

# Private Goals and Monetary Policy: Inflation and Resignations from the Federal Reserve Board \*

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My object all sublime  
I shall achieve in time  
To let the punishment fit the crime  
The punishment fit the crime  
W. S. Gilbert, *The Mikado*

Dear Mr. President:

I wish to tender herewith my resignation as a Member of the Board of Governors of the Federal Reserve System, effective May 15, 1976, or such earlier date as may suit your convenience. I take this action with deep regret, but the fact is that I simply cannot afford to serve in this capacity any longer.

Robert C. Holland

## 1. Introduction

None of us, at home or at work, is purely an "economic man"; nor are we entirely altruistic. It is difficult to find fault with Adam Smith's view of human behavior as the result of a mutually supporting

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combination of self-interest and sympathy towards one's fellow creatures.<sup>1</sup> Since public officials are people, too, it is at least plausible that their actions, public as well as private, are also produced by mixtures of self-interest and public responsibilities. The relative importance of the components of this mixture has become the focus of a significant research effort by economists and political scientists. These have not been studies of criminal behavior or even necessarily of violations of the spirit of the laws with which officials have been entrusted. Laws are subject to honest differences of interpretation and one may easily be persuaded that a construction which is good for oneself is good for one's country.

In an early call to economists to use their analytical tools to explain why regulators behave as they do, George Stigler (1971) concluded:

Until the basic logic of political life is developed, reformers will be ill-equipped to use the state for their reforms, and victims of the pervasive use of the state's support of special groups will be helpless to protect themselves. Economists should quickly establish the license to practice on the rational theory of political behavior.

Stigler's call was followed by an outpouring of empirical studies of regulators' behavior, including, in the last decade, the monetary authorities.<sup>2</sup> Several of these studies have reported tests of the hypothesis that the public actions of central bankers, specifically monetary policy, have been influenced by their personal goals, and some have concluded that one of the causes of inflation has been the Federal Reserve System's bureaucratic interest in inflation.<sup>3</sup> The proponents of this theory take as their point of departure Niskanen's (1971) argument that the bureaucrat's utility function includes "salary, perquisites of the office, public reputation, power, patronage, output of the bureau, ease of making changes and ease of managing the bureau. All of these variables except the last two ... are a positive

<sup>1</sup> *The Theory of Moral Sentiments* (Smith 1759). Although self-interest receives the greater emphasis, this "correspondence of sentiments" is carried forward into the second chapter of *The Wealth of Nations* (Smith 1776) as a contributor to "the propensity in human nature ... to truck, barter, and exchange one thing for another". The roles of self-interest and sentiment (the pleasure gained from others' happiness) in Smith's explanation of human behavior are discussed at length by Myers (1983, chs. 8-9).

<sup>2</sup> Several of these studies are discussed below.

<sup>3</sup> See Toma (1982) and Boyes, Mounts and Sowell (1988).

monotonic function of the total budget of the bureau" (p. 38). Federal Reserve officials are well placed to achieve their private goals because their operations generate revenues that are paid to the Treasury only after the deduction of operating expenses which cannot be monitored effectively by the Treasury or Congress. Since these revenues are derived from the creation of high-powered money, so the argument goes, the Federal Reserve bureaucracy benefits from inflation.

In 1989, New Zealand's Parliament sought to neutralize the Reserve Bank's inflationary tendencies by making price stability its primary goal and providing for the dismissal of the governor of the Bank if it misses an inflation target arranged in consultation with the minister of finance. Andreas Fischer (1993) interprets this arrangement as an attempt to reduce inflationary expectations by resolving the credibility problems of the central bank and the government in a Phillips curve world in which the central bank has a short-run incentive to cause unexpectedly high inflation and the government is politically motivated to pressure the central bank to monetize deficits. He writes that it is too early to draw any conclusions regarding the effectiveness of this legislation, but Carl Walsh (1993) infers from a model in which "the central banker shares society's preferences concerning output stabilization and inflation but also cares about holding office" that the threat of dismissal can be an effective means of avoiding inflation.<sup>4</sup>

This paper presents further evidence – produced by a natural experiment in which their real incomes have been functions of inflation – on the relationship between monetary policy and the personal costs and benefits of inflation to central bankers. Members of the Board of Governors of the Federal Reserve System are severely restricted in their access to outside income, and their salaries have been insensitive to inflation.<sup>5</sup> Between the inception of the Federal

<sup>4</sup> In a later paper Walsh (1995) assumes a central banker with a utility function consisting of society's preferences and his personal income, and develops an optimal (inflation-avoiding) contract which ties the central banker's income to inflation.

<sup>5</sup> The Federal Reserve System consists of a Board of Governors in Washington and twelve Federal Reserve Banks. The seven members of the Board are appointed by the president, subject to the approval of the Senate, for 14-year terms. A term expires every other year. Federal Reserve credit, primarily purchases of U.S. securities, is the primary determinant of the money stock and the price level. Fed security purchases are determined by the Federal Open Market Committee, which consists of the seven Board members, the president of the Federal Reserve Bank of New York, and four other

Reserve System in 1914 and 1987 the consumer price index rose at an average annual rate of 3.36 percent, compared with 2.56 percent for Board salaries. The rise in Board salaries from \$12,000 to \$75,800 was also proportionally less than all available indexes of private-sector incomes.<sup>6</sup> For example, the average manufacturing wage, which is the only private income series continuously available since 1914, rose from \$0.22 an hour in 1914 to \$9.91 in 1987, an average rate of increase of 5.35 percent per annum. The salaries of professional and executive groups reported for portions of this period have also risen faster than the price level. Clearly, the opportunity cost of Board membership has been a positive function of inflation.<sup>7</sup> Even accounting for the 62 percent increase in Board salaries between 1987 and 1993 (see Table 5) leaves a large discrepancy between long-term changes in Board and private incomes.

We are interested in the question: Has monetary policy been affected by the personal benefits and costs derived from or imposed

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Federal Reserve Bank presidents on a rotating basis. The chairman of the Federal Reserve Board, appointed from the Board by the president for four-year terms, is also chairman of the FOMC.

The presidents of the Federal Reserve Banks might also be the subject of an analysis similar to that for Board members presented here, but that project is reserved for the future. Board members and Bank presidents must be studied separately because they have different terms of office and their salaries are determined differently. It is appropriate that the Board be studied first because it may fairly be said that the Board dominates monetary policy. It prescribes reserve requirements within the ranges permitted by law and effectively determines Federal Reserve Bank discount rates. Bank budgets and appointments of Bank presidents are subject to its approval, its seven members are a majority of the Federal Open Market Committee, and the chairman of the Board is chairman of the FOMC. Strong chairmen (Eccles, Martin, Burns, Volcker and Greenspan) have dominated the FOMC most of the period since 1936, and even before that time, when the Federal Reserve Bank of New York took a larger part in policy discussions, the Board still dominated policy through its veto power over changes in discount rates (see Friedman and Schwartz 1963, chs. 5, 7).

<sup>6</sup> The chairman was paid the same salary as other members until 1956, when he began to receive a 2.5 percent premium which was approximately maintained until it was raised to about 8.5 percent in 1988.

<sup>7</sup> The annual earnings per full-time employee reported by the Department of Commerce (since 1929) and Lebergott (1900-1960), as well as the earnings of professional groups (*Historical Statistics of the U.S.*, pp. 164-65, 175-76), have all risen faster than consumer prices. So have the salaries of "selected professional, administrative, and technical occupations" as reported from 1961, and the median earnings of "executive, administrative, and managerial" workers reported for selected periods since 1967 in Bureau of Labor Statistics *Bulletins* 2307 and 2340 and *Employment and Earnings* (monthly). Taking account of "supplements to wages and salaries" of manufacturing and government workers (as reported, for example, in *Historical Statistics*, Series D898 and D904) has little effect on the ratio of Board to private compensation.

by inflation on the Federal Reserve Board? The answer of course rests in the exercise of the preferences of Board members subject to the constraints under which they operate, and we suggest that it may be found in the relationship between their resignations from the Board and the costs and benefits of Board membership. We hypothesize that the correlation between resignations and inflation is negative, zero, or positive, respectively, in the following three circumstances:

1. The bureaucracy-causes-inflation thesis, according to which inflation raises the value of Board membership by increasing the consumption of perquisites, implies a negative relationship between inflation and resignations. More precisely, since the acceptance of Board appointments depends on the expected costs and benefits of membership, including perquisites, resignations should be negatively related to unexpected inflation.

2. If members' utilities are functions of their personal real incomes and public goals, and the Board gets the monetary policy which maximizes those utilities, resignations will be independent of the results of monetary policy, including inflation.

3. If Board members' utilities are as assumed in case 2 but policy is dominated by public considerations, perhaps but not necessarily those described by Fischer, resignations will be positive functions of the costs of Board membership. Unlike case 2, in which inflation and private incomes are determined by Board preferences, in this case Board members pursue policies unrelated to their personal welfares because of an altruistic desire to maximize the public welfare and/or in response to pressure from the Treasury or other groups. They do their duty and resign when its cost becomes excessive.

The rest of the paper is devoted to empirical investigations of Board resignations with the object of determining which of the three relationships is consistent with the data. The next section compares average rates of inflation, the ratio of Board and private incomes, and Board resignations. But government service depends on more than income. Officials may sacrifice income for the opportunity to serve their country. This and other factors are taken into account in Section 3 in the estimation of the resignation implications of the lifetime employment plan of a Board member which reflects the non-monetary rewards of Board membership, opportunities in the private sector depending on age and experience, and the difference between

TABLE 1

## THE FEDERAL RESERVE BOARD, 1914-93

Name	Age <sup>a</sup>	Occ. <sup>b</sup>	Term <sup>c</sup>	Depart. <sup>d</sup>	Name	Age <sup>a</sup>	Occ. <sup>b</sup>	Term <sup>c</sup>	Depart. <sup>d</sup>
Hamlin	52	Bu	8/14-8/16 8/26-8/36	A2/36	Mills	53	Ba	2/52-2/58- 2/72	* 2/65
Warburg	46	Ba	8/14-8/18		Robertson	44	G	2/52-2/64- 2/78	*4/73
Delano	50	Bu	8/14-8/20	*7/18	Balderston	57	A	8/54-2/66	
Harding	50	Ba	8/14-8/22		P. Miller	65	A	8/54-2/68	D10/54
A. Miller	48	A	8/14-8/24- 8/34-8/46	A2/36	Shepardson	59	A	3/55-2/68	R4/67
Strauss	54	Ba	10/18-8/28	*3/20	King	38	Bu	3/59-2/60- 2/74	*9/63
Moehlenpahn	52	Ba	11/19-8/20		G. Mitchell	57	GF	8/61-2/62- 2/76	
Platt	55	Bu	6/20-8/28- 8/38	*9/30	Daane	45	GF	11/63-2/74	
Wills	48	Ba	9/20-3/21		Maisel	46	A	4/65-2/72	
J. Mitchell	53	Ba	5/21-4/31	*5/23	Brimmer	39	A	3/66-2/80	*8/74
Campbell	72	Bu	3/23-3/33	D3/23	Sherrill	40	B	5/67-2/68- 2/82	*11/71
Crissinger	62	B	5/23-8/32	*9/27	Burns	65	AG	2/70-2/84	*3/78
James	56	B	5/23-4/31- 4/41	A2/36	Sheehan	42	Bu	1/72-2/82	*6/75
Cunningham	53	Bu	5/23-1/33	D11/30	Bucher	39	Ba	6/72-2/86	*1/76
Young	45	BaF	10/27-8/32	*8/30	Holland	48	GF	6/73-2/78	*5/76
Meyer	54	Bu	9/30-8/38	*5/33	Wallich	59	A	3/74-2/88	*12/86
Magee	49	Bu	5/31-1/33		Coldwell	52	BaF	10/74-2/80	
Black	60	BaF	5/33-8/38	*8/34	Jackson	46	Ba	7/75-2/82	*11/78
Thomas	64	Bu	6/33-1/43	A2/36	Partee	48	GF	1/76-2/86	
Szymczak	38	B	6/33-4/43; 2/36-2/48- 2/62	A2/36 *5/61	Gardner	54	Ba	2/76-2/90	D11/78
Eccles	44	B	11/34-8/40; 2/36-2/40- 2/44-2/58	A2/36 *7/51	Lilly	58	Bu	6/76-2/78	
Morrison	53	B	2/36-2/38	*7/36	G. Miller	52	Bu	3/78-2/92	*8/79
					Teeters	48	G	9/78-2/84	
					Rice	59	Ba	6/79-2/90	*12/86
					Schultz	50	Ba	7/79-2/82	

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Name	Age <sup>a</sup>	Occ. <sup>b</sup>	Term <sup>c</sup>	Depart.	Name	Age <sup>a</sup>	Occ. <sup>b</sup>	Term <sup>c</sup>	Depart. <sup>d</sup>
Ransom	54	B	2/36-2/42- 2/56	D12/47	Volcker	51	Ba	8/79-2/92	*8/87
McKee	44	B	2/36-2/46		Gramley	53	GF	5/80-2/94	*9/85
Broderick	54	Ba	2/36-2/50	*9/37	P. Martin	58	Ba	3/82-2/96	*4/86
Davis	48	Bu	6/36-2/44; 2/40-2/54	*4/41	Seeger	52	B	7/84-2/98	*3/91
Draper	52	Bu	3/38-2/50		Angell	55	A	2/86-2/94	
Evans	51	Bu	3/42-2/54		Johnson	36	AG	2/86-2/00	*8/90
Vardaman	51	Ba	4/46-2/60	*11/58	Heller	46	Ba	8/86-2/96	*7/89
Clayton	55	Ba	2/47-2/52	D12/49	Kelley	55	B	5/87-2/90- 2/04	
McCabe	54	Bu	4/48-2/56	*3/51	Greenspan	61	B	8/87-2/92- 2/06	
Norton	58	Bu	9/50-2/64	*1/52	LaWare	60	B	8/88-2/02	
Powell	53	BaF	9/50-2/52		Mullins	44	AG	5/90-2/96	
W. Martin	44	Ba	4/51-2/56- 2/70		Lindsay	37	AG	11/91-2/00	
					Phillips	47	AG	12/91-2/98	
<i>Chairmen</i>				Meyer	9/30-5/33	Burns		2/70-2/78	
Hamlin	8/14-8/16		Black	5/33-8/34	Miller	3/78-8/79			
Harding	8/16-8/22		Eccles	11/34-2/48	Volcker	8/79-8/87			
Crissinger	5/23-9/27		McCabe	4/48-3/51	Greenspan	8/87-			
Young	10/27-8/30		Martin	4/51-2/70					

Notes: <sup>a</sup> Age at start of Board service.

<sup>b</sup> Main occupation before Board service: *Bu*: nonfinancial business, including law; *Ba*: banking and other financial business; *B*: *Bu* and *Ba*; *BaF*: on operations side of F. R. Banks; *A*: academic; *G*: government; *GF*: Board research staff; *AG*: academic and government.

<sup>c</sup> Terms of appointment: Szymczak and Eccles were reappointed after their terms were ended by the Banking Act of 1935; in 1940 Davis's term ending in 1944 was replaced by one ending in 1954.

<sup>d</sup> Dates of departure due to resignation (\*), end of term by Banking Act of 1935 (A), death (D), or retirement in conformance with Civil Service Regulations (R).

*The law relating to Board membership:* The Federal Reserve Act of 1913 provided for 5 members to be appointed by the President subject to Senate approval, originally for terms of 2, 4, 6, 8 and 10 years, and thereafter for 10 years. One member served as Chairman, with no specified term, at the President's pleasure. A member was added in 6/22. The Banking Act of 1935 terminated existing appointments effective 2/36 and provided for a new Board of 7 members appointed initially for terms of 2, 4, ... 14 years, and thereafter for 14 years. The Chairman was to be designated by the President for 4-year terms.

Sources: F.R. Board *Annual Reports*; F.R. Board Research Library information sheet; *Federal Reserve Bulletins*, esp. Sept. 1935, p. 613, and July 1992, pp. 567-77; *Who's Who in America*, various issues.

expected and realized inflation. Anticipating the concluding section, we argue that the estimates reported in the second and third sections, which show that Board resignations have responded positively to the personal opportunity costs of Board membership, are consistent with the third hypothesis. Additional support for this conclusion is derived from the observation that the periods during which Board salaries have been protected from inflation, that is, when members have had the least personal incentives to avoid inflation, have not seen above-average inflation.

## 2. An overview of inflation, relative incomes, and resignations from the Federal Reserve Board

Between the inception of the Board of Governors in August 1914 and the end of 1993, 34 of 72 members (listed in Table 1) resigned before the expirations of their terms of office. Only one of these resignations, in 1918, occurred during the two world wars, and that was by a former railroad man who took a commission in the U.S. Army Corps of Engineers to build railways in France. Members of the Board have not left government service during wartime. Of the peacetime resignations, 61 percent (20 of 33) were bunched in four periods comprising 19 percent (14 of 73) of peacetime years. These 14 years (8/34-9/37, 3/51-1/52, 11/71-8/79, 9/85-8/87) coincided with four of the most rapid peacetime monetary and/or price increases this century. The average annual rates of change of M1 and the CPI during 1934-37, 1951, 1971-79, and 1985-87 were 8.14 and 5.24 percent, respectively, compared with 5.70 and 3.41 percent for the entire 1914-93 period (4.71 and 3.08 percent excluding the war years 1917-18 and 1942-45).

The most important exception to the positive relationship between inflation and resignations occurred during the first few years of the Executive Schedule introduced in 1964 to improve the real incomes of government workers. Board salaries doubled between 1963 and 1970 while the CPI rose 27 percent and the average manufacturing wage rose 48 percent. There was only one resignation between the adoption of the Executive Schedule and November 1971. However, each annual implementation of the Executive Schedule requires a Congressional appropriation, which often has not been

forthcoming, and during the 1970s Board salaries rose less than 40 percent while the CPI and private wages more than doubled. Members resigned at a more rapid rate during 1971-79 than during any other period of similar length in the Fed's history. These observations suggest that resignation rates are sensitive to inflation because of the latter's influence on the ratio of Board to private salaries, and this is confirmed in Table 2.

The top-left portion of the Table shows that of 170 members on the Board at the beginnings of peacetime years of high inflation, 11.8 percent resigned during the year, compared with a resignation rate of 5.2 percent during years of low inflation — where *high* and *low* inflation are demarcated by the mean rate of inflation,  $\bar{p} = 3.08$  percent, between the Board's first full year of operation and 1993. The difference between these proportions is 0.066, with estimated standard deviation 0.026 and t-statistic 2.54, meaning that the hypothesis that resignation rates are the same during high- and low-inflation years is rejected at the 99 percent level.<sup>8</sup>

The difference between resignation rates is less (0.034) when the cut-off between high and low inflation is taken to be 5.59 percent (the mean of  $p$  plus half its standard deviation). The smaller differences between resignation rates when high inflation is considered to be 5.59 or 8.10 percent indicate that inflation exerts its greatest marginal impact on resignations when it is moderately high and that further increases produce few additional resignations.

The top-right portion of Table 2 presents analogous results for the rate of change of the ratio of Fed salaries to private wages ( $f-w$ ). The greatest difference between resignation rates during periods of high and low (absolute) rates of decline of relative Board incomes corresponds with the specification of a high rate of decline as the mean rate less half its standard deviation.

The middle portion of the Table shows that Board members with business backgrounds are more likely to resign when relative Board salaries fall than are those with primarily academic or government backgrounds, possibly because former businessmen have easier access

<sup>8</sup> For calculating inflation and changes in relative incomes, years are January to December, but the corresponding resignation years are taken to be February to January. This conforms with dates of terms since 1936, which have begun February 1 and ended January 31, and means that January resignations are paired with inflation during the calendar year ending the preceding month. Members dying or retiring during the year (terms ended August 1 before 1936) are excluded from the sample.

to the private sector.<sup>9</sup> We also see that middle-aged (50-54) members are less sensitive than others to decreases in  $f-w$ . This might be due to the greater job opportunities of young members, who have more to lose if they do not leave the Board when it ceases to be profitable, and the option of older members, with fewer job opportunities, to increase their leisure through retirement when their real income from employment falls.

The last set of ratios shows that businessmen and young and old members are more likely than others to resign at any time, independently of inflation or changes in relative wages, although the latter difference is not statistically significant at the usual confidence levels.

The next section considers these relationships in greater detail, specifically the interactions of inflation, the cost of membership, and the age and occupational experience of members in their decisions of whether to remain on the Board. Other possible influences, such as the deterioration of the status of Board membership, is also considered.

### 3. The determinants of Board resignations

Assume that Federal Reserve Board members shift between the Board and other employments to maximize their utilities, which depend on leisure and the present values of their lifetime earnings adjusted for the nonpecuniary returns from alternative occupations. The acceptance of a Board appointment depends on the expected

<sup>9</sup> *Business* includes the Bu, Ba, and BaF groups in Table 1. It seems appropriate to classify members who had been on the operating side of Federal Reserve Banks with businessmen because of their apparent ready access to high-paid positions, including the presidency of Federal Reserve Banks, which have always paid much more than Board membership. Three members resigned from the Board to become Federal Reserve Bank presidents: Young had been a commercial banker for 17 years and head of the Federal Reserve Bank of Minneapolis for the ten years immediately preceding his Board membership; Black was head of the Federal Reserve Bank of Atlanta immediately before and after his Board service; and Davis had been executive vice-president of a manufacturing company in addition to holding various newspaper and government positions. Powell, who had been First Vice-President of the Federal Reserve Bank of Minneapolis for 14 years before joining the Board, and Harding, who had been a commercial banker for 32 years, became heads of Federal Reserve Banks immediately or soon after leaving the Board.

TABLE 2  
RESIGNATION RATES DURING HIGH AND LOW INFLATION ( $p$ ) AND LOSS OF RELATIVE INCOME ( $f-w$ ) DURING PEACETIME: 1915-16, 1919-41, 1946-93

All members					
Cut-off (%)		$p$	$s(t)$	$f-w$	$s(t)$
$(\bar{p}, \bar{f-w})$	H:	20/170 = .118	.026	23/260 = .088	.026
3.08, -0.87	L:	14/268 = .052	(2.54)	11/178 = .062	(1.00)
$(\bar{p} + \frac{1}{2}\sigma_p, \bar{f-w} - \frac{1}{2}\sigma_{f-w})$	H:	12/117 = .103	.029	14/109 = .128	.030
5.59, -4.95	L:	22/321 = .069	(1.18)	20/329 = .061	(2.23)
$(\bar{p} + \sigma_p, \bar{f-w} - \sigma_{f-w})$	H:	4/44 = .091	.043	4/46 = .087	.042
8.10, -9.04	L:	30/394 = .076	(0.35)	33/392 = .077	(0.24)
Selected groups with cut-off $\bar{f-w} - \frac{1}{2}\sigma_{f-w} = -4.95$					
		Business	$s(t)$	Acad. & govt.	$s(t)$
	H:	12/72 = .167	.041	2/37 = .054	.037
	L:	15/197 = .076	(2.20)	5/132 = .038	(0.43)
		Mid-age (50-54)	$s(t)$	Young & old	$s(t)$
	H:	2/29 = .069	.053	12/80 = .150	.035
	L:	2/46 = .043	(0.49)	18/283 = .064	(2.46)
All peacetime years regardless of inflation					
		Occupation	$s(t)$	Age	$s(t)$
	Business	27/269 = .100	.026	50-54	4/75 = .053
	Acad. & govt.	7/169 = .041	(2.27)	Other	30/363 = .083
					(0.87)

*Definitions (sources):*  $p$  is the annual rate of change of the Consumer Price Index for urban wage earners (Bureau of Labor Statistics release and *Survey of Current Business*).

$f-w$  is the annual rate of change of the ratio of Board salaries to the average hourly wage of manufacturing workers ( $f$  for 1914-63 is from David Lilly, "Statement", *Federal Reserve Bulletin*, May 1977, and since 1964 from "The Executive Schedule", *U.S. Code, Title V*;  $w$  for 1914 and 1919-93 is from Bureau of Labor Statistics, *Employment, Hours, and Earnings*. Data for 1915-18 were estimated using "average weekly earnings" from U.S. Bureau of the Census, *Historical Statistics of the U.S.*, Series D804).

$\bar{p} = 3.08\%$  and  $\bar{f-w} = -0.87\%$  are the mean annual rates of change of  $p$  and  $f-w$  during 1915-93, omitting 1917-18 and 1942-45; their standard deviations are  $\sigma_p = 5.02\%$  and  $\sigma_{f-w} = 8.17\%$

$s$  and  $(t)$  denote the standard deviations of the proportions (resignation rates) and Student's  $t$ -statistics for differences between proportions. See Hoel (1954, pp. 110-113) for the distribution of the difference between two proportions.

course of Board salaries ( $F$ ) relative to those available elsewhere ( $W$ ), as well as on the expected status of Board membership ( $S$ ). If  $F$ ,  $W$ , and  $S$  proceed as expected, we should observe resignations to occur independently of these variables. Members would stay or leave depen-

ding on individual circumstances such as age, health, and personal job opportunities. On the other hand, unexpected falls in  $F/W$  and/or  $S$  should be accompanied by increases in resignations. This relationship may be expressed as

$$(1) P_t = P[R_t^s - E(R_t^s|t_a)] \quad P' > 0$$

That is, the probability that a member will remain on the Board during the  $t$ th year ( $P_t$ ) should be a positive function of the excess of Board relative to private salaries, adjusted for status ( $R_t^s$ ), over the value of  $R_t^s$  expected at the time of his appointment ( $t_a$ ). The statistics reported in Table 2 are consistent with the assumption of constant  $E(R_t^s|t_a)$ , which allows (1) to be rewritten

$$(2) P_t = P(R_t^s - R_n^s) \quad P' > 0$$

where  $R_n^s$  is average  $F/W$  since 1914 adjusted for status.<sup>10</sup>

Converting income to rates of change gives

$$(3) P_t = P[(f-w)_{at}, S_t, I_t]$$

where  $(f-w)_{at}$  is the rate of change of the ratio of Board and private salaries between the year of the member's appointment and the  $t$ th year,  $S_t$  represents variables affecting Board status, such as the variability of inflation, and  $I_t$  represents individual characteristics such as occupational experience previous to Board membership and age.

Estimates of alternative empirical specifications of (3) are reported in Table 3. We use a binomial logit model.<sup>11</sup> Each year of service by a Governor is an observation, so that from 1915 to 1986 there are 425 observations spanning 61 Governors. The sample period ends with 1986 to allow out-of-sample forecasts. The logit model takes the form

$$(4) \ln \frac{P(\text{stay})}{1 - P(\text{stay})} = b_1 + b_2 X_2 + \dots + b_k X_k$$

<sup>10</sup> Alternatively we could allow expectations of inflation to rise over time. This would be consistent with a low resignation rate during the high-inflation decade of the 1970s. But this is not what we observe. Furthermore the low rate of inflation during the 1980s has demonstrated that rising inflation is not inevitable.

<sup>11</sup> For discussions of this method see Judge *et al.* (1985, ch. 18) and Kmenta (1986, pp. 547-66). The probit model also lends itself to this problem, and in preliminary work results from logit and probit models were virtually the same. We use the logit model because of its convenience in calculating the probabilities in Table 4.

where  $P(\text{stay})$  is the probability that a member remains at the Board throughout a given year,  $1 - P(\text{stay})$  is the probability that he resigns during the year, and the  $X$ 's are variables affecting his choice.

The variable central to our investigation is  $f-w$ . However, since  $f-w$  is inversely related to inflation ( $p$ ), we first estimated a model designed to test the influence of inflation on resignations (Model 1). In Models 2-4  $p$  is replaced by  $f-w$ . The results in Table 2 indicated that the influences of  $p$  and  $f-w$  might be non-linear such that moderate increases in  $p$  or deteriorations in  $f-w$  exert substantial effects on resignation decisions whereas larger changes have little additional impact. To capture this relationship we use the cube roots of  $p$  and  $f-w$ , which increase at increasing rates for low values and at decreasing rates for high values.<sup>12</sup> The coefficient of  $p^c$  in Model 1 has the expected sign and is significant at the 7.7 percent level. But inflation ought to influence the resignation decision through its impact on the relative returns to Fed and alternative employments, so that the performance of the direct indicator  $(f-w)^c$  should be superior to that of the indirect  $p^c$ , and this is what we observe in Model 2, where the coefficient of  $(f-w)^c$  is significant at the 1 percent level.

The rate of change of the money stock ( $m1$ ) has been added in Model 3 to test whether money growth is interpreted by Board members as a predictor of inflation and  $f-w$ . The coefficient has the expected sign but its low significance indicates either that  $m1$  is not used by Board members as a predictor of  $f-w$  or their job opportunities are sufficiently flexible to allow them to wait until  $f-w$  actually falls before resigning. It should be noted that the failure of this coefficient to be significantly positive is inconsistent with the hypothesis that Fed officials have an interest in rapid money growth.

The effect of  $f-w$  may be conditional on factors specific to individual members, such as occupation prior to Board membership, and Table 3 shows that the influence of *occu* is highly significant. Members with backgrounds in private industry are more likely to resign than are those who have been employed principally in government or universities. Separate logit estimates (not reported here) based on these two occupational subgroups, which show that businessmen's resignations have responded in a statistically significant

<sup>12</sup> To avoid taking roots of negative numbers we shift the (x,y) origin along the x-axis. For  $f-w$  this entails a shift in  $x$  of  $0.292 = -\min[f-w]$ . We did this to finesse a programming algorithm which only takes roots of non-negative numbers; however, for our purposes the placement of the origin is somewhat arbitrary.

way to  $f-w$  but those of others have not, are also consistent with the results in Table 2.

The effects of age reported in Table 2 receive mild support from the estimates in Table 3, which indicate that young and old members are more likely to resign than middle-aged members. Estimates of the age at which resignation is least likely range from 52 to 56 in the four models of Table 3, although the coefficients upon which these estimates are based are significant only at the 9 to 15 percent levels.<sup>13</sup>

The positive coefficients of the war variable are consistent with our conjecture that resignation may be less likely during wartime, but they are not highly significant.

The year-to-year variance of inflation and the rate of growth of real GNP have been added to Model 4 as indicators of the status of Board membership. If the sense of a positive contribution to a strong and stable economy is a form of nonpecuniary income to Board members,  $V(p)$  and  $RGNP$  should have a negative and a positive sign, respectively. However, neither coefficient is significant. The failure of resignations to be related to dissents cited in Section 2 is further evidence that job satisfaction is unrelated to continued Board membership.<sup>14</sup> The negative sign of  $RGNP$  might even be interpreted as support for the notion that a strong economy and presumably a strong labor market induce members to leave the Board.

The variable remaining to be discussed is  $F/W$ , where, consistent with our model (especially see the paragraph preceding equation 1) the estimates indicate that the greater is a member's initial Board salary relative to alternative incomes, the less likely he is to resign.

Using the estimates in Model 2, the probability that a Governor in average circumstances stays on the job is  $P(\text{stay}) = 0.93$ .<sup>15</sup> These estimates allow predictions for individual Governors in recent years. The coefficients of Model 2 and observations on the variables for 1986 imply the values of  $P$  for 1986 in the second column of Table 4

<sup>13</sup> These ages maximize the quadratic function of the  $age$  and  $age^2$  variables.

<sup>14</sup> Furthermore, there seems to be no relationship between resignations and dissatisfaction with Board policies. Chappell, Havrilesky, and McGregor ranked members by preference for "ease" (that is, low interest rates) based on their dissents on the sides of "ease" or "tightness" between 1960 and 1987. Those dissenting frequently were no more likely to resign than those who seldom or never dissented. Furthermore, those dissenting on the side of tightness were no more likely to resign than their easy colleagues.

<sup>15</sup> Using sample means for 1915-86, the average Governor was 56.6 years old, had prior experience 65 percent in business, received a 2.4 percent annual raise, and incurred an annual 5.6 percent increase in the opportunity cost of private sector compensation.

TABLE 3

LOGIT MODELS FOR THE DECISION TO REMAIN ON OR  
RESIGN FROM THE FEDERAL RESERVE BOARD 1915-86  
(Dependent variable:  $\ln \{P(\text{stay})/[1 - P(\text{stay})]\}$ )

Variable	(1) Coefficient SE (P)	(2) Coefficient SE (P)	(3) Coefficient SE (P)	(4) Coefficient SE (P)
$-2 \ln L$	207.107	203.790	203.781	203.563
$\lambda$	14.90	18.21	18.22	18.44
Constant	-8.608	-18.853	-18.684	-19.041
	8.764 (.326)	9.042 (.037)	9.219 (.043)	9.110 (.037)
$(F/W)^b$	.410	.803	.801	.836
	.371 (.269)	.391 (.040)	.391 (.041)	.399 (.036)
$p^c$	-1.321			
	.748 (.077)			
$(f-w)^c$		6.858	6.814	6.369
		2.650 (.010)	2.682 (.011)	2.920 (.029)
$war$	1.193	2.229	2.248	2.603
	1.105 (.280)	1.554 (.151)	1.551 (.147)	1.897 (.170)
$age$	.449	.412	.409	.423
	.281 (.111)	.283 (.145)	.286 (.153)	.284 (.136)
$age^2$	-.004	-.004	-.004	-.004
	.003 (.090)	.003 (.118)	.003 (.125)	.003 (.110)
$occu$	-1.497	-1.444	-1.442	-1.458
	.549 (.006)	.543 (.008)	.543 (.008)	.546 (.008)
$m1$			-.357	
			3.817 (.925)	
$V(p)$				-.003
				.005 (.633)
$RGNP$				-1.348
				4.741 (.776)

Definitions and sources of data:

- $(F/W)^b$  = Natural log (ln) of ratio of member's starting Board salary to manufacturing worker average hourly wage prevailing at that time.  
 $p^c$  =  $(p + 10.7)^{1/3}$  where  $p$  is the percentage rate of change of the CPI; the absolute value of the lowest  $p$ , -10.7, has been added to make the variable non-negative.  
 $(f-w)^c$  =  $(f-w + .292)^{1/3}$  where  $f$  and  $w$  are the rates of change of Board salaries and manufacturing wages; -.292 is the lowest  $f-w$  observed.  
 $war$  = 1 for 1917-18 and 1942-45, 0 otherwise;  
 $age$  = is in years and applies to the current observation;  
 $age^2$  = is the square of age;  
 $occu$  = 1 if the member has a business background (as defined in Table 1), 0 otherwise;  
 $m1$  = rate of change of currency and checking accounts (M1);  
 $V(p)$  = variance of  $p$ ;  
 $RGNP$  = rate of change of real GNP.

Data are annual, with resignation/stay years being February to January as in Table 2; sources of  $p$ ,  $f$ , and  $w$  (and therefore  $F$  and  $W$ ) are given in Table 2;  $age$  and  $occu$  are from Table 1;  $m1$  is from *Historical Statistics of the U.S.* (Series X414), Federal Reserve Board *Money Stock Revisions*, and *Federal Reserve Bulletins*;  $RGNP$  is from Balke and Gordon (1986) and *Survey of Current Business*.

The models are estimated by a nonlinear maximum likelihood routine using the method of scoring to compute the estimates. Standard errors (SE) and probability values (P) are asymptotic approximations.  $\ln L$  is the natural log of the likelihood function, and  $\lambda$  is the likelihood ratio test statistic with  $\chi^2(k-1)$  distribution where  $k$  is the number of coefficients being estimated. Equation (1) is significant at the .99 percentile and (2) - (4) are significant at the .99 percentile.



for the Board members at the beginning of that year. The third column lists the probabilities of remaining on the Board through 1989.<sup>16</sup> The three members predicted to be most likely to resign did so during the next three years, while those most likely to stay were still on the Board at the beginning of 1990. The member least likely to resign, Angell, completed his term.

#### 4. Conclusion

The estimates in Sections 2 and 3 showed that resignations from the Federal Reserve Board have been associated with unusually large deteriorations in Board salaries relative to private sector incomes caused by above-average inflation. This is particularly true of members whose work backgrounds and ages have provided easiest access to high private incomes. Indicators of the status of Board membership, specifically such measures of job performance as price stability and economic growth, have not been significantly related to the duration of Board membership. These results are inconsistent with the bureaucratic inflation theory, which implies a positive correlation between resignations and inflation, as well as with the hypothesis that the Board pursues the monetary policy that maximizes utilities comprised of public goals and their personal real incomes, which implies independence between inflation and resignations, but is consistent with the popular idea expressed in textbooks and most other discussions of monetary policy that Federal Reserve actions are directed primarily toward public goals – which may be derived from an intellectual commitment to the Phillips curve or accepted under pressure from the president and Congress.<sup>17</sup> Board resignations during

<sup>16</sup> Assuming that the probabilities of staying were the same in each of the years 1986-89.

<sup>17</sup> The bureaucratic argument is also contradicted by the observation that the internal inflation incentive was greater between 1914 and 1947, when the Fed paid about 10 percent of its earnings to the Treasury, than since 1947, when the Treasury's tax on the Fed has been about 90 percent (Cribfield and Wood 1993).

Regarding political origins of inflation, Thomas Havrilesky and his co-authors have concluded that the President, Congress, and private groups influence monetary policy. For example, an index of Administration signalling (derived from newspaper reports of spokesmen's calls for easier or tighter policy) are significant predictors of money growth (Havrilesky 1992, ch. 4). Apparently the president is usually able to exert some influence on monetary policy, and he usually wants more inflation.

TABLE 4

PREDICTED RESIGNATIONS

Members, 2/86	P(stay 1986)	P(stay 1986-89)	Situation, 1/90
Angell <sup>a</sup>	.965	.867	On Board
Johnson <sup>b</sup>	.926	.735	On Board
Seger <sup>c</sup>	.868	.568	On Board
Wallich	.863	.555	Resigned
Volcker	.859	.544	Resigned
Martin	.806	.422	Resigned
Rice	.726	.278	Resigned

Notes: <sup>a</sup> Stayed to end of term; <sup>b</sup> Resigned 8/90; <sup>c</sup> Resigned 3/91.

high inflation suggest that members accept more inflation than is conducive to their personal welfare and resign when continued membership becomes inconsistent with the maximization of their personal utilities.

Our results reinforce other studies that have found bureaucracies to be responsive to the president and Congress, and fit into the broad view of bureaucratic behavior set forth by Wilson (1989), who argued that bureaucracies are not merely collections of imperialistic perquisite seekers. Many bureaucracies, particularly those with well-defined objectives, exhibit high standards of professionalism and resist additional functions that interfere with those objectives. Furthermore, like soldiers in combat, their conduct is influenced by a sense of duty which causes them to behave in the manner expected by their peers and superiors even when that behavior apparently is not, except in the acquisition and maintenance of self-esteem, in their own interests.<sup>18</sup> This view suggests that personal costs, such as dismissal in the New Zealand case and cuts in real income in the case of the Federal Reserve Board, are unlikely to deflect officials from their duty. The New Zealand law may be a useful signal of what that duty is, but if the actions of his American counterparts are a guide, the Reserve Bank governor will respond to economic conditions in the manner dictated by his conception of the public welfare (probably with

<sup>18</sup> See Wood and Waterman's (1991) discussion of the behavior of seven agencies (not including the Federal Reserve) during the 1980s and Chappell, Havrilesky, and McGregor (1993).

TABLE 5

THE CONSUMER PRICE INDEX, PRIVATE INCOMES,  
AND BOARD SALARIES AND RESIGNATIONS

	Levels			Average annual rates of change and resignations (%)				
	CPI <sup>a</sup>	W <sup>b</sup>	F <sup>c</sup>	CPI	W	F	Res <sup>d</sup>	
1914	7.81	\$0.22	\$12,000	1914-53				
				All	2.54	5.45	0.74	6.8
1953	20.78	1.74	16,000	Peacetime	.99	3.59	.90	7.3
1963	23.79	2.45	20,000	1953-93	4.27	4.89	5.23	7.7
1970	30.18	3.35	40,000	1953-63	1.36	3.48	2.26	4.5
1980	64.09	7.27	55,400	1963-70	3.46	4.57	10.41	2.1
1989	94.89	10.48	82,500	1970-79	7.21	8.01	3.07	15.8
				1979-87	5.54	5.01	4.70	9.8
1993	110.56	11.76	123,100	1987-93	4.09	2.89	8.42	5.3

Notes: <sup>a</sup> 100 in 1990.

<sup>b</sup> Average hourly manufacturing wage; Bureau of Labor Statistics' data on median "executive, administrative, and managerial" salaries (which grew slightly less rapidly than W during 1967-78 and slightly more rapidly than W during 1983-93, the periods when this series was available) indicate that the use of executive incomes would not significantly alter the relative movements in private and Board incomes observed using W.

<sup>c</sup> Board member's annual salary.

<sup>d</sup> Proportions of members resigning 1915-53, 1954-63, etc.

Sources: See Table 2.

substantial input from the government) regardless of its implications for his tenure.

Additional support for this conclusion is found in the conduct of American monetary policy when Federal Reserve Board real incomes were not harmed by inflation. If monetary policy is determined by a trade-off between the private goals of Board members, particularly their real incomes, and public goals, we should observe the least resistance to inflation when Board salaries are indexed to match or surpass inflation. However, Table 5 shows that average inflation during such periods, specifically 1963-70 and 1987-93, was slightly less than the average of the entire period since monetary policy was freed from the World War II bond support program. Furthermore, the Fed's submission to administration pressures – to Johnson's desire

for inflation in 1967-68 and Nixon's counter-inflation strategy of 1969-70 – was similar to that in other periods.<sup>19</sup> More recently, the Fed resisted political pressures to inflate during the 1990-91 recession. Slightly rephrasing our earlier conclusion, Board members apparently seek the jobs that maximize their utilities and resign from the Board when membership becomes inconsistent with those desires, but do not use their power over monetary policy for personal gain.

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<sup>19</sup> Havrilesky and Schweitzer (1990) also described four other occasions of strong administration signalling: the Nixon inflation (1971-72), Carter's pushes for low interest rates in the face of a rising deficit (1977-78) and following the second oil price shock (1979), and Reagan's abandonment of sound money (1985-86). On five of the six occasions the president got his way (1979 being the exception) and on five occasions the desire was for more inflation (excepting 1969-70).

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