

The Political Origin of Pension Funding

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Abstract

Pension funding, the extent of reliance of retirement income on private capitalized funding versus a state guarantee, varies enormously across countries. This paper argues that political preferences played a major role at the time of the historical decision on pension funding. These choice also became self-reinforcing, since the population will not support investor protection when its retirement income does not rely on financial claims on the private sector.

A political economy approach predicts that when the middle class has a high degree of financial participation, a political majority will support investor protection and limited fiscal redistribution. In contrast, in democracies with high wealth concentration, pivotal voters will prefer labor protection over minority investor protection, and favor a state-funded retirement system.

We present empirical evidence that variation in pension funding in democratic countries is well explained by wealth distribution shocks in the first half of the XX century, which occurred before the establishment of national pension systems. The effect is both economically and statistically very significant: a large shock reduces the stock of private retirement assets by 58% of GDP. The results stand after controlling for complementary explanations, such as legal origin, past and current demographic controls, measures of stock market performance, or other major financial shocks that were not specifically redistributive.

Date: 14 November 2006

1. Introduction

Few issues are as controversial at present as the issue of pension funding. Increased longevity and declining birth rate have affected the ability of pension systems to cover pension liabilities. The debate on pension reform is particularly intense in countries which historically chose to establish a pay-as-you-go system, where it is an open question how the financial consequences of the large projected shortfalls should be distributed across social groups. It appears therefore important to understand the determinants of the original choice on pension funding structure.

Most retirement systems were adopted after the Second World War. Why did some countries choose to rely to a greater extent to a state guarantee, backed by taxation, while others chose funding on capital markets?¹ When was the government entrusted with retirement income, and when were capital markets preferred? While most systems share both features (even the US has a significant Social Security component), countries vary vastly in their relative reliance on funded private assets versus unfunded state guarantee. The variation in capitalized pension assets across OECD countries exceeds by far the size variation in their capital markets. Some large differences across similar countries are particularly surprising. Why does Finland have so little pension assets in comparison to Denmark or Sweden? Why does Belgium have so little pre-funding in comparison to the Netherlands, or Switzerland so much in comparison to Austria?

This paper argues that historical pension funding choices in democratic countries reflected national political preferences on social insurance at the time. It also argues that historical choice have a self-reinforcing effect, since if the population holds no financial claims on the private sector, it will have little incentive to support investor protection.² But what determined the original funding choice? There are several candidate explanations. The degree of domestic capital market development is a natural explanation (although the direction of causality is ambiguous). This possibility may be tested by

¹ Of course, unfunded pension systems (PAYG) have some notional funding, as state pension institutions receive specifically issued public debt. Clearly, these assets exist only on paper, as they are backed by fiscal revenues just as any government liability.

² Pagano and Volpin (2006) model this self reinforcing process, and show evidence of a virtuous cycle in equity issuance in recent years, confirmed by an increasing acceptance of foreign takeovers.

examining whether independent determinants of financial development, such as legal origin (La Porta et al., 1997, 1998), contribute to explain pension funding choices. Other possible explanations concerns the national experience with demographics or financial returns.

This paper considers possible political causes to pension funding in democracies. A classic political economy approach identifies income inequality as determining the dominant preference for redistribution. Simply stated, a political majority in a democratic society with more income inequality would prefer more fiscal redistribution, and therefore support a state system funded with progressive taxation. An alternative political explanation comes from the recent literature on capital market orientation. Specifically, when the middle class has a high degree of financial participation, it is likely to support better investor protection, which ensures better financial returns. In contrast, in a country where wealth is concentrated, the middle class relies mostly on labor income. In this case, a political majority will favor high labor rents and weaker investor protection (Pagano and Volpin, 2005; Perotti and von Thadden, 2006). In this case, the preferred pension funding eschews capital market funding in favor of a state guarantee for retirement income. Since investor protection affects financial development (La Porta et al, 1997, 1998), the political economy approach implies that wealth inequality will affect both capital market development and pension funding.

Testing this political explanation directly requires historical measures of wealth distribution, for which hardly any reliable historical data is available. In this paper we adopt as a proxy a measure suggested in Perotti and von Thadden (2006), who use it to explain a major shift in financial development in some continental European countries, identified by Rajan and Zingales as the Great Reversal (2003). Their work suggests that the sharp inflationary shocks which hit some countries in the interwar period had a major redistributive effect, severely impoverishing the middle class. In these countries, the huge financial losses for this pivotal class led to a shift of political support away from capital markets and in favor of corporatist policies favoring stability over profitability, in order to control risk exposure for their uninsurable labor income (Pagano and Volpin, 2005; Perotti and von Thadden, 2006). Specifically, legislative and regulatory choices weakened control rights for minority equity investors in favor of a greater governance

role for banks, the state and even large, undiversified shareholders, reducing the attractiveness of security investments. At a later date, these preferences, and the associated choices, affected the subsequent decisions on the structure of pension funding, which in all countries were taken after the inflationary shocks.

We estimate the effect of this political shock in explaining the structure of pension funding in a sample of democracies, along with complementary and competing explanations. We control for causes related to demographics, legal origin or other independent determinants of financial development, and the national experience with average inflation and financial returns.

Countries with historically more developed financial markets may have naturally chosen to adopt market funding. While pension funding appears highly correlated with current financial development, the direction of causation is ambiguous. Accordingly, we test the explanatory power of independent determinants of financial development, such as legal origin (La Porta et al., 1997), as well as previous measures of market development. It appears that pension funding is not related to historical financial development or its independent determinants, such as legal origin.

We also examine whether the effect of the inflationary shock on pension funding may derive from a psychological response arising from the experience of large financial losses on capital markets. Other large shocks without a comparable redistributive effect for pivotal voters, such as the impact of the 1920 stock market crash, do not have a significant effect on pension funding. The sole financial variable which is significant is average stock returns, which have a natural direct impact on invested pension assets.

Finally, we control for demographics, using the proportion of older people in total population predominant around the time when the major decisions on pension structure was made. This variables turn out not to be significant.

The paper is structured as follows. The next section sketches the model and outlines our hypotheses. Section 3 discusses the historical development of pension systems in the major democratic countries around the world and presents various hypotheses. Section 4 contains the empirical tests. We conclude in Section 5.

2. Political choice over capital market orientation

To present our argument, this section sketches a simple version of the model drawn from Perotti and von Thadden (2006), which endogenizes political support for minority investor protection. Suppose a democratic majority chooses whether firm decisions will reflect the preferences of minority shareholders, or be left to large investors or banks. Voters have human capital in equal measure, and different endowments in financial capital, measured by the fraction θ_i of total financial wealth they hold. Agents are risk averse with mean-variance preferences, and work for ex ante identical firms which earn iid random profits π . Each firm has shares and bank loans. Would a majority of investors prefer to grant corporate power to banks or dispersed equity holders?³

We posit the standard assumption that risks associated with labor income cannot be hedged. Accordingly, promised labor rents W will be rationally set to be senior to all financial claims, so that labor income w equals $\text{Max} [W, \pi]$. For simplicity, financial risk may be fully diversified, so that it is optimal for all agents to hold the same fully diversified portfolio F in firm securities (both shares and bank loans). Thus each agent has expected income equal to expected labor income, $E(w) = E \text{Max} [W, \pi]$, plus his or her share of financial wealth, $\theta_i F$. Each voter makes political choices so as to maximize

$$\text{Max } E(w) - \frac{1}{2} A \text{Var} (w) = \text{Max} \{ E \text{Max} [W, \pi] + \theta_i E(F) - \frac{1}{2} \text{Var} (W) \}$$

where A is the coefficient of absolute risk aversion and $E(F) = \sum \min (\pi_i - W, 0)$ for all firms, and $\text{Var} (W) = \text{prob} (W < \pi) \text{Var} (\pi | W < \pi)$.

Suppose now that firms may choose to adopt either a very profitable but risky strategy R with return π_H or a safer but less profitable strategy S with return π_L . The financial risk of either strategy can be fully diversified, but the first strategy creates more labor income risk. It is easy to see that the risky strategy will always be chosen when equity holders are in control, while the safer one will be chosen when banks are in control, provided the promised wage W is not too high.

³ Assigning control to concentrated owners by allowing high control benefits as long as the firm remains solvent also induces a safe investment choice.

The basic result of this model is that in a democratic society with diffused holdings of financial wealth a political majority will prefer to grant strong minority equity protection and thus control to equity control, while in a society with concentrated wealth, bank control or weak investor protection (which leads to concentrated equity control) will be preferred. Formally, support for minority investor protection will occur only when the financial stake held by the median voter θ_M exceeds a threshold such that⁴

$$\theta_M E(\pi_R - \pi_L - W) < E \text{Max} [W, \pi_L] - E \text{Max} [W, \pi_R] + \frac{1}{2} A \{ \text{Var} (W|\pi_R) - \text{Var} (W|\pi_L) \}$$

In other words, the model predicts lack of political support for investor protection, and thus capital market development, when the capital gain accruing to the median voter from the riskier strategy does not compensate enough for the utility loss caused by the higher associated risk for his labor income.⁵ Pagano and Volpin (2005) also predict a similar alliance between inside capital and inside labor, which they also relate to the form of government, and offer evidence about a negative correlation between labor and investor protection.

3. A most brief history of pension funding

In the five decades prior to WW1, the so-called “Victorian” period, the western world was largely at peace. Industrial productivity rose rapidly, albeit with wide swings, but prices were stable or gently declining. Long-term contracts for house and land rentals were common; long term fixed rate debentures normal. In the UK, government debt included a fair share of perpetual bonds with a fixed nominal rate. While there were sharp stock market crises, their financial impact were circumscribed to relatively few wealthy individuals. Although occasional bank failures occurred, price stability ensured financial stability for individuals who could afford to invest in nominal assets for their old age.

⁴ This threshold always exists under reasonable conditions on the distributions of π_R and π_L ; in particular, π_R should not stochastically dominate π_L (Perotti and von Thadden, 2006).

⁵ Perotti and von Thadden (2006) also allows labor rents to be a political choice. Since in more unequal societies there is support for higher labor rents and thus more labor income risk, this reinforces a preference for less risk.

The earliest example of a pension system arose in Germany under Bismarck, who legislated a mandatory scheme for some categories of workers. The program relied on worker and firm contributions, enjoyed some fiscal benefits, and could not be drawn before late age. While these features made it an embryonic pension program, the pension claims were extremely modest, and could be drawn only upon reaching 70 years of age, at a time where most workers die before 60 years. Interestingly, the contributions were invested in financial securities, just as other national programs which imitated the German example in subsequent years. Across all early programs, pensions remain modest till the second world war.

The destruction of World War in 1914, after fifty years of peace in Europe, caught everyone by surprise. After the war, all participating countries faced large public debts and high costs of reconstruction. Countries which had suffered fighting on their territory, suffered large losses of territory, or faced massive reparations, faced vast and urgent spending needs, which could not easily be fiscalized given the state of economic disarray. Urgent expenditures as war veterans came back to a devastated economy amid fears of a socialist uprising forced these governments into rapid money printing, leading to a sharp acceleration in inflation. Austria and Germany experienced devastating hyperinflations. Also countries who won the war, in particular Italy, Belgium and France, were hard hit.

In contrast, the UK managed to finance its war expenditures by running down its large stock of private foreign assets against newly issued public debt. Its non European allies, such as the US or Australia, were outside the area of war destruction and could redistribute over time the war cost via issuance of public debt. Within Continental Europe, the Netherlands, Scandinavia and Switzerland who had managed to stay neutral were also spared. Some countries which were not drawn in WW1 suffered sharp inflationary shocks as a result of civil wars (in our sample, Finland, Greece, Spain and South Korea). Table 1 offers an overview of the variation in inflation across countries.

The Continental European countries hit by sudden inflation saw a sharp devaluation of long-term nominal savings, widely diffused at the time. Financial losses hit hard the middle and lower middle class, which had few real assets as hedges. Pensioners and small rentiers were largely wiped out; owners of modest holdings of land or rented housing suffered from the massive devaluation of rent income associated with

pre-war long-term leases. Reduced income, war damages and losses on nominal assets forced the middle class to liquidate other financial or real holdings such as stock or land, forcing it to stop participating in financial markets. By most contemporaneous accounts, wealth concentration became much more concentrated (Eulenburg, 1924).

The poor, of course, also suffered great hardship from the economic devastation. Yet this shock presumably did not alter their political preferences for redistribution, just as it did not for the richer classes.⁶ The inflationary shocks in the interwar period had a seismic political effect on the political system also because it hit hard social class which became politically pivotal after 1918, when most democratic countries moved to universal suffrage. In countries where the middle class had been impoverished, a political majority shifted support to less market-friendly policies, and in extreme case (as in Italy or Germany) less democratic institutions. These led to a greater role for corporatist policies, bank dominance over capital markets, and a major role for state intervention.

The world economy recovered in the 1920s, including Germany after 1924, and stock markets boomed, clearly favoring those who retained shares after WW1. The stock market crash of 1929 hit hard mostly these moneyed classes, so it did not dramatically alter voting behavior, but the flawed policy response⁷ led to a major depression. The population in all countries became keen to protect their uninsurable labor income, leading to increase in social programs everywhere. In the countries affected by earlier redistributive shocks where the pivotal voters had no stake left in financial market, it led to shifts in political support from investor protection to bank, family and state governance over firms associated with less risky corporatist policies (Perotti and Thadden, 2006).

In countries which escaped surprise inflation (the Anglo-Saxon allies, most of Scandinavia as well as Switzerland and the Netherlands), the middle class kept its savings, and remained supportive of policies supporting capital development. In fact, minority investor protection improved in these countries, as shown by the establishment of the SEC and legislation against concentration of financial power in the 1930s in the US, and a revised company law in the UK. In these countries, when the time for

⁶ Piketty et al (2006) show that many very rich renters in France were financially devastated by the post WW1 inflation.

fundamental decisions on the structure of the pension system came, the choice was to give an important role to market funding.⁸ In contrast, in countries affected by large wealth losses, the political choice was to neglect minority investor rights, and enhance the role of banks and the state vis-à-vis equity market investors. Corporatist policies, with higher labor protection, weaker competition, and nationalistic policies, found support among both inside labor and inside capital. Anecdotal evidence even suggests that ownership concentration increased in some countries, such as Italy (Aganin and Volpin, 2003) and Sweden (Hogfeldt, 2006).⁹

The largest inflationary shock came in almost all countries in our sample before WW2, with the exceptions of Japan, Mexico and South Korea.¹⁰ While social reforms in the 1930s included some broad pension reform, in most countries the establishment of the major social security program (defined as a comprehensive retirement program covering most production workers) came after WW2. Table 1 provides an overview of the estimated timing of major pension initiatives across countries, indicating the years of the first program (usually covering only specific groups) and the year of the first comprehensive program to offer broad coverage to private sector workers on a mandatory ,extended in different phases, but strongly suggest that major structural decisions on pension structure took place after the major financial crises of the interwar period. Accordingly, such shocks may have affected political preferences on investor protection and thus over state versus market funding at the time of these important decisions on pension systems.

⁷ These included too tight monetary and fiscal policy, and support policies for domestic production, which led to a rapid downward spiral in world trade. Similarly, tight money led to further demand deflation and lower prices, burdening industry with a much-increased real debt burden.

⁸ There have even been reversals in early pension systems after high inflation. In Germany, Bismarck introduced in 1889 the first pension system in the world (Meyer, 2004) *as a fully funded system in which contributions were done by employees, employers and state*. However, Germany switched to a PAYG scheme when it designed its pension system in 1949. Similar experiences were made in France and Finland.

⁹ Mark Roe (2006) argues that ownership concentration increased because capitalists sought to resist increased labor activism and state interference. Yet the increase, to the extent that it can be documented, does not appear more marked in more left oriented systems, with the possible exception of Sweden.

¹⁰ Japan suffered hyperinflation just after WW2. In subsequent years it experienced a major reorientation of its financial system with increasing concentration of control and bank dominance, coupled with better labor protection.

Alternative causes of pension structure

A first alternative explanation for the degree of pension funding is the realized rate of return on security investments. Clearly, poor financial returns will directly reduce capitalized funding. We will thus control for the average real rate of return on domestic stocks, which has a large cross-country variation. This variable will turn out to be a significant determinant of pension funding.

A separate argument is that national experiences with financial shocks may have discredited investment in private securities, and the state became to be seen as a safer and more benevolent source of retirement income than markets. In particular, the national experiences with the 1929 stock market crash may have shaped attitudes toward stocks. As we will show, the stock market drops was fairly comparable across the democratic countries in the sample, and so cannot explain their variation in retirement finance.

Another interpretation for the choice of state funding for retirement is that financial shocks, including sudden inflation, may have caused huge losses to pension funds or retirees, so that only a state-funded pension system could immediately grant retirement income to these people. Natural examples are the establishment of war pensions for veterans and war widows. Yet even if a state guarantee were needed to cover an immediate need, there would have been no reason to extend it to cover future claims, for which market funding could be built up by contributions from employees and workers.¹¹ In any case, this argument reflects a modern reality of onerous pension claims. Pensions were not at all generous in the early programs, population growth was high and life expectancy much lower than today. Re-establishing proper funding would not have been such a challenge at the time.

To what extent does capital market development matter for the funding choice? There is significant correlation between pension funding and market capitalization. But which way does causation run? Countries where pensions have been funded via security investments may have larger capital markets because pension funds may increase total

¹¹ A good example of such a dual policy comes from the case of Eastern European countries, many of which had high inflation during the transition stage. Most governments in the region chose to couple state guarantee for older cohorts with pre-funding for younger workers. In these countries, a dominant the role of the state has clearly been discredited by many decades of communist regimes.

savings, e.g. if they induce forced savings or if they have a coordinating role, e.g. by avoiding panics among dispersed investors or provide diversification that investors could not achieve on their own. To understand whether pension funding and capital market development are codetermined or whether market development or pension funding are the original cause, we need to use some independent determinant of financial development. Evidence shows that common law countries have on average better investor protection and more developed financial markets than civil law countries (La Porta et al, 1997, 1998). Legal origin is clearly a predetermined variable relative to pension system choices, so it may be used to proxy for exogenous variation in financial development. The evidence shows that legal origin is actually much less correlated with current pension funding than inflationary shocks, as Table 2 (Panel B) indicates. Private pension funding is actually not lower in civil law countries.

Finally, a simpler political economy explanation for pension funding would be that societies with more unequal income distribution will favor a fiscally backed pension system. Preferences for fiscal redistribution are a first order effect of any political choice model.¹² Of course, the effect of income inequality does not exclude other economic factors affecting political preferences. To the extent that inflationary shocks are uncorrelated with subsequent income inequality (as supposed to distribution of financial wealth), these political explanations may be complementary.

4. Empirical analysis

In this section, we first describe the sources of data and the construction of the variables, and then present the empirical analysis.

Data Sources and Description of Variables

We use OECD data on pension funds and market capitalization (OECD Newsletter, 2005). Information on the relative importance of capitalized pension and life insurance

¹² Even when contributions to a state pension system match expected pension claims, a progressive fiscal system ensures more redistribution and co-insurance relative to a privately funded system.

assets across country has been scarce until the OECD recently started to collect data in a comparable way. In principle, we wish to include all countries with a long democratic tradition, where current pension assets may reflect a historical choice. We excluded all former Communist countries from the list. The variable PENSION represents the percentage of funded pension assets over GDP in 2004, while PENSION+LIFE also includes accumulated life insurance assets.¹³ The OECD data include all types of pension plans: occupational, personal, mandatory and voluntary. Asset reserves from social security systems, which essentially reflect government bonds issued by the state and held by the state itself, are excluded.

Information on price series was collected from different sources, but mainly from the Global Financial Database (from Global Financial Data Corporation) that provides valuable historical time series of consumer price indices and stock price indices for all the countries considered here. For some countries, we completed the time series from other sources (Maddison, 1991, Mitchell, 1992, as well as national banks and governmental statistical agencies).

We constructed several variables for inflationary shocks, reported in Table 2. By inflationary shock, we mean an episode of a sudden jump in price levels. The variable SHOCK is a dummy variable equal to one if the country experienced a period of hyperinflation in the period 1900 to 1970, defined as an annual increase in consumer price index (CPI) of over 400%.¹⁴ HIGH_INFLATION is a dummy variable equal to one if the country's highest annual increase in CPI in the period 1900 to 1970 was at least 30%. Finally, we use the actual highest annual increase in CPI in the given period (denoted MAX_CPI). However, this is undefined for countries that experienced a hyperinflation. For these countries, we set the value to the highest level for the sub-sample of countries that did not have experience hyperinflation (i.e., to 491.6%, for Italy).

¹³ We performed the same analysis on pension assets data of 2002, with very similar results.

¹⁴ As robustness check, we considered a cut-off level of 70% (i.e., taking France as reference). This specification did not lead to materially different results.

We take from La Porta *et al.* (1997) the legal origin dummy variable, defined as one for English legal origin (common law countries) and labeled COMMON_LAW.¹⁵ We further collect from OECD (2004) stock market capitalization in 2002 for all countries, denoted by MARKET_CAP.

We collect additional data to investigate alternative factors that may have affected preferences or beliefs during the period under consideration. First, we explore whether the national experience with the stock market crash of 1929 have led voters to favor unfunded pension systems.¹⁶ The variable CRASH1929 captures the size of the crash in the domestic stock market from the top until through, as provided by Taylor (2002). We also collect data on current demographics, specifically the proportion of older people, to control for the stock of pension liabilities. In addition, countries with a higher proportion of older people at the time of the shock, which measures the size of the population at an age when they could no longer compensate for the shock, as this may have triggered fiscalization of their pensions. The variable POP1950_65+ measures for the proportion of the total population over 65 years old in 1950, using demographic information from the US Census (cf. <<http://www.census.gov/ipc/www/idbsprd.html>>). The historical values are taken for 1950, in some cases for either 1951 or 1960-1961. We also construct a similar variable for 2004, the same year as pension assets data, which we label POP2004_65+.

We have complete information on 16 countries and partial information on 8 more countries. For all 24 countries, we do have information on inflation and pension assets.

Descriptive Statistics

Table 2 shows summary statistics for the different variables. On average, the countries considered here had ratios of funded pension and life insurance assets over GDP of 61.6% in 2004 (34.3% for pension assets only). There is however great dispersion in the

¹⁵ Iceland is not included in the study of La Porta *et al.* (1997), but it has Scandinavian legal origin (Iceland is a former Norwegian crown colony, and was later ruled by Denmark until 1814).

¹⁶ Note that some countries experienced their stock market shock already in 1928 (for some countries, the market top is already earlier). See Taylor (2002) for more details on each country's exact date.

sample, with a minimum of 0% for Greece (the single country with no funded assets in our sample) and a maximum of 153% for Switzerland. The median is 54.1%, somewhat lower than the mean. The US had a fraction of funded pension and life insurance assets over GDP of 115%, higher than the sample average but by no means the highest.

Overall, 25% of the countries in our sample experienced a high inflationary shock or hyperinflation during the period considered (the variable SHOCK). Moreover, Table 2 indicates that 62.5% (i.e., 15 countries) had a period of high inflation (at least 30% increase in CPI in a single year). A quarter of the sample is composed of common law countries.

The stock market crashes of 1929-1930s caused huge share price drops around the world, about 65% on average. The dispersion however is relatively low (the standard deviation is 14.3%). The largest decrease in stock prices was experienced in the US, with 86.2%, but other countries had a stock crash quite similar in magnitude.

There is very little variation among countries in the proportion of older people in the population (POP65+), with an average of 8.7%. While this suggests that the hypothesis can contribute only a modest explanation power, it may make difference at the margin, if senior citizens are politically pivotal.

Figure 1 presents the univariate relationship between PENSION_LIFE and the dummy variable SHOCK graphically. It clearly indicates a negative link between inflationary shocks and accumulated pension assets, and suggests that outliers do not drive these results. This is confirmed by similar graphs using the other inflation variables (not shown here). Figure 2 shows the relationship between legal origin and funded pension assets. There, the link appears less clear, although the figure seems to indicate a slightly positive relationship.

Empirical tests

Table 3 gives our basic results. Subsequent tables provide a number of robustness checks, testing for alternative hypotheses and alternative measures of pension funding. The effect of an inflationary shock on funded assets is very strong, even when controlling for

alternative specifications and definition of inflationary shock. These results support the notion that countries that experienced an inflationary shock subsequently favored an unfunded pension system. The effect is economically significant, since (in the univariate setting; cf. Regression 1 in Panel A) such countries have 58.5% less funded pension and life insurance assets in 2004 than countries that did not have hyperinflation. Moreover, this variable already explains 31% of the variation alone. The variable SHOCK remains significant when estimated together with HIGH_INFLATION (Regression 2), indicating that the difference between high inflation and hyperinflation has much explanatory power. However, significant differences in funded assets are also observed between countries with low inflation and high inflation experience. The results also hold for MAX_CPI (Regression 3).¹⁷

Regression 4 (Table 3, Panel A) shows that common law countries do not have a greater propensity to choose a funded pension system per se. Legal origin also explains very little of the variation compared to our measure of shock in wealth distribution. In Regressions 5 – 6, when we examine both hypotheses jointly, legal origin still has no explanatory power (and the sign is now negative), while the inflationary shock hypothesis remains significant and at the same level of magnitude as in the univariate analysis. Also the improvement of R^2 is marginal.

In our sample, we do not have any legal origin countries for which SHOCK takes the value of one, i.e. experiences a major inflationary acceleration. Ideally, we would have wanted to include an interactive term SHOCK*COMMON_LAW but this is here not possible. Thus, we consider the effect of legal origin in the sub-sample of countries that did not experience an inflationary shock (Regressions 7 – 9, Table 3). Perhaps surprisingly, even in this selected sample, legal origin does not contribute in explaining the choice of pension funding. This raises the question why developed common law countries do not produce high inflation.

¹⁷ Due to very high correlation between SHOCK and MAX_CPI (95%), we are unable to estimate these two variables jointly.

In the last three regressions of Table 3, we include a control variable for non-democracies (Non-Democracy dummy). The dummy variable is meant to control for the fact that some countries were not democratic at the time the major pension reforms were put in place. As such, the political channel may become arguable. This is the case of Mexico, Portugal, South Korea and Spain. For these four countries, the variable is equal to one, and zero for all others. The non-democracy dummy is highly significant and negative (Regression 10). Accumulated pension funding is lower in countries that were not yet democratic at the time their major pension system program was put in place, indicating even lower interest in relying on the stock market. However, the inflationary shock variables remain highly significant and roughly at the same magnitude. It also remains significant in the sub-sample of countries that were democracies (Regressions 11 – 12).

In Table 4, we consider alternative measures of pension funding. In Regressions 1 – 4, we exclude life insurance reserves from the accumulated pension assets (the variable PENSION). Similar results are obtained. Moreover, we considered controlling for the level of unfunded pension liabilities. Unfortunately, no direct data seem available. We therefore estimated it by taking the annual old age benefit expenditures in each country multiplied by a constant discount factor of 20 (this corresponds to an interest rate of 5% under perpetual annuity in today's value terms). These data were obtained from OECD Social Expenditures Database (SOCX). In Regression 5 – 8 (Table 4), we run regressions on similar specifications but using funded pension assets (PENSION_LIFE) as percentage of total pension liabilities (PENSION_LIFE plus estimated unfunded pension liabilities).¹⁸ The effect of inflationary shocks remains strongly significant.

Robustness and Alternative Specifications

Table 5 investigates some alternative hypotheses and controls: the importance of older people in the population (POP1950_65+) in 1950, the impact of the stock markets crash of 1929-early 1930s (CRASH1929), stock market returns (STOCK_RETURNS), stock

¹⁸ Note this assumes that private (funded) pension liabilities are not under-funded so that it is equal to PENSION_LIFE. Moreover, it supposes that public liabilities are not funded at all. This is shown graphically in Figure 3.

market capitalization (current MARKET_CAP and market capitalization in 1913), and average annual inflation over several time periods (1901-1945 and 1920-1945).¹⁹

As mentioned earlier, the stock market crash of 1929 may have had a similar effect on the willingness of individuals to rely on capital markets. In this case, we expect also a negative impact of CRASH1929 on the size of accumulated pension assets. On the other hand, if the proportion of older people in the population is large, we may expect a greater support for an unfunded pension system that enables immediate payments of pension to older people. In this case, we expect a positive effect of POP1950_65+. As for the other variables, we investigate their impact, since these may be additional important control variables. For stock market returns and stock market capitalization, we expect a positive effect on pension funding, as it may make investments in stocks more attractive. For stock market capitalization, we test for current stock market capitalization as well as stock market capitalization in 1913. The latter is to take a value prior to any inflationary shock so that it is fully exogenous to the shock. The final control variable concerns overall inflation. Our empirical prediction states that inflationary shock creates wealth redistribution and shifts in political support away from investor protection, not inflation per se. We calculate average yearly inflation over two different time periods.

When examining empirically, we find no support for these alternative stories on demography (Regressions 1 – 3, Panel A) and crash of 1929 (Regression 4 – 6, Panel A), even in a univariate setting. Some additional controls are however significant but do not affect the significance of the political channel. This is particularly the case for long-run stock market returns (Regressions 7 – 9, Panel A). While stock market capitalization in 1913 is never significant (Regressions 1 – 2, Panel B), the current one is (Regressions 3 – 4, Panel B). As argued previously, we expect it to be simultaneously determined with pension funding, so that this variable is likely to be endogenous. However, the various specifications show that the political channel remains significant to the inclusion of current and past stock market capitalization. In Regressions 5 – 8 of Panel B, we control for average yearly inflation. Results indicate that only shock to inflation matter, but not

¹⁹ For the calculation of average annual inflation in each country, we excluded years of particularly high inflation, in particular of hyper-inflation and possible run-ups. For some countries, we did not have a sufficiently long time period to include them. In this case, we only included them if not more than three years of data was missing.

inflation per se. We therefore conclude that the political channel is robust to the inclusion of a number of additional controls.

Finally, we examine whether inflationary shocks are indeed the exogenous shock and not merely derived from devastating world and civil wars. In fact, high inflation is a fiscal phenomenon (Sargent and Wallace, 1981). In the aftermath of a destructive conflict, demands for public expenditures are extremely high, just at a time when the ability to raise fiscal revenues is at its lowest point. If it is impossible to find alternative funding methods, the military shock forces high inflation. Quite similar to Roe (2006), we measure war devastation by the change in industrial production during war times and examine whether inflationary shocks still have an exogenous component. We also control for civil wars by including a dummy variables if the inflationary shock was related to a civil war. Table 6 confirms that inflationary shocks remain significant.

5. Conclusions

This paper provides evidence that current pension funding reflects historical choices between market pre-funding and state guarantee were driven mainly by political preferences. Such choices presumably persisted because they had a direct reinforcing effect, and because they were consistent with contemporaneous choices on the governance of the financial system. In the first place, the pension funding choices were paralleled, and in some cases anticipated, by political choices about the role of markets versus institutions and large investors in corporate governance, which reinforced the pension structure chosen. Second, an indirect effect was caused by the impact of the initial choices on the diffusion of shareholdings and thus on political support for investor rights.

Following Perotti and von Thadden (2006), we seek for evidence of a causal role for politics in pension funding choices in the history of the Great Reversals after the Second World War, and draw some consequences for pension reform. We then conclude that the two are both codetermined by political choices. A political economy approach can explain clusters of societal choices on financial system structure, corporate governance, and the extent of labor rents (Pagano and Volpin, 2005; Perotti and von

Thadden, forthcoming). Among democracies, there is evidence of positive correlation of labor rents with bank, state or family governance and high private control benefits, and negative with investor protection. These initial choices had a major self-reinforcing effect for two main reasons. In the first place, the pension funding choices were paralleled, and in some cases anticipated, by political choices about the role of markets versus institutions and large investors in corporate governance, which reinforced the pension structure chosen. Second, an indirect effect was caused by the impact of the initial choices on the diffusion of shareholdings and thus on the political preferences of a majority.

Our instrument to establish causality is variation in inflationary shocks. Even before the clear statement in Sargent and Wallace (1981), it has been recognized that high inflation is a fiscal phenomenon. All the episodes of high inflation in our sample have followed devastating world or civil wars, natural causes for sudden, urgent fiscal need. In contrast, in the sample of countries that never experienced a major war-related price shock, the highest recorded inflation is associated with the oil shock of the 1970s.

In the aftermath of a destructive conflict, demands for public expenditures are extremely high, just at a time when the ability to raise fiscal revenues is at its lowest point. This pressure can be dramatic, given the need to demobilize troops and rebuild the infrastructure. Clearly, if it is impossible to find alternative funding methods, the military shock forces high inflation.

Our identification benefits from some variation in our small sample of democracies. There are examples of countries that experienced intense warfare and did not suffer high inflation. With no exceptions, these are countries that did not experience military invasions, such as the UK in both world wars. Such countries managed to fiscalize high war costs, so they were able to distribute over time the public spending shock. Yet there are countries which did not suffer any military destruction, such as Germany in WW1, where hyperinflation was the consequence of a high reparation burden. The political consequences of such shocks cannot be underestimated, as Keynes stated eloquently in his *Political Consequences of the World War* (1920).

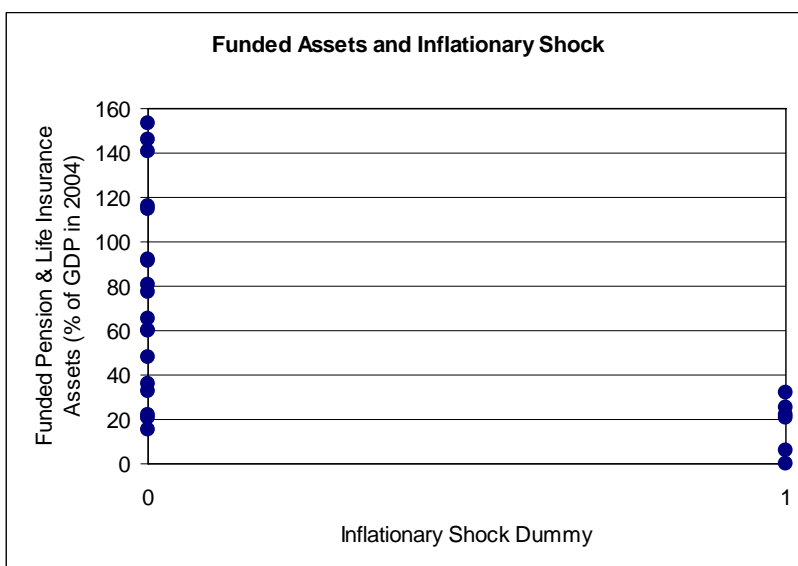
In conclusion, we argue that pensions are a highly political issue, and any reform will be driven by the political economy of this decision. The determinants of the historical choices on pension structure, of course, may be reversed. Many Continental European capital markets recovered in the last two decades also thanks to a massive privatization program, which produced more financial participation and thus more political support for capital markets (Biais and Perotti, 2002).

In the end, understanding the political determinants of pension structure is essential to help identifying the range of feasible solutions, and to predict to what extent structural features of existing systems, such as solidarity and coinsurance features, will persist.

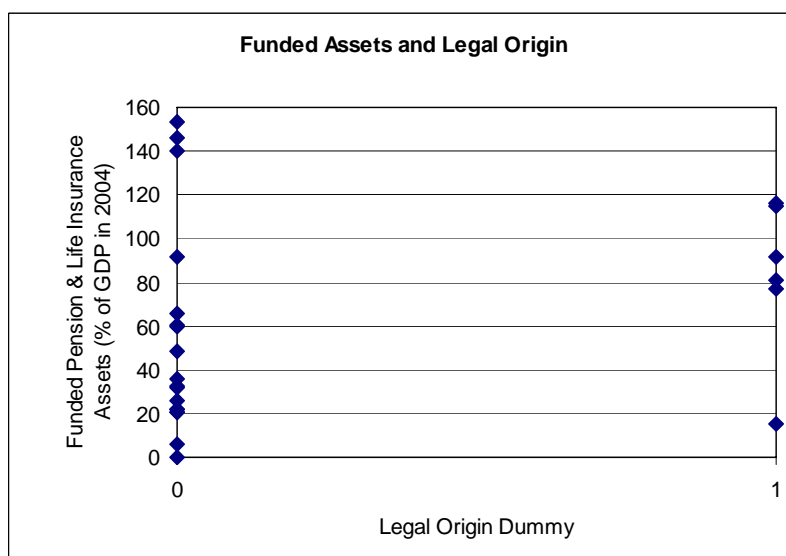
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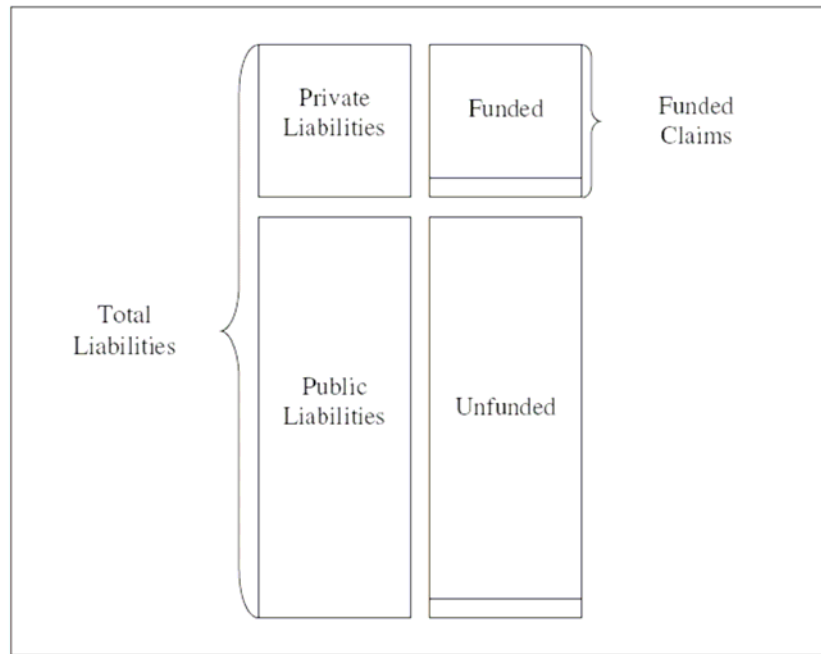
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Note: Figure 1 shows total funded pension and life insurance assets as percentage of GDP in 2004 (the variable PENSION+LIFE) on the x-axis and SHOCK dummy (as defined in Section 3) on the y-axis.



Note: Figure 2 shows total funded pension and life insurance assets as percentage of GDP in 2004 (the variable PENSION+LIFE) on the x-axis and Common Law dummy on the y-axis.



Note: Figure 3 shows the calculation of funded pension assets as percentage of total pension liabilities.

Table 1: Development of Pension Systems in Various Countries

Country	Year of First Program	Year of First Major Program
Australia	1908	1941
Austria	1909	1935
Belgium	1900	1967
Canada	1927	1966
Denmark	1891	1964
Finland	1937	1956
France	1910	1945
Germany	1889	1949
Greece	1934	1978-85
Iceland	1909	1969-70
Ireland	1908	1952
Italy	1919	1969
Japan	1875	1942-44
South Korea	1960	1973
Mexico	1943-44	1943-44
Netherlands	1913	1957
New Zealand	1898	1938
Norway	1936	1936
Portugal	1919	1935
Spain	1919	1939
Sweden	1913	1962
Switzerland	1946	1946
United Kingdom	1908	1948
United States	1896	1935

NOTE: "Year of First Program" typically involves only a particular group of society (e.g., veterans, war widows, miners). "Year of First Major Program" is based on programs involving "large coverage" of private sector (see Section 3 for further details). Main sources of information for the Year of First Program and Major Program are: Flora (1987a, 1987b) (for various European countries), the U.S. Social Security Administration (on: Social Security Programs Throughout the World), the Australian Bureau of Statistics, the Financial Report on the Public Pension Plan System (Japan) and the French Observatory of Retirement.

Table 2: Summary Statistics

Variables	Mean	Median	Minimum	Maximum	Standard Deviation	Nbr. Obs.
PENSION+LIFE	61.63	54.10	0.000	153.20	46.32	24
PENSION	34.31	12.00	0.000	111.90	38.92	24
SHOCK Dummy	0.250	0.000	0.000	1.000	0.442	24
HIGH_INFLATION Dummy	0.625	1.000	0.000	1.000	0.495	24
MAX_CPI	173.9	52.6	13.1	491.6	201.7	22
COMMON_LAW Dummy	0.250	0.000	0.000	1.000	0.442	24
CRASH1929	64.831	65.000	39.400	86.200	14.329	16
MARKET_CAP	0.723	0.436	0.146	2.044	0.572	22
NON-DEMOCRACY Dummy	0.167	0.000	0.000	1.000	0.381	24
POP1950_65+	0.087	0.089	0.035	0.122	0.023	24
POP2004_65+	0.147	0.155	0.055	0.191	0.034	24
STOCK_RETURNS	3.129	3.020	-0.120	5.880	1.773	23

NOTE: All the variables are defined in Section 4.

Table 3: The Political Choice of Pension System

Panel A						
Variables	(1)	(2)	(3)	(4)	(5)	(6)
SHOCK	-58.52 *** (11.58)	-36.83 *** (13.70)			-36.83 ** (14.04)	-38.81 ** (17.56)
HIGH_INFLATION		-43.38 ** (18.68)			-73.87 *** (21.29)	-72.30 *** (23.37)
MAX_CPI			-0.15 *** (0.028)			
COMMON_LAW				28.10 (18.36)	-45.73 * (22.52)	-47.64 * (23.50)
POP2004_65+						-100.31 (243.41)
Nbr. of Obs.	24	24	22	24	24	24
R-squared	31%	48%	45%	7%	57%	57%
Adj. R-squared	28%	43%	42%	3%	50%	48%
Panel B						
Variables	(7)	(8)	(9)	(10)	(11)	(12)
	Countries without the Largest Shocks (SHOCK = 0 Subsample)			Excluding Non-Democracies (NON-DEMOCRACY = 0 Subsample)		
SHOCK				-49.08 *** (14.41)	-63.21 *** (12.44)	-63.46 *** (16.54)
HIGH_INFLATION	-43.38 ** (18.53)		-73.87 *** (21.29)			
COMMON_LAW		9.67 (20.38)	-45.73 * (22.52)	3.45 (20.82)		-0.66 (21.28)
Non-Democracy				-37.31 ** (14.91)	NA	NA
Nbr. of Obs.	18	18	18	24	20	20
R-squared	26%	1%	38%	40%	32%	32%
Adj. R-squared	21%	X	30%	32%	28%	24%

NOTE: The dependent variable is the percentage of funded pension and life insurance assets over GDP in 2004 (PENSION+LIFE). All the regressions include a constant, whose coefficient is not reported. The dummy variable SHOCK is equal to one if the country experienced an increase in its Consumer Price Index (CPI) of 400% or more in a single year, and zero otherwise. The dummy variable HIGH_INFLATION is equal to one if the country experienced an increase in CPI of 30% or more in a single year, and zero otherwise. MAX_CPI gives the highest annual percentage increase in CPI in the years prior to each country's first major pension program. COMMON_LAW is a dummy variable equal to one if the country is a common law country, and zero otherwise. The variable POP2004_65+ measures for the proportion of the total population over 65 years old in 2004. The dummy variable NON-DEMOCRACY (i.e., countries that were not democratic at time of first major political decisions on pension system were made) equals one for South Korea, Mexico, Portugal and Spain. Regressions (11) and (12) are for the subsample NON-DEMOCRACY = 0. Robust standard errors are in parentheses. Significance levels: *** for 1%, ** for 5%, and * for 10%.

Table 4: Alternative Definitions of Pension Funding

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Funded Pension Assets, excluding Life Insurance Reserves				Percentage of Funded Pension Assets (PENSION+LIFE) from Total Liabilities			
SHOCK	-41.55 *** (9.58)	-35.67 *** (13.16)	-21.07 * (12.14)	-40.24 *** (14.88)	-0.23 *** (0.06)	-0.17 *** (0.06)	-0.12 * (0.07)	-0.15 ** (0.06)
HIGH_INFLATION			-58.38 ** (26.49)				-0.19 ** (0.07)	-0.16 ** (0.07)
COMMON_LAW		17.65 (17.37)	-26.13 (26.29)	8.72 (19.62)		0.16 ** (0.08)	0.02 (0.09)	0.00 (0.08)
POP2004_65+				-290.30 (193.62)				-1.44 (1.20)
Nbr. of Obs.	24	24	24	24	24	24	24	24
R-squared	22%	27%	48%	31%	29%	43%	53%	59%
Adj. R-squared	19%	19%	40%	21%	26%	38%	46%	50%

NOTE: In Regressions (1)-(4), the dependent variable is the percentage of funded pension assets over GDP in 2004, excluding Life Insurance assets (PENSION). In Regressions (5)-(8), the dependent variable is the percentage of funded pension liabilities/assets (PENSION+LIFE) from total liabilities, i.e., funded liabilities and unfunded public pension liabilities (defined as 20 times old age social expenditures) in 2004. All the regressions include a constant, whose coefficient is not reported. The dummy variable SHOCK is equal to one if the country experienced an increase in its Consumer Price Index (CPI) of 400% or more in a single year, and zero otherwise. The dummy variable HIGH_INFLATION is equal to one if the country experienced an increase in CPI of 30% or more in a single year, and zero otherwise. MAX_CPI gives the highest annual percentage increase in CPI in the years prior to each country's first major pension program. COMMON_LAW is a dummy variable equal to one if the country is a common law country, and zero otherwise. The variable POP2004_65+ measures for the proportion of the total population over 65 years old in 2004. Robust standard errors are in parentheses. Significance levels: *** for 1%, ** for 5%, and * for 10%.

Table 5: Possible Alternative Explanations

Panel A									
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SHOCK	-57.47 *** (13.51)	-54.14 *** (17.25)	-35.04 ** (16.73)	-54.63 *** (12.99)	-45.86 ** (17.91)	-18.29 ** (8.10)	-61.66 *** (13.23)	-55.28 *** (16.34)	-32.14 *** (9.47)
HIGH_INFLATION			-74.00 *** (21.95)			-87.54 *** (15.57)			-87.57 *** (16.39)
COMMON_LAW		9.72 (21.10)	-45.75 * (23.05)		27.68 (19.82)	-31.77 * (17.60)		19.73 (17.41)	-43.58 ** (19.27)
POP1950_65+	48.28 (252.57)	52.33 (239.20)	79.07 (177.93)						
CRASH1929				0.16 (0.624)	0.08 (0.575)	0.46 (0.354)			
STOCK_RETURNS							6.85 (4.30)	7.40 * (3.98)	8.23 *** (2.97)
Nbr. of Obs.	24	24	24	16	16	16	23	23	23
R-squared	31%	32%	57%	25%	33%	86%	39%	42%	82%
Adj. R-squared	25%	22%	48%	14%	16%	80%	32%	33%	78%

Panel B									
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SHOCK		-57.98 *** (13.26)	-20.05 ** (7.79)	-29.38 ** (12.88)	-19.21 (15.18)		-59.44 *** (13.16)		-57.13 *** (11.02)
HIGH_INFLATION			-81.20 ** (18.78)		-59.50 *** (17.71)				
COMMON_LAW			-30.76 (20.00)		-37.11 ** (14.12)				
MARKET_CAP_1913		8.5 (38.89)	14.94 (16.47)						
Current MARKET_CAP				42.64 ** (17.57)	30.98 ** (13.06)				
Average Inflation 1901-1945						-7.91 * (4.10)	-5.58 ** (2.54)		
Average Inflation 1920-1945								-7.28 * (3.53)	-3.77 * (2.16)
Nbr. of Obs.		15	15	22	22	15	15	21	21
R-squared		33%	85%	48%	64%	12%	39%	18%	42%
Adj. R-squared		x	79%	42%	56%	5%	28%	13%	35%

NOTE: The dependent variable is the percentage of funded pension and life insurance assets over GDP in 2004 (PENSION+LIFE). All the regressions include a constant, whose coefficient is not reported. The dummy variable SHOCK is equal to one if the country experienced an increase in its Consumer Price Index (CPI) of 400% or more in a single year, and zero otherwise. The dummy variable HIGH_INFLATION is equal to one if the country experienced an increase in CPI of 30% or more in a single year, and zero otherwise. MAX_CPI gives the highest annual percentage increase in CPI in the years prior to each country's first major pension program. COMMON_LAW is a dummy variable equal to one if the country is a common law country, and zero otherwise. The variable MARKET_CAP_1913 gives the market capitalization of the country's stock markets in 1913. The variable Current MARKET_CAP gives the market capitalization of the country's stock markets in 2002. The variables "Average Inflation 1901-1945" and "Average Inflation 1920-1945" give the average annual percentage change of CPI for their respective time period. For the calculation of average inflations, periods of "very high" inflation have been excluded (see Section 3 for more details). Robust standard errors are in parentheses. Significance levels: *** for 1%, ** for 5%, and * for 10%.

Table 6: Effect of Changes in Industrial Production on Pension Funding

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SHOCK				-47.26 ** (20.87)	-52.80 *** (11.50)	-22.29 ** (8.51)	-35.42 ** (13.28)	
HIGH_INFLATION						-71.09 *** (16.80)	-40.55 * (20.05)	
MAX_CPI								-0.15 *** (0.03)
Change in Industrial Production 1914-1918	-15.15 (33.24)	-2.06 (30.90)		-13.33 (33.66)		-33.16 (20.89)		
Change in Industrial Production 1939-1945	42.50 (24.31)	38.35 (24.02)		26.50 (26.58)		-7.16 (16.65)		
Civil War Dummy	-40.53 ** (18.15)		-41.61 *** (14.96)	-47.66 ** (19.61)	-25.77 * (13.34)	-7.10 (13.72)	-12.74 (12.72)	-12.69 ** (5.59)
Nbr. of Obs.	17	17	24	17	24	17	24	22
R-squared	27%	17%	12%	43%	35%	81%	49%	49%
Adj. R-squared	10%	5%	8%	24%	29%	73%	42%	43%

NOTE: The dependent variable is the percentage of funded pension and life insurance assets over GDP in 2004 (PENSION+LIFE). All the regressions include a constant, whose coefficient is not reported. The dummy variable SHOCK is equal to one if the country experienced an increase in its Consumer Price Index (CPI) of 400% or more in a single year, and zero otherwise. The dummy variable HIGH_INFLATION is equal to one if the country experienced an increase in CPI of 30% or more in a single year, and zero otherwise. MAX_CPI gives the highest annual percentage increase in CPI in the years prior to each country's first major pension program. The variable "Change in Industrial Production" gives the ratio of industrial production at the end of the considered period over industrial production at the beginning of the considered period. The variable "Civil War Dummy" is a dummy equal to 1 if the inflationary shock was related to a civil war, and 0 otherwise. Robust standard errors are in parentheses. Significance levels: *** for 1%, ** for 5%, and * for 10%.