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Paul A. Raschky and Hannelore Weck-Hannemann

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Paul A. Raschky and Hannelore Weck-Hannemann*

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Abstract

The paper compares the policy choices regarding risk-transfer against low-probability-high-loss events between elected and appointed public officials. Empirical evidence using data on U.S. municipality-level shows that appointed city managers are more likely to adopt federal risk-transfer regimes. It is argued that the variation in the level of insurance activity emerges from the different incentive schemes each government form is facing. Controlling for spatial dependencies further shows that the participation decision in the insurance program significantly depends on the decision of neighboring communities.

Keywords: politicians, bureaucrats, decision making under uncertainty, flood insurance, spatial econometrics

JEL classification: D72, D73, D81, Q54

*Both authors: Institute of Public Finance, University of Innsbruck, Universitaetsstrasse 15, A-6020 Innsbruck and alpS - Center for Natural Hazard Management, Innsbruck Austria. Contact: Tel.:+43-512-507-7160 13; Fax: +43-512-507-2970; Email:paul.raschky@uibk.ac.at. The authors would like to thank participants of workshops in Zurich and Dresden and Harald Oberhofer and Stefan Achleitner from the University of Innsbruck.

1 Introduction

Climate change, terrorist attacks, natural hazards or industrial accidents are risks that have two distinct features in common: A relatively low probability of occurrence and potentially large adverse effects on society either in terms of physical damage to human lives and capital stock or psychological effects by creating fear and uncertainty even within the unaffected part of the population. Of course, protection against such events is possible either by decreasing the probability of occurrence (e.g. reduction of greenhouse gases, surveillance activity) or reducing the damage potential (e.g. structural measures, catastrophe management) or transferring the risk (e.g. insurance, governmental relief). From a politico-economic perspective a key question is, which is - behind the veil of ignorance - the optimal societal decision mechanism for the provision of protection against low-probability-high-loss (LPHL)-events? The analysis in this paper emphasizes specifically on the analysis of LPHL-events in connection with natural hazards and the relevant risk-transfer mechanisms.

In general the concept of the veil of ignorance, although a useful tool for the theoretical analysis, is hard to transfer to the real political process as the proposed uncertainty about future individual position in society is nearly impossible to install, even at the constitutional table. Policies regarding climate change and its effects on humans (e.g. change in probability and magnitude of climatic natural hazards such as floods) might present a situation where uncertainty about the future individual position is more distinct than in other situations. Both theoretical and empirical research have shown that the market for risk-transfer against natural disasters tends to work imperfectly or fail completely (Kunreuther & Pauly 2004). The existence of transformation costs explains that sometimes information on the insurance market is unevenly distributed between the contract partners. This problem of asymmetric information is one of the basic explanations why the insurance market in general does not work perfectly. The resulting phenomena of adverse selection and moral hazard also applies to the market for disaster insurance (Kunreuther 2001). Kunreuther & Pauly (2004) suggest that market imperfections might be a combined problem of transaction costs and ambiguity about probability estimations by different insurance companies. The search for the optimal insurance imposes costs which are high enough to discourage the individual to engage in any further mitigation activity. Another strand of literature follows the ideas by Kahneman, Slovic & Tversky (1982) who argue that individuals' decisions in LPHL-situations are subject to choice anomalies. The empirical work by Browne & Hoyt (2000) finds that recent flood experience increases the demand for flood insurance and thus gives some support to concepts of choice heuristics. Brookshire, Thayer, Tschirhat & Schulze (1985) and Troy & Romm (2004) examine how the disclosure of information on natural hazard risks influences price gradients in hedonic market analysis. Both studies show importance of the distribution of information and that biases and imperfections on the market could be an issue of transaction costs rather than heuristics. Although the explanations for the failing of the market in the area of disaster insurance are multiple there is a rather broad consensus that state intervention could enhance efficiency and that ex-ante risk-transfer policies are preferable to ex-post policies (Kunreuther & Pauly 2006). The decision regarding risk-transfer policies is usually not subject to direct democratic action but is either transfered to elected representatives or appointed agents such as bureaucrats or council managers. Thus, the purpose of this paper is a positive analysis that compares the decisions of elected and appointed agents regarding the implementation of an existing risk-transfers mechanism against natural hazards.

The remainder of the paper proceeds as follows: The next section sets the theoretical framework and formulates the hypotheses. Section 3 presents the empirical application with data on communal decision on the participation in the National Flood Insurance Program (NFIP) in the USA. The last section concludes.

2 Theoretical Background

We have to assume that biases from decision making under uncertainty explained by the standard expected-utility theorem (Kahneman et al. 1982) also apply to political and bureaucratic decision makers. However, as a result of the institutional context politicians and bureaucrats face different incentive schemes. According to public choice theory (e.g. Downs 1957, Mueller 2003) politicians' decisions are mainly driven by re-election concerns. This holds true especially within a highly competitive democratic system where re-election constraints are binding and results in an 'as if' vote maximization.

The other decision mechanism of interest is bureaucracy. The hypotheses of the standard theory on bureaucracy about budget-maximization (Niskanen 1971) or augmenting discretionary power (Migué & Bélanger 1974) do not explicitly apply to our case. Agents in our context are not traditional bureaucrats but appointed city managers. In contrast to re-elected executives their appointment depends on the perceived talent and ability not primarily by voters but by the reference group of peers. Potential future employees (e.g. municipalities) evaluate the performance of the city manager with meaningful indicators. The major goal of this kind of bureaucrat is a high market value within the community of other city managers which can be obtained via 'performance excellence', i.e. by showing that the city manager's tasks are carefully executed. Thus there are analogies to the politico-economic model on the behavior of the World Bank (Frey 1984, Frey & Schneider 1986), ideas about central bank independency (Rogoff 1985) or fiscal policies (Blinder 1997, Alesina & Tabellini 2007*a*).

Another explanation for varying policy outcomes can be found in the agency literature. Maskin & Tirole (2004) suggest that the election process allows the public to make politicians accountable for their actions. In contrast to appointed officials, politicians are more accountable due to this institutional constraint. Thus they are more likely to accord (or response) to voter's opinion, even if it is short-sighted as in the context of natural hazard insurance.

This relative higher level of independence from voters or interest groups allows appointed executives to implement policies that that realize benefits only in future office-terms. The empirical study by Rauch (1995) that the civil service reforms and the accompanied formalization of city governance increased investment in long-term public infrastructure projects in U.S. cities.

Based on the findings in the literature we develop a simple model of the decision context regarding choices for risk-transfer mechanisms against natural hazards (see Appendix). The basic intention of the model is not to augment existing decision models and apply them to political agents. In contrast we assume, that the political decision makers follow the same decision models as other individuals do. Thus, decision outcomes do not vary because political executives are 'immune' against choice anomalies or have advantages in processing information. Rather, they might derive other policy choices because of the incentive scheme set by the institutional framework within they act.

The main conclusion of the theoretical model is that politicians and bureaucrats face different performance measures. While the politicians care about their re-election probability short-sighted preferences by the voters are directly transfered to the politicians' utility function. In contrast bureaucrats' performance is not only measured by the population's utility but also more objective and comparable performance measures, such as income or budget result. As long as there is some probability that a loss occurs and the fraction of the comparable indicator in the whole performance measurement is >0 the bureaucrat always has an incentive to invest at least some of the budget in risk-transfer. In addition the results of the model suggest that the probability of participation increases in income and occurrence probability.

3 Empirical Application

We test our hypotheses on adoption decisions of the U.S. National Flood Insurance Program (NFIP) on community level. In response to the rising burden of tax-payer funded disaster relief the U.S. congress initiated an institutionalized public-private-program for flood insurance called the NFIP in 1968. The central idea of the program is to counteract 'charity hazard' the phenomenon that individuals tend to underinsure or do not insure at all due to anticipated federal aid or private charity. Until 1973 the municipality's participation in the program was entirely voluntary. However, in order to increase incentives to participate the U.S. congress passed the Flood Disaster Protection Act in 1973, which demands the mandatory purchase of flood insurance for properties in flood prone areas, where the owner seeks mortgage from a federal lending institution. The program offers subsidized premiums (on average 30%-40% of the actual risk premium) for buildings constructed before the community joined the NFIP and actuarily fair premiums for all other private buildings in exchange for the adpotion and enforcement of municipal floodplain management systems (Federal Disaster Management Agency 2002).

U.S. communities show a variety of forms of city governance such as elected-mayor councils, council managers (city managers), commissions or representative town meetings. For the purpose of this study we consider only the mayor council (elected chief executive) and the council manager (appointed chief executive). The council manager resulted from a government reform in the early 1900s (the first city manager came into position in 1908) as a response to corruption an inefficiencies in major eastern cities (Kreft 2007). City managers are appointed by an elected city council and have full responsibility over 'managerial tasks', e.g. day-to-day operations, employment issues of the government's staff, budget preparation and recommending policies. This form should ensure that public policies promote long-term efficiency in the provision of public goods and sustainable development of the community, rather than following partisan interests and/or inefficient, 'short-sighted' political pressure. According to Kreft (2007) there is a current trend of adopting the council manager form of government in U.S. cities.

3.1 Data

Data on a municipalities entry into the regular NFIP, the initial date the Flood Hazard Boundary Map went into effect and other information on the NFIP stems from the Community Status Book (2006) published by the FEMA. The data on the form of government comes from the 1987 Census of Governments, Government Organization File by the U.S. Census. More recent data on the form of community government is available from the 1997 and 2002 Municipal Form of Government survey conducted by the International City/County Management Association (IMCA). However, Enikopolov (2007) and Aghion, Alesina & Trebbi (2005) suggest that the 1997 sample is biased toward large communities ($<$ 2,500 inhabitants) and that the respondent and non-respondent communities in the 2002 sample differ in ethnic division, population and income. Therefore the analysis in this paper only constructs a cross-section sample using data from the 1987 survey. Data on the communities budget stems from the 1987 Census of Governments, Government Finance File. Since this file only contains each single budget position, total general revenue, total current expenditure and the budget surplus are to be calculated manually using the Guidelines for Calculating Totals and Subtotals from the Government Finance Public use File. Data on economic, other socio-demographic as well as geographic characteristics of the communities is obtained from the U.S. Census of Population and Housing for the year 1990.

To our knowledge there is no comprehensive and consistently collected data on flood events or flood exposure on community-level publicly available. The most disaggregated and comprehensive data on flood hazards and property damage and historical flood events can be found in the Sheldus database provided by the Hazards and Vulnerability Research Institute, University of South Carolina. This data, however, is only available at county-level. This database includes all flood events between 1969 and 2006 resulting in more than U$ 50,000 in property or crop damage. The different datasets are merged using FIPS codes for states, counties and places as well as community names.

The data from the 1987 Census of Governments files contains information on 38,932 municipalities. Datasets were merged using information on the community name and State FIPS. Only observations with a unique identification were kept in the dataset. In the final step data on the community's status within the NFIP was merged. This information was obtained from the FEMA's NFIP Community Status Book (Federal Disaster Management Agency 2007). The final dataset thus only contains municipalities that have been collected in the status book which ensures that the municipality faces at least some flood risk at all. We further limit the dataset to municipalities with more than 1,000 inhabitants in order to avoid probable biases and irregularities with very small communities[1]. The geographical locations of the 5,008 municipalities in the final sample are presented in figure 1.

[Figure 1 about here]

As we can see there is a concentration of sample communities at the eastern part of the USA. This accumulation can be explained by the larger population density and larger community size. Table 1 represents summary statistics for the dependent and independent variables used in the estimation processes throughout the paper. The majority of control variables add to the communities damage potential (e.g. mean family income, housing density, rental units, population) and we thus expect a positive sign in the regression analysis. The figures in table 2 indicate no strong correlation between

[1] Estimates with the sample before this reduction, however, leads to similar results.

these additional control variables and mean family income. The annual budget result is also expected to have a positive impact on the participation probability as a surplus might facilitate the installation of the requested floodplain management ordinances. We expect the signs for unemployment and the number of poor persons to be negatively related with the dependent variable.

[Table 1 about here]

[Table 2 about here]

3.2 Empirical strategy

Our empirical analysis consists of four stages: First, we examine the validity of our model's key assumption. Then we test our major hypothesis about the influence of the communal government form on risk-transfer decisions. After that we perform a robustness test and examine the spatial properties of our econometric model.

Before estimating the effects of different governmental forms on the decision to participate in the NFIP, we test the plausibility of one of our assumptions. Based on the theoretical model appointed officials are considered to make decisions about a publicly provided good or risk-transfer with regard to an objective performance parameter, in our case income. Therefore we test whether municipalities governed by an appointed officials significantly report higher levels of mean income. The following OLS-model will be applied

$$ln(Mean\ Family\ Income) = \delta_0 + \delta_1 GovForm_i + \delta_2 Z_i + \eta_i \tag{1}$$

where $GovForm_i$ is a dummy that switches to 1 if community i is ruled by an appointed official and communities with an elected official are the reference group. Z_i is a vector of explanatory variables describing community i and eta_i is the error term. A municipality's governmental form could be the subject of endogeneity. One might assume that only wealthier communities adopt the decision rule of appointed executives. In order to overcome potential endogeneity issues we instrument the the governmental form dummy using the level of current expenditure, the fraction of municipalities ruled by city managers within the county and the year a municipality adopted local self-government.

After our assumptions have been tested regarding their validity we turn our focus towards the key question of this paper. As the decision whether to participate in the NFIP or not is a clear discrete choice situation we employ a maximum likelihood estimator. Based on the hypotheses in section 2 the following econometric equation is specified:

$$y_i = \beta_0 + \beta_1 GovForm_i + \beta_3 X_i + \beta_4 \sum_{c=1}^{N} Floods_c + \eta_k + \epsilon_i \qquad (2)$$

As we only have cross-section information on the form of government as well as a number of municipality characteristics in the years 1987 or 1990 we define our dependent variable as

$$y_i = \begin{cases} y_i = 1 & if\ EntryYear \leq 1987 \\ y_i = 0 & otherwise \end{cases}$$

$GovForm_i$ is a dummy that describes municipality's i form of government, X_i is a vector of control variables, $\sum Floods_c$ is the amount of flood days within the county (the proxy for the municipality's flood exposure), η_k are state specific fixed effects[2] and ϵ_i is the error term.

Once a community participates at the NFIP it is obliged to maintain active floodplain management. This should reduce the flood risk or at least the magnitude of floods occurring. Using the sum of flood days as a proxy for local flood risk - although valuable with respect to the individual risk perception - could give rise to another endogeneity issue. We therefore perform an additional probit-estimation using an alternative measure for the municipality's flood risk. Exogenous variables on the natural process (e.g. precipation data) are available for some regions of the U.S., however, describing the hydrological process of a flood has severe short-comings as one cannot analyse the relationship between the climatic and the topographic processes. An alternative would be data on the local 'objective' flood risk such as information about the housing distribution within the flood-hazard-zones. Unfortunately such data is not available to the public. Therefore we used GIS-data on flood hazard areas based on a study by the World Bank

[2]The inclusion of the state specific fixed effects is based on a statistical test. The Wald Chi^2 tests in table 2 and 3 reject the null-hypothesis that all state specific effects are zero.

and Columbia University (Dilley et al. 2005) that identifies global natural disaster hotspots. Data on flood disasters from 1985 to 2003 has been collected and georeferenced by the Dartmouth Flood Observatory. These spatial historical data on flood events have then been combined in $1^\circ \times 1^\circ$ grid cells. The attributes of the grid cells range form 0 to 10, depending on the amount of georeferenced flood events in the grid cell. The GIS-data has certain limitations: 1) Flood extent data identifies regions affected by floods and not the exact flooded areas. 2) Data on events in the early nineties are missing or of low spatial quality. However, this GIS-data is the best (publicly) available data on flood hazard area at such an aggregated level that has been collected and processed with a uniform method. We combined this data with a spatial layer of U.S. county boundaries and calculated each county's mean flood exposure. This GIS-data is used as a proxy for 'objective' flood risk and replaces the sum of flood days in equation (2). Figure 2 shows that the GIS-data was not collected U.S.-wide, thus we are able to perform a robustness test for a reduced sample. Nevertheless, the proxy seems to be a valid alternative as there is only weak correlation between the original and the new risk variable (see table 2).

[Figure 2 about here]

After performing the robustness test with respect to the risk variable spatial properties of our data is examined. The decision whether to participate in the NFIP might not only depend on the form of government and certain community characteristics, but also on the decisions of other, neighboring municipalities. The rationale for this assumption is twofold: Individual decisions are affected by decisions of other individuals within their reference group (Rincke 2006). As gathering information and evaluating alternatives creates transaction costs it might be cheaper for individuals to observe decisions made by other individuals and learn from the related outcomes. This idea does also apply to decision makers within the political process. Besley & Case (1995) show that office-motivated governments make policy decisions in accordance to a certain reference system consisting of benchmark jurisdictions.

A number of recent empirical studies have focused on the relationship between the spatial dependencies and the diffusion of policy innovations. The empirical study by Fredriksson & Millimet (2002) on strategic interaction between U.S. states in pollution abatement laws shows that states are responsive to abatement cost changes in neighboring states, at least when neighboring states have ex ante more stringent pollution laws.

The second rationale is based on the theory of externalities that applies to the policy issue at hand; flood hazard management. A community's decision to participate in the NFIP and the related adoption of floodplain management ordinances might induce external, transboundary costs and/or benefits on both up- and downstream communities. For example assume the community A decides to build a levee-system as a result of the NFIP-criteria. In case of continuing precipitation that amount of water that runs downstream increases and could cause a flood in downstream community B. The work by Fredriksson & Millimet (2002) on pollution abatement laws already shows that physical externalities create incentives for U.S. states to take their neighboring states' policy choices into account.

$$y_i = \gamma_0 + \rho_i \sum_{j=1}^{N} W^d y_j + \gamma_1 GovForm_i + \gamma_2 X_i + \gamma_3 \sum_{c=1}^{N} Floods_c + u_i \quad (3)$$

$$u_i = \lambda W^d u_i + \phi_i \quad (4)$$

y_j is the participation choice of municipality's i neighbors weighted by distance based matrix W^d. A significant and positive ρ would indicate that the participation decisions are positively interdependent. The distance based weight matrix is calculated using the coordinates (latitude and longitude) of municipality's geographical center. Based on a formula[3] applied by Mutl (2006) the distance from one municipality to all other municipalities can be calculated. The resulting distance vectors are then used to determine the individual weights, w_{ij}, in matrix W^d:

$$w_{ij} = \log(d_{max}) - \log(d_{ij}), \quad (5)$$

where d_{max} is the maximum distance in our sample and d_{ij} denotes for the distance between municipalities i and j. The result is a 5,008×5,008 distance weight matrix. We perform our spatial analysis in two steps. First

[3] $d_{ij} = \pi r \arccos\left[\sin\omega_i \sin\omega_j + \cos\omega_i \cos\omega_j \cos(\psi_j - \psi_i)\right]$, where $r = 6{,}731$, the Earth's mean radius, $\omega = \pi \frac{LAT}{180}$ and $\psi = \pi \frac{LONG}{180}$ are the latitude coordinate and the longitude coordinate, respectively, in degrees radius.

we estimate a probit with spatial correlation in the latent variable in order to estimate whether there is an interdependency of participation decisions among municipalities. In the second step we control for spatial correlation in the error term.

3.3 Econometric results

Results of OLS-estimates demonstrate that municipalities with a city manager feature a small (1.4%), but significantly higher level of mean family income (see table 3). The IV-estimates present similar results with no major changes in the size of the control variables. Our specification passes the Hansen J test and has a good first stage R^2. The results in table 3 support our model's assumption that appointed officials include performance measures such as income in their policy strategies.

In the next step we turn our focus on the key question of this paper. The results of the baseline estimates are presented in table 4. Column 4.1 shows the estimated coefficients and the respective marginal effects of the estimation without including the form of government. Mean family income, population, the number of flood days, the housing density and the number of rental units have a positive effect on the probability of participating in the NFIP. The budget result has a negative impact as well as the percentage of commuters. Alternative measures for flood exposure, such as the sum of flood damages before 1987, the mean flood damage per year or the number of victims before 1987 lead to similar results. Racial fragmentation or average level of eduction within the community do not have any significant effects. The percentage of correctly predicted participants is around 11.3. Unemployment rate and the percentage of poor persons within the community have been considered as additional control variables, however, they have been excluded from the estimation due to their high correlation with mean family income.

[Table 4 about here]

In the next step we included a dummy for the form of government, that switches to 1 if the community is headed by a council manager and 0 if the chief executive is an elected mayor. Municipalities headed by a council manager have a 7.2% higher probability of participating in the NFIP in comparison to communities headed by a mayor (column 4.2). These results accord to our hypothesis. The significance, sign and size of the other explanatory variables do not essentially change. A look at the correlation matrix (see table 2) shows that, in contrast to assumptions made by Kreft (2007), a council manager does not per se lead to higher levels of efficiency, at least measured by indicators such as budget results or mean family income.

[Table 5 about here]

Due to potenial biases using the sum of flood days as a proxy for the municipality's flood risk we perform a robustness test using an alternative flood proxy based on GIS-data. As the data is not avillable for the whole sample the number of observations is reduced to 3,738. The signs of the coefficients do not change and the size of the coefficients is similar to the results in Table 4.

[Table 6 about here]

Columns 6.1 and 6.3 in table 6 represent the estimation results of the first-order spatial AR model, where we control for the adoption decisions of all other communities weighted by their distance to community i, ρ. The spatial lag term is significantly positive indicating a positive relationship of participation decisions. If a given municipality chooses to participate in the NFIP, this would positively affect the decision of the neighboring communities and increases the probability of participation. Communities headed by council managers still have a significant positive effect on participation choice (column 6.3) however the coefficient is smaller than in the probit estimates. In the next step we estimated a general spatial model where we also controlled for spatial autocorrelation in the errors (columns 6.2 and 6.4). In comparison to the probit estimates, both the percentage correctly predicted as well as the log-likelihood values improve.

4 Discussion and Conclusion

This paper argues that elected and appointed executives follow different incentive schemes and as a result make different choices regarding risk-transfer mechanisms against LPHL-events. The empirical results confirm the hypothesis that appointed city managers have greater incentives to invest in risk-transfer mechanisms i.e. participate in the NFIP. Our results are robust to the inclusion of an alternative flood variable. The spatial estimates further indicate that participation decision of one community is related to the decisions of neighboring communities.

These empirical results could also have implications for propositions made by theoretical models on the delegation of policy tasks to politicians or bureaucrats. The model by Alesina & Tabellini (2007*b*) suggests that under the assumption of uncertain voter preferences delegation of tasks to politicians is preferable as the politician always chooses that policy that suits voters' preferences best. Given that our study provides a positive analysis we cannot per se make any comment on that normative result. However, a tentative point for further discussions can be brought forward.

First, decisions on risk-transfer-mechanisms against natural disasters seem to be affected by various problems indicating that at the constitutional table (behind the veil of ignorance) individuals are ex-ante uncertain about their ex-post preferences over different policies. Second, in principle this paper provides a positive analysis does not evaluate the NFIP itself in terms of efficiency. However, both theoretical and empirical literature already suggests that the participation in the NFIP has positive effects. Kunreuther & Pauly (2006) proposes that, in general, ex-ante policies against natural hazards are preferable to ex-post political decisions. The empirical study by Raschky (2007) shows that the adverse effects of an average flood on personal income are smaller in counties that have adopted the NFIP in comparison to other counties. Luechinger & Raschky (2007) find a significantly negative effect of flood events on individual life satisfaction in U.S. counties that do not participate in the NFIP.

Under the assumption that the participation in the NFIP results in an increase in efficiency (at least at the municipal level) the propositions made by Alesina & Tabellini (2007*b*) might not hold within the context of LPHL-events where individual preferences may be uncertain and subject to biases and heuristics (e.g. Kahneman et al. 1982, Kunreuther & Pauly 2004). Policy choices made by re-elected agents in accordance to short-sighted voters' preferences could increase existing inefficiencies and cause negative externalities on federal level (e.g. Samarita's dilemma and governmental relief). This proposition demands a more in-depth analysis and empirical evidence controlling for the expected costs of the participation as well as the expected benefits.

A Theoretical model

The general framework is set by the model on bureaucrats, politicians and multiple policy tasks (Alesina & Tabellini 2007*b*). However, the bureaucratic agent in our case is not just - as in the traditional sense - an executing agency restricted to implementing public policies (e.g. Niskanen 1971, Migué & Bélanger 1974) but an appointed public official with managerial responsibility. We implement the general assumptions Maskin & Tirole (2004) and Rauch (1995) in the existing framework. Enikopolov (2007) has already developed a model to compare policy decisions on communal public employment between elected and appointed executives.

To illustrate why appointed executives are more likely to participate in the NFIP we first specify voter's utility function that depends two public policies and the state of nature. Then describe the incentives of both elected and appointed agents and their maximization strategies are compared.

Voters in a community derive utility, U, from both a publicly provided good G and expected income y in the two states of nature.

$$U_t = (1-\pi)\left[y - \tau + G(a) - P(b)\right] + \pi\left[y(b) + \tau + G(a) - P(b)\right] \tag{6}$$

A state of nature with a natural disaster can occur with a probability, π, where $0 > \pi > 1$. In the disaster state, income y is destroyed and maybe replaced. However the replacement depends on the level of insurance coverage b. Insurance is costly and these costs are defined by function $P(b)$. Both activities, the provision of a public good and risk-transfer are financed by a lump-sum tax τ, is assumed to be exogenously determined and amounts to

$$\tau = a + b. \tag{7}$$

A.1 Politicians:

Politicians' decisions are driven by re-election concerns. Rational voters compare the ability of the incumbents with the expected ability of the opponents. Based on the assumptions of public choice theory and binding re-election constraints, incumbents care about the utility of the voters, U.

The voters' decision depends on the incumbents' expected future ability η_{t+1} conditional on their current performance. They will vote for the incumbent if

$$E(\eta_{t+1}|x_t) \geq 0. \tag{8}$$

Assuming that the incumbents' ability is inferred by the voters' observations of their current performance and the politicians' performance measures is what voter's care about than the politicians utility function can be written as:

$$V^P(a,b) = U_t \tag{9}$$

A.2 Bureaucrats

Bureaucrats in the form of city managers are driven by career concerns and his future market value. They care about how future employees (e.g. other municipalities) perceive their ability, θ. The bureaucrats utility function can be written as

$$V^B = (\theta|z_t) \tag{10}$$

where θ are the expectations on the bureaucrats ability conditional on the realization of the performance measurement z_t. Beside the utility of the voters, U, the measure of performance could include more 'comparable indicators' such as the community's overall income or a budget surplus. For reasons of simplicity we take income, y, as this other performance measure. If the constitution assigns responsibility for a policy task to the bureaucrat, it also defines the relevant performance measures and assigns the parameter ϕ to weigh the importance of the inhabitants' utility within the performance measure. The bureaucrats utility can be rewritten as:

$$V^B(U_t, y_t) = (\phi U_t + (1-\phi)y_t) \tag{11}$$

The ϕ accounts for the arguments put forward by Maskin & Tirole (2004). A low *phi* suggests that the influence of voters' preferences on the appointed official's performance and thus the accountability is not high. In the next step we consider the delegation of the task to either form of government. We start with the bureaucrat an set up the Lagrangian by using equations (6), (7) and (11):

$$\begin{aligned} L^B(a,b) = \phi\,[(1-\pi)(y-\tau+G(a)-P(b)) + \pi(y(b)-\tau+G(a)-p(b)] \\ + (1-\phi)((1-\pi)y+\pi y(b)) + \lambda(\tau-(a+b)) \end{aligned} \tag{12}$$

The first order condition is:

$$\begin{aligned} &(1-\phi)y'(b) + (-P'(b)(1-\pi) + \pi(y'(b)-P'(b))\phi - \lambda \\ &= ((1-\pi)G'(a) + \pi G'(a))\phi - \lambda \end{aligned} \tag{13}$$

Using equations , and building the Lagrangian we receive the first order condition for the politician:

$$\begin{aligned} &(1-\pi)(-P'(b)) + \pi(y'(b)-P'(b)) - \lambda \\ &= ((1-\pi)G'(a) + \pi G'(a)) - \lambda \end{aligned} \tag{14}$$

We can see that $\frac{\partial P'(b)}{\partial y} > 0$ and $\frac{\partial P'(b)}{\partial \pi} > 0$ for both, appointed and elected officials, however, $P'^B(b) > P'^P(b)$. This means that the amount of public money spend on insurance b increases with the probability of occurrence and the income at risk and is higher for the appointed official.

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Figure 1: Municipalities in sample

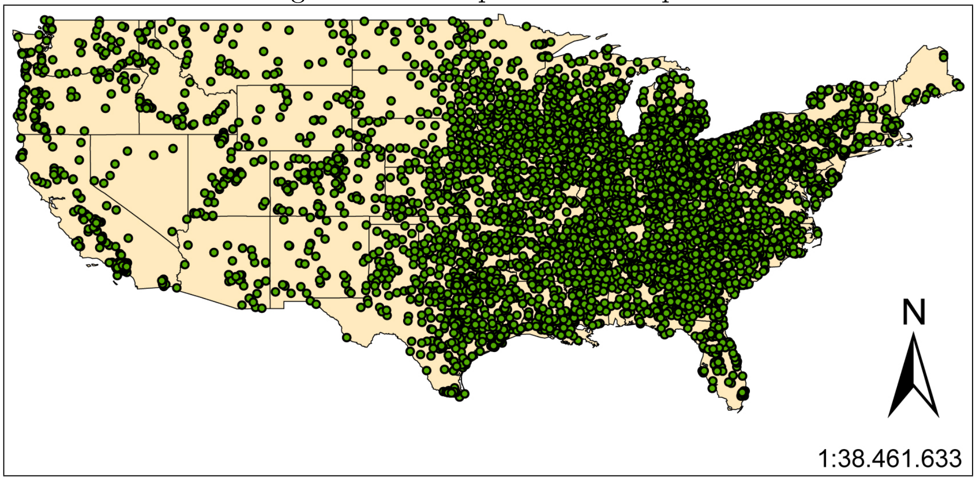

Table 1: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Part. NFIP	5,016	0.650	0.477	0	1
Mayor	5,016	0.753	0.431	0	1
City Manager	5,016	0.243	0.429	0	1
Mean Family Income	5,016	35,949.90	16,529.84	11,105	269,450
Unemployment rate	5,016	0.069	0.036	0	0.310
Persons poor	5,016	0.159	0.097	0.000	0.680
Employed within county	5,016	0.752	0.170	0.110	1.000
Vacant houses	5,016	0.088	0.068	0.000	0.900
Vacant rental units	5,016	0.090	0.064	0.000	0.820
Rental units	5,016	0.330	0.111	0.010	0.910
Budget surplus	5,016	-237.600	16,833	-256,490	593,301
Population	5,016	12,023	59,379	1001	3,009,528
No. of flood days in county	5,016	22	17	0	112
Housing density	5,016	0.290	0.290	0.003	9.03

Table 2: Correlation matrix

	NFIP	Manager	Mean Fam. Inc.	Emp. in Comm.	Vacant Houses	Vacant Rental	Rental Units	Budget	Pop.	Flood Days	Housing Density	Flood exposure
NFIP	1.00											
Manager	0.12	1.00										
Mean Family Inc.	0.16	0.18	1.00									
Employed in county	0.08	0.07	−0.08	1.00								
Vacant Houses	−0.05	0.01	−0.30	−0.10	1.00							
Vacant Rental	−0.01	0.04	−0.19	−0.07	0.72	1.00						
Rental Units	0.13	0.17	−0.23	0.17	0.09	0.08	1.00					
Budget Surplus	−0.02	−0.03	0.03	−0.04	0.00	0.00	−0.05	1.00				
Population	0.12	0.12	0.12	0.09	−0.00	0.02	0.18	0.42	1.00			
Flood days	0.01	−0.07	0.18	0.04	−0.20	−0.15	−0.11	0.06	0.06	1.00		
Housing dens.	0.21	0.15	0.26	0.09	−0.14	0.10	0.18	0.04	0.19	0.12	1.00	
Flood exposure	0.04	0.01	0.07	−0.09	−0.07	−0.05	−0.05	0.04	0.04	0.16	0.08	1.00

Table 3: Impact of government form on mean household income.

Dependent Variable: Ln(Mean family income)	OLS Coefficient (S.E.)	IV Coefficient (S.E.)
Mayor	*Reference group*	
City Manager	0.014**	0.078***
	(0.006)	(0.009)
Ln(Pop)	0.031***	0.025***
	(0.003)	(0.008)
Higher Education	0.019***	0.019***
(in %)	(0.001)	(0.001)
Adult unemployment	−0.023***	−0.023***
rate (in %)	(0.001)	(0.001)
Employed within	−0.002***	−0.002***
county (in %)	(0.000)	(0.000)
Housing density	0.057***	0.049***
	(0.018)	(0.018)
Longitude	0.002***	0.002***
	(0.000)	(0.000)
Latitude	0.005***	0.005***
	(0.001)	(0.001)
R^2/Centr. R^2	0.716	0.710
Prob>F	0.000	0.000
Number of obs.	5,016	5,016
No. of instruments		3
F-test of excl. inst		0.000
Shea's partial R^2		0.516
Hansen J stat.		0.155
Anderson LR stat.		0.000

Notes: ***, **, * indicate significance at the 1, 5 and 10% level. Robust standard errors in parenthesis.

Table 4: Participating at the NFIP 1987 (Probit-estimates).

Dependent Variable:	4.1		4.2	
Municipality participates in NFIP	Coefficient (S.E.)	M.E. (S.E.)	Coefficient (S.E.)	M.E. (S.E.)
Mayor			*Reference group*	
City Manager			0.208***	0.072***
			(0.060)	(0.021)
ln(Mean Family Income)	0.572***	0.204***	0.526***	0.188***
	(0.099)	(0.036)	(0.096)	(0.035)
Budget	−0.012**	−0.004**	−0.012**	−0.004**
(in Mio. USD)	(0.006)	(0.002)	(0.006)	(0.002)
Population	0.015***	0.005***	0.014***	0.005***
(in 1,000)	(0.006)	(0.002)	(0.005)	(0.002)
No.of flood days	0.015***	0.005***	0.015***	0.005***
	(0.002)	(0.001)	(0.002)	(0.001)
Housing density	0.882***	0.315***	0.855**	0.306***
	(0.174)	(0.063)	(0.172)	(0.062)
Employed within	0.003**	0.001**	0.002*	0.001*
county (in %)	(0.001)	(0.000)	(0.001)	(0.000)
Vacant houses (in%)	−0.004	−0.002	−0.005	−0.002
	(0.004)	(0.002))	(0.004)	(0.002)
Vacant rental	0.004	0.001	0.004	0.002
units (in %)	(0.004)	(0.002)	(0.004)	(0.002)
Rental units (in %)	0.013***	0.005***	0.012***	0.004***
	(0.003)	(0.001)	(0.003)	(0.001)
State dummies	Yes		Yes	
Wald Chi^2	0.000		0.000	
Number of obs.	5,008		5,008	
Prob>Chi^2	0.000		0.000	
Log-(Pseudo)likelihood	-2,878.231		-2,871.246	
Percentage correctly predicted	68.71		69.05	

Notes: ***, **, * indicate significance at the 1, 5 and 10% level. Robust standard errors in parenthesis.

Figure 2: Municipalities in sample

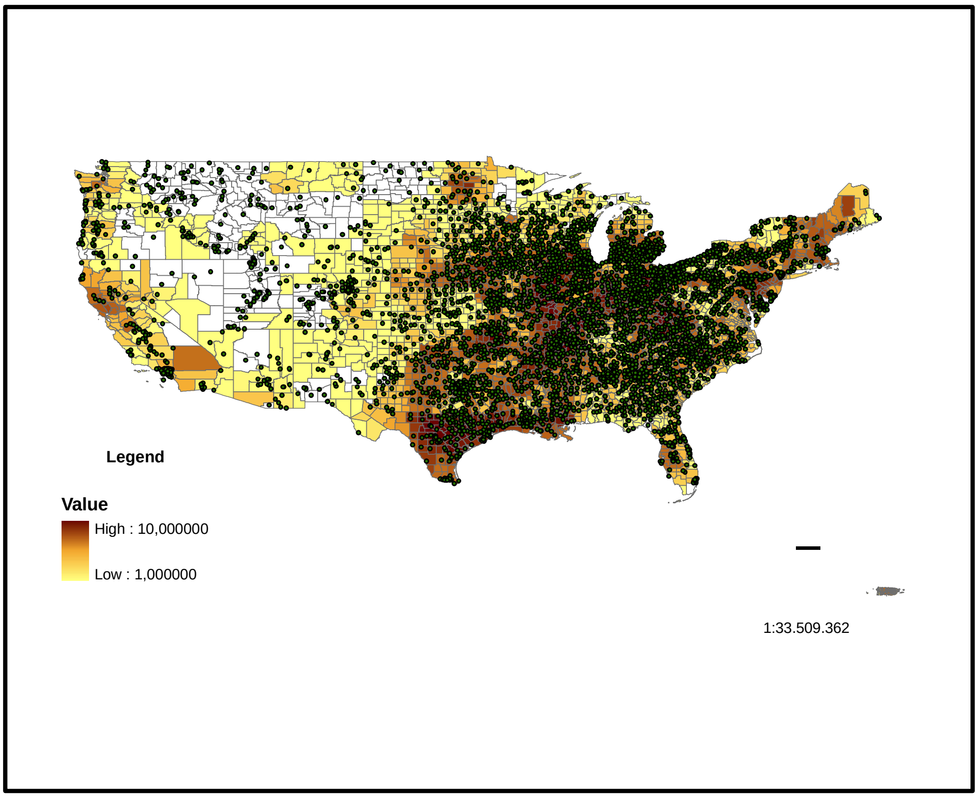

Table 5: Participating at the NFIP 1987 - Robustness Test.

Dependent Variable:	5.1		5.2	
Municipality participates	Coefficient	M.E.	Coefficient	M.E.
in NFIP	(S.E.)	(S.E.)	(S.E.)	(S.E.)
Mayor			*Reference group*	
City Manager			0.274***	0.095***
			(0.070)	(0.023)
ln(Mean Family Income)	0.637***	0.229***	0.580***	0.209***
	(0.114)	(0.042)	(0.110)	(0.040)
Budget	−0.011*	−0.004*	−0.009*	−0.003*
(in Mio. USD)	(0.006)	(0.002)	(0.006)	(0.002)
Population	0.014**	0.005**	0.019**	0.005**
(in 1,000)	(0.007)	(0.002)	(0.006)	(0.002)
Flood exposure	0.019**	0.007**	0.019**	0.007**
	(0.009)	(0.003)	(0.009)	(0.003)
Housing density	0.981***	0.353***	0.941***	0.339***
	(0.202)	(0.074)	(0.199)	(0.073)
Employed within	0.002	0.001	0.002	0.001
county (in %)	(0.001)	(0.001)	(0.001)	(0.001)
Vacant houses (in%)	−0.012	−0.004	−0.011	−0.004
	(0.008)	(0.002))	(0.007)	(0.003)
Vacant rental	0.005	0.002	0.005	0.002
units (in %)	(0.006)	(0.002)	(0.006)	(0.002)
Rental units (in %)	0.015***	0.005***	0.013***	0.005***
	(0.003)	(0.001)	(0.003)	(0.001)
State dummies	Yes		Yes	
Wald Chi^2	0.000		0.000	
Number of obs.	3,738		3,738	
Log-(Pseudo)likelihood	-2,157.683		-2,148.941	
Prob>Chi^2	0.000		0.000	
Percentage correctly predicted	90.26		90.93	

Notes: ***, **, * indicate significance at the 1, 5 and 10% level. Robust standard errors in parenthesis.

Table 6: Participating at the NFIP 1987 (Spatial-estimates).

Dependent Variable: Municipality participates in NFIP	6.1 Coeff. (S.E.)	6.2 Coeff. (S.E.)	6.3 Coeff. (S.E.)	6.4 Coeff. (S.E.)
ρ^a	0.190***	0.149***	0.193***	0.148***
	(0.011)	(0.009)	(0.011)	(0.009)
Mayor			*Ref. group*	
City Manager			0.090***	0.092***
			(0.017)	(0.017)
ln(Mean Family Income)	0.202***	0.202***	0.176***	0.175***
	(0.027)	(0.024)	(0.028)	(0.019)
Budget	−0.002***	−0.002***	−0.002***	−0.002***
(in Mio. USD)	(0.001)	(0.001)	(0.001)	(0.001)
Population	0.001***	0.001***	0.001***	0.001***
(in 1,000)	(0.000)	(0.000)	(0.000)	(0.000)
No.of flood days	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Housing density	0.253***	0.248***	0.236***	0.231**
	(0.047)	(0.048)	(0.047)	(0.048)
Employed within	0.001***	0.001***	0.001***	0.001***
county (in %)	(0.000)	(0.000)	(0.000)	(0.000)
Vacant houses (in%)	−0.002	−0.003*	−0.005*	−0.003*
	(0.001)	(0.001)	(0.001)	(0.001)
Vacant rental	0.002	0.002	0.004	0.002
units (in %)	(0.001)	(0.001)	(0.004)	(0.001)
Rental units (in %)	0.005***	0.005***	0.012***	0.005***
	(0.001)	(0.001)	(0.003)	(0.001)
State dummies	Yes	Yes	Yes	Yes
Wald Chi^2	0.000	0.000	0.000	0.000
Number of obs.	5,008	5,008	5,008	5,008
Log-(Pseudo)likelihood	-1,308.917	1,566.051	-1,295.455	1,579.934
λ^b		0.746***		0.788***
		(0.088)		(0.111)

Notes: ***, **, * indicate significance at the 1, 5 and 10% level. ^{a} Spatial lag term; ^{b} Spatial autocorrelation in errors. Robust standard errors in parenthesis.

Table 7: Description and Sources of Data

Variable	Description	Source
NFIP	Municipality has entered the NFIP before 1987	Community Status Book FEMA
GovForm	Dummy variable: 1 if ruled by city manager, 0 if ruled by mayor	Gorvernment Organization File U.S. Census of Governments 1987, U.S. Census
FloodDays	Sum of flood days between 1970 and 1987 in county	Sheldus Database
FloodExposure	GIS-Data: Geo-referenced flood areas based on historical events	Dilley et al. (2005)
Controls	Mean family income, population, housing density % employed within county, vacant houses, vacant rental rental units, ethnic fractionalization, unemployment rate longitude, latitutde, education	U.S. census of population and housing 1990, U.S. Census
Budget	Total general revenue - total current expenditure	Government Finance File U.S. Census of Governments 1987, U.S. Census
Homerule	Year of municipality's home rule	Gorvernment Organization File U.S. Census of Governments 1987, U.S. Census

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Who is going to save us now? Bureaucrats, Politicians and Risky Tasks

Abstract

The paper compares the policy choices regarding risk-transfer against low-probability-high-loss events between elected and appointed public officials. Empirical evidence using data on U.S. municipality-level shows that appointed city managers are more likely to adopt federal risk-transfer regimes. It is argued that the variation in the level of insurance activity emerges from the different incentive schemes each government form is facing. Controlling for spatial dependencies further shows that the participation decision in the insurance program significantly depends on the decision of neighboring communities.

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