Bubbling Under: Political Preferences during Asset Bubbles

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Abstract

Advanced industrial countries have had two unprecedented asset bubbles in the past decade, first in the stock market and second in the housing market. To the degree that citizens budget future earnings from current paper asset values, we might expect these bubbles to have a large impact on political preferences over pensions policy, social insurance, and interest rates. This paper develops a micro-theory of individual preferences over such public policies during periods characterized by asset bubbles. I then link micro-preferences to macro-policy, developing a theory of how governments and central banks might respond to citizen demands when asset earnings become more significant than wage earnings. I show that under such conditions the politics of inflation flips from an *Employment Dominance* model of low interest rates (and hence high wage inflation) harming asset owners and benefiting wage earners, to an *Asset Dominance* model where low interest rates benefit asset owners and harm wage earners. Tax and spending policies, particularly public pensions provision will also be strongly impacted by the relative role of asset inflaiton. I also show that the well-known theory that 'conservative' central bankers can secure low inflation does not necessarily hold in a world of asset inflation. 'Partisan conservative' central bankers may, in fact, wish to lower interest rates and secure high asset inflation. Finally, I demonstrate empirically that individuals who experience high levels of asset inflation systematically prefer low social security spending and reduced taxes.

1 Introduction

From the 'dot com' bubble of the late 1990s through to the explosion in housing prices in the first decade of the twenty-first century, fluctuations in asset valuations have driven economic cycles in the OECD. Yet, despite the increased importance of asset ownership in defining the wealth of citizens, and the level of equality between them, we know very little about how political preferences over economic policies are affected by this shift. Does asset ownership have the same impact on preferences over taxation as wage income? Do asset owners demand higher or lower interest rates? What forms of inflation benefit asset owners? How are social policies that hedge against risk, like unemployment insurance and pensions, affected by the balance between asset and wage income?

Unfortunately, the current literature on the political economy of macroeconomic policy is unsuited to answering these questions. There is a voluminous literature on both preferences over wage inflation (Alesina and Rosenthal, 1995; Alesina, Roubini and Cohen, 1997; Hibbs Jr, 1977) and the effects of institutional characteristics, especially central bank independence (Iversen, 1999; Broz, 2002), on policy outcomes like unemployment and interest rates. However, perhaps partly in response to this literature, price inflation has largely been tamed in the OECD during the past two decade. Figure 1, from Wu (2006), demonstrates the long-run decline in price inflation across advanced industrialized countries since the 1970s.

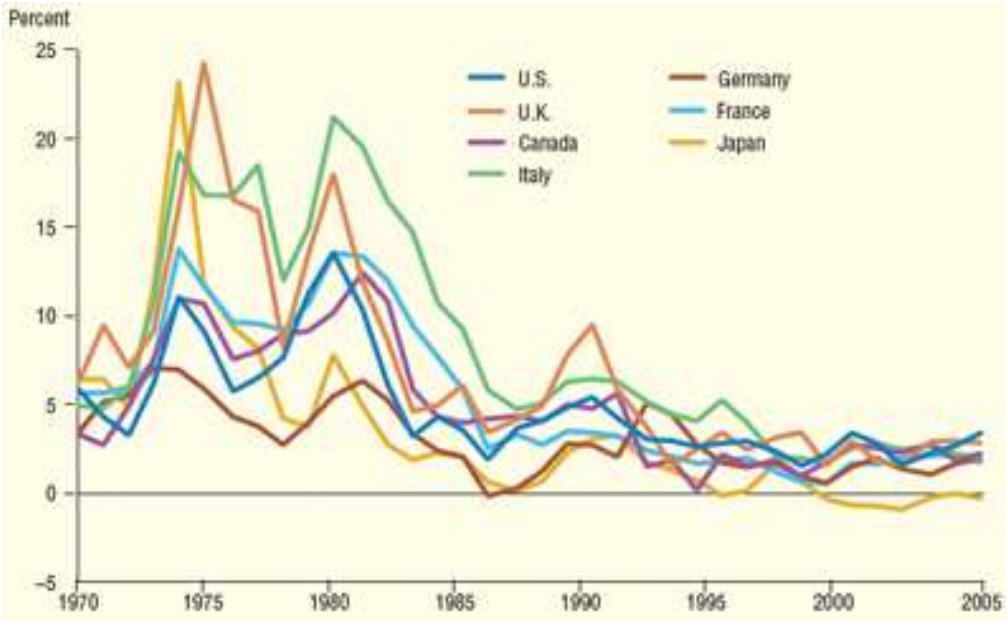

Figure 1: CPI Inflation in the OECD since 1970. Taken from Wu (2006, p.6)

Furthermore, differences across countries attributable to institutional differences or across time since 1990, attributable to partisan cycles, appear to have diminished, as can be seen in Figure 1. Thus, the political economy literature on price inflation is perhaps a victim of its own success, at least within advanced industrial countries, and analysis of the impact of unions and partisanship on inflation feels somewhat like Sovietology.

While wage inflation has fallen off the political radar in most states, if not yet out of academic debate, a potentially equally significant form of inflation has emerged over the past decade: asset price inflation. Shiller (2006) notes that real home prices have near tripled since 1983 in Boston, London, Paris, and Sydney. The housing boom has not been confined to

Figure 2: US Real Rents and Home Prices since 1900. Taken from Shiller (2006, p.4)

'global cities': while average real US rents have increased by only ten percent since 1997, average real house prices have increased 50 percent (Baker, 2006). The huge surge in the valuation of residential and commercial real estate in most OECD countries has created a new 'wealth gap' between property owners and renters that dwarfs any such inequality in the postwar period. The property boom followed sharply on the heels of the 'dot com' bubble in stock prices, which massively increased the paper wealth, albeit briefly, of the owners of shares and pension plans during the late 1990s. Figure 2, from Shiller 2006 demonstrates how real house prices and real rents have diverged in the USA over the past century, in particular since 1995.

These twin asset booms - perhaps 'bubbles' - have had an enormous impact on the political economy of OECD states, both in the manner by which they have directly increased wealth inequality but also through their second order effects on the policy preferences of voters, especially in terms of insuring against job loss and old age. In this paper, focusing on housing, I develop a formal model that examines how individual preferences over taxation and the interest rate vary across asset owners and asset non-owners, and individuals of varying labor market status. I then show that such preferences and the political coalitions deriving from them are dependent on the relative impact of taxation and interest rates on the returns to asset ownership versus wage earnings.

At one extreme, I present the case of *Asset Dominance*, where asset valuations are highly sensitive to changes in the interest rate and where taxable income derives increasingly from asset ownership rather than employment. At the other extreme, we have the more traditional case of *Employment Dominance*, where interest rates sharply affect employment rates and where taxation takes a larger bite out of wages than asset returns. While the latter case produces left-right politics that resemble the classic partisan model developed by (Hibbs Jr, 1977), the former case, perhaps more characteristic of the current state of affairs, flips these preferences. In particular, I show that under certain conditions, right-wing parties may favor low taxation and low interest rates, with left-wing parties preferring higher taxation and higher interest rates. Furthermore, I show that in the

Asset Dominance model right wing parties will demand lower pensions, and left wing parties lower unemployment benefits than in the *Employment Dominance* model. Finally, I also show that even under central bank independence (CBI), the partisanship of central bankers may matter, contrary to the assumptions underlying CBI theory (for example, Ball, 1999; Rogoff, 1985). In fact, 'conservative' central bankers may actually desire lower rates of interest than neutral bankers, because asset inflation can be desirable for right-wing parties.

The paper begins in Section 2 by laying out the basic logic of the formal model, presenting the actors, policy variables, relevant parameters, and states of the world. In Section 3, I then turn to a detailed examination of the effects of taxation and interest rates on the utility of individuals, characterized by their asset ownership and labor market status. Section 4 examines how individual interests are aggregated by political parties, suggesting a variety of coalitions in multidimensional taxation-interest rate space. These coalitions are shown to differ across the situations of *Asset Dominance* and *Employment Dominance*. In Section 5, I examine how depriving politicians of the ability to set interest rates, by introducing an independent central banker, affects these political coalitions and the implications of whether the central banker is political neutral and *inflation averse* or is a *partisan conservative*. Section 6 provides a preliminary empirical test of some of the assertions in the theoretical sections - that individuals who have experienced significant asset inflation will demand reduced

public pension provision and reduced tax rates - using data from the 2004 National Election Survey and the Case-Shiller index of house price appreciation. Section 7 concludes with implications for the political economy literature more broadly and some potential lines of future research.

2 Outlining a Model of Asset Price Inflation

In this section I briefly outline the logic of the formal model. I begin by considering the relevant actors: individuals, politicians, and central bankers, discussing the relevant policy variables over which their preferences are defined. I then outline the difference between two states of the world: the *Asset Dominance* model and the *Employment Dominance* model.

2.1 The Actors

I begin by outlining the three key sets of actors making decisions within the model: individuals, politicians, and central bankers.

Individuals: First we have individuals who work in the goods market, potentially own assets in the asset market, and vote in political elections. Individuals are indexed ij, and have preferences defined over their current and future (retired) income, employment, and taxes. Individuals divide into four groups, of potentially varying size. First, individuals split into those who own assets (i.e., housing) and those who do not: $i \in \{A, \sim A\}$.

Second individuals split into those who are labor market insiders and face no threat of unemployment and those who are labor market outsiders and risk unemployment: $j \in \{N, \sim N\}$. Asset ownership and labor market status are not necessarily correlated. Thus, four potential groups emerge: (a) asset owning insiders (A, N); (b) asset non-owning insiders $(\sim A, N)$; (c) asset owning outsiders $(A, \sim N)$; and (d) asset non-owning outsiders $(\sim A, \sim N)$.

Individuals live for two periods, in the labor market in period zero and retired in period one. A proportion $N \leq 1$ are *insiders*, who are always employed in period zero and all earn the uniform wage w. A proportion $1 - N$ are *outsiders*, who face a risk of unemployment in period zero: they are employed with probability e, earning w, and unemployed with probability $1 - e$, in which case they receive the unemployment benefit b.

Individuals also have asset income a_i. For the proportion of the population $A \in [0, 1]$ who own assets, $a_i = \tilde{a}$. For the remaining proportion $1 - A$, $a_i = 0$. Asset-owning individuals receive earnings from their assets if the rate of asset inflation π_a exceeds that of price inflation π_p. We assume that the earnings from assets are earned and spent in period one, when the voters have retired. The proportion $1 - A$ of the population who do not own assets receive no asset returns in period one. All voters, regardless of their asset ownership, also receive a public pension g in period one, financed by taxation of period zero earnings. The value of this pension is reduced by the level of price inflation π_p.

Politicians: Second, we have politicians, indexed k, from two political parties - the left party L and the right party R - who also have preferences over employment, taxes and benefits but also over their ability to be re-elected, which depends on how many individuals vote for them. I do not explicitly model the voting process but in Section 4 I suggest how coalitions among individuals emerge and how, using the framework of a probabilistic voting model, politicians might aggregate these into election-winning constituencies. This party then chooses a tax rate, implying a policy schedule (b, g), where b is the unemployment benefit distributed in period zero and g is the pension payment distributed in period one. If the central bank is dependent then the incumbent party will also choose an interest rate r, which will impact employment in period zero and price and asset inflation between period zero to period one.

Central Bankers: Third, we have central bankers who may or may not themselves have partisan preferences or preferences over economic policy, depending on the model setup. The bankers are also affected by institutional characteristics including their independence from politicians. Through Section 4, I assume that politicians can manipulate the interest rate and thus, that the central bank is dependent. In Section 5, I alter this logic to examine the case where central bankers independently set interest rates. Central banks set the interest rate, which in turn effects price and asset inflation between period zero and period one. If central bankers are

independent then they set the interest rate themselves, balancing inflation aversity and their own partisan preferences $\alpha \in [0, 1]]$. If central bankers are dependent then they faithfully implement the preferred interest rate of the incumbent political party, either r_L or r_R.

2.2 Two States of the World: *Asset Dominance* and *Employment Dominance*

In Section 4, I examine how political coalitions vary across two states of the world: *Asset Dominance* and *Employment Dominance*. What defines these states? The former - *Asset Dominance* - occurs when (a) asset income is more tax sensitive than wage income, and (b) when asset inflation is more sensitive to the interest rate than are price inflation and employment. *Employment Dominance* - occurs when (a) wage income is more tax sensitive than asset income, and (b) when price inflation and employment are more sensitive to the interest rate than is asset inflation. The formal definition of these two states is developed in Section 3.

Substantively, these two states of the world are suggestive of the difference in macroeconomic policy and outcomes between the Keynesian era of Phillips Curve tradeoffs and the post-1995 era of asset booms and crashes. The earlier period, that examined in Douglas Hibbs' seminal work on partisan control of the macroeconomy (Hibbs Jr, 1977), saw little real asset growth in most states: for example, as can be seen in Figure 2, US real house prices were essentially stable between 1950 and the late

1970s. However, price inflation fluctuated greatly during this period, and employment was closely linked to these inflationary cycles, peaking along with price inflation and collapsing in deflationary episodes. Given the close links between interest rates on the one hand, and price inflation and employment on the other, it is unsurprising that the politics of interest rates centered around their effect on labor, which preferred low interest rates, and capital, which preferred higher interest rates. Consequently, according to Hibbs, left-wing parties favored lower interest rates, higher price inflation, and higher employment. Right-wing parties, conversely, favored higher interest rates, lower inflation, and lower employment. This period closely resembles the *Employment Dominance* model.

The more recent period, emerging in the 1980s but most apparent since 1995, has seen price inflation stabilizing at a lower level, with employment also relatively high, in most advanced industrial states. The reasons behind the victory over price inflation are complex. Typically, analysts focus on the role of independent central banks, the decline in unionization, and the price-lowering impact of globalization (Alesina and Summers, 1993; Taylor, 2000; Akerlof et al., 1996). However, macroeconomic volatility has not vanished. Rather it has reappeared in the asset market with three housing booms (and busts?) and two major stock market crashes in the USA since 1975. Furthermore, the magnitude of these asset cycles appears to be increasing. Individual income appears increasingly tied to stock and home ownership, particularly given the secular increase in the proportion

of citizens who own at least some stocks or property. Interest rate fluctuations appear to more strongly impact housing and stock prices than they do employment (Roubini 2006; but see Posen 2006 for a more cautionary analysis). Certainly, the stagnation of median US wages despite soaring stock and housing valuations, during a period of historically low interest rates between 2002 and 2005, provides *prima facie* evidence of this change. Thus, as asset income becomes relatively more important and as assets become more sensitive to interest rates than prices, the economy more closely resembles the *Asset Dominance* model.

3 Developing a Formal Model

In this section, I elaborate a formal model of preferences over taxation and interest rates under varying conditions of price and asset inflation. The model is built up from individual preferences, subject to the government's budget constraint and to changes in the parameters governing the level and sensitivity of asset inflation.

Individuals earn income $y_i = w$ if they are employed and $y_i = 0$ if unemployed in period zero. A proportion N of voters are labor market insiders, for whom the probability of unemployment is zero. The remaining fraction $(1 - N)$ of the population are labor market outsiders and face a risk of unemployment: there is a probability e that they will be employed and $1 - e$ that they will be unemployed. Consequently, the proportion of

the overall population that is employed is $N + (1 - N)e$ and the proportion that is unemployed is $(1 - N)(1 - e)$. If citizens are unemployed they receive the unemployment benefit b. The level of employment among labor market outsiders, e, is negatively related to interest rates r and positively related to the rate of price inflation π_p.

The relationship between interest rates, employment, and price inflation follows the synthesis of current macroeconomic orthodoxy developed by David Soskice and Wendy Carlin (Carlin and Soskice 2004, 2006, building off work by Taylor 1993; Ball 1999; Romer 2000). Policy changes in interest rates are presumed to affect the overall level of economic activity, which in this model is represented by the rate of employment. Increases in employment will then positively impact wage/price inflation as increased labor demand leads to a bidding up of labor costs. In this model, interest rates and employment occur in period zero with the effect on inflation occurring in period one. Thus we can reframe the employment of outsiders as $e(r)$ and price inflation as $\pi_p(e(r)) = \pi_p(r)$.

We now turn to the asset market. Voters have assets a_i, where $a_i = \tilde{a}$ for a proportion $A \in 0, 1$ of the population and $a_i = 0$ for a proportion $(1 - A)$. We assume that the group of asset owners A and the group of labor market insiders N are not necessarily coterminous. Thus four sets of people emerge: (a) asset owning insiders (A, N); (b) asset non-owning insiders $(\sim A, N)$; (c) asset owning outsiders $(A, \sim N)$; and (d) asset non-owning outsiders $(\sim A, \sim N)$.

In period one all voters retire and receive (a) the government pension, adjusted for price inflation $g(1-\pi_p)$; and (b) a return from their asset ownership (net of taxes t applied in period zero): $a_i[1-t][\pi_a-\pi_p]$, where π_a is the rate of asset inflation and π_p is the rate of price inflation. Put simply, when asset inflation exceeds price inflation, asset owners receive an extra income supplement in retirement from the increased real valuation of their assets but where price inflation exceeds asset inflation, asset owners experience a real loss. Putting the government pension and asset income together, we find that asset owners - groups (a) and (c) - receive $g(1-\pi_p)+\tilde{a}[1-t][\pi_a-\pi_p]$ and asset non-owners - groups (b) and (d) - receive $g(1-\pi_p)$.

Both the unemployment benefit and pensions are paid for out of general taxation. We normalize population to equal one so that average tax take will equal total tax take. Total tax take, T, is defined as a flat tax t multiplied by average earned *and* asset income $\bar{Y}=E(y_i+a_i)=w(N+(1-N)e)+A\tilde{a}$, which we refer to as the *tax base*. Thus total tax take $T=t\bar{Y}$ equals spending $g+(1-N)(1-e)b$, producing the budget constraint.[1]

$$T(r)=t\bar{Y}(r)=t[w[N+[1-N]e(r)]+A\tilde{a}]=g+[1-N][1-e(r)]b \quad (1)$$

[1]Note that the total tax take T will be dependent on the tax base $\bar{Y}$, which is itself dependent on employment $e(r)$ and hence on the interest rate r. Thus, $T\equiv T(r)$. We will manipulate this identity, when we examine the total effect of interest rates on utility.

The Basic Utility Function of Voters: We now examine how individual utility is affected by the policy variables, in particular the tax rate t and the interest rate r. In order to pay for unemployment benefits b and pensions g, individuals are taxed on both their asset income a_i and their period zero wage income y_i.[2] Interest rates affect the rate of employment e of outsiders in period zero and the rate of price inflation π_p and asset inflation π_a in period one. Thus the generic utility function for voters appears as follows:

$$i \in \{N, \sim N\}, j \in \{A, \sim A\} \quad b_i = 0, y_i = w \text{ if } i = N \quad b_i = b, y_i = we \text{ if } i = \sim N$$

$$U_{ij} = [1-t][a_i + y_i] + [1-e]b(y_i) + \delta\Big[g[1-\pi_p] + a_i[1-t][\pi_a - \pi_p]\Big] \quad (2)$$

The basic elements of this expression are period zero income net of taxes $[1-t][a_i + y_i]$; the unemployment benefit that labor market outsiders receive if unemployed $[1-e]b_i$; the period one pension, discounted and net of price inflation, received by everyone $\delta g(1-\pi_p)$; and period one asset appreciation, net both of taxed asset income in period zero and of price inflation $\delta a_i[1-t][\pi_a(r) - \pi_p(r)]$.

To more set out more clearly the distributive implications of tax and interest rates we can examine the utility function of each of the four groups in society: (a) asset owning insiders; (b) asset non-owning insiders; (c)

[2] I assume that the revenues from asset and wage taxation are used interchangeably and thus both fund employment benefits and pensions. In fact, in many states asset taxation funds local goods and wage taxation funds national goods. This model does not make this distinction. However, it should be noted that other forms of asset taxation, like capital gains taxes and inheritance taxes are collected and distributed nationally.

asset owning outsiders; and (d) asset non-owning outsiders.

Asset Owning Insiders

$$U_{AN} = [1-t][\tilde{a}+w] + \delta\left[g[1-\pi_p] + \tilde{a}[1-t][\pi_a - \pi_p]\right] \tag{3}$$

Asset owning insiders face no uncertainty about employment and hence income in period zero. They are consequently taxed on both their asset income $\tilde{a}$ and wage income w. Their return from taxes is confined to the pension received in period one. In period one they also receive returns from asset inflation, net of price inflation and the portion of assets taxed in period zero.

Asset Non-Owning Insiders

$$U_{\sim AN} = [1-t][w] + \delta\left[g[1-\pi_p]\right] \tag{4}$$

Asset non-owning insiders also face no uncertainty about employment but since they own no assets they are taxed less than asset owners in period zero. In period one, however, they receive only the pension transfer.

Asset Owning Outsiders

$$U_{A\sim N} = [1-t][\tilde{a}+we] + [1-e]b + \delta\left[g[1-\pi_p] + \tilde{a}[1-t][\pi_a - \pi_p]\right] \tag{5}$$

Asset owning outsiders face uncertainty about their labor market position and thus are taxed on earned income with probability e and receive the unemployment benefit with probability $1-e$. They receive both the pension and net asset earnings in period one.

Asset Non-Owning Outsiders

$$U_{\sim A \sim N} = [1-t][we] + [1-e]b + \delta\Big[g[1-\pi_p]\Big] \tag{6}$$

Finally, asset non-owning outsiders also face uncertainty about their labor market position but pay less tax than asset owning outsiders since they do not own taxable assets. They receive only the pension transfer in period one.

The Effect of Taxation on Utility: We now turn to examine the differential impact of taxation across these four groups. Doing so allows us to begin identifying the potential political cleavages and coalitions that can emerge when parties choose differing tax rates. In order to analyze these expressions we need to define the effects of taxation on pensions and the unemployment benefit. These effects can be derived from the budget constraint in Equation (1). The derivative of the unemployment benefit with respect to taxation is:

$$\partial b/\partial t = \frac{w[N + (1-N)e(r)] + A\tilde{a}}{[1-N][1-e]} = \frac{\bar{Y}(r)}{[1-N][1-e]} \tag{7}$$

The derivative of pensions with respect to taxation is:

$$\partial g/\partial t = w[N + (1-N)e(r)] + A\tilde{a} = \bar{Y}(r) \tag{8}$$

With these expressions in hand we can turn to the derivative of utility with respect to taxation for each group:

$$\frac{\partial U_{AN}}{\partial t} = -[\tilde{a} + w] + \delta\left[\bar{Y}[1 - \pi_p] - \tilde{a}[\pi_a - \pi_p]\right] \tag{9}$$

$$\frac{\partial U_{\sim AN}}{\partial t} = -w + \delta\left[\bar{Y}[1 - \pi_p]\right] \tag{10}$$

$$\frac{\partial U_{A\sim N}}{\partial t} = -[\tilde{a} + we] + \frac{\bar{Y}}{1 - N} + \delta\left[\bar{Y}[1 - \pi_p] - \tilde{a}[\pi_a - \pi_p]\right] \tag{11}$$

$$\frac{\partial U_{\sim A\sim N}}{\partial t} = -we + \frac{\bar{Y}}{1 - N} + \delta\left[\bar{Y}[1 - \pi_p]\right] \tag{12}$$

Before comparing the groups, it is useful to outline the components of these equations. The first effect, $-[a_i + y_i]$ is the loss of period zero income due to taxation and is largest for asset owning insiders ($-\tilde{a} - w$) and smallest for asset non-owning outsiders ($-we$). This effect, while differentiated in magnitude, is strictly negative for all groups. The second effect, $\bar{Y}/(1 - N)$, which only occurs for labor market outsiders, is the positive impact of receiving the unemployment benefit. The third effect, which applies equally to all citizens is the increase in the publicly provided pension g, suitably discounted and adjusted for price inflation π_p and the size of the tax base $\bar{Y}$. This effect is strictly positive. Finally, we have the fourth effect, $-a_i[\pi_a - \pi_p]$, which represents the asset inflation lost from increased asset taxation. This effect only applies to asset owners. The magnitude and direction of this effect depends on the difference between the rate of

asset and price inflation; that is, asset inflation is only valuable when it exceeds inflation in the cost of goods and services. If price inflation outstrips asset inflation this effect reverses since assets would have been worth less in the future - thus public pensions become more important.

Comparing the effects of taxation on the different groups, Equations (9) through (12) demonstrate that taxation has a clear redistributive impact from asset owners to non-owners and labor market insiders to outsiders. Asset-owning insiders are the chief losers from taxation since they benefit only from the provision of pensions and lose both asset and wage income to taxation. The chief-winners are asset non-owning outsiders who gain from both unemployment benefits and pensions and have no assets to tax. The remaining groups - asset non-owning insiders and asset owning outsiders - experience a more moderate effect of taxation. The former group only gain pensions from taxation but have no assets to tax. The latter group may receive unemployment benefits as well as pensions but find their assets taxed. Whether asset non-owning insiders have a greater relative preference for taxation than asset owning outsiders depends on the following inequality:

$$\frac{\partial U_{A\sim N}}{\partial t} < \frac{\partial U_{\sim AN}}{\partial t} \quad \Longleftrightarrow \quad \frac{\bar{Y}}{1-N} + w(1-e) < \tilde{a}(1+\delta(\pi_a - \pi_p)) \tag{13}$$

This inequality is more likely to hold: (a) when employment is high, wages are low, or unemployment benefits are low; or (b) when asset ownership

or the rate of asset inflation are high. Put more simply, asset owning outsiders will be harmed more greatly by taxation when they receive a great deal of their income from assets, the risk of becoming unemployed is low, and the unemployment benefit they would receive if they did become unemployed is low. In this scenario, their tax loss from their assets is not made up by the benefits of being insured against losing their jobs. This state of affairs is associated with being in an *Asset Dominance* state of the world. Where wages and employment are more important, the inequality flips and asset owning outsiders become more relatively favorable to taxes than asset non-owning insiders: this is the *Employment Dominance* state. Putting these conclusions together, we can array the preferences over taxation of different societal groups in a two-by-two table.

Table 1: Preferences over Taxation

	Insiders	**Outsiders**
Asset Owners	Dislike taxation most	Dislike taxation under *Asset Dominance*
Asset Non-Owners	Dislike taxation under *Employment Dominance*	Like taxation most

Finally, it is worth noting that the negative impact of taxation is always reduced for all groups when either asset ownership A or the proportion of labor market insiders N rises. There are two reasons for this effect. First, increases in both A and N grow the size of the tax base $\bar{Y}$ thus decreasing

the tax rate necessary to cover a fixed level of unemployment benefits and pensions. Second, a growth in N reduces the number of labor market outsiders, thereby lowering the proportion of people at risk of unemployment who might require unemployment benefits. Thus increases in N reduce the number of recipients of b lowering the overall level of taxation.

The Effect of Interest Rates on Utility: The impact of interest rates on the different groups is considerably more complex than that of taxation. Not only do interest rates directly affect another set of variables - employment, price inflation, and asset inflation - but changes in the interest rate indirectly affect the rate of taxation itself, since they change employment and thus both the size of the tax base $\bar{Y}$ and the number of recipients of the unemployment benefit b. In this section, we begin by laying out how interest rates affect economic activity variables like employment and inflation before examining this second-order effect on taxation. Putting both direct and indirect effects of interest rates together we conclude by examining the differential impact on the four groups.

In setting out the economic effects of interest rates we follow the Soskice-Carlin model, in which interest rates affect economic activity (including employment), which in turn impacts price inflation. Thus we begin by modeling employment as negatively related to the interest rate. The employment rate of labor market outsiders is modeled as $e = \bar{e} - \beta_e r$, where $\bar{e}$

is the level of employment when interest rates equal zero [3]. The β_e parameter represents the sensitivity of employment to changes in interest rates.

We now turn to modeling price inflation π_p between periods zero and one, which is determined by the level of economic activity in period zero, as represented by the employment rate e. The sensitivity of price inflation to increases in employment is modeled by the parameter β_p. The ensuing equation is $\pi_p = \beta_p e = \beta_p[\bar{e} - \beta_e r]$. We denote the sensitivity of price inflation to interest rates as $\gamma_p = \beta_e \beta_p$, where $\partial \pi_p / \partial r = -\gamma_p = -\beta_p \beta_e$.

Finally, we assume that asset inflation is directly affected by the interest rate; that is, the effect of the interest rate is not channeled through employment but instead relates to the ease of borrowing so as to purchase assets. Thus, asset inflation can be stated as $\pi_a = \bar{\pi}_a - \gamma_a r$, where $\bar{\pi}_a$ is the rate asset inflation when interest rates equal zero and γ_a is the sensitivity of asset inflation to the interest rate.

The sensitivity parameters γ_p and γ_a determine the responsiveness of price and asset inflation to interest rates. Importantly, if $\gamma_p = \gamma_a$ then any change in interest rates has the same impact on asset and price inflation. Conversely, where γ_p and γ_a differ substantially, altering interest rates has strongly asymmetric effects.

The relationship between γ_p and γ_a also represents the degree to which price and asset inflation are based on structural fundamentals rather than

[3] We can think of this as the maximum possible level of employment achievable in the short-term under a sustained monetary easing.

macroeconomically induced demand. For example, if the state suffers a geographical shock which reduces the housing stock - for example, an earthquake - the reduced supply of housing will, all else equal, lead to a real rise in house prices. Similarly, if the state's population increases dramatically, this provides a structural increase in the demand for housing, leading to a similar level of asset inflation. Note that in both these cases, house prices could rise *even* while interest rates rise. In the logic of the model, although $\Delta r > 0$, nonetheless $\pi_a > 0$ because γ_a is effectively zero (whatever interest rate impact would normally occur is countered by exogenous market forces and thus within the model $\gamma_a = 0$).

Turning to the second-order effect of interest rates, since employment is partly determined by changes in interest rates, the size of the tax base $\bar{Y}$ and the level of taxation required to pay for employment benefits are both dependent on interest rates; thus $t = t(r)$ or:

$$t(r) \quad = \quad \frac{g + [1 - N][1 - e(r)]b}{\bar{Y}(r)} \quad = \quad \frac{g + [1 - N][1 - e(r)]b}{w[N + [1 - N]e(r)] + A\tilde{a}} \qquad (14)$$

The effect of interest rates on the level of taxation needed (a) to pay for unemployment benefits for the increased number of unemployed, and (b) to compensate for the decreased tax base, is somewhat complicated. We assume throughout that b and g remain constant. Thus, benefits and pensions are not any more generous. Taxes are raised in order to pay for more people to receive benefits and to maintain the tax take given the smaller

tax base. To denote that g and b are constant, we label them g^* and b^*. Since the effect of interest rates on taxation operates through employment it is worth restating that $\partial e/\partial r = -\beta_e$.

$$\frac{\partial t}{\partial r} = \frac{1}{\bar{Y}}\left(\beta_e[1-N]b^*\left[1+\frac{w}{\bar{Y}}\left(g^*+[1-N][1-e]\right)\right]\right) = B > 0 \tag{15}$$

We denote $\partial t/\partial r$ by B in order to simplify the following expressions.[4] Having established both the direct and indirect effects of interest rates we can turn examining the effects of interest rates on our four groups:

$$\frac{\partial U_{AN}}{\partial r} = -B[\tilde{a}+w] + \delta\left[g^*\gamma_p - \tilde{a}\left[B[\pi_a-\pi_p]+[1-t][\gamma_a-\gamma_p]\right]\right] \tag{16}$$

$$\frac{\partial U_{\sim AN}}{\partial r} = -Bw + \delta g^*\gamma_p \tag{17}$$

$$\begin{aligned}\frac{\partial U_{A\sim N}}{\partial r} &= -B[\tilde{a}+we] - \beta_e[[1-t]w-b^*]+ \\ &\delta\left[g^*\gamma_p - \tilde{a}\left[B[\pi_a-\pi_p]+[1-t][\gamma_a-\gamma_p]\right]\right]\end{aligned} \tag{18}$$

$$\frac{\partial U_{\sim A\sim N}}{\partial r} = -Bwe - \beta_e[[1-t]w-b^*] + \delta g^*\gamma_p \tag{19}$$

The components of Equations (16) through (20) are as follows. First, the negative impact on period zero income caused by the positive response of taxation to raising interest rates, $-By_i$. This affects all groups, although

[4] B is dependent on the exogenous population parameters of wage level w, asset ownership and A and the proportion of labor market insiders N: thus $B = B(w, A, N)$, where $\partial B/\partial w < 0$, $\partial B/\partial A < 0$, and $\partial B/\partial N < 0$

asset owning insiders are most strongly impacted and asset non-owning outsiders are least impacted. Second, there is the negative effect of raising interest rates on employment, $-\beta_e[[1-t]w - b^*]$, which harms labor market outsiders only. Third, there is a positive impact on the value of the pension transfer, $\delta g^* \gamma_p$, since its real value is harmed less by price inflation when interest rates are high. All citizens benefit from this impact of reducing inflation.

Finally, there is a complex impact on asset valuation, $-\tilde{a}[B[\pi_a - \pi_p] + [1-t][\gamma_a - \gamma_p]]$, which impacts only asset owners. The first part of this expression represents the negative impact on asset returns caused by taxes rising when interest rates increase. The second part of the expression represents the direct impact of interest rates on asset and price inflation. When asset inflation sensitivity γ_a is larger than price inflation sensitivity γ_p, this effect will be negative. Intuitively, if increasing interest rates has no effect on prices but asset inflation is reduced significantly (or $\gamma_a > \gamma_p$), then assets will have a lower real valuation. This scenario resembles the current housing bubble, wherein price inflation is being kept in check by global competition and reduced unionization, whereas the rise in asset prices since 2002 appears closely linked to the low interest rates that held during that time. Conversely, if assets are insensitive to interest rates (or $\gamma_a < \gamma_p$), then real asset valuations would increase with interest rates. This scenario may more closely resemble the era of Keynesian management between 1950 and 1973, when housing prices were fairly stable but price and

wage inflation were both volatile and closely related to macroeconomic policy.

The balance between γ_p and γ_a is thus a critical determinant in ascertaining how macroeconomic policy differentlally affects owners and non-owners and, in particular, demonstrates that owners may actually favor lower interest rates than non-owners. As we shall see, if owners are represented by right-wing parties we may find that such parties favor lower interest rates in times where $\gamma_a > \gamma_p$, the opposite of the classic Hibbs model of partisan macroeconomic preferences.

Comparing the effect of the interest rate on the four groups is somewhat more complicated than was the case with taxation, given the number of new parameters. However, for most parameter values we find that the asset non-owning insiders are most favorable to raising interest rates because they face no employment risk and own no assets, hence face no negative effect on asset inflation. They experience only two effects of increased interest rates: first, an increase in their taxes conditional on B because of the effects of increased unemployment on the tax base and on the number of citizens receiving benefits; and second, an increase in the real value of their pensions as price inflation is reduced.

Conversely, asset owning outsiders are the most harmed by increased interest rates. Not only do they face increased period zero taxes but they also lose out from the reduced chance of employment and from the potential decline in their asset valuation.

The remaining two groups - asset owning insiders and asset non-owning outsiders - have more moderate views of interest rates. Which group is most opposed to raising interest rates will depend on whether the effects of interest rates are stronger on employment or on asset inflation. Asset owning insiders will be more opposed to increased interest rates than asset non-owning outsiders if the following condition holds:

$$(e-1)Bw - \tilde{a}\Big[B[1+[\pi_a-\pi_p]+[1-t][\gamma_a-\gamma_p]\Big] < -\beta_e[[1-t]w-b] \quad (20)$$

This equation is more likely to hold whenever asset sensitivity is higher than price sensitivity ($\gamma_a > \gamma_p$), when the impact of interest rates on taxation B is higher, when asset valuation $\tilde{a}$ is higher, when the impact of interest rates on employment β_e is lower, or when the gap between net wages and unemployment benefits, $(1-t)w-b$, is lower. Substantively, this implies that when the impact of interest rates on assets is much stronger than on employment and hence prices, asset owning insiders have a greater dislike for interest rates than do asset non-owning outsiders. This corresponds to the state of *Asset Dominance*. When the impact of interest rates on employment and prices is more important - the state of *Employment Dominance* - asset non-owning outsiders have a greater distaste for rising interest rates than do asset owning insiders. These results provides us with the preferences for each group over interest rates in Table 2.[5]

[5]Note that since price inflation π_p equals employment sensitivity β_e multiplied by β_p, whenever the effect of interest rates is much stronger on assets than employment it will

Table 2: Preferences over Interest Rates

	Insiders	**Outsiders**
Asset Owners	Dislike interest rates under *Asset Dominance*	Dislike interest rates most
Asset Non-Owners	Like interest rates most	Dislike interest rates under *Employment Dominance*

As was the case with taxation, increasing A and N attenuates the negative effects on utility of higher interest rates. In fact, this mechanism works through the same channels as before: by increasing the size of the tax base and reducing the number of unemployment benefit claimants. Since higher interest rates negatively affect employment, this would normally lead to a higher tax requirement through the parameter $B = \partial t/\partial r$ outlined above. However, as noted in footnote (2), since $\partial B/\partial A < 0$ and $\partial B/\partial N < 0$, increases in asset ownership and the number of labor market insiders reduce the pass-through of interest rates into higher taxation. However, while increased ownership and insider status attenuate the negative effects of taxation and interest rates through the fiscal mechanism, they have a quite different impact of the *political economy* of taxation and interest rates since they alter the differential size of voting groups.

also be stronger on asset inflation than price inflation for most values of β_p.

4 From Preferences to Politics

So far we have established only the preferences of different groups, defined by asset ownership and labor market status, over taxation and interest rates. To move from preferences to policy we need to examine how political parties might aggregate these preferences and how political equilibria are affected by changes in the size of each group, the relationship between asset ownership and labor market status, and the relative importance of wages and employment versus asset income.

We begin by assuming that the four groups are equally sized and that asset ownership and labor market status are uncorrelated. Referring back to Tables 1 and 2 we can array the preferences of each group in two-dimensional tax-interest space. As implied by the tables, we must distinguish between two states of the world: (a) the state where asset sensitivity is higher than employment sensitivity and asset income is particularly important; and (b) the state where asset sensitivity is lower than employment sensitivity and wage income is more important than asset income. The first state of the world can be thought of as the *Asset Dominance* model and the second as the *Employment Dominance* or Hibbsian model.[6]

We begin with the *Asset Dominance* model, displayed in Figure 3. Here we see two potential political coalitions emerge in two-dimensional space.

[6]Formally, the *Asset Dominance* model holds when both Equation (13) and Equation (20) hold. The *Employment Dominance* model holds in the reverse situation. Clearly, if only equation holds the analysis will be more complex and the interests of the intermediate groups - asset owning outsiders and asset non-owning insiders - will be more similar.

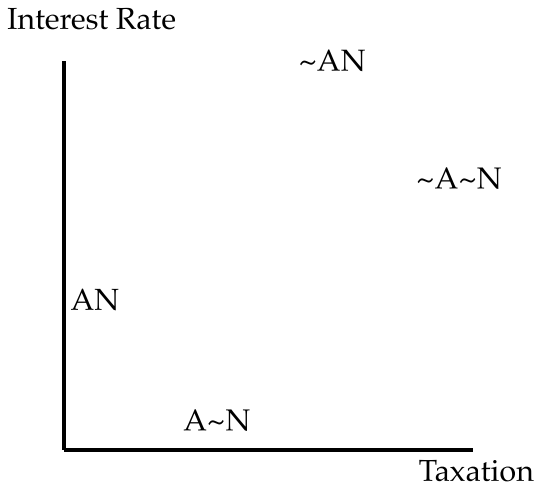

Figure 3: The Asset Dominance Model

First, in the lower left corner, with preferences for relatively low levels of both taxation and interest rates, we have asset owning insiders and asset owning outsiders. In the upper right corner, conversely, we have asset non-owning insiders and asset non-owning outsiders, with preferences for relatively high taxes and interest rates. In two-dimensional issue space we thus have two clear coalitions, based around asset ownership. Intuitively, when interest rates and taxation have stronger effects on asset income than they do on wage income, political coalitions will split along asset ownership lines. Substantively, this would appear as a political cleavage between home-owners and renters, or between the old and the young.

We now turn to the *Employment Dominance* model, displayed in Figure 4. Here we see two alternative coalitions. In the top left corner we have

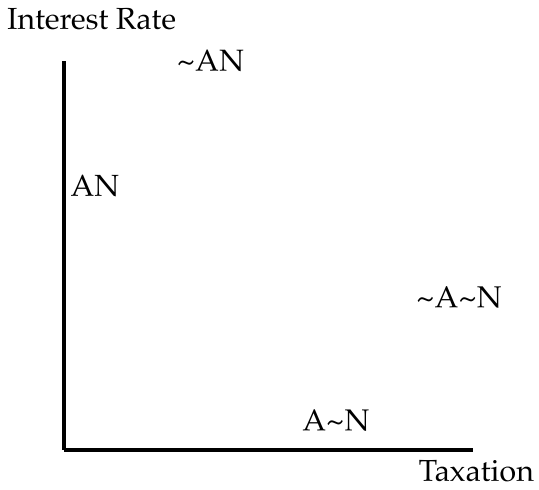

Figure 4: The Employment Dominance Model

asset owning insiders and asset non-owning insiders, with preferences for low taxation but high interest rates. In the bottom right corner we have asset owning outsiders and asset non-owning outsiders, with preferences for high taxation and low interest rates. This pattern of coalitions looks similar to the classic Hibbs model of the political economy of macroeconomic policy, with the trade-off between price inflation and employment the dominant political cleavage.

How can we translate the *Asset Dominance* and *Employment Dominance* models on to a left-right dimension? Multidimensional models are notoriously difficult to capture using the standard techniques of probabilistic voting or Downsian models because of the problem of cycling. However, there are three ways of informally approaching this question.

First, we can follow the underlying logic of the *Asset Dominance* and *Employment Dominance* models by assuming that in the former, assets are a greater share of income than employment, with the reverse pertaining in the latter. Further, we assume that right-wing parties represent the half of the population with greater income, with left-wing parties representing the poorer half. Clearly, for voting to be non-determinative, we would need to introduce a randomized ideological (or other) shock that would permit some asset owners to vote left and some asset non-owners to vote right. With this adjustment, along with the assumption of partisan politicians (that is, no convergence to the median voter) we would find that right-wing parties demanded low taxes and low interest rates in the *Asset Dominance model* and lower taxes but higher interest rates in the *Employment Dominance model*. Conversely, left wing parties would demand high taxes and high interest rates in the *Asset Dominance* model and high taxes and low interest rates in the *Employment Dominance* model.

The implication of this set-up is that in the *Asset Dominance* model, right-wing parties represent higher income, older, homeowners (whether insiders or outsiders) and left-wing parties represent low income, younger, renters (again crossing both insiders and outsiders). In the *Employment Dominance* model, conversely, right-wing parties represent young and old, wealthy labor market insiders, with the left representing young and old, poorer labor market outsiders. Empirically testing this proposition would be a useful confirmation of whether asset or employment income domi-

nates political coalitions in different time periods.

Second, we could assume that the intermediate groups of asset owning outsiders and asset non-owning insiders are smaller than the extreme groups of asset owning insiders and asset non-owning outsiders. A number of recent political economy models (for example, Iversen and Soskice, 2002; Iversen, 1999; Ansell, 2006; Persson and Tabellini, 2000) employ a 'three group' assumption, where parties compete for the votes of three socio-economic groups (typically the upper income group, the middle class, and the poor). In the case of two parties, we would expect the right-wing party to represent asset owning insiders and the left-wing party to represent asset non-owning outsiders, with the remaining intermediate group split between the two parties. The intermediate group would vote probabilistically, with the relative size of asset owning outsiders versus asset non-owning insiders partially determining which party wins a majority. Because of the fixed preferences of each party's 'core' support we can still derive the expected policy position of each party. In the *Asset Dominance* model, right wing parties will continue to prefer low taxation and low interest rates and left-wing parties high taxation and high interest rates. However, the partisan gap on interest rates is likely to be smaller than that on taxation because the base groups have stronger preferences over taxation than they do over interest rates (put differently, the intermediate groups are the ones with the strongest preferences over interest rates). The *Employment Dominance* model sees a similar pattern of

taxation preferences being stronger than interest rate preferences, albeit with right-wing parties preferring low tax and high interest rates and left-wing parties preferring high tax and low interest rates.

Third, we could simply remove the intermediate groups from analysis, thereby assuming that the categories of asset ownership and labor market insider status are coterminous. In this case we simply examine the preferences of asset owning insiders versus asset non-owning outsiders, with the former represented by right-wing parties and the latter represented by left-wing parties. Once more we see the pattern of right-wing parties demanding lower interest and lower taxes and left-wing parties demanding higher taxes and interest rates in the *Asset Dominance* model, with right-wing parties demanding lower taxes but higher interest rates and left-wing parties demanding higher taxes and lower interest rates in the *Employment Dominance* model.

The key conclusion to our analysis of the political cleavages is that political choice over the interest rate depends on whether the *Asset Dominance* or *Employment Dominance* model prevails. Table 3 demonstrates how right and left wing parties vary in their preferences over taxation and interest rates across the two models. While party preferences over taxation remain constant across the two models, their preferences over interest rates switch.

What are the effects of expanding asset ownership or changing labor market status on political coalitions and party preferences? We being by

Table 3: Party Preferences over Taxation and Interest Rates

	Left Wing Parties	**Right Wing Parties**
Asset Dominance	High Taxation High Interest Rates	Low Taxation Low Interest Rates
Employment Dominance	High Taxation Low Interest Rates	Low Taxation High Interest Rates

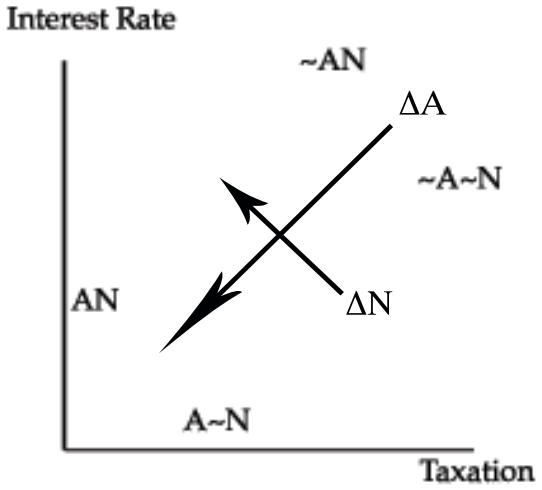

Figure 5: Changes in Asset Ownership and Labor Market Status in the Asset Dominance Model

examining the impact of these changes in the state of *Asset Dominance*. Figure 5 shows the likely direction of policy as asset ownership or the number of insiders increases. When asset ownership increases, we will see a growth in the AN / $A \sim N$ coalition, which will, assuming coalition size translates effectively into policy outcomes, cause a reduction in both the level of taxation and interest rates. As a corollary, we would expect pension provision and unemployment benefits to be reduced when asset ownership expands in a world of *Asset Dominance*. The effect of increasing the number of labor market insiders differs. This increases the relative size of the AN / $\sim AN$ coalition, which implies, like before, a decrease in taxation, but also an increase in interest rates. Note that the impact on both taxes and interest rates is considerably smaller when the insider group expands than when asset ownership expands.

Expanding asset ownership and the number of labor market insiders has a slightly different effect in the state of *Employment Dominance*, as seen in Figure 6. In this case, as before increasing asset ownership should lead to a decrease in both taxes and interest rates whereas increasing the number of labor market insiders should reduce taxes but increase interest rates. However, whereas the impact of increasing asset ownership was larger than that of increasing the number of insiders in the *Asset Dominance* model, the reverse is true in the *Employment Dominance* model. Here, as people become more secure in the labor market, they develop a strong distaste for both price inflation and taxation. However, since asset income

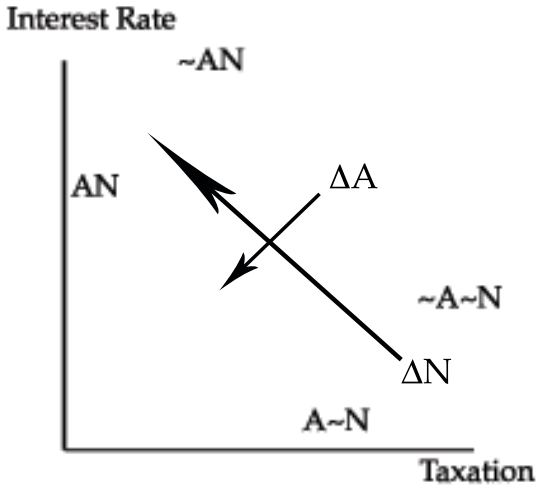

Figure 6: Changes in Asset Ownership and Labor Market Status in the Employment Dominance Model

matters less, the impact of asset ownership is smaller. Note that in both states of the world, the directions of the arrows are identical. Thus the more general implication is that increasing asset ownership should push down interest rates (although there is clearly an endogeneity problem in testing this assertion) and decrease tax rates, thereby decreasing pensions and unemployment benefit provision. I develop further conclusions about these policy items in the next section.

5 The Impact of Monetary Institutions

The political equilibrium above was derived by assuming that politicians could set interest rates to achieve electoral or partisan goals. However,

many states have independent central banks that remove this discretion from the hands of politicians. Although the literature on the effects of monetary institutions on the political economy of monetary policy is vast, certain commonalities are present across the debate.[7] As Hall and Franzese (2003) note, the classic Barro-Gordon-Rogoff model of central banking makes two key assumptions about independent central banks, which permit these institutions to achieve low rates of inflation without sacrificing employment: (a) the *credibility* of the bank's signals to labor market actors about monetary policy; and (b) the *conservatism* of central bankers themselves, which supports their interest in low inflation without the incentive to pump-prime employment.

This paper takes issue with the second of these assumptions.[8] A number of scholars have explored whether the predilections of central bankers might vary substantially, distorting the assumption of conservatism (see, in particular, Adolph, 2004). However, even if bankers are reliably conservative in their partisan leanings, this does not, in itself, suffice to show that inflation will remain low. The monetary institutions literature assumes that conservatism implies higher interest rates because conservative central bankers dislike price inflation and do not care sufficiently about employment to permit higher levels of price inflation. Price inflation, as we saw in the model above, follows a Hibbsian partisan logic, with poorer in-

[7] See for example,(Barro and Gordon, 1983; Rogoff, 1985)

[8] Hall and Franzese attack the first assumption, arguing that the ability of labor market actors to follow central bankers' signals is dependent on union organization.

dividuals willing to tolerate higher inflation than richer individuals, given that high price inflation boosts employment (at least in the short run).

However, if 'conservatives' benefit disproportionately from asset inflation, then the Hibbsian logic may not hold. In this reverse scenario, conservative central bankers may have a partisan interest in *lower* interest rates in order to encourage higher asset inflation. This section explores the impact of independent central banks on the political equilibrium developed in the previous section, noting that the traditional view of the inflation-reducing impact of independent central banks may not hold in a world where asset inflation is more interest-rate sensitive than price inflation.

We begin by noting that introducing an independent central banker compacts the two-dimensional choice of politicians in the previous section - over both taxation and interest rates - into a one-dimensional model of choices over tax rates, since the independent central banker takes control of interest rates. For a fixed interest rate we can compare the preferences over taxation of our four groups, as noted in Table 1. Asset owning insiders are expected to desire the lowest tax rates with asset non-owning outsiders desiring the highest tax rate. The intermediate groups desire more moderate levels of taxation, with the order between asset owning outsiders and asset non-owning insiders determined by Equation (13). Whichever order among the intermediate groups holds, in all cases we expect right-wing parties to desire lower taxation and left-wing parties to desire higher taxation as in Table 3.

Thus, partisan politics under independent central banks is not hugely interesting and does not vary substantially between the *Asset Dominance* and *Employment Dominance*. However, we can note that when asset inflation is higher, we would expect all asset owners to prefer lower levels of public pension provision. Thus, if right-wing parties disproportionately represent asset owners we would expect right-wing parties to have a stronger aversion to taxation and demand lower levels of pension provision under the *Asset Dominance* model than they do under the *Employment Dominance* model. Conversely, left-wing parties will demand higher levels of unemployment insurance under the *Employment Dominance* model than they do under the *Asset Dominance* model. Thus, though the political cleavages with an independent central banker are less interesting than those where politicians set interest rates (due to the compacting of multi-dimensional policy space into a single dimension', there remain interesting implications about *within*-party change in policy preferences across the *Asset Dominance* and *Employment Dominance* models, as laid out in Table 4.

Table 4: Within-Party Changes in Policy Preferences under CBI

	Left Wing Parties	**Right Wing Parties**
Asset Dominance	Lower Unemployment Benefits	Lower Pensions Provision
Employment Dominance	Higher Unemployment Benefits	Higher Pension Provision

Re-examining the 'Conservative' Central Banker Theory: We now turn to examine the independent central banker's preferences over interest rates. The benchmark model for central banker preferences assumes that inflation enters their utility function quadratically, with a maximum at a price inflation target π_p^*.[9] The assumption that central bankers are conservative also means that economic growth enters into their utility function quadratically, with the natural rate of growth Δy^* as their ideal point.[10] Associated with the natural rate of growth is the natural level of employment e^*. For the sake of consistency with the model in Section 3, I model economic growth as monotonically related to employment: $\Delta y = f(e)$ where $\Delta y^* = f(e^*)$. Since the model in Section 3 derives price inflation as a function of employment, we can frame the central banker's preferences in terms of $\pi_p(e) = \beta_p e$, where $\pi_p^* = \beta_p e^*$. In as much as 'conservativism' in a central banker implies reluctance to raise the rate of economic growth and hence employment above their natural levels, and assuming that doing so would raise price inflation, standard models assert that central bankers are inflation-averse. However, these standard political economy models solely examine economic activity and inflation in the goods market and ignore asset inflation. Thus, the standard utility function for an independent central banker, as laid out in the political economy literature, can be

[9] Typically, π_p^* is defined as expected inflation π^e.

[10] This setup is used in, for example, Clark (2003), Clark and Hallerberg (2000)

characterized as:

$$\hat{U}_{ICB} = -[\pi_p(e) - \pi_p^*(e)]^2 \tag{21}$$

How might this formulation be altered in a world where central bankers, by manipulating interest rates, can also affect asset inflation? The outcome rather depends on the meaning of 'conservatism'. If 'conservative' central bankers are those who are averse to inflation *per se*, then presumably this would apply as much to asset inflation as price inflation (at least, controlling for fundamental demand and supply effects in asset markets). A simple quadratic loss function for asset inflation, with ideal point π_a^*, would be thus be included in their utility function. In that case, our *inflation averse* independent central banker, denoted IA would have the following utility function.

$$U_{ICB}^{IA} = -[\pi_p(e) - \pi_p^*(e)]^2 - [\pi_a - \pi_a^*]^2 \tag{22}$$

The *inflation averse* independent central banker adjusts interest rates in order to maximize utility. Since interest rates affect price and asset inflation through the sensitivity parameters γ_p and γ_a, we adjust Equation (22) accordingly:

$$U_{ICB}^{IA}(r) = -[\beta_p[\bar{e} - \beta_e r] - \pi_p^*(e)]^2 - [[\bar{\pi}_a - \gamma_a r] - \pi_a^*]^2 \tag{23}$$

Which produces the following first order condition:

$$r^{IA} = \frac{\gamma_p[\beta_p\bar{e} - \pi_p^*] + \gamma_a[\bar{\pi}_a - \pi_a^*]}{\gamma_p^2 + \gamma_a^2} \tag{24}$$

The resulting interest rate from an *inflation averse* independent central banker is fairly simple. The optimum interest rate r^{IA} rises in both price sensitivity γ_p and asset sensitivity γ_a, as well as in the 'maximum' rates of price inflation and asset inflation $\bar{\pi}_p = \beta_p\bar{e}$ and $\bar{\pi}_a$ and is reduced in the levels of targeted price and asset inflation π_p^* and π_a^*. The central banker has no partisan interest in targeting price versus asset inflation other than by responding to whichever is most interest rate sensitive.

We now turn to the case where the independent central banker has 'conservative' preferences in the sense of sharing the partisan interests of right-wing parties. In the classic political economy model of independent central banks, this shared partisanship is optimal, since only by having an interest in increasing employment at the expense of inflation, can the suboptimal outcome of the time inconsistency problem emerge. If neither 'conservative' central bankers nor 'conservative' governments have such an interest the problem vanishes (on the assumption that 'conservative' parties have no interest in causing short-term rises in economic activity for political business cycle reasons). However, independent central bankers who are 'conservative' in the partisan sense may not avoid this problem, since as we saw before, under the conditions of *Asset Dominance* right-wing parties demand lower interest rates. *Partisan conserva-*

tive bankers may thus benefit from higher asset inflation, with their level of partisanship modeled with the parameter $\alpha \in [0, 1]$. For fully *inflation averse* central bankers $\alpha = 0$. Thus the utility function of a *partisan conservative* independent central banker U_{ICB}^{PC} can be phrased as follows.

$$U_{ICB}^{PC} = -[\beta_p[\bar{e} - \beta_e r] - \pi_p^*(e)]^2 + \alpha[\bar{\pi}_a - \gamma_a r] - [1 - \alpha][[\bar{\pi}_a - \gamma_a r] - \pi_a^*]^2 \quad (25)$$

Taking the derivative of this expression with respect to the interest rate we derive the first order condition for the optimal interest rate for the *partisan conservative* independent central banker.

$$r^{PC} = \frac{\gamma_p[\beta_p \bar{e} - \pi_p^*] + [1 - \alpha]\gamma_a[\bar{\pi}_a - \pi_a^*] - \frac{1}{2}\gamma_a \alpha}{\gamma_p^2 + \gamma_a^2} \quad (26)$$

The *partisan conservative* central banker will always prefer a lower interest rate than the *inflation averse* central banker:

$$r^{PC} = r^{IA} - \alpha\gamma_a \left[[\bar{\pi}_a - \pi_a^*] + \frac{1}{2}\right] \quad (27)$$

Note that the gap between interest rates favored by an *inflation averse* central banker and a *partisan conservative* banker rises with α, the level of partisanship of the banker, with γ_a, the sensitivity of asset inflation to changes in the interest rate, and with $[\bar{\pi}_a - \pi_a^*]$, the gap between maximum asset inflation and targeted asset inflation. In conditions where the

central banker is very conservative in the partisan sense and when asset sensitivity is particularly high - for example, during an asset bubble - we would expect correspondingly low interest rates. Substantively, this appears similar to the famous 'Greenspan put' mentioned in Shiller (2005, 40-41), which refers to the disinclination of famously conservative central banker to raise interest rates during the stock market boom of 1995 to 2000. Shiller also notes a similar 'put' following 9/11 through to 2003, which was a likely precursor of the housing bubble. Greenspan's later declarations in 2005 that historically low interest rates throughout the prime *and* subprime mortgage markets were unconcerning, provides more direct evidence of his attitude towards interest rates at a time of high potential asset price sensitivity (given that the peak of the US housing boom was reached in 2005-6).

6 Some Preliminary Tests

In this section, I undertake a preliminary test of part of the argument developed above. In Section 5, I argued that periods of *Asset Dominance* will be characterized by reduced demand for public pensions, as citizens rely on house price appreciation for their future income. I argue that citizens with ample asset appreciation will be those most sensitive to higher taxation to pay for public pensions and will also be least demanding of such public provision given their large private savings in the form of returns

on their assets. Section 5 claimed that where the owners of assets are more likely to be members of right-wing parties we will see right-wing parties, *in particular*, emphasize reduced public pension provision. But the more general argument based on individual preferences, as derived in Section 4, implies that more broadly this partisan dynamic is a function of the difference in preferences between asset owners and non-owners. More generally, I argued that asset owners should become increasingly tax-sensitive during periods of high asset inflation. Hence in this section I conduct a set of preliminary tests of whether asset price appreciation is empirically linked to preferences over public pension provision and taxation.

In developing these tests I use public opinion data from the 2004 American National Election Survey (henceforth NES) merged with house price appreciation data from the Case-Shiller Housing Index of twenty American Metropolitan Statistical Areas (MSAs). In order to operationalize the preferences of asset owners versus non-owners and *Asset Dominance*, I construct a measure of the degree of house price appreciation that each survey respondent has experienced. I then use an ordered logit analysis (or binary logit depending on the dependent variable) to test whether this house price appreciation measure impacts preferences social security spending and taxation.

Constructing an indicator of individual asset appreciation requires combining data from aggregate house price data and individual survey information on asset ownership. To do so, I take advantage of the Case-Shiller

index, which provides data on average house price inflation in twenty MSAs across the United States, dating back, in some cases, to 1987. The MSAs include New York / New Jersey / Connecticut; Boston; Philadelphia; Washington DC; Atlanta; Charlotte; Miami; Tampa; Dallas; Houston; Cleveland; Detroit; Chicago; Minneapolis; Phoenix; Las Vegas; Portland; Seattle; San Francisco; and Los Angeles. While this range of cities includes some with extraordinary price appreciation since 1990, for example Phoenix and Los Angeles, it also includes cities like Detroit, Houston, and Cleveland, that experienced relatively little price growth and occasional declines across this period.

However, while house price growth in MSAs may have MSA-wide effects that impact both owners and non-owners, we cannot effectively address our question of the impact of asset price appreciation on Social Security preferences by simply using MSA dummies or the rate of MSA-wide appreciation as a variable. The problem lies in the fact that individuals are likely to have sharply differing preferences depending on whether they are home owners or renters and furthermore *how long* they have owned their property (and hence the appreciation that they have garnered).

Thus to create a more effective individualized measure of asset price appreciation I use data from the 2004 NES to ascertain (a) if individuals own or rent, and (b) the length of time they have owned their property.[11] I then use the length of ownership to construct an estimate of

[11]I use data from both the 'Pre' and 'Post' election surveys, which have different ques-

the asset price appreciation individuals have experienced since they purchased their property by assigning to each individual the growth in property prices in their MSA since the date of purchase. For owners who purchased before 1987, I truncate their appreciation to that gained since 1987 due to lack of earlier data. Renters score zero on this index. The variable has a mean of .51, a standard deviation of .54, and ranges between zero and 1.98.

Clearly, the house price appreciation variable I create does not provide us with the *actual* level of appreciation of an individual's particular house; such data would in any case be unavailable for privacy reasons since the NES does not provide personal identification. However, on the assumption that on average the MSA aggregate reflects the balance of house price appreciation for individuals in the survey, this variable provides effectively as close a measure of house price appreciation as we are likely to get, short of supplying an actual survey question on appreciation.

As control variables, I employ three different measures of political preferences. Controlling for political preferences is particularly important given that the theoretical argument above argues that partisanship and asset ownership is likely to be correlated. Furthermore, the political debates over Social Security and taxation typically places Democrats on the side of increased funding and taxes and Republicans on the side of reduced

tions about tax and spending preferences - I alter the control variables to ensure they correspond to the period in which the questions are being asked.

public funding and taxes. I use three measures: firstly, the feeling thermometer score for George W Bush, which ranges from zero to one hundred; secondly, a dummy variable for if the respondent is a registered Republican; and thirdly a Party ID measure from one (strong democrat) to seven (strong republican). For the other control variables I use gender, age, highest level of education achieved, and household income.

I begin by testing the proposition that asset owners will prefer lower public provision of pensions in times of high asset price appreciation.In order to tap preferences over public pensions spending I use a question from the pre-election survey section of the 2004 NES that asks whether individuals would like to see Federal spending on Social Security increased, remain the same, or decreased. I combine these answers into a three point scale.

The statistical technique I employ in Table 5 is an ordered logit, which is appropriate given the three point scale on the dependent variable, and the uncertainty about whether these three positions regarding Social Security are equidistant on an interval scale in terms of measuring underlying preferences towards public pensions. I present six models, which differ in the partisanship measure they employ and in whether they use post-stratification sample weights as supplied in the NES.[12] The advantage of sample weights is, of course, that they adjust observations for their sam-

[12]These sample weights differ between the 'Pre' and 'Post' election surveys, thus I use two different sets of sampling weights across the three estimations in Tables 5 through 7.

Table 5: House Appreciation and Preferences over Funding Social Security

	(1)	(2)	(3)	(4)	(5)	(6)
House Appreciation	-.654	-.555	-.645	-.546	-.624	-.538
	(.230)***	(.320)*	(.237)***	(.319)*	(.240)***	(.323)*
GWB Feeling	-.007	-.005				
	(.005)	(.007)				
Republican			-.654	-.655		
			(.273)**	(.319)**		
Party ID					-.161	-.165
					(.042)***	(.050)***
Gender	.433	.392	.421	.382	.369	.338
	(.237)*	(.309)	(.251)*	(.320)	(.249)	(.313)
Age	-.0007	-.002	-.002	-.003	-.004	-.004
	(.009)	(.011)	(.009)	(.011)	(.009)	(.012)
Education	-.267	-.234	-.221	-.198	-.253	-.235
	(.075)***	(.116)**	(.063)***	(.095)**	(.062)***	(.094)**
Income	.013	-.010	.009	-.014	.011	-.010
	(.021)	(.026)	(.022)	(.028)	(.022)	(.027)
First Difference	-.195	-.158	-.190	-.155	-.188	-.153
Weights	N	Y	N	Y	N	Y
Obs.	246	246	246	246	245	245

ple versus population weight. However, we are not using the entire NES sample but a particular sub-sample that is not representative of the overall sample or indeed the US population as a whole: individuals who live in MSAs. Thus the appropriateness of sample weights under these conditions is questionable. This problem is further accentuated by the much smaller sample size when observations are restricted to MSAs: the observations drop from over 1,000 in the full NES sample to under 250. Under these small sample conditions, weighting an observation by 0.5 or by 2 has a much larger effect on estimates and standard errors than when using the full NES sample. Thus, given the uncertainty about the appropriateness of sample weighting in these conditions, I conduct each estimation twice, once with and once without weights. All standard errors are adjusted for clustering within MSAs.

Models 1 through 6 are presented in Table 5. Models 1 and 2 use the George W Bush feeling thermometer as their partisanship variable. In fact, that variable is not statistically significant in either model. However, the house price appreciation variable *is* statistically significant in both regressions, albeit only at the ten percent level in Model 2, which use sample weights. The *First Difference* row in Table 5 shows the effect of moving from the tenth to the ninetieth percentile in terms of the house price appreciation variable on the probability of wanting to increase federal spending on Social Security. Models 1 and 2 show that this change in house price appreciation is associated with a fifteen to twenty percent decrease in sup-

port for increased Social Security spending.

Models 3 through 6 show very similar results, albeit with the partisanship variable now significantly and negatively related to support for increased Social Security spending. The estimates on the impact of house price appreciation differ little from Models 1 and 2, demonstrating that this effect is robust to a number of different operationalizations of partisanship; important given our concerns about the correlation between partisanship and both asset ownership and Social Security preferences.

Table 6 uses data from the 2004 Post-Election survey in order to ascertain the effect of asset price appreciation on tax preferences. Specifically the respondents are asked "Do you favor an increase in the federal budget deficit in order to cut the taxes paid by ordinary Americans"? This question then estimates the propensity of Americans to desire reduced taxes, no matter the consequences for overall budgetary stability. The question is coded as a simple yes / no, hence I employ a simple binary logit estimation strategy. As before the difference between the models (1 through 4) is the partisanship variable used and whether sampling weights were employed. I omit the Party ID from Models 5 and 6 of Table 5 since including it leads to 'over-prediction' of the dependent variable (that is, Party ID perfectly predicts the response of the 216 respondents in this limited sample).

The results in Table 6 show strong support for the assertion that house price appreciation makes individuals more tax sensitive. In all four mod-

Table 6: House Appreciation and Preferences over Tax Cuts

	(1)	(2)	(3)	(4)
House Appreciation	.667	.807	.696	.796
	(.245)***	(.278)***	(.245)***	(.271)***
GWB Feeling	.018	.020		
	(.004)***	(.005)***		
Republican			.635	.639
			(.283)**	(.312)**
Gender	.094	.121	.046	.082
	(.248)	(.313)	(.240)	(.278)
Age	-.046	-.046	-.042	-.040
	(.008)***	(.011)***	(.008)***	(.012)***
Education	-.321	-.401	-.399	-.467
	(.101)***	(.115)***	(.105)***	(.123)***
Household Income	-.031	-.043	-.015	-.019
	(.027)	(.027)	(.027)	(.027)
Constant	2.310	2.799	3.030	3.322
	(.587)***	(.817)***	(.537)***	(.835)***
First Difference	.204	.238	.213	.239
Weights	N	Y	N	Y
Observations	216	216	217	217

els there is a highly robust estimate of a positive impact of appreciation on the probability that individuals will answer the tax-cutting question in the affirmative. Moving from the 10th to 90th percentile on the house appreciation data - which means moving from a renter (or an owner with no appreciation) to an owner who has experienced a 130% increase in the price of their house - is associated with a twenty to twenty-four percent increase in the likelihood of supporting deficit-widening tax cuts. This table then provides strong empirical evidence for the claim that asset owners who experience high levels of appreciation will become more tax-sensitive, even controlling for their partisanship, earned income, education, and other demographic characteristics.

Table 7, however, provides a somewhat different, opposed view of the effect of house price appreciation on tax preferences. This table uses as its dependent variable a question from the pre-election survey of the 2004 NES, which asks "Do you feel you are asked to pay more than you should in federal income taxes, about the right amount, or less than you should"? There are two distinct differences with the previous tax question, aside from their timing with respect to the election. First, this question is a less direct one in terms of views about the level of overall taxation and also lacks a direct trade-off in the question. Consequently, this question appears more normative than the earlier one, and may pick up what respondents 'think' the right answer is, rather than their actual opinion. Second, and potentially more important, this question asks directly about federal

Table 7: House Appreciation and Personal Income Tax Burden

	(1)	(2)	(3)	(4)	(5)	(6)
House Appreciation	.799	.831	.804	.845	.846	.885
	(.210)***	(.270)***	(.206)***	(.268)***	(.208)***	(.275)***
GWB Feeling	.003	.004				
	(.004)	(.004)				
Republican			.056	-.135		
			(.304)	(.385)		
Party ID					.008	-.029
					(.062)	(.083)
Gender	-.196	-.133	-.201	-.140	-.175	-.123
	(.305)	(.315)	(.307)	(.313)	(.311)	(.312)
Age	.005	.007	.005	.008	.005	.008
	(.010)	(.012)	(.010)	(.012)	(.011)	(.012)
Education	.208	.193	.188	.170	.193	.168
	(.101)**	(.128)	(.096)*	(.123)	(.102)*	(.134)
Household Income	-.045	-.033	-.041	-.028	-.042	-.028
	(.020)**	(.022)	(.020)**	(.023)	(.020)**	(.025)
First Differences	.241	.248	.243	.227	.250	.240
Weights	N	Y	N	Y	N	Y
Observations	237	237	237	237	236	236

income taxes whereas the previous one mentions just 'taxes' overall. Since property tax is part of the latter but not the former, it is possible that respondents are simply ignoring the impact on property taxes of house price appreciation in this pre-election question about whether they should pay more or less but are including property taxes in the broader question about cutting taxes more generally.

Caveats aside, empirical analysis of the effect of house price appreciation on answers to this question reveals an interesting pattern. I use an ordered logit since the question has three answers - too much, the right amount, and not enough. The surprising result in Table 7, across all six models, is that there is a highly robust *positive* relationship between house price appreciation and the respondent answering that they do not pay enough (or pay the right amount) of *income* taxes rather than that they pay too much. A move from the 10th to 90th percentile on the appreciation variable reveals that individuals with high rates of appreciation are around twenty-five percent more likely to say that they are taxed enough on their income or too little compared to a renter. This surprising result suggests that homeowners who appreciate high levels of house price appreciation, even while their incomes remain constant, may feel richer and hence *expect* that they should be paying higher levels in taxation - or conversely, that renters who are struggling to get on the property ladder may feel the bite of income taxation more than owners.

The key question is whether the 'income' element of the question is driving this result. If this is indeed the case, then the result is reconcilable with the model as it shows that asset owners are less reliant, and asset non-owners more reliant, on earned income subject to income taxation. However, if this is not the case, and respondents are not differentiating between income taxation and more general taxation including property taxes then this result remains somewhat more mysterious. Regardless of

the precise answer, these three estimations on the effects of house price appreciation on social security and taxation show a powerful role for appreciation, often stronger and more robust than standard demographic variables. Further testing on different samples, in different years, or in different countries, will help to flesh out these findings.

7 Conclusion

This paper has developed a theoretical framework for thinking about preferences, political coalitions, and policy outcomes in a world where asset inflation is becoming increasingly important. Distinguishing between *Asset Dominance* and *Employment Dominance* states of the world demonstrates that changes in the determinants of price and asset volatility can also alter political coalitions over taxation, pensions, unemployment benefits, and interest rates, and can even undermine the *raison d'être* for a 'conservative' independent central banker.

The implications of asset inflation are thus profound for political economy, though this paper represents only a tentative step in the direction of a broader research program. As Iversen and Soskice (2006*b*) have noted, the institutionalist literature on the political economy of macroeconomics has rather stripped partisan politics from its models, assuming a technocratic view of how optimal institutional design can reduce partisan discretion. This paper reintroduces partisan politics into the study of macroeconomic

policy in two manners.

First, it shows that the classic Hibbsian model of right-wing parties preferring higher interest rates and left-wing parties preferring lower interest rates can be flipped on its head when we consider asset inflation. If right-wing parties' constituencies begin to care relatively more about the value of their assets than about price inflation (which appears to be quelled in most OECD states) then it should not surprise us to see conservative parties be the chief proponents of monetary easing. Conversely, left-wing parties, unable to manipulate employment through macroeconomic policy, may turn their concerns instead to the relative asset poverty of their base, as housing prices shoot out of the range of the poor and young. They may, then, demand a contractionary policy. Both parties, this paper notes, may end up reducing unemployment benefits and pensions under *Asset Dominance*, thereby contributing to a re-marketization of insurance against age and unemployment. The house as 'nest egg' may replace the charity of the state.

Second, I show that clever institutional design may not be sufficient in holding back inflation. While the technocratic fix of the 'conservative' central banker may well prevent the time inconsistency dilemma that leads to spiraling price inflation, no such pattern is ensured in terms of controlling asset inflation. The 'conservative central banker' scheme is effective in a world of *Employment Dominance* because a conservative has no vested interest in low interest rates and inflation in such a world. However, under

Asset Dominance conservative partisan leanings might be reflected in a tolerance for higher levels of asset inflation than would be permitted by a neutral *inflation averse* central banker.

Thirdly, in a preliminary test, I show that house price appreciation does appear to have an empirically robust relationship to individual preferences over government policies, specifically Social Security and tax rates. While combining the NES survey and the Case Shiller house index leads to a somewhat truncated dataset, making survey analysis with population weights less effective, I nonetheless find a sustained and robust impact across specifications of asset price appreciation on Social Security and tax preferences, with individuals who have experience house price doubling 15 percent less likely to support expansion and with sizable impacts on preferred tax rates and opinions about the personal tax burden.

This paper develops a mostly theoretical step towards the study of the political economy of asset inflation. The next step must continue the empirical work conducted in the previous section. At the individual level, examining the preferences of individuals over other economic policies than social security and taxation, conditioned on their asset ownership, would be a useful contribution. At the macro level, one could trace the evolution of taxation and interest rate policies as home ownership has expanded so as to test Section 4's assertion that increases in asset ownership lead to lower taxation and interest rates. Cross-sectional time series analysis in the Hibbsian mold could ascertain whether the partisan preferences sug-

gested by this paper have indeed flipped as asset bubbles have become more macroeconomically significant. Finally, cross-national case analysis would be a useful way of testing the mechanisms suggested by this paper. For example, while many OECD countries experienced a housing bubble between 2001 and 2006, Germany and Sweden did not. The former has a (highly) independent central bank, whereas the latter has a more dependent central bank, providing some nice variation when comparing these states to those like Ireland (independent central bank) and the UK (dependent then independent) central bank. Such studies could tease out the implications of this paper, refining the conceptualization of political coalitions and central bankers and examining policies not incorporated in this paper, for example financial deregulation and planning laws. Whatever the findings and their import for the validity of the theory tested in this paper, it is clear that the recent phenomenal growth in housing and stock market valuations in the industrial world will have large political and redistributive impacts. The hitherto slumbering politics of macroeconomic policy have been awakened.

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