# Attitudes Toward Government as Determinants of Intertemporal Choice

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July 15, 2011

**Abstract**: Many transactions between citizens and government – such as those related to the provision of future pension income – have an important intertemporal element. In such settings, individuals may discount future cash flows more heavily if their confidence or trust in the government as the counter-party to the transaction is low. In this paper, we examine an economically meaningful choice faced by retirees in response to a Constitutional Court ruling over whether to accept a small, immediate pension payment or a stream of larger, delayed payments. Approximately 70 percent of retirees chose the more immediate payments, despite the fact that the deferred option provided a nominal internal rate-of-return in excess of 26 percent. We first document that these individual decisions are correlated in sensible ways with a wide range of covariates, including education, income, liquidity constraints, and longevity expectations. We then show that, even after controlling for such factors, individual choices are strongly influenced by their attitudes toward government. Those with less confidence that the government will make good on its commitments are more likely to take the smaller, more immediate stream of payments. An important counteracting force is loss aversion: those who believe it is important to receive the "the full amount owed" from the government are substantially more likely to take the delayed payments. These findings indicate that a citizenry's attitudes toward government can have important implications for how citizens value future benefit promises.

*"Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time."*

- Ken Arrow, 1972

## 1. <u>Introduction</u>

Social scientists have long recognized that the level of trust and confidence citizens have in each other and in their government potentially has important economic implications. At a macro level, Knack and Keefer (1997) suggest that trust is important for the accumulation of human and physical capital. Government credibility also plays a central role in areas ranging from monetary policy (e.g., Barro and Gordon 1983) to individual decisions about tax evasion (e.g., Slemrod 2002).[1]

Such issues are particularly salient when the government is the counter-party to a long-term commitment, such as when the government promises future retirement benefits in exchange for tax payments while working. In the U.S. context, for example, the presence of political risk to Social Security benefits was cited often by proponents of reform as a rationale for partially replacing the system with a program of pre-funded personal retirement accounts.[2] Much of the current political debate public defined benefit pensions in the U.S. centers on the extent to which fiscally strained state and local governments will be able to make good on their pension commitments.

To the extent that individuals do not exhibit strong confidence that future payments indeed will be made, they may behave as if they are discounting the future more steeply. Such behavior would have numerous economic and policy implications. From an economic efficiency

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[1] Slemrod (2002) provides an excellent review of the literature on the role of trust in public finance.
[2] The 2001 President's Commission to Strengthen Social Security, for example, highlighted a U.S. Supreme Court decision (Fleming v. Nestor) which indicated that individuals did not have a right to their Social Security benefits and that Congress could change those benefits at any time.

perspective, Summers (1989) shows that the deadweight loss from taxation is significantly reduced – even to zero – if there is a strong "benefit-tax linkage." In other words, if individuals are confident that a marginal dollar of tax paid today will result directly in another dollar increase in the present value of future benefits, that marginal tax payment would have no efficiency cost. In contrast, settings in which the tax-benefit linkage is low are associated with much higher deadweight losses. Thus, if political risk prompts individuals not to fully value future benefits, this could increase the efficiency loss associated with the revenue supporting the system. It could also increase the net cost of providing public services if public employees undervalue the pension, thus limiting the offset to wages. Another implication is that the presence of a "political risk premium" means that a public pension system might be able to reduce its long-run liabilities by offering individuals an opportunity to exchange future benefits for (more steeply discounted) near-term benefits. For example, policymakers might be able to replace a defined benefit plan with a defined contribution plan at less than actuarially fair rates if individuals are discounting the value of defined benefits heavily.

In most real-world settings, there are reasons that make it quite difficult to assess the importance of political risk relative to other factors that affect individuals' discount rates. First, in most public pension programs where one would look for such effects, individuals have little choice. For example, participation in the U.S. Social Security system is mandatory for those working in covered sectors and, aside from choosing the benefit claiming date, there is no room for choice. Second, the existing literature on inter-temporal decision-making has documented significant heterogeneity in discount rates. Thus, even if one has a setting in which it is possible to observe individuals making decisions based on beliefs about political risk factors, it is

important to be able to control for the other sources of discount rate heterogeneity that have already been shown in the prior literature to be important.

In this paper, we use a rather unique policy setting that allows us to overcome many of these difficulties. In 1998, the Constitutional Court of Croatia ruled that the government had unconstitutionally cut benefits to hundreds of thousands of retirees during the early and mid-1990s. The Court further ordered that the government "make whole" the affected retiree population. To comply with this ruling, after a protracted period of negotiations, in July 2004 the Croatian Parliament passed a law that stipulates that the compensation (differential in pension payout with interest) is to be paid out from an investment fund, established solely for that purpose, and funded and guaranteed by the state. It took another year to further negotiate the precise manner in which this was to be done. Ultimately, in late 2005, eligible retirees were offered a one-time, irrevocable choice between receiving their full (nominal) repayment via a series of deferred payments or taking, effectively, an immediate payment equal to only 50% of the nominal face value of the full repayment amount. Although the deferred payment option (described in more detail below) offered a nominal internal rate-of-return in excess of 26 percent relative to the more immediate payment option, approximately 70 percent of retirees chose the more immediate payment schedule.

We examine empirically the determinants of this choice using micro data from a survey fielded for this purpose in late 2008 and early 2009. The use of these micro-level survey data enables us to examine a wide range of possible determinants of this choice. Many of the determinants on which we provide evidence – including mortality expectations, risk aversion, education, income, and the like – are of independent interest in their own right. The most novel

contribution of this paper, however, is to directly study how citizen attitudes toward the government affect this intertemporal decision.

This setting has several important advantages for studying this question. First, because of the way the government designed the program, individuals were faced with a very explicit, one-time, irrevocable choice, thus providing a clear choice setting. Second, the monetary value of the settlements was quite large (roughly equivalent, on average, to a year of household income for the average Croatian retiree), ensuring that the choice was a meaningful one. To our knowledge, the only study that shares these two advantages with ours is Warner and Pleeter (2001). It studies the separation choices made by a large number of U.S. military personnel (about 65,000) in the early 1990s. These individuals effectively faced a choice between receiving a lump sum payment and an annuity, with an implied discount rate that made these two payout streams equivalent in present-value terms of between 17 and 20 percent.

The third advantage, singular to our study, is that ours is a setting in which issues of trust and confidence in government are particularly salient given the country's recent political and economic history (more on this below). By contrast, it is very likely that the military personnel in Warner and Pleeter (2001) had no doubt that the military would follow through on their promised payments.[3]

We begin our analysis by examining how individuals' pension choices are correlated with the characteristics that have been shown in the prior literature to be important determinants of discount rates. Individuals, on average, behave as if they have very high discount rates, as evidenced by the fact that 69 percent of individuals chose the earlier-payment option despite the

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[3] They may have had heterogeneous beliefs about other determinants of their personal discount rates, including beliefs about future inflation and economic prospects, when making their choice in the early 1990s (which, in part, may explain the unexpectedly large fraction of those who took the immediate, lump sum payment, despite the large implied personal discount rates associated with that choice). Warner and Pleeter (2001) does not feature, for example, the decision-makers' beliefs regarding inflation or economic prospects in there study. By contrast, we do.

deferred payments' nominal internal rate of return of more than 26 percent. Moreover, we find that willingness to defer payments correlates with a number of demographic characteristics in a sensible way. For example, we find that individuals are more likely to take the deferred payment (and thus exhibit a lower discount rate) if they are younger, have children, are in poor health, have high income, and are not liquidity-constrained. We also find that individuals do consider the broader macroeconomic environment in a sensible way: those who are more concerned about future inflation and those more concerned about the possible devaluation of the Kuna (the Croatian currency) were more likely to take the immediate payment option.

We then turn to an analysis of factors related to attitudes toward government. We find evidence that individuals who have a lower level of confidence in the government are substantially more likely to choose the more immediate payment option.

Working in the opposite direction, that is, in favor of encouraging individuals to take the delayed, larger payout, is loss aversion. Our qualitative research with Croatian retirees prior to fielding our survey indicated that many had strong feelings about the importance of the government paying them the "full amount they were owed no matter how long it takes." Qualitatively, and consistent with the psychological importance of loss aversion and reference points in the decision-making process (Shefrin and Statman 1979), these individuals appeared to have established a reference point around the nominal amount owed, and indicated strong feelings about the importance of getting this amount back. The focus on nominal amounts is consistent with the findings of Odean (1999), who finds that stock investors seem to exhibit loss aversion around the nominal amount paid for a stock. Consistent with this, our empirical evidence indicates that individuals who believe it is important to get the full amount due no matter how long it takes were 27 percentage points more likely to accept the deferred payment

option. We also find that most of these loss averse individuals would continue to choose the deferred option even if its payout period were hypothetically extended to a 10-year (rather than 6-year) horizon.

To address concerns about our question serving as a noisy proxy for loss aversion (i.e., measurement error) as well as to address concerns about reverse causality (i.e., individuals who chose the delayed option rationalize it by stating they did it for this reason), we instrument using an individual's birth region, and these results confirm the importance of loss aversion as an important explanatory factor. Indeed, our regression results suggest that if no one considered "being made whole" an important consideration, the fraction choosing the delayed payout option would fall from 30% to only 12% of the population.

Although Croatia's recent political history clearly differs from that of the U.S. and many other nations, the findings of this study have relevance for debates over public pension systems in the U.S. and elsewhere. At the federal level in the U.S., the long-run structural deficits facing Social Security have led to a high level of skepticism among segments of the population (especially the young) about whether they will receive their Social Security benefits when they retire.[4] Whereas such concerns almost certainly are exaggerated, there is little question that future benefits are subject to what economists call "political risk." (e.g., Shoven and Slavov, 2006). At the sub-national level in the U.S., the underfunded status of many of the nation's public defined benefit pension plans has led to an erosion in confidence that benefits will be paid. For example, Novy-Marx and Rauh (2009) calculate that state public pensions are under-funded by $3.23 trillion. The presence of political risk may lead participants in these systems to discount future benefits at a higher rate (even to the point of placing zero value on future benefits

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[4] For example, a July 2010 Gallup Poll (Gallup, 2010) indicates that "six in 10 workers hold no hope of receiving Social Security."

if the Gallup poll results are to be taken at face value!). If so, this is a double-edged sword. On the one hand, it means that the cost of these programs may exceed the perceived value to the participants. On the other hand, this opens up an opportunity to reform these programs by offering lump-sum options (or converting to a DC system) in return for a substantial actuarial reduction in the present value of benefits.

This paper proceeds as follows. In Section 2 we discuss the relevant literature on inter-temporal decision-making and discount rates, and in Section 3 we provide background on the Croatian pension repayment plan. Our research methodology and summary statistics are presented in Section 4. Section 5 discuses the relation between traditional determinants of inter-temporal choice and whether individuals selected the immediate-payment or deferred-payment option. The role of political risk and loss aversion in this choice is examined in Section 6. Section 7 offers conclusions.

## 2. **Related Literatures of Discount Rates**

The canonical consumption-based model in economics and finance, dating back to Samuelson (1937), captures the determinants of intertemporal decisions primarily through a single parameter – the discount rate. Of course, unlike an interest rate (which represents an individual's ability to trade-off present for future consumption), the discount rate (which represents an individual's willingness to postpone consumption) is not observable directly. A large number of papers have attempted to measure discount rates using a range of approaches, with wide variation in the results. For example, several efforts to measure discount rates from surveys and experiments have found evidence of very low, and in some cases even negative, discount rates.[5] By contrast,

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[5] See, for example, Barsky et al. (1997), Loewenstein (1987), Loewenstein and Prelec (1991, 1992), and Loewenstein and Thaler (1989).

several econometric studies of actual behavior have estimated discount rates that are extremely large.[6] Barsky et al. (1997) note that "one possible explanation of the finding of high subjective discount rates in the econometric work is the difficulty of controlling for features of the economic environment facing agents, such as liquidity constraints and the need for precautionary savings." Our survey will allow us to control for such factors. We nonetheless find that, even after doing so, implied discount rates remain high.

Another strand of the literature on intertemporal decision-making examines how discount rates vary across the population. For example, Gilman (1976), Black (1984) and Lawrance (1991) report that discount rates decline with income, education, and age, and that blacks have higher discount rates than whites do. Warner and Pleeter (2001) find, using evidence from a U.S. military downsizing program, that military officers exhibit lower discount rates than enlisted personnel does, that blacks exhibit a higher discount rate than whites do, and that discount rates decline with education. To our knowledge, however, none of these studies explore the role of attitudes or beliefs about political risk.

Our context provides several advantages over most of the prior literature related to discount rates. First, like Warner and Pleeter (2001) and other studies of consumer choice, but unlike the large experimental survey literature, we are able to examine actual (rather than hypothetical) choices over an amount of money that is large enough to be quite meaningful to the typical retiree. Second, because the policy decision about the size of this repayment and the population that was to receive it was determined by a Constitutional Court decision and a subsequently passed law, we have a fairly clean experimental setting that is not contaminated by concerns about self-selection. This is in contrast to Warner and Pleeter (2001), who analyze a

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[6] Warner & Pleeter (2001) find discount rates from 0 to more than 30 percent. See also Hausman (1979) and Lawrence (1991).

setting in which individuals only made the inter-temporal decision if they opted to voluntarily separate from military service, a group that may differ from those who chose to continue military service.[7] Third, because we were able to conduct our own survey of a large population of participants, we are able to explore a number of potential explanations, including those related to attitudes toward government and other preferences that would not be readily observable from administrative data alone.

### 3. <u>Background on the Croatian Pension Choice</u>

After declaring its independence from Yugoslavia in 1991, Croatia became embroiled in a war until it signed a peace agreement with Bosnia & Herzegovina and Serbia in 1995. During this period, the Croatian government operated under considerable pressure and with a scarcity of resources as it faced the need to finance the war effort, the effects of war destruction, a severely challenged economy, as well as a simultaneous transition toward a market economy and democracy in the post-Communist era. Under these circumstances, one of the steps the government undertook at the time to secure additional resources was altering the manner in which public pension benefits were calculated. Essentially, the change in the benefit took the form of a switch from wage-indexing to price-indexing of benefits, which had the effect of lowering the amount of money retirees had received.

Shortly after the peace agreement was signed in 1995, organized groups representing the interests of affected pensioners filed a series of lawsuits questioning the constitutionality of this pension change. In 1998, the Constitutional Court of Croatia agreed that the benefit change was unconstitutional and ruled that the government must reimburse retirees for the benefit shortfall.

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[7] Warner and Pleeter (2001) did account for this sample selection in their empirical methodology.

However, the Court did not address how this remediation program should be implemented. Six years of political negotiations followed, with legislation finally being passed on July 21, 2004.

The 2004 legislation stipulated that retirees should receive the difference between what they were owed under the law and what they had actually received, along with interest. The money was to be paid from an investment fund that was established solely for this purpose, with funding guaranteed by the state. The amount of payment owed to most retirees was substantial: for a large share of retirees, it was roughly a year or more of retirement income. This is reflected in the tabulations presented in Table 1 that show the distribution of the pension repayment amount for the full sample, as well as broken down by income groups (both the pension repayment amount and the income level are self-reported). We find that, as expected, higher-income individuals are owed a higher pension-repayment amount because they likely had bigger pensions to begin with. Further, the pension repayment amount roughly equates to a year of income for the typical respondent. For example, among respondents in the 2,000-4,000 Kuna monthly income bracket (annual income of 24,000 to 48,000 Kuna), both the median and mean pension repayment amounts are around 36,000 (about $7,000US).

Another year had passed before the manner of the payment and the payment options were fully developed. Finally, in December 2005, approximately 430,000 individuals were given a choice between two payout options. Individuals who chose option A were promised four semi-annual payments—totaling 50% of the nominal value of the calculated amount owed—commencing in mid-2006 and terminating in December 2007. Those who chose option B were promised six annual payments—totaling 100% of the nominal calculated amount owed—commencing in December 2007 and terminating in December 2012. Table 2 presents the breakdown and timing of the payments that would be made under Option A (the more immediate

payments) and Option B (the more deferred payments) for someone with a pension repayment amount of 60,000 Kunas.

As shown in the bottom row of Table 2, the break-even discount rate that equates these two payment streams is approximately 26.6%. Despite the high, nominal return from choosing option B, 71% of participants choose option A, the earlier, smaller stream of payments.[8] To put this nominal 26.6% return into perspective, it is useful to consider how this relates to inflation and to other rates of return available to Croatian citizens. As indicated in Figure 1, post-war inflation has been in relatively stable, reaching a high of approximately 8% in 1998, and hovering around 4% for much of the past decade. Of course, this period of relatively low and stable inflation is coming on the heels of a period of extremely high inflation. Thus, while the 26.6% nominal return corresponds, *ex post*, to a very high real return, it will be important for us to control for heterogeneity in individual views about inflation risk (which we will do using our survey instrument, to be discussed below). The 26.6% return is also quite high in comparison with other savings instruments, as reported in Figure 2. In the years around the time of the pension choice, rates on CDs, savings, and government bonds – whether denominated in Kunas or in foreign currencies – were substantially below 26.6%. Thus, by virtually any measure, the internal rate of return provided by delaying pension payments was substantial.

## 4. **Research Methodology and Summary Statistics**

Fielding our own survey of retirees was both necessary and desirable for two primary reasons. First, Croatia does not have a nationally-representative, household data set that could be used for this purpose, and Croatian privacy laws rendered administrative data unavailable. Second, all of

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[8] As reported by Večernji List on June 27, 2007, 299,910 retirees received their third payment under Option A in late June 2007. As reported by Večernji List on December 16, 2008, 123,321 retirees received their second payment under Option B in late December 2008.

the data needed for this project (e.g., pension choice, demographic data, and, particularly, data on attitudes toward government) likely would not have been included in standard data sets even if they had existed.

We contracted with the Croatian survey agency PULS (affiliated with the U.S. Gallup polling organization) to conduct our own survey of retirees concerning their pension choice. This survey was fielded between late October 2008 and early January 2009, and thus occurred at a time the pension choice was still fresh in the minds of most individuals: indeed, those who chose option A (the more immediate payment option) would have recently received their final payment, whereas those who chose option B would have been early in the payment process.

The survey, designed to be representative of the affected population and fielded accordingly, asked a series of detailed questions about the respondent's pension choice, demographics (e.g., age, income, gender, family status, etc.), and a wide range of questions to assess knowledge, beliefs, and attitudes about economic and financial matters.

We collected 2,619 survey responses. Of these, 1,818 respondents, or 69% of the sample, had selected option A, whereas 801 respondents, or 31% of the sample, had selected option B. As shown in Figure 3, these proportions match the division of choice within the population almost exactly (69% of the sample opting for Option A compared to 71% of the full population). This suggests that our sampling was representative and that individuals reported their pension choice truthfully.

Our primary dependent variable for our analysis is a binary variable, "OptionPicked," set equal to zero when the individual selected option A (the smaller, more immediate payouts) and equal to one when the individual selected option B (the more deferred payouts). If one were to interpret this choice as being driven entirely by a comparison of one's discount rate to the

internal-rate-of-return (an interpretation that, as discussed below, is an over-simplification), those with a dependent variable value of 0 (i.e., those that chose option A) should be viewed as having a discount rate in excess of 26.6%, whereas those with a value of 1 (i.e., those who chose option B) should be viewed as having a discount rate below 26.6%.

We regress this binary variable against a range of covariates.[9] Given our definition of the dependent variable, a positive coefficient associated with a covariate should be interpreted as an increased willingness to defer consumption (i.e., a lower discount rate), whereas a negative coefficient should be interpreted as a decreased willingness to defer consumption (i.e., a higher discount rate).

In Table 3, we report the summary statistics for the key covariates that we include in our regressions of the pension repayment choice (our regressions will also include 24 indicator variables indicating the individual's county of residence within Croatia, which we do not tabulate in this table). For purposes of this summary table, as well as our later regressions, we group variables into seven categories and present in distinct panels: (A) rate of time preference and risk aversion; (B) income, wealth, and liquidity constraints; (C) education, financial literacy, and financial self-assessment; (D) family structure and other demographics; (E) health and longevity; (F) views about macroeconomic factors; (G) beliefs concerning attitudes toward government. The tabulations presented in the table suggest that our survey respondents exhibit substantial heterogeneity in terms of their attitudes towards risk, their financial condition, their education and financial literacy, and their views about inflation or exchange rate fluctuations. For example, just over two-fifths of individuals have a savings account (either in Kuna or Euros), and just over a quarter have more than a high school education. There is also substantial

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[9] For ease of interpretation, we report the coefficients on a linear probability model. Non-linear binary choice models yield very similar marginal effects.

heterogeneity in terms of their attitudes toward government.  For example, whereas 32% of

respondents state that they were very confident at the time of their choice that the government

would make all payments, 36.9% were not at all confident.  Roughly 3 of 5 individuals felt it was

very important that they receive all the money owed no matter how long it takes, while 1 out of 5

placed no importance on this factor.  Given the myriad of factors involved in making an

intertemporal choice, we turn to regression analysis sort out the relative importance of the

various factors.


## 5. **Empirical Analysis of the Determinants of Inter-Temporal Choice**

In this section, we regress the pension repayment choice against a large number of variables of

interest.  Our dependent variable is an indicator variable equal to 100 if the respondent selected

pension repayment Option B (the more deferred payment option), and 0 if the respondent picked

Option A (more immediate payment).   We chose to scale the binary variable by 100 so that the

coefficients can be interpreted as percentage point changes in the likelihood of picking the

deferred Option B. The linear regression is estimated by OLS with robust standard errors. All of

the variables presented in the Table 3 summary statistics are included in the regression, with

explanatory variables organized into the same seven groups for ease of readability and

exposition. We also include in the full-specification regression 24 indicator variables indicating

the individual's county of residence within Croatia, which we do not tabulate in the individual

table.   Results of our primary specification are reported in Table 4.

*5.1 Rate of Time Preference and Risk Aversion*

We begin by controlling directly for a proxy measure of an individual's pure rate of time preference. A number of studies have attempted to estimate a time preference parameter by asking individuals to make choices between current and deferred payoffs. Our approach is similar to Kirby et al. (1999) and Chabris et al (2008)[10]: we describe a situation in which the individual has received 20,000 Kunas[11] and is given a choice between keeping the money and doing with it as they please, or depositing the money with an "extremely reputable bank as a CD for one year, so that you will be promised a certain annual interest rate, but will not be able to touch the money until the year expires." We then ask "If you would be willing to make such a deposit, what interest rate would the extremely reputable bank need to offer to pay you so that you would prefer to deposit the 20,000 Kunas as a CD for one year, rather than keep it and do with it as you please?" If respondents did not provide a meaningful response, we took them through a branching series of responses, asking them if they would deposit the money at various rates (5%, 10%, 15%, and 25%) to approximate their rate of time preference for a one-year bank deposit.

Approximately 29% of respondents indicated that there was "no rate" at which they would be willing to give up current access to the money for a higher future return, which suggests that these individuals have a very high rate of discount. Of the 71% of respondents who provided an answer to this question (either originally or through the "branching" questions), the

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[10] Kirby et al. (1999) and Chabris et al. (2008) use a series of questions that ask subjects to choose between "smaller, immediate reward (SIR) and a larger, delayed reward (LDR)." For example, the first question asks "Would you prefer $54 today, or $55 in 117 days?" Additional questions vary the reward sizes as well as the time period of delay. Other survey approaches attempt to elicit discount rates from questions about the desired slope of equal present-value consumption paths. For example, Barsky et al. (1997) follow this approach in the Health and Retirement Survey (although in a small sample) and find that, even with a zero interest rate, individuals prefer an upward sloping consumption profile, suggesting that these individuals exhibit a negative discount rate.
[11] This amount equals approximately $4,000US. Also, it is equal to approximately one-third of the average annual wage in Croatia, and to about three-quarters of the average annual pension in Croatia.

mean and median rates were 8.65% and 7%, respectively. If we treat the three-tenths of respondents who did not provide a rate as being greater than 25 percentage points, the median rate of discount rises to 10%. In general, there is substantial heterogeneity: whereas a large fraction of the respondents reports having a discount rate in excess of 25%, one-quarter of the respondents will postpone consumption for a year for a bank-deposit return of 5% or less, while about a third will do so for a return in the 6-10% range.

As indicated in panel A of Table 4, this proxy for the pure rate of time preference is not significantly correlated with the choice of pension payments.   There are two reasons for this finding: (1) because of the context of our question (investing in a bank CD), our time preference measure may be very noisy for those with limited investment experience, and (2) it may be that liquidity constraints are confounding our measure, as has been hypothesized as a reason for the difference in estimated rates of time preference between the experimental and empirical literatures.

Further analysis is supportive of both of these reasons.  In Figure 4, we report the coefficients from a modified version of our baseline regression in which we interact the time preference question with variables that capture these effects.  The first bar represents the coefficient from Table 4, i.e., the baseline coefficient on our rate of time preference question. Subsequent bars show the effect of rate of time preference for various subgroups. For respondents who own a savings account or certificates of deposits (CDs) denominated in a foreign currency (such as Euros), a trait shared by just under three-tenths of the sample respondents, we find that having a higher discount rate is associated with a significantly lower probability of choosing the more deferred payout option (option B). A 5% shift in the discount rate is associated with a statistically significant 5 percentage point reduction in the likelihood of

choosing option B. For those who do not own such a savings account (and thus for whom our question is less salient), there is no relation. To test for liquidity constraints, we ask individuals to rate on a scale from 1 (not at all important) to 5 (extremely important) the importance of the following statement in influencing their decision: "An immediate need for money to help pay some expenses, such as debts, medical expenses, bills, home or apartment repairs or renovation, replacement of major appliances, or similar, for self, family, or friends." One quarter of the respondents answered that liquidity constraints were not important (answered "1" or "2"), while one-half of the respondents answered that liquidity constraints were important (answered "4" or "5"). For unconstrained individuals, we find that our measure of their subjective rate of time preference significantly predicts the pension repayment option they selected (higher rate is associated with lower likelihood of picking the deferred-money option). For those who were liquidity constrained, the thought of deferring the pension repayment may not be considered a possibility under any rate of return and, therefore, the respondent's time rate of preference is not correlated with their decision. (We will discuss the direct effects of liquidity constraints below).

In short, we find that our proxy for the pure rate of time preference is informative for those individuals for whom our proxy is most salient. These findings are reminiscent of other research that has indicated the importance of focusing on the sub-population for which a particular measure may have more meaning. For example, Malloy, Moskowitz, and Vissing-Jørgensen (2008) show that consumption-based asset pricing models perform better when focused on the consumption risk of stock-holders, rather than that of the overall population. In a different context, Brown (2001) shows that forward-looking utility-based measures of the value of guaranteed income are significantly correlated with annuity choice for individuals with longer planning horizons, but not for those who are more myopic.

We also control for risk aversion in Panel A of Table 4, but do not find any significant correlation with the pension payment choice.

5.2 *Income, Wealth, and Liquidity Constraints*

In Panel B of Table 4, we report the effects of various economic factors, many of which are very consistent with the predictions generated by standard models of inter-temporal choice.

We find that, consistent with prior research, higher income and wealthier individuals exhibit lower discount rates (as manifested by a greater likelihood to accept the deferred payments). Specifically, we find evidence of income and wealth gradients: middle and higher-income individuals, for example, are each 6 percentage points more likely to defer payments than low income individuals are.

Due to cultural norms in Croatia, we purposely did not ask directly for measures of overall net worth. We did, however, ask a series of "yes/no" questions about ownership of specific types of assets. While many of these measures (ownership of real estate, mutual funds, bonds, etc.) are not significant, we do find that individuals who own stocks and have savings denominated in a foreign currency are more likely to defer payments, as are individuals with higher pension repayment amount (i.e., more money at stake in the Option A/B decision).

In discussing the fact that econometric studies of behavior and experimental/survey results come to very different conclusions regarding discount rates, Barsky et al. (1997) note that "one possible explanation of the finding of high subjective discount rates in the econometric work is the difficulty of controlling for features of the economic environment facing agents, such as liquidity constraints and the need for precautionary savings." The fact that our income

measures and stock ownership measure are negatively correlated with discount rates is consistent with such a liquidity-constraint explanation.

We also measure liquidity constraints through the direct question referenced in Section 5.1. We find, as reported in the bottom part of Panel B of Table 4, that individuals who rate liquidity constraints as being very important or important are 18.7 percentage points more likely to take the immediate payment option than those who rate it as unimportant or very unimportant.

5.3 *Education, Financial Literacy, and Self-Assessments*

As shown in the first row of Panel C, more highly educated individuals are more likely to defer payments. Specifically, those with more than a high school education are nearly 4 percentage points more likely to choose option B than those with a high school education or less are.

The growing literature has emphasized that overall education is not a perfect proxy for financial literacy, and that financial literacy has a direct effect on influencing financial decision-making (e.g., Lusardi and Mitchell (2007a, 2007b)). Thus, in addition to the overall education level, we also include numerous measures of financial literacy drawn from the extant literature. None of these measures (e.g., education or work experience in accounting, economics, or finance; self-reported assessment of numeracy) are significantly correlated with the deferral decision.

5.4 *Family Structure and Other Demographics*

We also find that family structure matters. As shown in Panel D, there is a high degree of within-couple correlation in the choice. For those couples in which both spouses made a pension choice, there is a 50 percentage-point difference in the probability of choosing option B depending on

whether one's spouse chose A or B. Of course, the high within-couple correlation should *not* be interpreted as a causal relation, but rather as the likely outcome of a joint household decision. Nonetheless, we control for this in all specifications, although the coefficients on other variables are virtually unchanged if we exclude the spouse's choice.

We also find that the presence of children in the household makes it 10 percentage points more likely that one will choose the higher-return, deferred payment option. This is consistent with a view that those with children may have bequest motives (and thus the higher total payments are more attractive, especially given that children are qualified to receive the payments if the pensioner dies before the full series of payments have been received). Consistent with this, we further find that those who indicated that leaving money to heirs is very important were 8.5 percentage points more likely to pick Option B relative to those for whom this was not an important consideration in their choice. Similarly, those for whom receiving the most money while they *were still alive* was very important were 5 percentage points more likely to take the more immediate payment option (less likely to pick Option B) relative to those for whom this was not important.

5.5 *Health and Longevity*

Individuals rationally discount the future not only because of the pure rate of time preference, but also because they rationally recognize that they may not live long enough to receive payments. This is a particularly relevant consideration in a sample of elderly individuals such as pensioners. Indeed, in standard consumption models, one can think about discounting by the sum of the pure discount rate and the mortality rate. However, in most studies of discount rate behavior,

researchers have not had access to information about longevity expectations aside from a respondent's age, which misses within cohort heterogeneity in mortality expectations.

In our survey, we find that beliefs about health and life expectancy (as reported in Panel E of Table 4) are quite important determinants of the intertemporal choice. First, for each additional year of age at the time the pension repayment choice was made, an individual is one percentage point less likely to defer consumption. Even after conditioning for age, individuals who rate themselves as being in very good or excellent health are significantly more likely to defer payments. In addition, those who were less confident at the time of the choice that they would live at least 7 years (the time required to receive all payments under option B) are nearly 8 percentage points more likely to take immediate payments. This suggests that there is substantial heterogeneity in health and longevity expectations within age groups, and that this heterogeneity is important for understanding inter-temporal decision-making.

5.6 *Macroeconomic Factors*

Given Croatia's political and economic history, a natural concern that pensioners might have is whether the government would be committed to maintaining the purchasing power of the promised future stream of benefits. Simply put, in their lifetimes, Croatian retirees eligible for compensation have "seen it all" – war and its related destruction (twice), high inflationary periods lasting several years at a time, if not decades, accompanied by "stabilization" attempts and recession (multiple times), and hyperinflation (at least twice).[12] However, the decade prior to the pension repayment choice was marked by fairly mild inflation.

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[12] Most Croatian retirees eligible for compensation likely saw the effects of the Great Depression in their early childhood, WWII and the difficult recovery thereafter in their youth, and a multitude of high-inflationary periods. The example of Socialist Federative Republic of Yugoslavia, of which Croatia was a part until 1991, continues to serve as a textbook example of hyperinflation and, generally, rampant inflation. For example, the annual inflation

Our survey asked individuals "at the time you were making your A or B choice, how high did you think that annual inflation would be (that is, by how much would prices rise each year) over the period of the next several years from that time?" They were given a range of options to choose from (0 – 4%, 5-8%, 9-12%, 13-16%, more than 16%), which we collapsed into three ranges (0-8%, 9-16%, more than 16%). While only 2% of sample respondents expected inflation to be more than 16% per year, these individuals are 11.5 percentage points less likely to choose the deferred payment option than those who believe it will be less than 8% per year.

On a related note, Croatia is a relatively small, open economy, and thus even average citizens are aware of the importance of maintaining the Kuna's purchasing power relative to other currencies (especially the Euro). Thus, we also asked "at the time you were making your A or B choice, what was your opinion about the movement of the Kuna relative to the Euro over the period of the next several years from that time?" Those who thought that the Kuna would go down relative to the Euro were 3.9 percentage points less likely to take the deferred payment option.

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(CPI) in 1965 was around 48 percent, only to be lowered to several percent per year in the period from 1966 to 1970. From 1971 to 1979, annual inflation was "only" around 20 percent per year in most years. Once Marshall Tito passed away in 1980, the economic outlook changed and the credit constraints forced a much higher inflation. In the period from 1980 to 1985, annual inflation rates ranged from 32.7 percent per year (1982) to 75.4 percent per year (1985). Late 1980s brought about further escalation, from 91.6 percent per year in 1986, to 240 percent per year in 1988, to 2,685 percent per year in 1989. A somewhat successful attempt of curtailing inflation was launched at the time by then Yugoslav Prime Minister Ante Marković, reducing the annual inflation in 1990 to "only" 120 percent per year. Political unrest that began in 1989 culminated with the secession of Slovenia and Croatia on June 25, 1991. The war ensued immediately thereafter and the annual inflation rate in Croatia in 1991 (no longer part of Yugoslavia, though subject to its military aggression and destruction) was 100 percent per year. The next two years, witnessing the heaviest fighting and destruction, saw annual inflation rates soar to 595 and 1,467 percent per year, respectively. The two years to follow, 1994 and 1995, saw stabilization of the inflation rates, with 112 percent per year and 24 percent per year, respectively. The period from 1995 to 2008, by comparison with the past, has seen relatively low annual inflation rates, ranging from 3.31 percent per year in 2005 to 8.16% in 1998. At the moment of making their choice, the retirees were in the relatively low inflationary environment (3.31% per year), and the inflation rate was on a moderate upswing at the point they responded to our survey in late 2008 (the annual inflation rate for 2008 is 6.38%, a far cry from the thousands of percent per year seen most recently only fifteen year ago, but about twice the rate compared to that which prevailed at the time of their choice in 2005.

*5.7 Attitudes Toward Government*

*5.7.1 Confidence that the Government will Honor its Payment Commitment*

Through our informal discussions with Croatian retirees (prior to fielding our survey), it became clear that there were important differences in the population as to the extent to which they had confidence that the government will actually "make good" on its commitment to make all future payouts. Such skepticism is understandable given that the initial basis of the Constitutional Court decision that led to the pension choice in the first place was that the government had, in the early 1990s, essentially reneged on part of its promised pension payments to retirees. Thus, some retirees continued to express a degree of skepticism about whether the government would be willing or able to follow through on these payments for the life of the program.

We tested this idea in two ways that differ primarily in terms of whether the issue was raised in a more positive or a more negative frame. In the more positive frame, we asked individuals "at the time you were making your A or B choice, how confident were you that the government would make all of the payments to all the retirees who selected option B?" They were given a 5-point scale, where 1 was "not at all confident" and 5 was "extremely confident." We find that this has a quantitatively and statistically important effect on people's decisions. Those who rate this factor as a 4 or 5 on the confidence scale are 11.5 percentage points more likely to choose the delayed payout option than those who expressed little confidence in the Croatia government's ability to make all the payments it promised.

We also asked a more negatively-framed question. Specifically, in our list of factors that respondents were asked to rate in terms of relative importance in their decision-making (a 5-

point scale where 1 is "not at all important" and 5 is "extremely important"), we asked people to rate the importance of a "concern that the government might not honor its commitment to payout all of the money owed." We find that, even after controlling for the confidence question above, the importance of this factor also has a significant effect. Those who rate this factor as a 4 or 5 on the importance scale are 7 percentage points more likely to choose the more immediate payment option than those who rate it as not an important factor are.[13]

5.7.2 Loss Aversion: *The Importance of Receiving "What is Owed No Matter How Long It Takes"*

Another issue that came out of our pre-survey qualitative research was that a sizeable minority of individuals expressed a strong desire to be "made whole no matter how long it takes." Qualitatively, it appeared that these individuals were placing tremendous weight on receiving the full *nominal* amount they were owed, suggesting that the nominal value owed was serving as an important reference point. Averting this sense of loss seemed more important to these individuals than the specific timing of the payments or the present value of the payments. This sense of loss aversion was tightly linked with the fact that it was the government who had originally failed to pay people what they were due, and the fact that they now wanted the government to make them "whole" again.

To test for this possibility, we asked individuals to rate on a 5-point scale the relative importance of the factor "desire that the full amount of the debt that you were due would be paid

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[13] Naturally, one might be concerned that individuals may display systematic biases when recalling how they felt at the time of the decision. For example, it may be that after seeing the government follow through on the payments, individuals may believe they made a mistake in choosing the more immediate payment option, and thus, *ex post*, the rationalize the decision by blaming the government. It is worth noting, however, that if individuals exhibit such a bias, it did not lead them to misreport their pension choice because, as noted above, the sample proportion matches nearly exactly the population proportion that chose A versus B.

out, no matter how long it took." Three-fifths of the population ranked this factor as very or extremely important (4 or 5 on a 5-point scale), while less than one-fifth rated it as not important to them at all.

As displayed in Figure 5, in a univariate setting we find that those who believe this factor is very/extremely important are 29 percentage points more likely to take the deferred payment relative to those who believe this is not important. This result is unchanged once we put in the full suite of other control variables – the effect is still a 27 percentage point change. Thus, the desire to receive the full amount due is very important economically and acts independently from a wide range of socioeconomic characteristics and beliefs (i.e., controlling for a whole range of factors that are important in their own right does not diminish the magnitude of its effect).

To give a sense for the economic magnitude of this attitude, if the entire population shifted from their current beliefs regarding the importance of receiving the full amount due no matter how long it takes (i.e., 61% believing this is very important and 13% believing this is moderately important) to everyone believing this is not an important consideration, the selection of the deferred-payment Option B would have fallen from 30.6 percentage points to 11.9 percentage points. Indeed, this effect is larger than virtually any other variable in our regression.

If our question is indeed picking up loss aversion around the nominal amount owed, then it ought to be the case that the individuals for whom this is an important factor are fairly insensitive to the internal return offered by the choice of option B over A. Put differently, even if the payments were spread out over a longer period of time, thus lowering the internal return, individuals who exhibit "loss aversion" should still desire option B. A confounding factor, of course, is that the median age of our sample is 68, and if the payment were spread out over too long of a period, individuals might be concerned that they would not receive the full amount due

while they were still alive.  The remaining columns of Figure 6 illustrates these effects by making use of a question that asks individuals what pension choice they would make if the payments were spread over 10 years instead of 6 years (which is implies a 16.6% rate of return, down from 26.6%).

In this hypothetical 10-year deferral scenario, 17.4% of individuals would pick the deferred money.  However, part of this decline likely reflects that many of our respondents might be concerned about whether they would still be alive at the end of the payment stream.  To account for this, the right-half of Figure 7 shows the results of the actual 6-year deferral and the hypothetical 10-year deferral for individuals who would be no more than 70 years old when they would receive their final payment.  For this younger population, 39% actually selected option B, and 31.6% would have selected option B even if payments were spread out longer.  The loss aversion effect (i.e., "being made whole" effect) is nearly identical in the two scenarios, even though the second scenario results in a much lower return.  This supports that loss aversion over the nominal amount owed is a very important factor in explaining the behavior of those who chose option B.

Of course, as a measure of loss aversion, our question has two limitations.  First, we recognize that it is a rather noisy proxy of whether an individual has an underlying aversion to losses, and that, as a result, measurement error may cause attenuation bias.  Potentially biasing in the opposite direction is the possibility that we may have the causality reversed, i.e., that individuals who chose the delayed option subsequently report their desire to be made whole as an *ex post* rationalization (although given that their choice granted them a 26% return, it is not clear why they would feel the need to rationalize it.)

To address both of these potential concerns, we turn to an instrumental variables strategy.

Our strategy builds on the work of Guiso, Sapienza and Zigales (2004) and Brown et al. (2008) that shows that an individual's region of birth can have long-lasting effects on attitudes later in life. We make use of the fact that individuals born in continental Croatia (the center of the country centered around Zagreb) would like have different views about the importance of receiving what they are due from the government than would individuals in outer regions of Croatia that have been culturally separate for centuries. Our conjecture is that this physical and cultural separation from the center of government causes more of a concern about being "wronged" by the government and a greater focus on wanting to get back everything they are owed. Thus, we construct a simple binary instrument based on whether individuals were born in continental Croatia or in outlying areas (a picture of the geographic lines can be seen in Figure 7). For perspective, 44% of Croatians in our survey were born in continental Croatia.

In panel A of Table 5, we report the results of our first-stage regression of our proxy for loss aversion (i.e., the importance of receiving the full amount due) against our binary indicator of region of birth. The results show that individuals born in continental Croatia are 7% less likely to indicate that it is important to receive the full amount owed than individuals born outside of continental Croatia. Importantly, this coefficient is virtually unchanged whether or not when we include the full set of other explanatory variables from our earlier regression – including a full set of 24 indicator variables for the region where the respondent *currently* lives, underscoring that this effect is orthogonal to all the other factors influencing the pension choice. In the second stage, we find that the instrumented effect of loss aversion is significant, with a coefficient of 57, even larger than our baseline case (as would be consistent with measurement error biasing our estimates downwards).

The 2SLS results provide confirming evidence that a desire to receive the full, nominal amount due – which we interpret as a proxy for loss aversion – has a very strong effect on the pension choice. Ironically, in this case, loss aversion works in the direction of pushing individuals toward what might plausibly be considered – at least *ex post* – the better financial choice. In other words, a form of loss aversion – rather than other, traditional factors – may help explain the behavior of many of the individuals who opted for the 26.6% internal rate of return associated with taking the delayed payout.

7. **Summary and Conclusions**

In this paper, we empirically examine the determinants of individuals' discount rates. We exploit a unique "experiment" in Croatia – retirees there were given the choice between one of two payment streams to compensate them for past underpayments from the pension system. One option offered more immediate payments, while the other option offered a more deferred payment structure (but an internal rate of return of more than 26% compared to the first option). Our use of micro-level survey data enables us to examine a wide range of possible determinants of this choice, including proxies for beliefs about various types of political risk.

We find that many factors contribute to the "discount rate" individuals used in making this decision. As one might expect, those with higher income and wealth and those not facing liquidity constraints exhibited lower discount rates and thus were more willing to accept deferred payment from the government. Family structure and health were also important in this intertemporal tradeoff. Those with children and self-reported strong bequest motives were much more likely to accept a deferred pension repayment option, while those who were older and reported poor health were more likely to accept much less money up front.

Unique to this study, we also examine the role beliefs concerning various types of political risk play in individuals' decision-making. In particular, we find that those individuals with low confidence in the government's ability to make all the payments promised are much more likely to select a more immediate, reduced payment stream.

Another important consideration expressed by individuals is the desire to receive the full amount owed, no matter how long it takes. We interpret this as a form of loss aversion around the *nominal* amount owed, regardless of the present value of the stream of payments. Three-fifths of pensioners regarded this consideration as very important to them. The prevalence of this factor, and the intensity with which it was held, is estimated to have increased the proportion of the population opting for the deferred-payment plan by the government (which paid out the exact nominal amount owed to the pensioners, but spread it out over many years) from only 12% of the population to 31%.

Although Croatia's recent political history clearly differs from that of the U.S. and many other nations, the findings of this study have relevance for debates over public pension systems in the U.S. and elsewhere. The presence of political risk may lead participants in these systems to discount future benefits at a higher rate than would be predicted otherwise by the standard socioeconomic determinants of intertemporal decision-making. This would suggest that many retirees may view as attractive a government program offering pensioners a lump-sum payment rather than a promised stream of benefits (even if offered at a substantial discount in present-value terms from the government's perspective). Interestingly, our results also suggest that loss aversion around nominal promises can be an important factor in determining choice.

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**Table 1: Summary Statistics of Pension Repayment Amount by Household Income**

This table provides the distribution of the pension repayment amount owed to households in the survey, broken down by the self-reported income range of the household. Amounts are in Kuna (the Croatian currency).

| | 10th | 25th | Median | 75th | 90th | Mean |
|---|---|---|---|---|---|---|
| **Full Sample** | 12,000 | 25,000 | 38,938 | 50,000 | 66,000 | 39,668 |
| **Lower Income (less than 2,000 Kn/month)** | 4,250 | 9,400 | 16,650 | 24,000 | 43,000 | 20,936 |
| **Medium Income (2,000 to 4,000 Kn/month)** | 14,000 | 26,000 | 36,000 | 47,280 | 56,000 | 36,851 |
| **Higher Income (4,000 Kn/month or more)** | 18,000 | 32,000 | 43,000 | 60,000 | 78,000 | 46,598 |

**Table 2: Hypothetical Example of Payments Under Two Pension Repayment Options**

The table illustrates the breakdown and timing of the payments that would be made under Option A (the more immediate payments) and Option B (the more deferred payments) for a pension repayment amount of 60,000 Kunas. For reference, our survey was fielded between late October 2008 and mid-January 2009.

|  | Option A | Option B |
|---|---|---|
| mid July 2005 | Gov't Announces to Offer A/B Choice | |
| late December 2005 | Decision-Making Time | |
| late June 2006 | 7,500 | |
| late December 2006 | 7,500 | |
| late June 2007 | 7,500 | |
| late December 2007 | 7,500 | 10,000 |
| late June 2008 | | |
| late December 2008 | | 10,000 |
| late June 2009 | | |
| late December 2009 | | 10,000 |
| late June 2010 | | |
| late December 2010 | | 10,000 |
| late June 2011 | | |
| late December 2011 | | 10,000 |
| late June 2012 | | |
| late December 2012 | | 10,000 |
| **Total Paid:** | 30,000 | 60,000 |
| **Discount Rate that Equates the Present Value of the Two Payout Streams** | 26.6% | |

**Table 3: Summary Statistics for Key Variables, in Percent Unless Stated Otherwise**

| Panel A: Rate of Time Preference and Risk Aversion | |
|---|---|
| *Not Willing to Deposit for 1 Year (no CD)* | |
| Willing (no CD=0) | 71.2 |
| Not Willing (no CD=1) | 28.8 |
| *Deposit Rate for 1 Year (if willing to deposit, in %)* | |
| 10th | 5 |
| 25th | 5 |
| Median | 7 |
| 75th | 10 |
| 90th | 15 |
| Mean | 8.6 |
| *Risk Level Regarding Income Gamble* | |
| Take No Gamble | 52.9 |
| Take Gamble 2x Income for 10% Loss | 9.9 |
| Take Gamble 2x Income for 30% Loss | 15.2 |
| Take Gamble 2x Income for 50% Loss | 8.8 |
| DK/Ref | 13.1 |
| *Self Perception of Inclination to Take Risk* | |
| Not at All Willing | 59.6 |
| Moderately Willing | 25.4 |
| Very Willing | 12.2 |
| DK/Ref | 2.8 |

| Panel B: Income, Wealth, and Liquidity Constraints | |
|---|---|
| *Living Standard Relative to Average Retiree* | |
| Below | 20.8 |
| About the Same | 54.8 |
| Higher | 20.6 |
| DK/Ref | 3.8 |
| *Income (Croatian Kuna/month)* | |
| Lower Income (less than 2,000) | 9.1 |
| Medium Income (2,000 to 4,000) | 46.4 |
| Higher Income (4,000 or more) | 44.5 |
| | |
| Lives With Children? | 42.0 |
| Family Helped? | 31.6 |
| *Owns...* | |
| House? | 87.7 |
| Savings in Croatian Kuna? | 30.2 |
| Savings in Foreign Currency? | 29.1 |
| Vacation Home? | 19.8 |
| Rental Real Estate? | 7.7 |
| Other Real Estate? | 31.6 |
| Stocks? | 15.9 |
| Mutual Funds? | 3.4 |
| Bonds? | 0.9 |
| *Reported Pension Repayment Amount?* | |
| Did Not Report | 18.2 |
| Reported Pension Repayment Amount | 81.8 |
| *Pension Repayment Amount in Kunas, if Reported* | |
| 10th | 12,000 |
| 25th | 25,000 |
| Median | 38,938 |
| 75th | 50,000 |
| 90th | 66,000 |
| Mean | 39,668 |
| *Immediate Need to Pay for Something* | |
| Very Unlikely | 25.2 |
| Moderately Likely | 19.9 |
| Very Likely | 51.4 |
| DK/Ref | 3.5 |

| Panel C: Education, Financial Literacy, and Self-Assessments | |
|---|---|
| *Education* | |
| High School or Less | 71.6 |
| More than High School | 28.4 |
| *School Exposure to Acc., Bank., Bus., Econ., Fin.* | |
| Not at All | 46.1 |
| A Little | 24.3 |
| A Lot | 27.4 |
| DK/Ref | 2.2 |
| *Job Exposure to Acc., Bank., Bus., Econ., Fin.* | |
| Not at All | 43.4 |
| A Little | 22.9 |
| A Lot | 30.0 |
| DK/Ref | 3.7 |
| *Extensive Financial Calculations Picking A or B* | |
| Not at All Extensive | 57.6 |
| Moderately Extensive | 22.1 |
| Very Extensive | 11.0 |
| DK/Ref | 9.3 |
| *Good at Calculations* | |
| Not at All Good | 6.3 |
| Moderately Good | 31.8 |
| Very Good | 59.9 |
| DK/Ref | 2.0 |
| *Good at Everyday Finance* | |
| Not at All Good | 5.0 |
| Moderately Good | 11.3 |
| Very Good | 80.3 |
| DK/Ref | 3.4 |
| *Financial Skill Relative to Others* | |
| Worse than Others | 4.2 |
| About the Same as Others | 56.0 |
| Better than Others | 30.2 |
| DK/Ref | 9.6 |
| *Response to Simple Interest Compounding Question* | |
| Completely Wrong | 18.4 |
| Almost Correct | 23.8 |
| Correct | 32.0 |
| DK/Ref | 25.8 |
| *Response to Simple Inflation Question* | |
| Completely Wrong | 4.3 |
| Almost Correct | 7.6 |
| Correct | 74.9 |
| DK/Ref | 13.2 |
| *Response to "Doubling" Compounding Question* | |
| Wrong | 24.2 |
| Guessed 5-10 Years to Double at 10% | 44.7 |
| DK/Ref | 31.1 |

# Table 3: Summary Statistics for Key Variables (Continued)

| Panel D: Family Structure and Other Demographics | |
|---|---|
| *Married at Time of Option Choice?* | 71.1 |
| *Spouse Picked A?* | 18.9 |
| *Spouse Picked B?* | 8.0 |
| *Any Children?* | 90.6 |
| *How Important that Money Would go to Heirs* | |
| Not at All Important | 19.6 |
| Moderately Important | 10.9 |
| Very Important | 60.3 |
| DK/Ref | 9.2 |
| *Age at Time of Choice (in years)* | |
| 10th | 60 |
| 25th | 63 |
| Median | 68 |
| 75th | 71 |
| 90th | 75 |
| Mean | 67.4 |
| *Important to Receive Most Money While Alive* | |
| Not at All Important | 22.2 |
| Moderately Important | 20.5 |
| Very Important | 49.8 |
| DK/Ref | 7.5 |
| | |
| *Croat Nationality?* | 87.6 |
| *Formerly Employed by State or Local* | 32.4 |
| *Female?* | 58.0 |

| Panel E: Health and Longevity | |
|---|---|
| *Health Relative to Peers (Other Retirees)* | |
| Very Poor or Poor | 22.4 |
| Average | 45.0 |
| Good or Excellent | 31.5 |
| DK/Ref | 1.2 |
| *Likelihood Alive 7+ Years Beyond Choice Time* | |
| Not at All Likely | 21.8 |
| Moderately Likely | 28.5 |
| Very Likely | 33.9 |
| DK/Ref | 15.8 |

| Panel F: Macroeconomic Risk | |
|---|---|
| *Inflation Belief over Several Years at Choice Time* | |
| Annual Inflation in 0-8% Range | 43.6 |
| Annual Inflation in 9-16% Range | 11.6 |
| Annual Inflation more than 16% | 2.1 |
| DK/Ref | 42.7 |
| *Exchange Rate Belief over Several Years at Choice Time* | |
| Kuna Will Remain the Same or Appreciate Against Euro | 51.3 |
| Kuna Will Depreciate Against Euro | 21.7 |
| DK/Ref | 27.0 |

| Panel G: Political Risk and Being Made Whole | |
|---|---|
| *Choice Time Confidence All B Payments Will be Made* | |
| Not at All Confident | 36.9 |
| Moderately Confident | 29.1 |
| Very Confident | 32.0 |
| DK/Ref | 2.1 |
| *Concern Government Might Not Honor Its Commitment* | |
| Not at All Important | 26.1 |
| Moderately Important | 22.1 |
| Very Important | 44.4 |
| DK/Ref | 7.4 |
| *Desire to Receive Full Amount Due No Matter How Long it Takes* | |
| Not at All Important | 17.0 |
| Moderately Important | 13.6 |
| Very Important | 60.8 |
| DK/Ref | 8.6 |

**Table 4: Linear regression of decision to select Option B (more deferred payment) for pension repayment**

The dependent variable is an indicator variable for whether the respondent selected pension repayment Option B (the more deferred payment option). This variable is expressed as 0 if the respondent picked Option A (more immediate payment) and 100 if the respondent picked Option B, thus the coefficients represent percentage point changes in the likelihood of picking Option B. The linear regression is estimated by OLS, with robust standard errors. The regression is estimated on 2,490 observations and the adjusted R-squared of the regression is 0.31. ***, **, * denote statistical significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

| Panel A: Rate of Time Preference and Risk Aversion | | |
|---|---|---|
| | Coef. | SE |
| *Not Willing to Deposit for 1 Year (no CD1)* | 1.3 | 2.3 |
| *Deposit Rate for 1 Year (0 if not willing, %)* | -0.1 | 0.2 |
| *Risk Level Regarding Income Gamble* | | |
| Take Gamble 2x Income for 10% Loss | -0.9 | 2.7 |
| Take Gamble 2x Income for 30% Loss | -1.8 | 2.2 |
| Take Gamble 2x Income for 50% Loss | 0.5 | 2.9 |
| DK/Ref | 0.2 | 2.6 |
| *Self Perception of Inclination to Take Risk* | | |
| Moderately Willing | 0.5 | 1.9 |
| Very Willing | -1.2 | 2.6 |
| DK/Ref | 4.8 | 5.9 |

| Panel B: Income, Wealth, and Liquidity Constraints | | |
|---|---|---|
| | Coef. | SE |
| *Living Standard Relative to Average Retiree* | | |
| About the Same | 0.6 | 2.1 |
| Higher | 1.2 | 3.0 |
| DK/Ref | 3.1 | 4.7 |
| *Income (Croatian Kuna/month)* | | |
| Medium Income (2,000 to 4,000) | 6.6** | 2.8 |
| Higher Income (4,000 or more) | 6.7** | 3.3 |
| *Lives With Children?* | 1.7 | 1.7 |
| *Family Helped?* | 1.9 | 1.8 |
| *Owns...* | | |
| House? | -1.3 | 2.3 |
| Savings in Croatian Kuna? | 0.4 | 1.9 |
| Savings in Foreign Currency? | 2.9 | 2.0 |
| Vacation Home? | 2.6 | 2.1 |
| Rental Real Estate? | 1.9 | 3.3 |
| Other Real Estate? | 1.1 | 1.8 |
| Stocks? | 5.0** | 2.4 |
| Mutual Funds? | 0.8 | 4.9 |
| Bonds? | 3.2 | 12.3 |
| *Did Not Report Pension Repayment* | 21.2* | 12.6 |
| *ln(Pension Payment Amount, if Reported)* | 2.6** | 1.2 |
| *Immediate Need to Pay for Something* | | |
| Moderately Likely | -8.2*** | 2.6 |
| Very Likely | -18.7*** | 2.2 |
| DK/Ref | -0.8 | 5.2 |

| Panel C: Education, Financial Literacy, and Self-Assessments | | |
|---|---|---|
| | Coef. | SE |
| *Education* | | |
| More than High School | 3.3* | 1.9 |
| *School Exposure to Acc., Bank., Bus., Econ., Fin.* | | |
| A Little | 0.8 | 2.1 |
| A Lot | 3.3 | 2.5 |
| DK/Ref | -5.6 | 5.2 |
| *Job Exposure to Acc., Bank., Bus., Econ., Fin.* | | |
| A Little | -3.3 | 2.2 |
| A Lot | -3.7 | 2.3 |
| DK/Ref | 3.0 | 4.2 |
| *Extensive Financial Calculations in Picking A or B* | | |
| Moderately Extensive | -0.4 | 2.0 |
| Very Extensive | 1.7 | 2.6 |
| DK/Ref | -5.3* | 2.8 |
| *Good at Calculations* | | |
| Moderately Good | -0.1 | 3.4 |
| Very Good | 0.5 | 3.3 |
| DK/Ref | 8.9 | 7.5 |
| *Good at Everyday Finance* | | |
| Moderately Good | -2.7 | 4.4 |
| Very Good | -5.8 | 3.9 |
| DK/Ref | -10.6* | 5.9 |
| *Financial Skill Relative to Others* | | |
| About the Same as Others | -4.4 | 4.1 |
| Better than Others | -3.4 | 4.3 |
| DK/Ref | -1.7 | 4.7 |
| *Response to Simple Interest Compounding* | | |
| Almost Correct | 1.9 | 2.5 |
| Correct | -0.6 | 2.3 |
| DK/Ref | 1.4 | 2.6 |
| *Response to Simple Inflation Question* | | |
| Almost Correct | 5.9 | 4.8 |
| Correct | 6.0 | 3.9 |
| DK/Ref | 4.3 | 4.5 |
| *Response to "Doubling" Compounding Question* | | |
| Guessed 5-10 Years to Double at | 0.2 | 2.0 |
| DK/Ref | 2.5 | 2.3 |

**Table 4: Linear regression of decision to select Option B (more deferred payment) for pension repayment, continued**

| Panel D: Family Structure and Other Demographics | Coef. | SE |
|---|---|---|
| Married at Time of Option Choice? | 3.3 | 2.2 |
| Spouse Picked A? | -17.4*** | 2.0 |
| Spouse Picked B? | 34.1*** | 3.3 |
| Any Children? | 8.7*** | 2.5 |
| How Important that Money Would go to Heirs | | |
| Moderately Important | 3.8 | 2.9 |
| Very Important | 8.4*** | 2.2 |
| DK/Ref | 0.5 | 3.0 |
| Age at Time of Choice (in years) | -1.0*** | 0.1 |
| Important to Receive Most Money While Alive | | |
| Moderately Important | -6.5** | 2.6 |
| Very Important | -5.0** | 2.2 |
| DK/Ref | -7.3** | 3.7 |
| Croat Nationality? | -2.4 | 2.4 |
| Formerly Employed by State or Local Gov't? | 0.0 | 1.7 |
| Female? | -2.5 | 1.9 |

| Panel E: Health and Longevity | Coef. | SE |
|---|---|---|
| Health Relative to Peers (Other Retirees) | | |
| Average | 2.0 | 2.0 |
| Good or Excellent | 5.4** | 2.3 |
| DK/Ref | 5.2 | 7.4 |
| Likelihood Alive 7+ Years Beyond Choice Time | | |
| Moderately Likely | 8.1*** | 2.2 |
| Very Likely | 9.2*** | 2.3 |
| DK/Ref | 5.5** | 2.6 |

| Panel F: Macroeconomic Risks | Coef. | SE |
|---|---|---|
| Inflation Belief over Several Years at Choice Time | | |
| Annual Inflation in 9-16% Range | -2.6 | 2.6 |
| Annual Inflation more than 16% | -10.7* | 6.1 |
| DK/Ref | -2.4 | 2.0 |
| Exchange Rate Belief over Several Years at Choice Time | | |
| Kuna Will Depreciate Against Euro | -4.6** | 2.0 |
| DK/Ref | 1.0 | 2.1 |

| Panel G: Political Risk and Being Made Whole | Coef. | SE |
|---|---|---|
| Choice Time Confidence All B Payments Will be Made | | |
| Moderately Confident | 7.6*** | 1.9 |
| Very Confident | 14.2*** | 2.0 |
| DK/Ref | -3.8 | 5.1 |
| Concern Government Might Not Honor Its Commitment | | |
| Moderately Important | -2.1 | 2.4 |
| Very Important | -7.4*** | 2.0 |
| DK/Ref | 3.6 | 3.9 |
| Desire to Receive Full Amount Due No Matter How Long it Takes | | |
| Moderately Important | 11.6*** | 2.7 |
| Very Important | 26.9*** | 2.1 |
| DK/Ref | 8.6*** | 3.2 |

**Table 5: IV Regression of Pension Repayment Choice, Instrumenting for the Importance of "Receiving the Full Amount Due No Matter How Long it Takes" with whether was Born in Continental Croatia**

This table presents the two-stage least squares regression of the pension repayment choice, where the importance of "receiving the full amount due no matter how long it takes" is instrumented with the birth region of the respondent (the first-stage regression). Precisely, in Panel A, whether "receiving the full amount due no matter how long it takes" is very important or not very important is related to whether the respondent was born in continental Croatia (that is, born in the capital Zagreb or surrounding counties – the region identified as continental Croatia. See Figure 8 for further details on the definition of continental Croatia. The first-stage regression in column (1) includes no other controls and the regression in column (2) includes all of the other explanatory variables that will be included as determinants of the pension repayment choice. In Panel B, the dependent variable of the second-stage (IV) regression is an indicator variable for whether the respondent selected pension repayment Option B (the more deferred payment option). This variable is expressed as 0 if the respondent picked Option A (more immediate payment) and 100 if the respondent picked Option B. In column (3), the importance of receiving the full amount due is not instrument for with being born in continental Croatia, while in column (4) it is. The linear regressions are all estimated by OLS or 2SLS, with robust standard errors. The regressions are all estimated on 2,490 observations. $^{***}$, $^{**}$, $^{*}$ denote statistical significance at the 1-percent, 5-percent, and 10-percent levels, respectively.

| Panel A: First-Stage Regression | | | Panel B: Second-Stage Regression | | |
|---|---|---|---|---|---|
| | Dependent Variable: | | | Dependent Variable: | |
| | *Receiving the Full Amount Due No Matter How Long it Takes is Very Important (0/100)* | | | *Select Pension Repayment Option B, the deferred payment (0/100)* | |
| | (1) | (2) | | (3) | (4) |
| Born in Continental Croatia | −6.6$^{***}$ | −7.4$^{***}$ | Being Made Whole Very Important | 20.8$^{***}$ | 57.0$^{*}$ |
| | (2.0) | (2.7) | | (1.7) | (33.0) |
| Other Controls? | No | Yes | Other Controls? | Yes | Yes |
| F-test of Instrument | 11.3$^{***}$ | 7.7$^{***}$ | Instrumental Variables? | No | Yes |
| No. of Observations | 2,490 | 2,490 | No. of Observations | 2,490 | 2,490 |
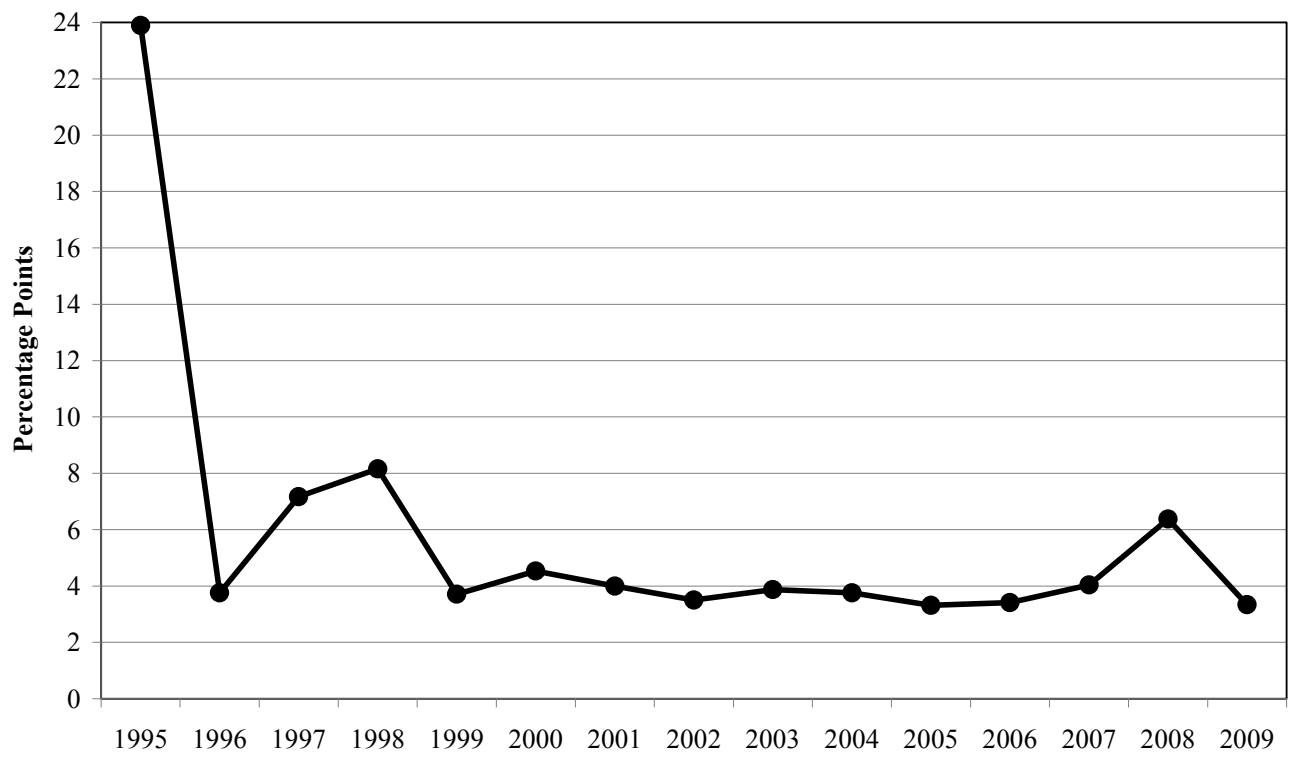
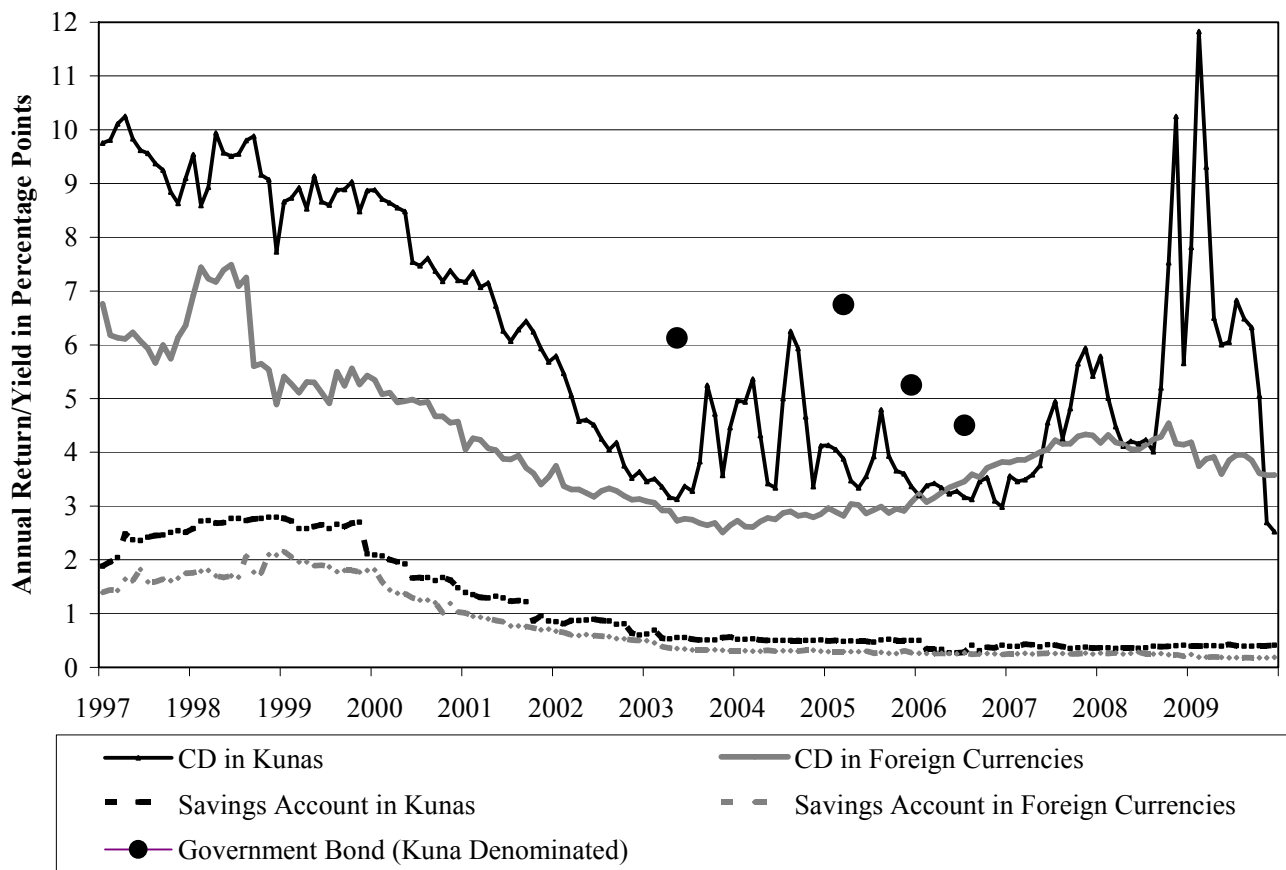**Figure 1: Croatia Annual Inflation Rate, 1995-2009.**

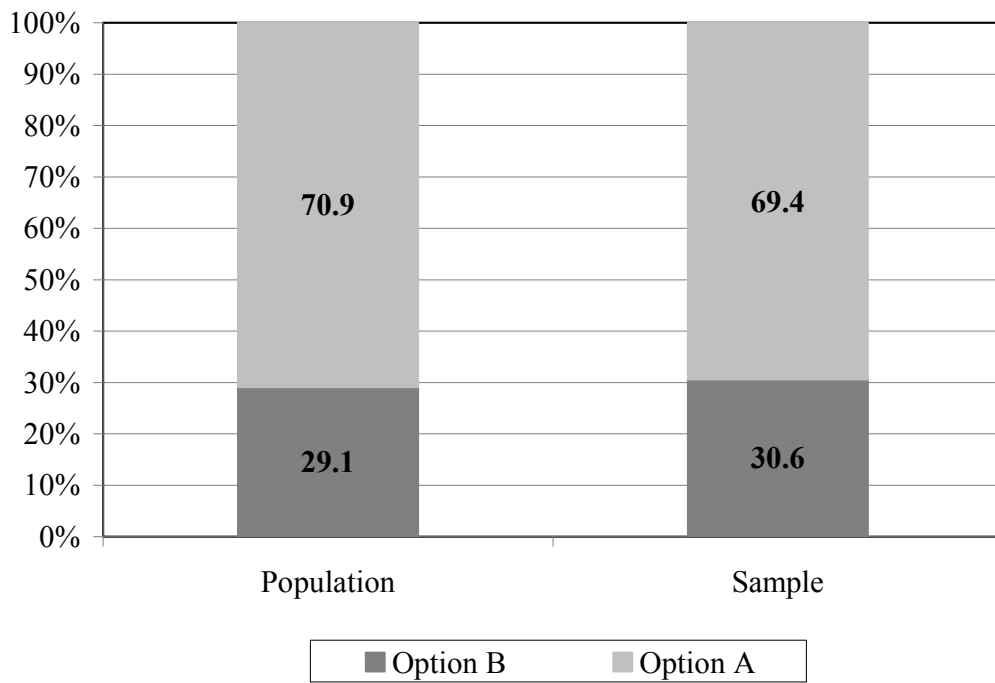**Figure 2: Various Rates of Savings and Investments Returns in Croatia, 1997-2009.**

**Figure 3: Percent Choosing Option A (More Immediate) and Option B (More Deferred) in the Population and the Sample.**
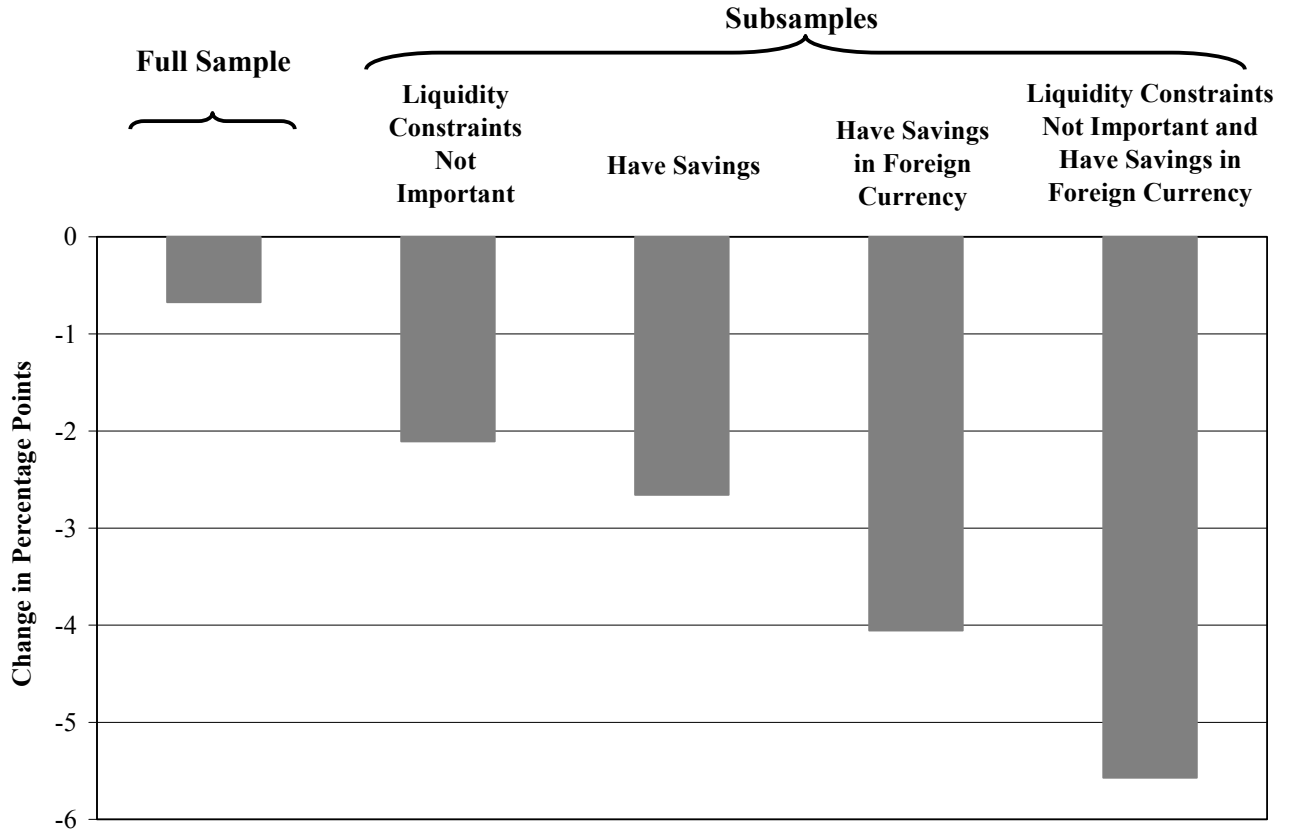
**Figure 4: Change in Likelihood of Selecting Option B (More Deferred Payment) Associated with a 5% Increase in the Individual's Stated Rate of Time Preference, by Subgroups.**
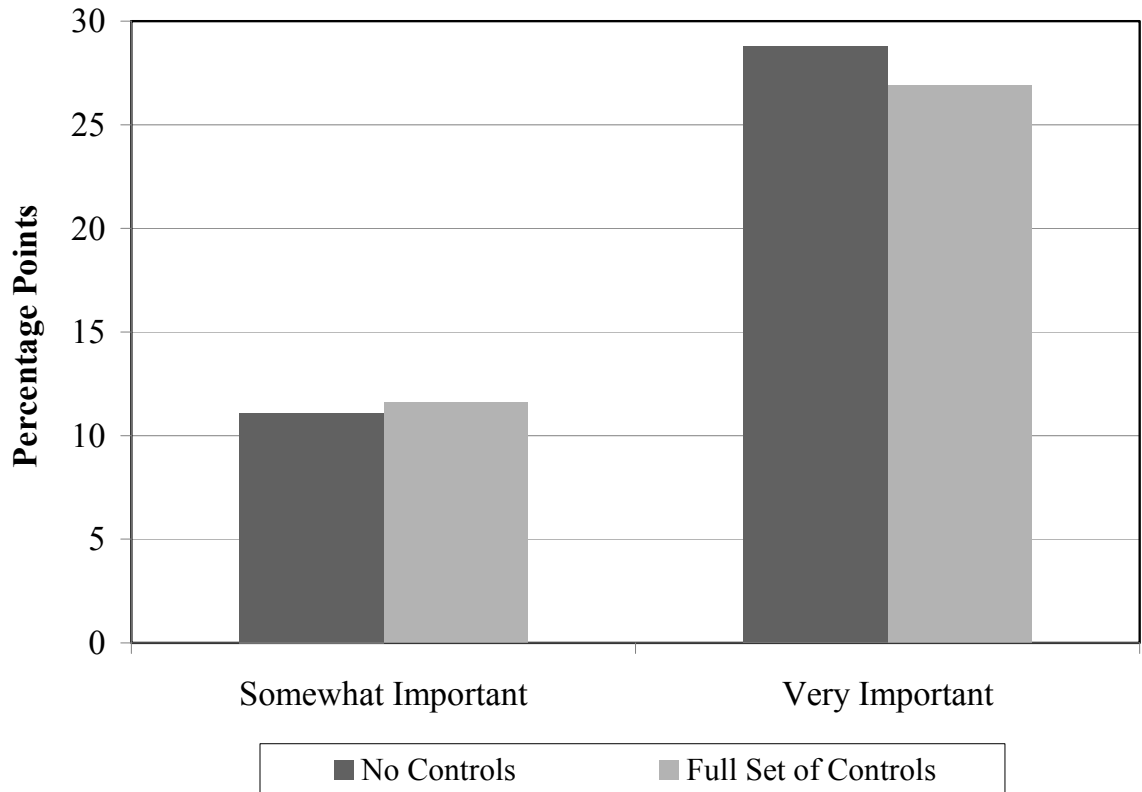
**Figure 5: Likelihood of Selecting Option B (More Deferred Payment) for Individuals for Whom "Being Made Whole No Matter How Long It Takes" is Somewhat Important or Very Important (Relative to Those for Whom it is Not Important).**
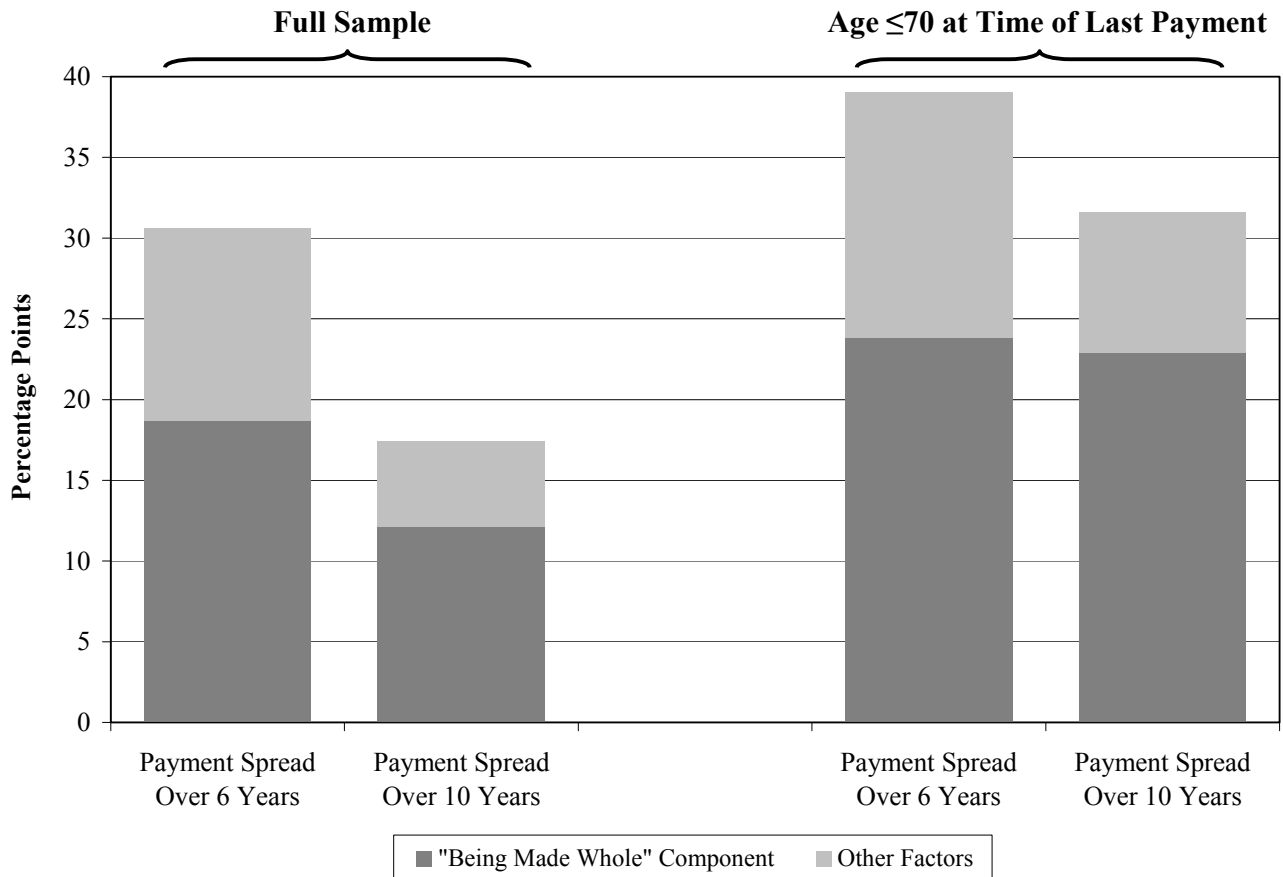
**Figure 6: Actual Likelihood of Selecting Option B (More Deferred Payment) and Hypothetical Choice if Payments Spread Out Over 10 Years (Rather Than 6 Years).**

**Figure 7: Map of Croatia with Central Croatia and Zagreb highlighted.**