

NATIONALIZATION, COMPENSATION AND
WEALTH TRANSFER: AN EMPIRICAL NOTE ABOUT
THE FRENCH EXPERIENCE
1981-1982

by
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I N S E A D

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1. INTRODUCTION

The purpose of this paper is to shed light upon the wealth transfer effects among different classes of economic agents in the case of a compulsory transfer of ownership at a decreed price, colloquially called nationalization. One possible wealth transfer occurs between those who, in tempore suspecto, happen to hold shares of nationalized companies and those who don't. Another type consists of wealth transfers among shareholders of different nationalized companies. In order to estimate actual wealth transfers we use stock market data and methodologies derived from the event study literature¹. The "event" investigated is the French Nationalization bill whose final version became law on February 15, 1982. This investigation is motivated by our belief that the modern theory of finance can be instrumental in testing some legal standards such as the "fairness", "equitableness" and "equality of treatment" of a regulation without having to resort to normative statements.

In this study, wealth transfers are defined as the difference between the compensation offered by the nationalization bill and the compensation which would make shareholders of nationalized firms indifferent to nationalization. Indifference compensations, or prices, of the eleven nationalized firms traded on the Paris Bourse were estimated, using a matched portfolio approach. It was found that the total sample transfer of wealth towards nationalized firms shareholders represents nearly 46% of the indifference compensation. This premium is in line with the current practice regarding private company takeovers in France. However, it was also found that the premium varies considerably from one firm to another. This result can be interpreted as evidence that the French nationalization bill is not in accordance with the constitutional requirement of equality of treatment among shareholders of the nationalized firms.

The paper is divided in six parts. Section 2 describes some of the central features of the French nationalization program and the attempts by the French government to provide a compensation package acceptable by the National Assembly and the Constitutional Council.² Section 3 formulates the specific contribution of the paper and describes the methodology. The experimental design is described in Section 4. The results are presented in Section 5. A summary and conclusions are given in Section 6.

2. THE FRENCH NATIONALIZATION PROGRAM

Widespread nationalization of industrial and banking firms belonged to the electoral platform on which President Mitterrand was elected in the two ballots of April 26 and May 10, 1981 and which sent a Socialist-Communist majority to the National Assembly on the two legislative election ballots of June 7 and June 21, 1981. The first version of the nationalization bill was approved by the French cabinet on September 9, 1981 and voted in second reading by the French Assembly on December 18, 1981.

The bill authorized the French government to enact forced conversion of shares of a number of industrial firms and financial institutions into state guaranteed bonds negotiable on the French stock market. The conversion price between the shares and the bonds to be issued in payment was the object of considerable debate among the interested parties, within the French cabinet and during the discussion of the bill at the National Assembly. According to the French Constitution, the price has to be "fair and equitable". In the first version of the bill the French government declared "fair" price P_n^d for firm n was defined by the following formula³:

$$P_n^d = .5 S_n + .25 B_n + .25 E_n$$

where

S_n = Average daily share price (adjusted for changes in the number of shares outstanding) during the years 1978 through 1980.

B_n = Net non consolidated book value per share on December 31, 1980.

E_n = Ten times the average yearly net earnings per share from 1978 to 1980.

This version of the bill was successfully challenged on constitutional grounds. On January 16, 1981, the Constitutional Council declared that some provisions of the bill were not conform to the French constitution. Relevant to this study was the following comment "in regard to the listed shares, the method of calculation of their exchange value leads to inequalities of treatment... These inequalities of treatment are intensified, in many cases, by a substantial underestimation of the exchange value"⁴. Following this verdict the quotations of nationalized firms shares on the French Stock Exchange were immediately suspended.

A second and final nationalization bill was adopted by the French Cabinet on January 20, 1982, voted by the National Assembly on February 5, 1982, approved by the Constitutional Council on February 12, 1982 and finally published in the Journal Officiel on February 13, 1982. According to this new bill, the conversion price of a share of a nationalized firm n , P_n^d , is set equal to the highest monthly average of daily prices from October 1980 to March 1981⁵. A dividend equal to the 1980 one is added to this average. This sum is further increased by 14% as compensation for the 1981 French CPI inflation rate. Physical conversion of shares into government bonds has to be completed within three months of the law's publication, but the bonds earn interest as of January 1, 1982. Shares were traded again, at prices close their conversion value since February 18, 1982 as "compensation titles".

3. CONTRIBUTION AND METHODOLOGY

To what extent would payment of the "government decreed fair price", P_n^d , redistribute wealth between shareholders of nationalized firms and other economic agents on one hand and among the shareholders themselves on the other hand? Ideally, a measure of wealth redistribution requires a measure of the compensation which would make a shareholder of a victim company indifferent to nationalization. We call this level of compensation the indifference price. It is what the price of nationalized firms shares would have been in the absence of any news on nationalization. Its amount corresponds to a compensation level which would leave an investor as well off (not better, not worse), *ceteris paribus*, from having invested 'in tempore non suspecto' in nationalized firms shares as he would have been from having invested in other shares. This definition has three important implications for the estimation of indifference prices.

First, it calls for estimates of what actual prices would have been, and not of what they would have been expected to be. Therefore, expected return models such as the Capital Asset Pricing Model or the Market Model, which are extensively used in event studies to estimate expected returns (or prices), are of less help in determining indifference prices.

Second, the impact of any event, except the nationalization event, should be accounted for. Thus, the effect of the changes in the French Presidency and in the French Government, following the election of President Mitterrand and of a Socialist-communist majority in the National Assembly, have to be taken into account in determining indifference prices. In contrast, the compensation prices offered by the French Government discounted these political changes since they were determined in reference to market prices observed during a period when the events were supposedly not yet anticipated.

Third, a date must be fixed at which indifference prices are estimated. Should it be the date at which the actual conversion of shares into bonds take place? Or the date at which the government announced the conversion price? Or should it be the date when the bonds start earning interest? Since the dates don't coincide, no unequivocal reference date can be set. The date selected in this study is the last stock market trading day before the French government published the conversion price, namely January 15, 1982. This is the last date before the nationalized shares were traded at their compensation value, all uncertainty about the amount of compensation and conversion date being removed afterwards.

The difference between the compensation offered by the nationalization bill and the indifference price is the rent from nationalization. If positive, this rent measures the per share capital gain from nationalization accruing to nationalized company shareholders. If negative, it measures the per share amount of shareholders' property confiscation due to nationalization. This rent, furthermore, provides a standard against which can be assessed to what extent the compensation proposed by the bill discriminates between classes of investors on the basis of their portfolio composition prior to the news on nationalization.

3.1 Rent and wealth transfer measurement methods

Assume that the only benefit investors require from holding shares is periodic return. Then, the rent and wealth transfer measurements proceed as follows.

Let security $R_{j,t}$ and market $R_{m,t}$ returns during period t be defined as :

$$R_{j,t} \equiv \frac{P_{j,t} + D_{j,t} - P_{j,t-1}}{P_{j,t-1}} \quad \text{for } j = 1, \dots, J \\ t = 1, \dots, T \quad (1)$$

and

$$R_{m,t} \equiv \frac{1}{J} \sum_{i=1}^J R_{j,t} \quad \text{for } t = 1, \dots, T \quad (2)$$

in which $P_{j,t}$ is the security periodic closing price adjusted for changes in the number of shares outstanding, $D_{j,t}$ the dividend paid (assumed at the end of the period), J the universe of stocks and T the period at the end of which the indifference price is estimated.

Consider the period from $t = 1, \dots, S < T$ during which the event is not yet anticipated. During this period, indifference prices $P_{n,t}^*$ and corresponding indifference returns $R_{n,t}^*$ of the N nationalized companies, namely the period returns that would have been observed in the absence of news on nationalization, coincide with their observed prices $P_{n,t}$ and returns $R_{n,t}$:

$$P_{n,t}^* = P_{n,t} \quad (3)$$

$$R_{n,t}^* = R_{n,t} \quad (4)$$

for $t=1, \dots, S$ and $n=1, \dots, N^S$.

Suppose non-anticipated nationalization would suddenly have been effective (compulsory transfer of title in return for compensation payment) at the last trading day of period $t = S$. Equation (3) says that the price at which shareholders would be indifferent to nationalization, at that time, is the closing market price of that day. Furthermore, (1), (3) and (4) clearly imply also :

$$P_{n,t}^* = P_{n,t-1} (1 + R_{n,t}) - D_{n,t} \quad (5)$$

for $t=2, \dots, S$ and $n=1, \dots, N$.

For period $S+1$ during which information about nationalization reached the market for the first time (5) cannot be applied anymore to obtain $P_{n,S+1}$ because the observed return during that period will have been affected by that information. For that period, one would rather have to estimate the indifference returns $R_{n,S+1}^*$. Then, one can write :

$$P_{n,S+1}^* = P_{n,S} (1 + R_{n,S+1}^*) - D_{n,S+1} \quad (6)$$

for $n = 1, \dots, N$.

Once estimates are obtained for each of the $R_{n,t}^*$, $t=S+1, \dots, T$, indifference prices can be estimated successively for each period $t = S+2, \dots, T$ and for each nationalized security n :

$$P_{n,S+t}^* = P_{n,S+t-1}^* (1 + R_{n,S+t}^*) - D_{n,S+t} \quad (7)$$

for $t = 2, \dots, T-S$ and $n = 1, \dots, N$.

Section 3.2 discusses indifference returns estimation procedures. We shall conclude now with the derivation of rent and wealth transfers from indifference prices estimates.

Rent from nationalization accruing to a share of nationalized company n at time T , $RENT_{n,T}$ is the difference between the decreed price P_n^d and the indifference price $P_{n,T}^*$:

$$RENT_{n,T} = P_n^d - P_{n,T}^* \quad \text{for } n = 1, \dots, N. \quad (8)$$

The wealth from nationalization being transferred to all the shareholders of company n at time T , $WT_{n,T}$, equals the rent per share times the number of shares outstanding $q_{n,T}$:

$$WT_{n,T} = q_{n,T} \cdot RENT_{n,T} \quad \text{for } n = 1, \dots, N. \quad (9)$$

Lastly, the total wealth being transferred, due to nationalization, from non holders of shares in nationalized companies to the class of nationalized companies' shareholders TWT_T equals :

$$TWT_T = \sum_{n=1}^N WT_{n,T} \quad (10)$$

The calculation of $WT_{n,T}$ requires an estimation of each periodic individual indifference returns $R_{n,t}^*$. Therefore, it is subject to measurement errors. Provided these errors are less than perfectly correlated cross-sectionally, their impact in estimating TWT_T can be attenuated by using a grouping technique⁷. This leads to the alternative measure TWT calculated directly over a portfolio of nationalized firms rather than by aggregation across companies as indicated by equation (10).

For this purpose, consider an equally weighted portfolio of nationalized firms whose returns are given by:

$$R_{N,t} = \frac{1}{N} \sum_{n=1}^N R_{n,t} \quad \text{for } t = 1, \dots, S. \quad (11-1)$$

and

$$R_{N,t}^* = \frac{1}{N} \sum_{n=1}^N R_{n,t}^* \quad \text{for } t = S+1, \dots, T. \quad (11-2)$$

where $R_{N,t}^*$ designates the portfolio periodic indifference returns.

From equation (4) it follows that

$$R_{N,t}^* = R_{N,t} \quad \text{for } t = 1, \dots, S. \quad (11-3)$$

In addition, let I_t^* be an indifference index defined as

$$I_t^* \equiv 1 \quad \text{for } t = S \quad (12-1)$$

and
$$I_{S+t}^* = I_{S+t-1}^* (1 + R_{N,S+t}^*) \quad \text{for } t = 1, \dots, T-S \quad (12-2)$$

Equation (12-2) says that for 1 French franc invested at the end of period S in the equally weighted portfolio of nationalized firms, the successive investment values in the absence of news on nationalization are given by I_{S+1}^* , I_{S+2}^* , ... I_T^* . For (12-2) to hold, the proportions invested in each security should be kept identical from $t = S$ to $t = T$ (see Appendix).

The market value of the portfolio of nationalized firms at $t = S$ multiplied with the indifference index I_T^* gives an estimate of the indifference value of this portfolio $V_{N,T}^*$ at time T. In symbols:

$$V_{N,T}^* = \left[\sum_{n=1}^N q_{n,S} \cdot P_{n,S} \right] \cdot I_T^* \quad (13)$$

The alternate measure of the total wealth transfer TWT_T^i is then given by:

$$TWT_T^i = \left(\sum_{n=1}^N q_{n,S} \cdot P_n^d \right) - V_{N,T}^* \quad (14)$$

3.2 Indifference return estimation procedure

Equations (7) and (12) indicate that indifference prices or indices can be computed, given periodic indifference returns $R_{n,t}^*$. These indifference returns are, by definition, the returns that shareholders of nationalized firms would have experienced in the absence of news on nationalization from $t = S+1$ to $t = T$. Since those returns cannot be observed, it is necessary to specify some generating function which would provide estimates of them. For this purpose, this paper uses the matched portfolio technique originally developed by Black and Scholes (1973)⁸.

Matched portfolios are defined as portfolios of non-nationalized firms shares whose returns during periods $t = 1, \dots, T$ are expected not to be different from returns on nationalized firms shares in the absence of news on their nationalization. In symbols, let $R_{n,t}^M$ and $R_{N,t}^M$ be the returns during period t on the portfolios matched to nationalized firm securities and to their equally weighted portfolio, respectively, then:

$$\begin{aligned} \tilde{R}_{n,t}^* &= \tilde{R}_{n,t}^M + \tilde{\mu}_{n,t} && \text{for } n = 1, \dots, N \\ &&& \text{and } t = 1, \dots, T \end{aligned} \quad (15-1)$$

and

$$\tilde{R}_{N,t}^* = \tilde{R}_{N,t}^M + \tilde{\mu}_{N,t} \quad \text{for } t = 1, \dots, T \quad (15-2)$$

in which $\tilde{R}_{n,t}^*$, $\tilde{R}_{N,t}^*$ are defined according to equations (1), (4), (11) and $\tilde{\mu}_{n,t}$, $\tilde{\mu}_{N,t}$ are normally distributed random terms with zero mean and constant variance. Matched portfolios are empirically identified as these portfolios for which

$$E(\hat{\mu}_{n,t}) = 0 \quad \text{for } n = 1, \dots, N \\ t = 1, \dots, T \quad (16-1)$$

and

$$E(\hat{\mu}_{N,t}) = 0 \quad \text{for } t = 1, \dots, T \quad (16-2)$$

hold empirically.

They are constructed according to their systematic risk beta during a construction period $t = 1, \dots, C < S^9$. The observed returns on the matched portfolios are then used as proxies for what the returns on the shares of nationalizable companies would have been during the period $t = S + 1, \dots, T$ in the absence of nationalization. Under this approach it is assumed that the election of President Mitterrand and subsequent events have affected equally the systematic risk of the matched portfolios as that of the corresponding nationalized firms in the absence of their nationalization.

Portfolios construction proceeds as follows. Betas are estimated during the construction period according to:

$$\tilde{R}_{j,t} = \hat{\alpha}_j + \hat{\beta}_j \tilde{R}_{m,t} + \tilde{\epsilon}_{j,t} \quad (17)$$

and

$$\beta_N = \frac{1}{N} \sum_{n=1}^N \beta_n \quad (18)$$

for $t=1, \dots, C$ and in which $\tilde{R}_{j,t}$ and $\tilde{R}_{m,t}$ are defined according to equations (1) and (2). Then a high beta β_H and a low beta β_L portfolio are constructed each as an equally weighted portfolio of half the non-nationalized securities with the highest beta and half the non-nationalized securities with the lowest beta, respectively.

Corresponding to each nationalized security n and to their portfolio N , weighting factors, γ_n and γ_N are obtained as solution of the equations :

$$\hat{\beta}_n = \gamma_n \cdot \hat{\beta}_H + (1 - \gamma_n) \cdot \hat{\beta}_L \quad \text{for } n = 1, \dots, N \quad (19-1)$$

and

$$\hat{\beta}_N = \gamma_N \cdot \hat{\beta}_H + (1 - \gamma_N) \cdot \hat{\beta}_L \quad (19-2)$$

If R_{Ht} and R_{Lt} designate the periodic returns on the high and low beta portfolios, it follows that the returns computed as :

$$R_{n,t}^M = \gamma_n R_{H,t} + (1 - \gamma_n) R_{L,t} \quad \text{for } n = 1, \dots, N \quad (20-1)$$

and

$$R_{N,t}^M = \gamma_N R_{H,t} + (1 - \gamma_N) R_{H,t} \quad \text{for } t = 1, \dots, T \quad (20-2)$$

are the returns of the matched portfolios. Under this construction, the indifference returns $R_{n,t}^*$, and $R_{N,t}^*$ are measured by :

$$R_{n,t}^* = R_{n,t}^M \quad \text{for } n = 1, \dots, N \\ \text{and } t = C+1, \dots, T \quad (21-1)$$

and

$$R_{N,t}^* = R_{N,t}^M \quad \text{for } t = C+1, \dots, T. \quad (21-2)$$

3.3 Significance of differential returns

In order to determine the significance of return differences between realized nationalized firm's returns and their indifferent returns, differential returns between the equally weighted portfolio of nationalized firms $R_{N,t}$ and its indifference returns $R_{N,t}^*$ are computed as :

$$DR_t^N = R_{N,t} - R_{N,t}^* \quad \text{for } t = C+1, \dots, T. \quad (22)$$

Cumulative differential returns CDR_t for different periods going from t to $t + z$ are also obtained as :

$$CDR_t^{t+z} = \sum_t^{t+z} DR_t \quad (23)$$

The following significance tests are performed on those return differentials. Assuming that DR_t is normally distributed we test whether \tilde{DR}_t is statistically different from 0 on week t by computing the t -statistic :

$$t(\tilde{DR}_t) = \frac{\tilde{DR}_t}{\hat{\sigma}(\tilde{DR}_t)} \quad (24)$$

where $\hat{\sigma}(\tilde{DR}_t)$ is the sample standard deviation of \tilde{DR}_t during the construction period $t = 1, \dots, C$. Accordingly, we test also if the cumulative differential returns \tilde{CDR}_t^{t+z} are significantly different from zero by calculating the t statistic

$$t(\tilde{CDR}_t^{t+z}) = \frac{\tilde{CDR}_t^{t+z}}{\sqrt{z \cdot \hat{\sigma}(\tilde{DR}_t)}} \quad (25)$$

under the assumption that DR_t is normally and independantly distributed.

The analysis of differential returns is also instrumental in determining the critical date $t = S$ at which the market started to build up expectations regarding nationalization. At this date cumulative differential returns must show values significantly different from zero. Finally, observations of differential returns prove to be illuminating in explaining investor's reaction to nationalization from the time it was anticipated until it officially occurred.

4. THE EXPERIMENTAL DESIGN

4.1 The Data

The final version of the nationalization bill, published February 16, 1982, indicates that 25 companies are immediately nationalized. Five industrial groups, 18 commercial banks and two holding companies. Eleven of them, the largest ones, are traded in the most active French stock market, namely the forward market of the Paris exchange¹⁰. Market data on our sample which consists of these 11 companies are given in table 1. The aggregate market value as per December 31, 1980 of the companies traded on the French exchanges and to be taken over by the state represented 14 per cent of the total stock market capitalization of French companies and our sample 9.2 per cent.

Weekly Friday closing prices for shares traded in the forward market are recorded and distributed on a magnetic tape by the Compagnie des Agents de Change, the French Association of stock brokers. Weekly returns are computed according to equation (1). The market returns $R_{m,t}$ used in the regression equation (17) to estimate securities' betas are computed according to equation (2) over the 155 most traded securities (including the 11 nationalized securities) and whose stock market data are recorded on the tape of the Compagnie des Agents de Change.

The high and low beta portfolio used in the construction of the matched portfolios, are formed as equally weighted portfolios of the 72 non nationalized securities with the highest beta and the 72 non nationalized securities with the lowest beta respectively.

4.2 The construction and test periods

The analysis extended from July 7, 1979 to January 15, 1982, that is over 132 weeks. The construction period $t = 1, \dots, C$ with $C = 64$ started July 7, 1979 and ended October 3, 1980 while the test period $t = C + 1, \dots, T$ with $C + 1 = 65$ and $T = 132$ spans the adjacent period ending January 15, 1982. The critical date October 3, 1980 was chosen on the basis that the French political year starts in October. The end of the test period, January 15, 1982 corresponds to the last Friday before the government announced the compensation prices of the second version of the nationalization bill. The actual amount of observations on nationalized firms returns was 64 since the quotations on the shares of these firms had already been interrupted for four weeks from September 9 to September 30, 1981 after the first version of the nationalization bill adopted by the French government was made public. For symmetry reasons the construction period was also defined over 64 weeks¹¹. Week 96 was the last week before President Mitterrand was elected May 10, 1981.

5. RESULTS

5.1 Analysis of the observed differential returns

Weekly differential DR^N and cumulative differential CDR between the realized return on the equally weighted portfolio of nationalized firms and its indifference return over the test period - October 3, 1980 to January 15, 1982 - are presented in Table 2 along with t - statistics on DR. Selected statistics on CDR are given in Table 3 and Graphic 1 depicts the evolution of CDR during the test period.

From Graphic 1 it appears that the differential returns walked randomly during the whole period and until the very last trading day preceding the election date (week 96). Tables 2 and 3 show that this was indeed the case. From the beginning of the test period, October 3, 1980, to the week preceding the election of candidate Mitterrand, May 10, 1981, only 6 differential returns out of 32 are significantly different from zero and the cumulative differential return at $t = 96$ shows a non significant value ($t=1.64$).

Candidate Mitterrand was running on an election platform that foresaw the nationalization of the banking sector, the industrial groups and the holding companies listed in Table 1. In view of what happened to the differential return before and after the election outcome was known ($t = 96$) it appears clearly that investors did not anticipate that candidate Mitterrand would be elected President. The market was indeed surprised by the outcome of the election. This is not incompatible with market efficiency and it strengthens the proposition that on May 8, 1981 share prices of victim companies are best estimates of the intrinsic value of these shares, as of that date, in the absence of nationalization. In fact, the pre and post election behaviour of the cumulative differential returns would reinforce the argument that this price was a 'non-nationalization event' price. Our first result is then that the victim companies share prices on May 8, 1981 form the best starting point to estimate a compensation for nationalization that would leave investors indifferent between non-nationalization and nationalization. That is, the period S as defined in section 3.1 is week 96.

Differential returns DR are differences in realized returns between the portfolio of nationalized firm and its matched portfolio. As mentioned above, these differential returns and their cumulative values are not significantly different from zero from the end of the matched portfolio construction period ($t = 65$) to the last period when nationalization was not yet anticipated ($t = 96$). This result can be interpreted as evidence that matched portfolio returns can be used as a generating function for indifference returns on nationalized firms and their portfolios.

The first couple of days after the election the market was thrown off balance and trading in most shares was interrupted under a stock market regulation that maximum price changes per day must not exceed 10%. By May 15 the market had dropped 17.12% from its May 8 level, and by May 22 another 4.73%. The group of victim companies showed successive differential returns of - 8.3% ($t = - 9.49$) and - 6.3% ($t = - 7.16$) and a cumulative differential return of - 14.7% ($t = - 11.83$). For six weeks after this, through July 3 cumulative differential returns did not vary much around the level attained on May 22 ($t = 1.02$). This was the period of the pre and post legislative election campaign, whose outcome on June 21, this time, was fully anticipated.

The V shaped cumulative differential returns profile from July 3 through the latest end of week observation of September 4, before trading in the shares of the victim companies was interrupted on September 9, essentially reflects market anticipation about the compensation package. The appointment of three communist ministers and of a known radical minister for nationalization in the new government during the week-end after closing of trading on July 3 precipitated the drop of the cumulative differential return after this date. The cumulative differential return attained its lowest level on August 14. Since May 8 it showed a decrease of 28.7% ($t = 8.73$). During the week ending August 21, the government, apparently unexpectedly, announced that compensation would not exclusively be based on an average of historical stock prices through December 31, 1980, but would be based also on past book values and a multiple of profits. This was perceived as good news, as most companies in the sample had been traded below book value. On the day the cabinet approved the first nationalization bill, trading was interrupted. When trading restarted on September 30, the government had already made public the first list of compensation prices. The bill was then debated in the National Assembly which finally voted it on October 26. However, the Senate rejected the bill on November 23. But the National Assembly definitively adopted the project December 18, on second reading. During the period from October 2 to December 18, differential returns show significant erratic changes reflecting continuous changes in anticipation regarding compensation while the bill was discussed at the National Assembly and the Senate. Following its adoption by the Assembly, the bill was submitted to the Constitutional Council to decide about its constitutionality. The negative decision of the Council was apparently not anticipated by the investors since from December 18 to January 15, the day before the Council decision was made public, the cumulative differential return was not significantly different from 0 ($t = .51$).

5.2 Wealth Transfers

Total Sample Wealth Transfer TWT_T

On graph 2 the weekly indifference price index on the equally weighted portfolio of the 11 nationalized firms included in the sample, I^* , as defined by equation (12), is reported along with the non adjusted, observed index I_t^{12} . Both are set at 1 on May 8, 1982, ($t = 96$) the last trading day before the election of Président Mitterrand and are computed over the period extending to January 15, 1982 ($t = 132$). The differences between the two indices at any particular point in time t reflect the cumulative differential return at time t discussed in the previous paragraph. Table 4 presents both indices on January 15, 1982, the last trading day preceding the official announcement of the second version of the nationalization bill, that is I_{132}^* and I_{132} respectively. On the same table is also shown the indifference capitalization of the portfolio computed according to equation (13), that is $V_{N,t}^* = I_{132}^* \sum_{n=1}^{11} q_n P_{n,96}$, the compensation offered in the two nationalization bills computed as $\sum_{n=1}^{11} q_n P_n^d$ and finally the estimated sample total wealth transfer TWT_T as given by equation (14).

The sample total wealth transfer in favor nationalized company shareholders corresponding to the first version of the bill - which was declared unconstitutional by the Constitutional Council particularly on the ground of insufficient compensation - is estimated at 4.24 billion francs, that is 20.8% higher than the indifference market value. As for the second version of the bill, which was approved by the Council and became law on February 16, 1982, the wealth transfer is estimated at 9.48 billion francs or 46.1% of the indifference market value. In both cases the compensation for an equally weighted portfolio of the shares making up our sample is higher than the estimated market value of the same portfolio in the absence of nationalization. This is not surprising, given the compensation formulas used. As already mentioned the first bill made some provision for book value in the determination of the compensation offered which, for some nationalized firms, has been higher than their market value. Moreover in both bills and particularly in the second one, market values which entered the compensation formula were taken over periods when, not only the nationalization bill but also the change to a socialist presidency and to a socialist government were not anticipated. It is worth contrasting their market values estimate with our indifference market values which adjust only for nationalization and nothing else.

Nevertheless, it is interesting to notice that the estimate of the premium offered by the second version of the bill over the indifference price, that is 47.3%, is close to the 50% premium observed for non compulsory takeovers in recent years in France (Jacquillat, 1982).

Individual Wealth Transfers $WT_{n,T}$

Individual wealth transfers $WT_{n,132}$ estimated on January 15, 1982 and related data are presented in Table 5. Indifference share prices on each of the 11 nationalized firms of the sample were obtained according to equations (6) and (7), the rent from nationalization and the wealth transfers $WT_{n,132}$ according to equations (8) and (9) respectively. The sum of individual wealth transfers is the total wealth transfer as given by equation (10). Other aggregate values are sample capitalization at indicated share prices.

The mean and standard deviation of the rents corresponding to the first nationalization bill and expressed as percentage of indifference prices, are 24.7% and 28.7% respectively with three negative rents out of 11. The wide dispersion of these rents was, as mentioned in section 2, instrumental in the rejection of the first nationalization bill by the constitutional council. For the second and final version of the bill, the mean of the rents went up from 24.7% of the indifference prices to 43.8%, the standard deviation went down from 28.7% to 11.8% and there are no more negative rents. The reduction of the dispersion of the rents coupled with large increases in the compensation to shareholders of firms such as Credit Commercial de France, Compagnie Générale d'Electricité and Compagnie Financière de Paris et des Pays-Bas were apparently felt as sufficient improvements in the compensation package to remove the objections of unfairness raised by the first bill. It remains however that some important discriminations still persist. While all shareholders of the nationalized firms gain from nationalization, some are notably more compensated than others. For example, the rent from nationalization obtained by Rhône Poulenc shareholders is nearly three times the gain obtained by Banque Rothschild shareholders, percentage wise. Note also that, on average, shareholders of industrial firms gain more than shareholders of finance and banking firms¹³.

In Table 5, aggregate values show an overall gain from nationalization of 4.06 and 9.31 billions francs for the first and second version of the bill, respectively. These estimates are very close to those reported in Table 4 and obtained directly from the equally weighted portfolio of nationalized firms: 4.24 and 9.48 billion francs, respectively. In estimating indifference prices, matched portfolios were constructed so as to exhibit the same systematic risk as each nationalized security. Although measurement errors on the securities beta could generate estimation errors on the indifference prices, it is striking that the two different approaches to total wealth transfer used in this study led to practically identical estimates. While estimation errors might affect indifference prices¹⁴, it appears that they don't have much effect on the overall estimate of the gain from nationalization to shareholders of nationalized firms.

6. SUMMARY AND CONCLUSION

In this paper we developed a methodology to estimate the changes in market returns and the wealth transfers associated with a case of ultimate regulation, namely nationalization. The empirical analysis was carried out on the recent French experience which involved the nationalization of industrial and banking firms representing more than 14% of the total French Stock Market capitalization. Using a control portfolio approach to estimate what would have been the returns as well as the market prices of nationalized stocks in the absence of nationalization, we were able to provide a standard of reference for the compensation actually received by the shareholders of nationalized firms. Furthermore, if the economic concept of indifference would be used as a legal standard against which the legal French constitutional norm of "fairness" and "equality of treatment" would be tested, our study led to the following conclusions regarding the French Nationalization experience.

First, it was found that the compensation for the overall sample investigated includes a premium over the compensation that would have made investors indifferent, on margin, to nationalization. This premium, in the final version of the nationalization bill represents more than 46% of the "indifference" compensation, thus making shareholders of nationalized companies, on average, much better off than they would have been under a Mitterand regime in the absence of nationalization. This premium over what the market price would have been is in line with French stock market practice with private company takeovers, representing in a sense the value of control. Secondly, while the final version of the bill is less discriminatory between shareholders of different nationalized firms, some large discrepancies remain when actual compensation for each nationalized stock is compared with the market determined indifference price. Thus, one can hardly claim that, on this ground, the nationalization bill guarantees the constitutional norm of "equality of treatment".

APPENDIX

Consider an investment at the end of period S in a portfolio including $\frac{1}{N \cdot P_{n,S}}$ of each nationalized firm n. The value of this investment is

$$I_S = \sum_{n=1}^N \frac{1}{N \cdot P_{n,S}} \cdot P_{n,S} = 1 \quad (1')$$

Furthermore, each security contributes to the value I_S of the portfolio in the same amount : $1/N$ French franc. In other words the investment considered is a one French franc placement in an equally weighted portfolio of the N nationalized firms.

At the end of period S + 1, the indifference value of this investment I_{S+1}^* is given by :

$$I_{S+1}^* = \sum_{n=1}^N \frac{1}{N \cdot P_{n,S}} \cdot P_{n,S+1}^* + \sum_{n=1}^N \frac{1}{N \cdot P_{n,S}} \cdot D_{n,S+1} \quad (2')$$

Substituting $P_{n,S+1}^*$ of (2') by its value given in equation (6), gives :

$$I_{S+1}^* = \sum_{n=1}^N \frac{1}{N \cdot P_{n,S}} \cdot \left[P_{n,S} \cdot (1+R_{n,S+1}^*) - D_{n,S+1} \right] + \sum_{n=1}^N \frac{1}{N \cdot P_{n,S}} \cdot D_{n,S+1} \quad (3')$$

that is :

$$I_{S+1}^* = 1 + R_{n,S+1}^* \quad (4')$$

For the portfolio to remain an equally weighted portfolio for the next period S+2, the available wealth I_{S+1}^* must be redistributed equally among the N securities. This is done by investing in $I_{S+1}^* \cdot \frac{1}{N \cdot P_{n,S+1}^*}$

share of each nationalized firm.

At the end of period t=S+2, the indifference value of the portfolio is given by :

$$I_{S+2}^* = \sum_{n=1}^N \frac{1}{N \cdot P_{n,S+1}^*} \cdot P_{n,S+2}^* + \sum_{n=1}^N \frac{I_{S+1}^*}{N \cdot P_{n,S+1}^*} \cdot D_{n,S+1} \quad (5')$$

Making use again of equation (6) we obtain :

$$I_{S+2}^* = \sum_{n=1}^N \frac{I_{S+1}^*}{N \cdot P_{n,S+1}^*} \cdot \left[P_{n,S+1}^* (1+R_{n,S+2}^*) - D_{n,S+2} \right] + \sum_{n=1}^N \frac{I_{S+1}^*}{N \cdot P_{n,S+1}^*} \cdot D_{n,S+1} \quad (6')$$

that is :

$$I_{S+2}^* = I_{S+1}^* (1+R_{N,S+2}^*) \quad (7')$$

and more generally

$$I_{S+t}^* = I_{S+t-1}^* (1+R_{N,S+t}^*) \text{ for } t = 1, \dots, T-S \quad (8')$$

with $I_S^* = 1,$

Equation (8') or equation (12) in the text, gives for each period subsequent to period S, $t = S+1, \dots, T$ indifference values of an initial 1 French franc investment in an equally weighted portfolio of nationalized firms whose weights are maintained identical during the investment horizon from $t=S$ to $t=T$.

FOOTNOTES

1. For a survey of literature on the subject see Brown and Warner (1980) and Schwert (1981).
2. For a bill to be adopted, it has to be voted both by the National Assembly and the Senate. If the Senate rejects the bill, the National Assembly has to vote again on the bill for it to be definitively adopted by the legislative body. Usually the second vote gives the same result as the first so that the rejection of a bill by the Senate remains without significant effect. This was indeed the case for the two versions of the nationalization bill. However, if the constitutionality of the bill is challenged, the Constitutional Council is asked to check the conformity of the bill with the requirements of the French constitution. The first version of the bill, while voted by the Assembly, was declared unconstitutional by the Council.
3. See Charzat report for a detailed description of the formula.
4. Journal Officiel de la République Française, January 17, 1982, pp 302-303.
5. March 1981 was chosen as the end of the reference period on the assumption that at this point in time the stock market had not yet anticipated the changes in the French presidency and French Government.
6. It should be pointed out that $R_{n,t}^*$ will only by chance be equal to the expected return $E(R_{n,t})$ during any particular t and that the residual is white noise.
7. See, for example, Fama (1976) pp 343-348 on the problems associated with measurement errors in portfolio analysis and the grouping technique that can be used to reduce the impact of such errors.
8. For other examples of the use of this technique see, for example, Warner (1977) Watts (1978) and Vermaelen (1981).
9. Assuming that the Market Model holds, then $E(\tilde{R}_{n,t}^M) = \hat{\alpha}_n^M + \hat{\beta}_n^M E(\tilde{R}_{m,t})$ and $E(\tilde{R}_{n,t}^*) = \hat{\alpha}_n + \hat{\beta}_n E(\tilde{R}_{m,t})$; that is $E(\hat{u}_{n,t}) = (\hat{\alpha}_n^M - \hat{\alpha}_n) + (\hat{\beta}_n^M - \hat{\beta}_n) E(\tilde{R}_{m,t})$. By construction, $\hat{\beta}_n^M = \hat{\beta}_n$. Another condition should be imposed for $E(\hat{u}_{n,t}) = 0$, namely $\hat{\alpha}_n^M = \hat{\alpha}_n$. This is provided by the assumption that the Capital Asset Pricing Model holds.
10. On the forward market, price and quantities of share to be traded are fixed on the day they are negotiated but delivery and payment take place seven business days before the end of the month in which the deal is made.
11. Experiments going further back in the past did not materially affect the matched portfolios composition.
12. The non adjusted, observed index I_t is defined as I_t^* , i.e. by equation (12) in which observed returns substitute for indifference returns.

13. From the reference period when decreed prices P_n^d were determined (October 1981 - March 1982) to January 15, 1982 the French stock market return dropped. Accordingly, the high beta matched portfolios returns decreased more than the low beta matched portfolios returns. In other words, indifference prices $P_{n,t}^*$ of the high beta nationalized firms decreased relatively more than the indifference prices of the low beta nationalized firms during the same period. Thus the percentage rents $(P_n^* - P_{n,T}^*)/P_{n,T}^*$ of the high beta firms must be higher than the low beta firms rents. Now, it is well known that industrial firms betas are generally higher than banking and finance firms betas. This is indeed the case in our sample with the only exception of Compagnie Générale d'Electricité whose beta is marginally lower than the highest banking firm beta. Thus, it shouldn't be surprising to actually observe that rents on industrial firms are higher than rents on banking and finance firms.
14. To test for the impact of such estimation errors, new indifference prices were estimated with matched portfolios of stocks on non nationalized firms whose betas were within \pm two standard deviations of the corresponding nationalized firm stock beta during the estimation period. Results show a mean difference of 1.7% and extreme differences of - 1.9% to 2.9% with indifference prices based on single beta estimates.

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TABLE 1

STOCK MARKET DATA ON THE SAMPLE OF NATIONALIZED FIRMS

	Shares outstanding on 31.12.80	Price per share 31.12.80	Aggregate Market Value 31.12.80	Annual Trans- action Value 1980	Annual Trans- action Volume 1980	Share Turn- over
			Billions F	Billions F	≠ Shares	% of ≠ Shares outstanding
Banque Rothschild	2,090,000	160.00	.335	.062	385,570	18.4
Crédit Commercial de France	6,623,237	210.00	1.391	.163	854,241	12.8
Crédit Industriel et Commercial	4,522,827	175.00	.792	.043	292,500	6.4
Crédit du Nord	4,801,220	83.00	.399	.026	382,347	7.9
Compagnie Financière de Paris et des Pays Bas	16,461,018	244.90	4.032	.729	3,058,607	18.6
Compagnie Financière de Suez	9,469,206	309.00	2.926	.723	2,347,654	24.8
Compagnie Générale d'Electricité (CGE)	7,046,805	369.00	2.600	.483	1,274,380	18.5
Thomson-Brandt	6,340,000	222.50	1.411	.446	1,929,658	30.7
Rhône-Poulenc S.A.	22,728,684	87.50	1.989	.631	5,230,160	22.7
Péchiney Ugine Kulhmann (PUK)	25,491,353	89.40	2.279	.633	6,144,756	24.1
Compagnie de Saint-Gobain Pont à Mousson	34,650,000	136.00	4.712	.572	4,353,205	12.5
Sample Total			22.866	4.511	26,253,078	17.9
Stock Market Total (French Companies)			247,957	42.760		
Sample Percentage			9.2%	10.5%		

Data sources are : Column (1) Rapport Charzat, Cy's Annual Report for 1980, Annuaire Défossés-SEF. All other columns - L'Année Boursière 1980 or Compagnie des Agents de Change Directly

Table 2

Differential Returns (DR), statistics on DR and Cumulative
Differential Returns (CDR) during the test period

<u>Period</u>	<u>End of Period date</u>	<u>DR</u>	<u>t (DR)</u>	<u>CDR</u>	<u>Period</u>	<u>End of Period date</u>	<u>DR</u>	<u>t (DR)</u>	<u>CDR</u>
65	03.10.80	.016	1.78*	.016	99	29.05.81	.015	1.73*	-.078
66	10.10.80	-.008	-.87	.008	100	05.06.81	-.017	-1.88*	-.095
67	17.10.80	.010	1.15	.018	101	12.06.81	-.022	2.51*	-.073
68	24.10.80	.005	.55	.023	102	19.06.81	-.023	-2.61*	-.096
69	31.10.80	-.008	-.93	.015	103	26.06.81	.027	3.15*	-.068
70	07.11.80	.022	2.49*	.037	104	03.07.81	-.006	-.68	-.074
71	14.11.80	.006	.67	.043	105	10.07.81	-.018	-2.05*	-.092
72	21.11.80	.000	.02	.043	106	17.07.81	-.020	-2.24*	-.112
73	28.11.80	-.015	-1.75*	.027	107	24.07.81	-.077	-8.77*	-.189
74	05.12.80	-.003	-.37	.024	108	31.07.81	-.012	-1.36	-.201
75	12.12.80	.018	1.99*	.042	109	07.08.81	-.014	-1.59	-.215
76	19.12.80	.010	1.16	.052	110	14.08.81	-.020	-2.24*	-.234
77	26.12.80	-.004	-.41	.048	111	21.08.81	.039	4.42*	-.195
78	02.01.81	-.011	-1.31	.037	112	28.08.81	.098	11.20*	-.097
79	09.01.81	.005	.56	.042	113	04.09.81	.023	2.59*	-.074
80	16.01.81	-.004	-.44	.038	114 ^a	11.09.81			
81	23.01.81	-.001	-.08	.038	115 ^a	18.09.81			
82	30.01.81	-.006	-.68	.031	116 ^a	25.09.81			
83	06.02.81	.009	1.06	.040	117 ^a	02.10.81			
84	13.02.81	-.004	-.43	.037	118	09.10.81	-.033	-3.78*	-.108
85	20.02.81	.012	1.38	.049	119	16.10.81	.069	7.90*	-.038
86	27.02.81	-.006	-.71	.043	120	23.10.81	-.003	-.29	-.041
87	06.03.81	.016	1.77*	.058	121	30.10.81	.004	.47	-.037
88	13.03.81	.009	1.07	.068	122	06.11.81	.019	2.15*	-.018
89	20.03.81	-.002	-.17	.066	123	13.11.81	.030	3.47*	.013
90	27.03.81	-.011	-1.28	.055	124	20.11.81	.053	6.07*	.067
91	03.04.81	.007	.76	.061	125	27.11.81	-.037	-4.24*	.029
92	10.04.81	.003	.34	.064	126	04.12.81	-.019	-2.18*	.010
93	16.04.81	-.005	-.57	.060	127	11.12.81	-.005	.70	.004
94	24.04.81	.003	.38	.063	128	18.12.81	.005	.59	.009
95	30.04.81	-.009	-1.02	.054	129	25.12.81	-.003	-.29	.006
96	08.05.81	-.001	-.14	.053	130	31.12.81	.011	1.23	.017
97	15.05.81	-.083	-9.49*	-.030	131	08.01.82	-.003	-.36	.014
98	22.05.81	-.063	-7.16*	-.094	132	15.01.82	-.000	-.05	.014

a : quotations on nationalized firms were interrupted during these periods.

* : indicates significance at 5% and higher levels.

Table 3
Cumulative Differential Returns CDR , their t-values
t(CDR) and 5% significance level t^* (CDR)

<u>Period</u>	<u>CDR</u>	<u>t(CDR)</u>	<u>t^*(CDR)</u>
65 through 96 (03.10.81 to 08.05.81)	.053	1.06	1.64
97 through 98 (08.05.81 to 22.05.81)	-.147	-11.83	- 2.92
99 through 104 (22.05.81 to 03.07.81)	.020	1.02	2.02
97 through 110 (08.05.81 to 14.08.81)	-.287	-8.73	- 1.76
128 through 132 (18.12.81 to 15.01.82)	.010	.51	2.02
96 through 132 (08.05.81 to 15.01.82)	-.004	- .07	1.64

Table 4

Observed and Indifference Price Indices, Sample Capitalization and Compensation offered^a in both versions of the nationalization bill

	<u>May 8, 1981</u>	<u>First version</u>	<u>Second and final version</u>
Observed index (I)	1	.993 ^b	.993 ^b
Indifference index (I [*])	1	.879 ^b	.879 ^b
Indifference capitalization ^a (V [*] _{N,t})	23.209 ^c	20.400	20.400
Compensation offered ^a N ($\sum_{n=1}^N q_{n,S} \cdot P_n^d$)	-	24.642	29.885
Total Sample Wealth Transfer ^a (TWT _T)	-	4.242	9.485

a : in billion French francs

b : as per January 15, 1982

c : observed market capitalization

Table 5

Indifference Prices on January 15, 1982^a, Decreed Prices^a, Rents^a, Wealth Transfers^b and Aggregate Values^{b,c}

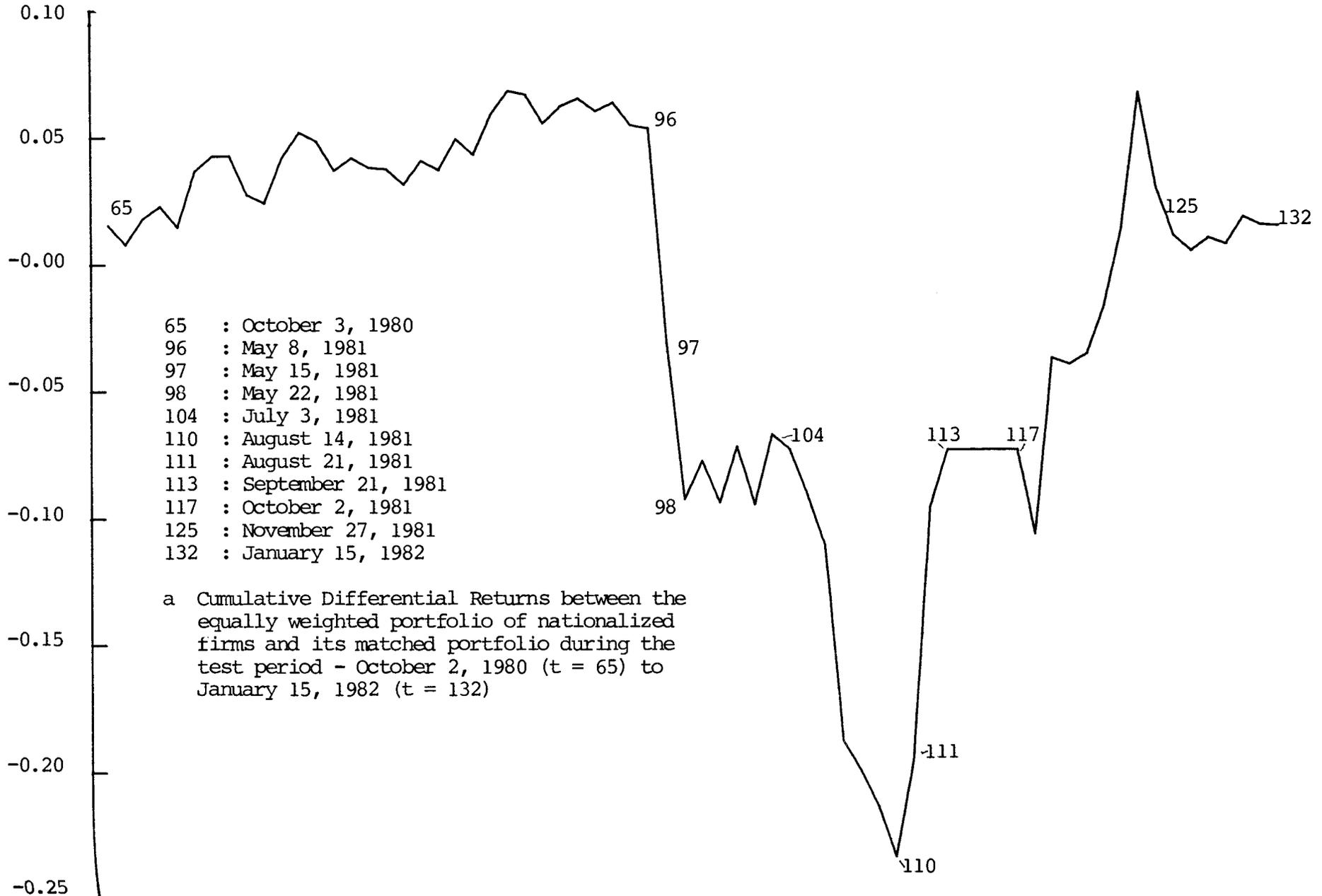
	Indifference Price	First version of the bill			Second version of the bill				
		Decreed Price	Rent %	Wealth Transfer	Decreed Price	Rent %	Wealth Transfer		
Banque Rothschild	158.9	241.0	82.1	51.7	.172	197.2	38.3	24.1	.080
Crédit Commercial de France	179.8	163.8	-16.0	-8.9	-.106	253.9	74.1	41.2	491
Crédit Industriel et Commercial	153.2	159.7	6.5	4.2	.029	203.3	50.1	32.7	227
Crédit du Nord	70.2	101.3	31.1	44.4	.149	102.3	32.1	45.7	154
Compagnie Financière de Paris et des Pays Bas	230.1	218.7	-11.4	-5.0	-.188	303.4	73.3	31.9	1,207
Compagnie Financière de Suez	283.0	327.4	44.4	15.7	.420	423.1	140.1	49.5	1,327
Compagnie Générale d'Electricité	364.2	334.2	-30.0	-8.2	-.211	492.3	128.1	35.2	903
Thomson Brandt	205.4	255.7	50.3	24.5	.319	306.9	101.5	49.4	644
Rhône Poulenc	71.8	136.0	64.2	89.4	1,459	121.0	49.2	68.5	1,118
Pechiney Ugine Kuhlman (PUK)	82.5	104.6	22.1	26.8	.563	124.2	41.7	50.5	1,063
Saint Gobain	114.1	156.2	42.1	36.9	1,459	174.6	60.5	53.0	2,096
Aggregate Value ^{b,c}	20,578	24,642	4,064	19.7	4.064	29,885	9,310	45.2	9.310

a : in French Francs b : in billion French Francs c : sample capitalization at indicated share price and rent

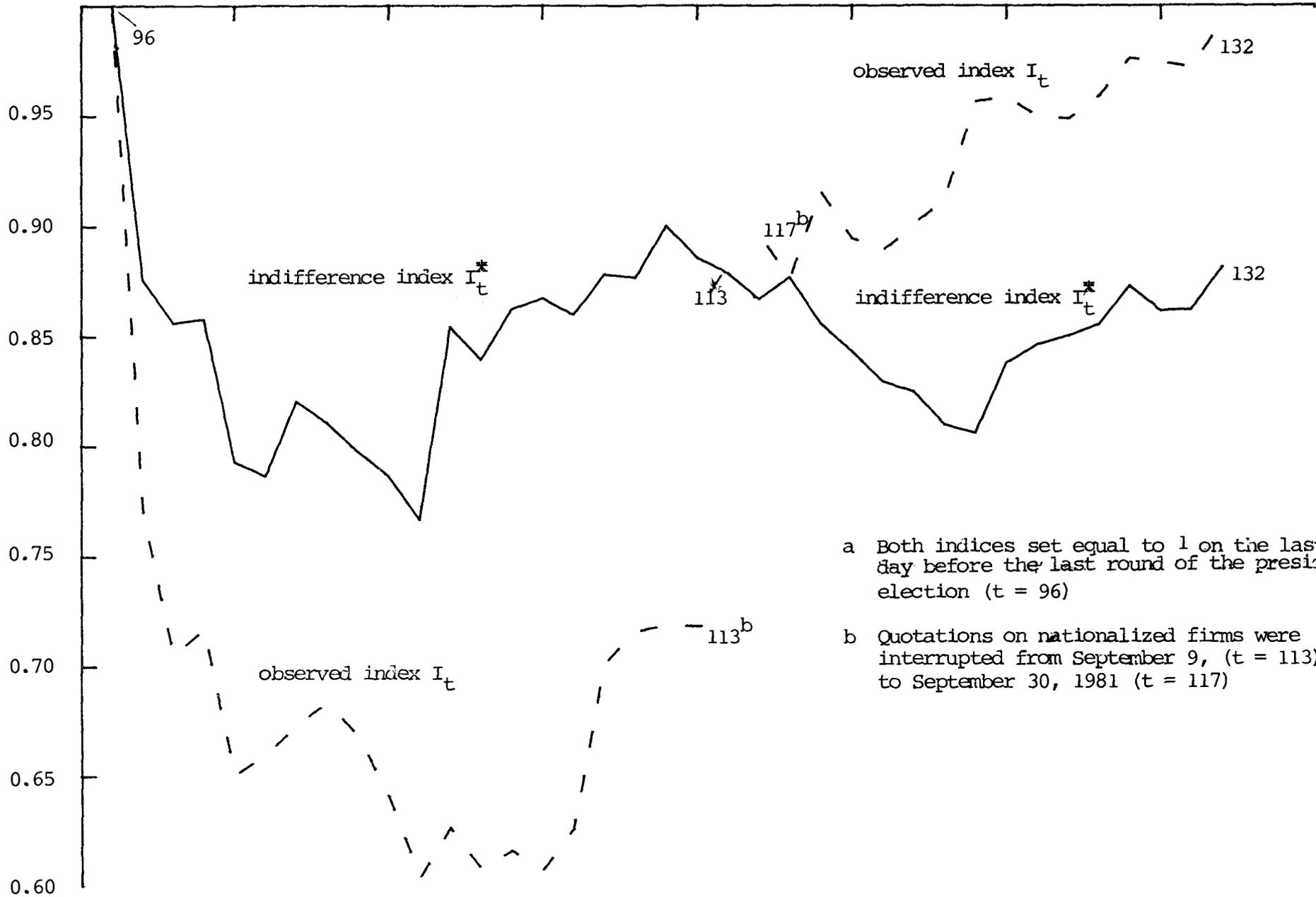
d : as percent of indifference price

CUMULATIVE DIFFERENTIAL RETURN^a

Graph 1



PORTFOLIO PRICE INDICES ^a
 from May 8, 1981 to January 15, 1982



- a Both indices set equal to 1 on the last trading day before the last round of the presidential election ($t = 96$)
- b Quotations on nationalized firms were interrupted from September 9, ($t = 113$) to September 30, 1981 ($t = 117$)

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