmes or institutions that should be audited", and "the Executive has failed to put in place effective and credible" formal mechanisms (e.g. surveys, focus groups or public hearings) "to find out the public's opinion" on a state budget proposal or budget outturns. Finally, regarding

[16] Citizens' budget guides are available at: http://www.mfin.hr/hr/vodici-za-gradane.

[17] OBI is the only independent and internationally comparable indicator used for the measurement of the transparency of central government budget, participation and oversight; central government budget meaning "all government budgets except the budgets of local government units" and the budgets of local government budget users (Bronić and Urban, 2015:1). IMF's fiscal transparency ratings before the 2014 review of the FT Code were based on Fiscal Reports on the Observance of Standards and Codes – ROSC. Following the review, the Reports were replaced by the new Fiscal Transparency Evaluation – FTE system to analyse fiscal transparency practices according to the FT Code. For more information, see: IMF (2016).

[18] For the 2015 open budget survey, see: IBP (2015a); for methodology, see: IBP (2015b). The results of the next such survey, to include 115 countries, are expected to be available by the end of 2017 (see: http://www.internationalbudget.org/opening-budgets/open-budget-initiative/open-budget-survey/2017-news).

[19] IBP is a Washington-based non-profit organization conducting research in budget transparency since 2006. It engages independent experts from a number of countries to complete OBI score surveys and calculates the countries' OBI on the basis of such surveys.

[20] Previous scores were: 42 (2006), 59 (2008), 57 (2010), and 61 (2012); for more details, see: http://www.internationalbudget.org/opening-budgets/open-budget-initiative/open-budget-survey/country-info/?country=hr.

[21] The average public participation score for the 102 surveyed countries is only 25.

[22] Certain weaknesses exist on the local level as well. Only several Croatian towns have some experience with engaging citizens in the preparation of the local budget (e.g. Pazin, Crikvenica, Rijeka and Pula), making it hard to speak about specific models of participatory budgeting in Croatian local units. In most of the cases it is just a consultation process "without real engagement of citizens in the decision-making process on concrete financial sums" (Džinić, Murray Svidroňová and Markowska-Bzducha, 2016:36).

budget oversight, OBS shows that budget oversight by the State Audit Office is adequate (the score being 92 out of 100), while budget oversight by the Parliament is weak (27 out of 100), judging it necessary to establish a specialized budget research office within the Parliament.

According to IBP, the measures necessary to improve participation are: establishing credible and effective mechanisms (i.e. public hearings, surveys, and focus groups), ensuring that the public is informed of the purpose of public budget engagements and provided with sufficient information to participate effectively, and establishing formal mechanisms for the public to assist the State Audit Office to formulate its programme and participate in audit.

With this in mind, and especially since FT Code's principle of participation implies not only the requirement to provide an accessible summary of the implications of budget policies, but citizen participation in budget deliberations as well, we will examine the legal instruments of public participation in the budgetary process in the Republic of Croatia which allow the realisation of that principle.

4 LEGAL INSTRUMENTS OF PUBLIC PARTICIPATION IN THE BUDGETARY PROCESS IN THE REPUBLIC OF CROATIA

Since Article 212 par. 1 of the Parliament Standing Orders stipulates that the provisions of the Standing Orders "pertaining to the procedures to enact laws shall be applied accordingly" to the adoption of the central budget – for instance, the provision on the commencement of the enactment procedure (Article 171), receiving and forwarding bills (Article 178), consideration of a bill in working bodies (Article 179), debate on the final draft of a bill (Article 195) and amendments (Article 196-202) – it can be inferred that the legal instruments of public participation in the legislative procedure apply to the budgetary process as well[23]. It should be noted that Struić and Bratić (2017), when studying the normative solutions of public participation in the legislative process through the role of parliamentary working bodies, using the example of the Finance and Central Budget Committee of the Croatian Parliament from the fifth to the eighth parliamentary term, identified the existence of several public participation mechanisms in the legislative process, specifically: the right of initiative to propose laws, i.e. amendments, the right to be informed, the right to advise, and the right to be involved in working groups and bodies.

We will start from these legal mechanisms (instruments) – which can be generally designated as *general legal instruments* for the purpose of this paper, considering their applicability in both the legislative process and the budget passing process

[23] It is worth noting that the Rules of Procedure of the Government of the Republic of Croatia (hereinafter: Government Rules of Procedure) contain no special provisions regarding the budget; rather, Article 30 par. 4 stipulates in a general manner that the central state administration bodies shall, when forwarding draft bills, other regulations and acts to the Government, enclose the relevant reports on consultation with the interested public (only if carried out), while Article 174 par. 4 of the Parliament Standing Orders stipulates that the proposer shall enclose with the submitted bill a report on conducted consultations.

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– and analyse in more detail what are their components and if they can be used to accomplish the objective to "participate in budget deliberations" as per item 2.3.3. of the FT Code. Moreover, we will examine if there are, apart from these instruments, any other, *special participation instruments*, specific to the budgetary process itself.

4.1 GENERAL LEGAL INSTRUMENTS OF PARTICIPATION

Implementing the mechanisms of public participation in the legislative process as defined in the aforementioned paper by Struić and Bratić (2017) to the budgetary process, the first mechanism of public participation in the budgetary process that should be mentioned is *the right to be informed*.

The right to be informed. According to the Consultation Code, informing is the first level of participation, which "assumes a one-way process whereby state authorities" either inform citizens at their own discretion "or citizens obtain information on their own initiative" (e.g. by way of official gazettes, the websites of state bodies, etc.). The right to access to information held by public authorities is guaranteed by Article 38 par. 4 of the Croatian Constitution and more closely defined in the Right of Access to Information Act. According to the Act, public authorities[24] are obliged to publish many information[25] "in an easily searchable and machine readable format" on their websites – for instance, documents relevant to the public authority's scope of activity, information on financing sources, the budget, financial plan or other appropriate documents that determine the revenues and expenditures of public authorities, and data and reports on the execution of the budget, financial plans and other appropriate documents (Article 10 par. 1). Additionally, public authorities must inform the public of, among other things, agendas of meetings and sessions of official bodies and their scheduled times, manner of work and possibilities of direct insight into their work (Article 12 par. 1 item 1).

In the context of the right to be informed, we should mention the provisions that enable public representatives to follow public authorities' work and take part in sessions. For example, the Parliament Standing Orders contain several provisions on transparency of work (Articles 279-288), notably provisions on the obligation to inform the public of its work, its decisions and matters debated, and on the possibility for draft acts of Parliament or acts of Parliament to be "published in full in the public media or as separate publications" (Article 279), publishing its bulletin ("Parliament's website shall be considered the official bulletin of Parliament") and other publications (Article 280 par. 1), exempting from publication Parlia-

[24] These are, *inter alia*, state administration bodies, other state authorities, bodies of local and regional self-government units, legal entities and other persons vested with public authority, as well as other bodies as per Article 5 par. 1 item 2 of the Right of Access to Information Act.

[25] According to Article 5 item 5 of the Right of Access to Information Act, the right of access to information encompasses the right of the beneficiary "to seek and acquire information," as well as "the obligation of the public authorities to ensure access to requested information, i.e. to disclose information regardless of the request, when so required by the law or other regulations".

ment documents and materials classified as confidential (Article 281 par. 1) and the possibility to close Parliament working bodies' sessions (or individual parts thereof) to the public (Article 284). The public character of Parliament sessions is noted in Article 84 of the Constitution, as well as in the Rules on the Public Transparency of the Work of Parliament and its working bodies regarding the "presence of representatives of citizens' associations, non-governmental organisations and citizens" as observers at sessions, visits of organised groups of citizens to Parliament, methods of recording and broadcasting Parliament sessions, registering media representatives, and Parliament website content (Article 1).

Moreover, according to Article 9 of the Act on the Government of the Republic of Croatia (hereinafter: Act on the Government), Government sessions are public, but the Government can decide that the public would not be present at the session, i.e. debate on certain items on the agenda; moreover, pursuant to Article 32 item 2, decisions, resolutions and conclusions can be published in the official gazette if the Government decides so when adopting such acts. Furthermore, the transparency of the Government's work is determined in Articles 52-54 of the Government Rules of Procedure, specifically Article 52 item 3 according to which the Prime Minister's Office's Public Relations Service shall issue a statement to the media regarding closed sessions at the latest within an hour after the session is finished (unless the Government decides that the public would not be informed on a particular issue). Government coordination sessions (sessions of its permanent working bodies) are closed to the public (unless decided otherwise by the coordination body chairperson) and there are no audio recordings, while the sessions of Government expert working groups are closed to the public and there are no audio recordings, without exception.

It follows from the above that, in the course of the budgetary process, the public has the right to request (and obtain) one or more pieces of information and that the public authority must enable access to the requested information, i.e. to publish information whether they have been requested or not (if such publication is required pursuant to a law or regulation). Moreover, the public has the right to follow the work of the Parliament, the Government and parliamentary working bodies (such as round tables) and to be present at their sessions, with certain limitations: the public does not have access to confidential documents and materials, and the Government and Parliament working bodies can decide that a session (of a part thereof) would be closed to the public. There are no provisions, however, regarding the criteria for the Government and Parliament working bodies to follow. It should, moreover, be noted that, according to the Report on the Implementation of the Act on the Right of Access to Information for 2016 (Information Commissioner, 2017), there have been "irregularities in dealing with citizens' requests", at all levels and in all kinds of bodies, particularly "with respect to deadlines and the manner of decision-making". Cases of citizens' requests for access to information being ignored are particularly alarming.

The right to consultation. The public can participate in the budgetary process by exercising its *right to being consulted*. Within the meaning of the Consultation Code, this is the second level of participation involving "a two-way process" in the course of which state authorities solicit and receive feedback "from citizens and the interested public[26] in the procedure" for the enactment of laws and the "adoption of other regulations and acts". Pursuant to Article 11 of the Act on the Right of Access to Information, public authorities are obliged to conduct public consultations via their websites or via the central state website for public consultations when adopting regulations and general acts, or other strategic or planning documents where these affect the interests of citizens and legal entities. In other words, these bodies must consult the public by enabling interested individuals or legal entities to deliver their proposals and opinions and by answering them. The proactive approach to the publication of information allows the public to get acquainted with the decisions of public authorities, enabling more transparency and more openness[27] as well as more efficiency when it comes to the activities of such bodies (for more information, see: Information Commissioner, 2016). For consultation purposes, state administration bodies have at their disposal the central state website for public consultations (*e-Savjetovanja*), while other public bodies (including local and regional self-government units and legal persons with public authority) can use their websites or the central state website for public consultation, specifically by releasing "the draft of the regulation, general act or other document", along with a "substantiation of the reasons and objectives to be achieved through the adoption of the regulation, act or other document, and inviting the public to submit their proposals and opinions" (Article 11 par. 2). Public authorities "are obliged to conduct public consultations as a rule, for a duration of 30 days"; upon the expiry of the deadline, the public authority is obliged to draft and publish a report on the public consultation, which contains the received proposals and comments, as well as the reasons for their rejection (Article 11 par. 3 and 4). The implementation of these provisions shall be monitored by the Information Commissioner by reviewing citizens' petitions, public authorities' reports, etc.

The report on public consultations plays a significant role according to the Government Rules of Procedure, Article 30 par. 4 of which stipulates that central state administration bodies shall enclose reports on public consultations with the interested public when draft bills, other regulations and acts are submitted to the Government. This provision is applied when public consultations are conducted in accordance with special regulations, i.e. the Consultation Code, but not when they are conducted in accordance with regulations pertaining to regulatory impact

[26] According to the Consultation Code, these are "citizens, civil society organizations (informal civic groups or initiatives, associations, foundations, funds, private institutions, trade unions, associations of employers), representatives of the academic community, chambers, public institutions and other legal entities performing a public service or who might be affected by the law, other regulation or act which is being adopted, or who are to be included in its implementation".

[27] Unlike transparency, which is a one-way process enabling citizens to obtain information from public authorities at own request or on the basis of that public authority's initiative, openness is a two-way process where information is offered to citizen, eliciting a feedback in the form of opinions and attitudes of citizens (for more information, see: Đurman, 2016:350-351).

assessment.[28] Moreover, reporting on conducted consultations with the interested public is mentioned in the Parliament Standing Orders, stipulating in its Article 174 par. 4 that the sponsor shall enclose with the submitted bill a report on consultations with the interested public.

However, according to the Report on the Implementation of the Act on the Right of Access to Information for 2016 (Information Commissioner, 2017) public authorities have not reached a satisfactory level of proactivity in the publication of information which would point to the adoption of transparency as a premise to guide their day-to-day activities. For instance, some public authorities do not update the information on their websites, there have been problems with the format of the documents, website availability and user-friendliness, clarity of published information, etc. Even though the number of conducted consultations has been on the rise, especially on the central level, there is much room for improvement regarding the quality of implementation[29], particularly regarding the adoption and publication of necessary documents (plans and reports).

Right of initiative. Furthermore, in order to potentially have an impact on the adoption of, or an amendment and/or addition to a regulation, act or document, citizens and other representatives of the public may use the *right of initiative* pursuant to Article 46 of the Constitution, by virtue of which everyone is "entitled to file petitions and complaints and to submit proposals to governmental and other public bodies, as well as to receive responses thereto". This provision is referenced in Article 44 par. 6 of the Parliament Standing Orders, according to which, "if a petition or proposal for the enactment of legislation or other acts is submitted by citizens to Parliament, then the Speaker of Parliament shall refer it to the chairperson of the relevant working body which shall be obliged to notify the sponsor of the petition or proposal on the outcome of such a petition or proposal within a period not exceeding three months". Apart from this right to legislative initiative, the same instrument allows the public to petition any representative, political group, Parliament working body or the Government (who are authorised to spon-

[28] The process of regulatory impact assessment is governed by the Act on Regulatory Impact Assessment. Regulatory impact assessment is a procedure for the "preparation and drafting of draft bills through the analysis of direct impacts, aimed at choosing the optimum legal solution or undertaking other activities and measures" (Article 2 par. 1). Since the Act on Regulatory Impact Assessment applies to the drafting of draft bills (Article 5 par. 1) and since only one specific act is passed under the budgetary process – the Act on the Execution of the State Budget of the Republic of Croatia for the current year – which having in mind the topics it regulates does not fall under the scope of the Act on Regulatory Impact Assessment (Article 15 par. 1 item 3) or has it been included in the Annual Plan of Normative Activities (planning document on draft bills to be submitted to the Government in the course of the budget year (for a list of plans, see: https://zakonodavstvo.gov.hr/godisnji-plan-normativnih-aktivnosti/229), it will not be referred to in this paper.

[29] Witness to this are, for instance, the results of the *Index of Good Governance in Croatia 2012* research, according to which only 14% of institutions (4 ministries) made an attempt at finding out the opinion of the public on what budgetary priorities should be in 2013, while only two of the 29 analysed institutions (the Government and the Ministry of Finance) made an attempt at finding out the public opinion on their budgets and spending in 2012 or 2013. It has also been noted that the majority of documents for the 29 institutions (budget proposals, enacted budgets, semi-annual financial reports and annual financial reports) can indeed be found on the websites of the Ministry of Finance, Government, Parliament or the Official Gazette, but only as part of summary documents for all budget users (Miošić, Bronić and Škrabalo, 2013:25-28).

sor amendments) to table amendments. However, it is usually unclear from the proposal of the act or the amendment if representatives of the public participated in their formulation (or, if yes, in which way and to what extent)[30], making it difficult to determine the frequency (and efficiency) of the use of this public participation instrument in the budgetary process.

It is also important to note that the Consultation Code – a document that has been harmonized with a number of international documents, such as the Code of Good Practice for Civil Participation in the Decision-Making Process (Council of Europe, 2009) – stipulates the minimum standards and measures[31] for conducting consultations with the interested public when drafting a regulation or act (resolution, declaration, strategy, programme, etc.) through which the policy of the Croatian Parliament or the Government is expressed, and for whose drafting the central state administration bodies and offices of the Government are competent. However, as Ott and Bronić (2015a:36) point out, the scope of the Consultation Code has not been "extended to the budgetary process and the budget is formulated and presented in a relatively closed procedure", while key budgetary documents such as budget proposals and semi-annual and annual reports on state budget have not been discussed. Yet, since the instruments of public participation in the course of the enactment of laws apply to the budgetary process and since the Consultation Code is to be applied in the procedure to enact laws, other regulations and acts – including the state budget – it follows that the general principles, standards and measures for consultations with the interested public stipulated in the Consultation Code should be applied to the budgetary process. On the other hand, it should be borne in mind that the Consultation Code is not legally binding, meaning that the failure to implement it does not result in sanctions, and that the deadline for consultations according to the Consultation Code is only 15 days, unlike the deadline for consultations set out in the Act on the Right of Access to Information.

The right to be involved. The third level of public participation, according to the Consultation Code, is involvement, which "assumes a higher level in the two-way process" through which citizens and other "representatives of the interested public are actively involved in the creation of public policies, for example through membership in working groups". In this context, it is worth noting the provisions of the Government Rules of Procedure and the Parliament Standing Orders regarding the *right to be involved*, as the fourth key instrument of public participation in the budgetary process. According to the Parliament Standing Orders, the public can participate on the basis of the provisions on the establishment of special working groups by virtue of the decision of the chairperson of a working body (Article 53 item 1), invitation of public officials, scholars and professionals and other persons

[30] Compare with Struić and Bratić, 2017:138.

[31] Pursuant to Chapter V item 1 of the Consultation Code, this means timely information about the plan for the enactment of laws, access to and clarity of the content of the consultation process, the time limit for its implementation, feedback information about the effects of the consultations conducted and the harmonization of the application of standards and measures of conducting consultations in state bodies.

to meetings of working bodies in order to obtain their opinions on matters being discussed (Article 57 par. 1), including scientific and other organisations and individual experts in the preparation of acts or the consideration of certain matters within the competence of the working body if the relevant funds are secured (Article 52), and the appointment of public officials, scholars and professionals "to working bodies with all the rights pertaining to members of working bodies, with the exception of the right of decision-making" (Article 57 par. 3).[32] Government Rules of Procedure contain but one provision on public involvement, specifically the one regarding the possibility to invite established experts in certain areas to Committee sessions, i.e. Government coordination group in order to provide expert opinions (Article 21 item 6).

Moreover, the Decision on the Establishment of a Commission on Fiscal Policy[33], consisting of six members (representatives of certain institutions[34] appointed by the Parliament) and the president of the Parliament's Finance and Central Budget Committee presiding over the Commission on Fiscal Policy, contains provisions on public involvement. Apart from the representatives of those institutions, other persons can participate in the activities of the Commission on Fiscal Policy (take part in the discussions, without having voting rights), and the Commission on Fiscal Policy can hire external experts for the drafting of the Fiscal Policy Assessment Report (Article 25 item 1 and 2 of the Rules of Procedure of the Commission on Fiscal Policy). Even though Commission sessions are, as a rule, closed to the public, it can adopt a special decision by virtue of which a session becomes open to the public (Article 20 item 1 and 2 of the Rules of Procedure of the Commission on Fiscal Policy).

Partnership. Even though the Consultation Code provides a fourth level of public participation, partnership – as "the highest level of cooperation and mutual responsibility of the Government and representatives of the interested public in the process of adoption and implementation of programmes, laws, other regulations and acts" (Chapter III par. 1 subpar. 4) – the research in the area of legal instruments of public participation in the legislative procedure has shown that this level has not yet been reached since there lacks the aspect of *codecision* as a precondition for the implementation of that level of participation in the legislative procedure (Struić and Bratić, 2017:144). If we exempt the abovementioned example of the Commission on Fiscal Policy, where decisions are made by a majority vote of all of its members (including the votes of the representatives of certain institutions appointed by the Parliament) – but not of other persons who might

[32] For more information, see: Struić and Bratić, 2017:142-144.

[33] According to Chapter I of the Decision, the Commission on Fiscal Policy (hereinafter: Commission) is a professional and independent body the aim of which is to improve the public finance system and to monitor the application of fiscal rules as determined in the Fiscal Responsibility Act in order to contribute to "ensuring and maintaining fiscal discipline, transparency and mid-term and long-term sustainability of public finance".

[34] These are the representatives of the State Audit Office, the Zagreb Institute of Economics, the Institute of Public Finance, Croatian National Bank, and business and law schools. These institutions choose their representatives among established scientists and experts possessing a certain level of education, professional knowledge, and professional experience in the area of public finance, macroeconomics, economic policy, and accountancy.

participate in its activities – the lack of this precondition in the legislative procedure should in principle be sought in the budgetary process as well, since the public officials, scholars and professionals appointed to Parliament working bodies have no decision-making rights, and neither do other persons who might be invited to participate in a session of a Parliament working body or a Committee session, i.e. Government coordination group to provide professional opinions.

4.2 SPECIAL LEGAL INSTRUMENTS OF PUBLIC PARTICIPATION

Even though a number of regulations establishing various instruments of public participation in the legislative procedure and the budgetary process has been mentioned, these regulations make no mention of special participation instruments particular to the budgetary process.

Another important aspect of the legal framework governing this issue is the Agreement on the Establishment of the Economic and Social Council (ESC)[35]. The Agreement stipulates, among other things, that the ESC, which represents the highest form of tripartite social dialogue in the Republic of Croatia, shall evaluate and offer its opinion on the measures aimed at macroeconomic stability, economic competitiveness, and a balanced economic and social development, and offer its opinion regarding the budget proposal and proposals for acts in the area of labour, economy, and social security. It also discusses and can offer its opinion on proposals for other acts and regulations of public interest (Article 10). Even though the Agreement may look like a special legal instrument of participation, since it expressly allows that the ESC offer an opinion on the budget proposal, we should note that it is in fact a general legal instrument since the ESC also offers opinions regarding proposals for acts, meaning that the Agreement is not, in its essence, a special instrument of participation particular to the budgetary process.

Even though consultation between Government representatives and social partners under the ESC aimed at offering opinions on the budget proposal could be interpreted as consultation[36], according to some authors, they do not represent public participation. Namely, according to Ott and Bronić (2015a:32), "citizens are not included in that stage, although the Government deems them to be included", as they can influence policies and consequently indirectly the budget through public consultations in line with the Consultation Code. They, however, point out that ESC opinions cannot be considered as participation in the formulation of the budget and that this represents but a formal fulfilment of obligations set out in the Agreement because the discussion with social partners takes place only after the final state budget draft is adopted by the Government. According to the

[35] ESC is composed of Government representatives and social partners (higher-level employers' associations and higher-level union associations). They may commence consultation before drafting specific documents.

[36] Consultation in this context can include, e.g. the principle of offering comments as per Article 79 par. 2 of the Act on the State Administration System, according to which "ministers, secretaries of central offices, and directors of state administration organisations may decide that the drafts of those regulations in the preparation of which the public is particularly interested shall be published in mass media, and also invite all interested parties to give their comments regarding the draft of such regulations".

Croatian Association of Counties, this is suggested by the fact that there are 2 to 3 state budget amendments per year, "supported by all counties, but none has ever been adopted by the Parliament" (Ott and Bronić, 2015a:36).

In a word, the public has the right to *informing*, *consultation*, *initiative*, and *involvement*, while the right to *partnership* is limited to the possibility of participation through the Commission on Fiscal Policy, where decisions are adopted by a majority vote of all of its members (not including other persons who might participate in its activities). Apart from the latter example – the Commission on Fiscal Policy – the public does not have codecision powers in the budgetary process, which is one of the preconditions for the implementation of this highest level of participation according to the Consultation Code. Finally, regulations providing the aforementioned general legal instruments do not contain special instruments of participation specific for the budgetary process itself.

5 CONCLUSION

The final review of the FT Code from 2014 introduces the principle of participation which is to be applied in the Republic of Croatia due to the fact that Croatia is an IMF member. With that in mind, as well has bearing in mind the fact that public participation, as one facet of fiscal transparency, is becoming part of an increasing number of international documents, this paper closely analyses the legal instruments of public participation in the budgetary process in Croatia. First, an interdisciplinary approach has demonstrated the significance and economic effects of public participation in the budgetary process, identified the instruments of public participation in the process, and investigated their components and whether they can lead to "an opportunity to participate in budget deliberations" as per item 2.3.3. of the FT Code in the Republic of Croatia. The assumption was made that there were various legal instruments of public participation in the budgetary process in the Croatian law which would enable the implementation of the participation principle set out in the FT Code, as well as that they were not specific to the budgetary process itself but were rather general legal instruments of participation applied in the law-making process and the process of adopting other regulations.

Namely, it has been found that the provisions of the Parliament Standing Orders pertaining to the procedures to enact laws are applied to the passage of the central budget (Article 212 par. 1 of the Parliament Standing Orders), which has led to the conclusion that the legal instruments of participation in the law-making process are applicable in the budgetary process as well. With that in mind and based on earlier research into the normative solutions for public participation in the law-making procedure through the role of parliamentary working bodies, finding that there were several instruments of public participation in place in the law-making procedure which can, in principle, be defined as general legal instruments, the authors analysed their nature in more detail and sought to find out whether they could correspond to instruments of "participation in budget deliberations" as per item 2.3.3. of the FT Code. Moreover, the authors have looked into the potential

existence of other, special legal instruments of participation, specific to the budgetary process itself.

It has been found that the public has the right to be *informed*, to be *consulted*, the right of *initiative*, and the right to *involvement*, while the right to *partnership* was limited to the possibility of participation in decision-making in the Commission on Fiscal Policy. The right to *be informed* means not only the right to access information, which can be requested at any stage of the budgetary process, but the proactive publication of information by public authorities throughout the budgetary process as well. The right to be *consulted* can be claimed only in the procedure of the adoption of regulations and acts or other strategic or planning documents that have an impact on the interests of citizens and legal entities, in accordance with the Act on the Right of Access to Information and the Consultation Code. The third instrument, the right of *initiative*, can be employed within the context of the Parliament, regarding the possibility granted by the Parliament Standing Orders for a parliamentary working body to discuss petitions and proposals, take them into account and, eventually, implement them in the regulation, act, or document in question. Within the context of the right to *involvement*, the public has the opportunity to participate by way of membership in special working groups (but only when this has been allowed by virtue of the decision on the establishment and appointing the members of a working group, made by the chairperson of the working body), as experts or representatives of scientific and other organizations (only under the condition that the relevant funds are secured) and as public officials, scholars and professionals (only when appointed by the Parliament), or Commission on Fiscal Policy members, i.e. representatives of particular institutions appointed by the Parliament (one member per institution). Since the aforementioned are general legal instruments of participation which are applicable in both the law-making procedure and in the budgetary process, and considering the fact that the instruments enabling an opportunity "to participate in budget deliberations" as per item 2.3.3. of the FT Code have not been precisely defined in the FT Code, it could be concluded that representatives of the public can use any of the aforementioned instruments in the course of the budgetary process in order to implement the principles of participation according to the FT Code, but only taking into account the constraints imposed by the regulations introducing those instruments.

There is a fourth level of public participation according to the Consultation Code, *partnership*, which implies the possibility of codecision within a Commission on Fiscal Policy, where decisions are made by a majority vote of all its members (in other words, including the representatives of certain institutions appointed by the Parliament, but excluding other persons that may participate in its activities). However, except in the latter case, the public has no codecision powers in the budgetary process, even though codecision is a precondition for the implementation of this highest level of participation. Namely, public officials, scholars and professionals appointed to parliamentary working bodies have no decision-making rights, and neither do other persons who might be invited to a parliamentary

working body session or a Committee meeting, i.e. a Government coordination group session, to offer expert opinions. Finally, the regulations that provide the aforementioned general legal instruments do not offer special instruments of participation particular to the budgetary process itself.

Having identified the available instruments and determined the possibilities to participate in the budgetary decision-making process in line with the FT Code, several potential problems have been identified regarding their efficient application in practice, such as the fact that the Consultation Code is not legally binding and the failure to implement its provisions does not result in sanctions (it could only possibly raise the issue of political responsibility), or the inexistence of particular criteria when the Government and a parliamentary working body decide to close a (part of) a session to the public. Those and other potential issues – such as those mentioned when talking about the Report on the Implementation of the Act on the Right of Access to Information for 2016 – could lead to the assumption that there is some room to improve the current legal instruments of participation, but this issue should be analysed separately. Namely, if one bears in mind that the 2015 OBI score for Croatia was 38 (out of 100) and that the Ministry of Finance has been publishing budget guides for citizens since 2012, which, however, do not contain a summary of the budget's impact on the average citizen, it could be assumed that the true and full application of the public participation principle as defined in the FT Code by way of the legal instruments analysed in this paper is still some way away.

Finally, while taking into account the fact that further research is necessary to analyse the ways to improve the current legal instruments of participation, as noted above, it is worth mentioning some possible approaches to that end and formulate some general recommendations based on the research presented in this paper. The first option is to adopt a new Consultation Code that would explicitly include the budgetary process and be harmonized with the Act on the Right of Access to Information. However, one should keep in mind that the Consultation Code is applicable to the budgetary process without the need for this to be explicitly noted (since the Consultation Code is not only applied in the law-making process, but also in the process of making other regulations and acts, which includes the central budget). Moreover, the legal principle of *lex superior derogat legi inferiori*, according to which a higher-level regulation (Act on the Right of Access to Information) overrides a lower-level regulation (Consultation Code), could suffice when it comes to the contradictory provisions of the two.

Moreover, a dedicated act – a code of fiscal transparency which would impose the obligation to strengthen fiscal transparency and participation in accordance with a number of international documents mentioned herein and particularly with the FT Code – should be drafted and adopted by the Government. Additionally, a set of guidelines for its implementation should be devised to guide not only the representatives of government bodies involved in the budgetary process, but the public

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at large as well. Furthermore, the possibility to amend and/or make additions to the Government Rules of Procedure and the Parliament Standing Orders to determine the criteria under which the Government and Parliament working body can decide to close (a part of) a session to the public, among other things, should be considered, as should the option to strengthen partnership, the fourth level of public participation, by explicitly extending the codecision powers to (at least) working groups, for instance.

Apart from the above solutions which focus on the legal framework, the issue of its application in practice is significant, as well. Namely, as mentioned above, many problems are present in practice, particularly when it comes to the Report on the Implementation of the Act on the Right of Access to Information for 2016. These are, for instance, irregularities in dealing with citizen requests and ignoring their petitions, or the irregular updating of public authorities' websites. The solutions should be part of a comprehensive approach which would include not only the abovementioned options to intervene within the legal framework but to intervene on the level of all government bodies involved in the budgetary process as well (e.g. training for staff, encouraging cooperation and coordination among and within government bodies, increasing their capacities). Moreover, this approach should include continuous activities aimed at strengthening citizens' awareness of the importance of participation in the budgetary process, as well as the role of the legal instruments covered herein and how to use them. Without such a comprehensive approach, the full implementation of the FT Code principles of participation will be impossible to achieve.

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