The Impact of Political Economy on the Income Tax System

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Abstract

In this article, we analyzed to what extent political decisions have influenced the French income tax system of the Fifth Republic. After examining previous studies, we chose appropriate economic and political variables to explain the probability of a fiscal reform. We first tried to predict how they related with the probability of reform. Then, we built a database to test our hypotheses with econometric models. The results obtained indicate that approval rating of the president, political color of the president and the senate, and debt are the most significant variables after 1980. Nonetheless economic factors prevail considering longer periods (1959-2013).

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Issues and motivation

Understanding the details of the French tax system has become a thorny issue. Let's consider the number of tax breaks: in 2008, 508 breaks were in force, costing between 50 and 73 billion euros. According to government reports, the income tax concentrates around 200 tax breaks adding up to about 39 billion euros in 2008. These numerous fiscal exemptions resulted from political decisions used to sway the electorate in addition to pressing economic needs.

In this report, we aim to explicit the manifold correlations between economics and politics in tax reforms. Even if theoretical economic models are essential to shape policies, tax reforms are decided by politicians, not economists. Therefore, economic variables should not be the only variables taken into account. We chose to focus our study on the income tax, one of the most symbolic taxes in France. Created in 1914, it is now deeply ingrained in French society despite a structure that has been significantly modified through out many reforms.

The aim is to determine to what extent politics more than economics could have spawn fiscal shifts. We realized that there were no studies related to this subject in France. In order to carry out this work, we needed to select political and economic variables – the explanatory variables –. This choice is crucial, because these variables must provide enough details about the political and the economic state of the country while remaining reasonable in number. As a result, we relied on the previous researches to make these choices. In our model, the economic and political variables chosen influence the probability that a fiscal reform is going to happen each year. As a consequence, we built a binary variable – the explained variable – which is equal to one when a major tax income reform is implemented and zero otherwise. We reviewed all the income tax reforms from 1914 and arbitrated among thresholds or tax brackets reforms to elaborate this variable.

We could then develop our database of the explanatory variables. This task proved to be quite delicate. In some cases, we had no choice but to merge data from different sources so as to cover the largest period possible. Thanks to econometric models, the final database helps bring tendencies out by testing the significance as well as the marginal effect of each variable.

Before using the econometric model, we tried to analyze as many potential causalities

and correlations as possible between the explained and the explanatory variable. We wanted to predict what a natural result would be according to us. We also wanted to put the variables into perspective, so as not to give irrelevant interpretation of the results of the econometric model. In most cases with these reflections, we came up with conflicting influences – that is to say reasons for positive and negative correlation –. The econometric results would determine which effect prevailed.

Even though the time interval is not very large (1980-2013 for the first regression), some results came out. We observed that the approval rate of the president, the political color of the president and the senate, and the debt were very significant in this model, and in a lesser extent the share of property income in the gross household income and the prime minister approval rating. We also analyzed the sign of the marginal effect to explain the different correlations.

Finally, by placing less variables in our model, we were able to extend the time interval (1959-2013) only to discover that the president approval rate was less significant than the share of property income in this longer period of time. This result suggests that political factors have been prevailing recently (1980-2013) whereas economic variables were more significant at the beginning of the Fifth Republic (1959-2013).

The study is divided into four parts. By studying the literature related to tax and politics – part 1 –, we first determine the main factors which could have influenced these tax reforms. Indeed, the chosen articles disclose several economic and political conditions which could favor the implementation of tax reforms. The selected hypotheses are summarized in part 2. In addition, we collected data related to these assumptions in order to test them. The description of the database as well as the potential correlations are in part 3. Finally, the econometric results are discussed in part 4.

1 Previous Studies

1.1 Normative Approach

1.1.1 Introduction

In the nineteenth century fear of revolution pushed the European political elite to extend voting rights and thus spawn redistributive programs (cf. positive approach). Therefore, Great Britain implemented an income tax in 1842 followed by Germany in 1893 and France in 1914 giving rise to the first theoretical models of optimal income taxation. Edgeworth developed a simple model in 1897 which considered the income of each individual as exogenous to the tax system which was then derived by maximization of a social welfare function. However, the model lead to the perfect equalization of after-tax income (100% redistribution) which is clearly in contradiction to most principles of fairness in European countries. This is a direct result of the exogenous character of income in the model which, in reality, is clearly affected by the tax system. Indeed, a higher marginal tax rate creates a disincentive to work which has to be accounted for in a valid theoretical model. Redistributive public policy interventions face an equity-efficiency trade-off. The first theoretical model encompassed this was developed by Mirrlees in 1971 and still serves as the reference for most works on optimal tax theory. The model derives a formula for optimal tax rates which was connected to practical tax policy and empiric studies in the late 90's. Most works after Mirrlees have been aimed at improving the results obtained in the 1971 model in order to better describe empirical data. After summarizing the work of Mirrlees on optimal income taxation, we will explore several works that extend this model.

1.1.2 Mirrlees Model (1971)

Hypotheses The Mirrlees model is based on several key assumptions:

- Income y is endogenous to the model
- The population is normalized to one. Skills, ω, and income, y, are continuously distributed with density $f(\omega)$ and $h(y)$, respectively. We impose that:

$$\omega \in [\underline{\omega}, \overline{\omega}] \, and \; y \in [0, \infty] \tag{1}$$

- All individuals have the same quasi-linear utility function:

$$U(y(\omega, \omega)) = c(\omega) - k(y(\omega), \omega) \tag{2}$$

1.1.3 Objectives of optimal tax profile

We define a tax profile as optimal when it satisfies three conditions:

1. Each individual works in order to earn an income that maximizes his utility.

2. The government's objective is to maximize the social welfare function defined by:

$$S = \int g(\omega)U(y(\omega))f(\omega)d\omega \tag{3}$$

   where g(ω) represents the marginal social welfare weight which "mesures the dollar value in terms of public funds of increasing consumption of individuals with skill omega by \$1". This parameter is depends on the social justice principles of the society we are studying.

3. The allocation, (c,y), is admissible, which means that:

   - it is resource feasible (what is consumed does not exceed what is produced):

$$\int c(\omega)f(\omega)d\omega \leq \int y(\omega)f(\omega)d\omega \tag{4}$$

     We will suppose that the allocation is Pareto-efficient which means that the above inequation becomes an equality.

   - it is incentive compatible (ensures that individuals are willing to reveal their skill and thus get an allocation (c,y) that is compatible with their skill level):

$$\forall(\omega,\omega')U(y(\omega),\omega) \geq U(y(\omega'),\omega) \tag{5}$$

Optimal Marginal Tax Rate in the Mirrlees model Several calculations which are described in the appendix A led to the following equation:

$$\frac{T'(y)}{1-T'(y)} = (1-G(\omega))\frac{(1-F(\omega))}{f(\omega)}(1+\frac{1}{\epsilon}) \tag{6}$$

This equation is known as Diamond's ABC formula and enables us to calculate the optimal marginal tax rate to apply on an income y.

Analysis of Diamond's ABC formula Diamond's ABC formula was first derived by Mirrlees in 1998 and was extensively used and interpreted by Diamond in 1998 and Saez in 2001.

Seeing that the left-hand of the equation is an increasing function of the marginal tax rate, we can deduce that the marginal tax rate decreases with $G(\omega)$ and ϵ. On the other hand, it increases when we care less for individuals who earn this level of income or more.

From this we can deduce several hypothesis that affect the tax system of a country:

- **Labor supply** and how it is affected by changes in wage. This hypothesis will be incorporated into our model through the unemployment rate,
- **Distribution of income**
- **Value society puts on individuals with high incomes** which is represented by $G(\omega)$. This measures the redistributive taste of a society. However, it is very complicated to measure this practically in a society so we have decided to incorporate this measure through the poverty rate, distribution of income, and the share of social charges in household income.

1.1.4 Income Transfer Programs

An important part of tax policy debate is concerned with welfare programs: marginal tax rates at the bottom of the income distribution. There is a disagreement between economists on the structure of such programs. The most popular form of welfare programs, which was advocated as early as 1940 by Milton Friedman, is a Negative Income Tax (NIT) which acts as a guaranteed income for all workers including the unemployed. As the revenue of a worker increases the NIT is taxed away until the benefit is fully lost. Many European countries use a NIT and the US has implemented a similar program for single headed families, the Temporary Assistance for Needy Families (TANF). However, several economists have criticized the NIT because it can create a disincentive to work. These economists advocate a Earned Income Credit program which, contrary to the NIT program, offers an incentive to work. Under EIC programs the government partially matches all income below a certain threshold. In 1975 the US set up a EIC program: the Earned Income Tax Credit. There is a strong pressure in many countries to move away from NIT and towards EIC programs. In fact, EITC programs provide a strong incentive to work, even for minimum income, however it fails to provide support to the unemployed, the most in need of income support programs. In his 2000 paper, Optimal Income Intensive Programs: Intensive versus Extensive Labor Supply Responses, Emmanuel Saez analyses different optimal income tax models in order to shed light on the debate between NIT programs and EITC programs.

Mirrlees Model: intensive response The Mirrlees model supposes that workers choose the amount and intensity of work they perform according to the income they benefit from their job in order to maximize their utility: the response of the workers is intensive. Let us look at the marginal tax rate at the bottom of the income distribution. We suppose here that the minimum income level is 0 (unemployment) and that there exists a group of unemployed. Indeed, the case where the minimum income level is positive

leads to a zero marginal tax rate at the bottom of the income distribution ($G(\omega) = 1$ in this case). In the case where the minimum income level tends towards 0 we have:

$$\frac{T'(0)}{1 - T'(0)} = \frac{G(y(0)) - 1}{\epsilon} \tag{7}$$

The model thus concludes that the higher the redistributive taste of the government, the higher the marginal tax rate at the bottom. This can be interpreted simply by noting that large lump-sum transfers for zero-income workers (-$T(0)$) can only be achieved with high marginal rates at the bottom (simulations show that the optimal marginal tax rate is usually around 70-80% for $y = 0$). Thus, an intensive labor response model values high lump-sum transfers to the unemployed and low income workers which characterizes a Negative Income tax.

Extensive response model However, when a government provides welfare benefits for the unemployed, workers can choose not to work if the welfare benefits E = -T(0) exceed disposable income $y - T(y)$ i.e. the tax liability $T(y) - T(0)$ is greater than income y. Diamond (1982) developed a formula for the optimal tax rate in the case of an extensive labor response:

$$\frac{T(y) - T(0)}{y - (T(y) - T(0)} = \frac{1}{\eta(\omega)}(1 - g(y)) \tag{8}$$

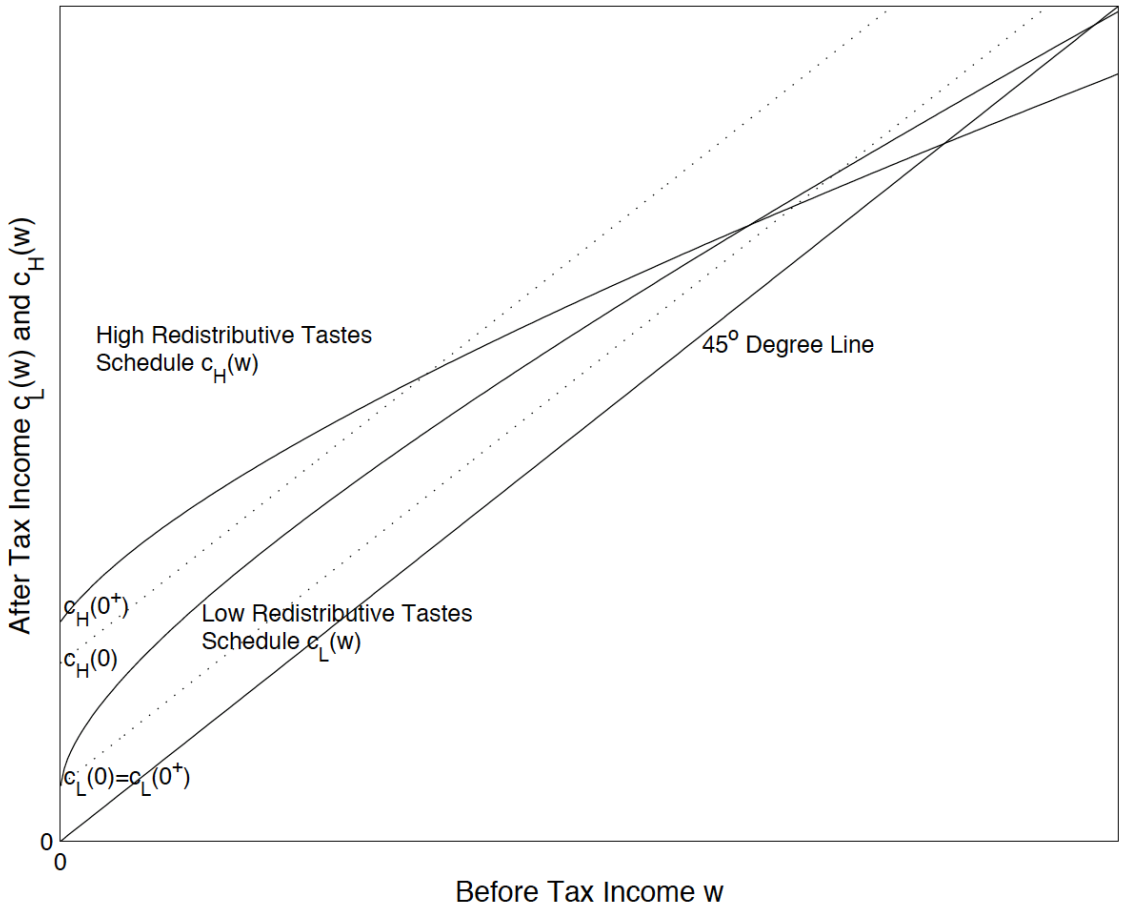
where η is the elasticity of participation at skill level ω.

As we saw, a worker can decide to stop working if the tax liability is greater than income. Thus, the left side of the previous equation has to be greater than -1 for ω positive. However, according to Saez, when the redistributive tastes of a country are strong enough it is possible that the left side of the equation can be smaller than -1 when $\omega = 0$. In this case, there is a discontinuity at 0 in the tax system. The following figure shows the numerical simulation obtained by Saez in his article. c_l represents the case of a society with mild redistributive tastes while c_h represents the case of a society with high redistributive tastes.

We can thus see that in the case of a society with high redistributive tastes, low income workers will receive more aid form the government than the unemployed. In the case where the redistributive tastes are mild there is no discontinuity. In both cases we see that low income workers receive larger transfers from the government than the unemployed (zero-income workers) which characterizes an Earned Income Credit program.

Reality of labor supply responses The previous discussion shows that the structure of the transfer depends on the characteristics of the labor supply response. In reality labor supply response is a mix of intensive and extensive response. Saez developed a model which encompasses both responses and ran simulations using the formula he derived. The

Figure 1: Optimal Transfer Schedules, Extensive Margin



results show that the optimal transfer program is a mix of EIC and NIT programs with the relative weight of each program is highly dependent on the participatory elasticity.

1.1.5 Generalized social marginal welfare weights for optimal tax theory

The formula derived from the Mirrlees model, despite its great theoretical contribution, has proved hard to use in interpreting actual tax systems. In Saez's and Stantcheva's *Generalized social marginal welfare weights for optimal tax theory*, the two economists propose an alternative method to evaluate tax reforms and derive an optimal tax system. Their method, which is based on using generalized social marginal welfare weights, makes it possible to evaluate a much broader spectrum of elements that enter the tax policy debate. Furthermore, the results of the standard welfare approach (based on maximizing a general social welfare function) are included in this model by simply defining the generalized social marginal welfare weights as the standard marginal social welfare weights. The general results obtained by this approach leads the two economists to study how optimal tax theory can be reconciled with actual practices.

The Approach The approach considers a tax system $T(z)$ and perturbing the system by a small reform ΔT. It then evaluates the impact on the utility of each individual agent in order to derive the welfare impact of the tax reform on a certain individual which can then be aggregated in order to determine the effect on total welfare. A tax reform is then defined as desirable if, and only if, the effect on welfare is positive. The tax system is then defined as optimal if there are no small budget neutral reforms that are desirable.

The method is innovative in the way it computes the impact on the total welfare of society. In order to calculate the effect on welfare each individual in the economy is awarded a generalized social welfare weight that is weighted in the sum of the total welfare. This generalized social welfare weight mesures how much society values the marginal consumption of each individual and thus represents the value that society puts on providing an additional dollar of consumption to any given individual. This weight can be chosen in order to represent many models of society (utilitarian wights, libertarian weights, standard social marginal welfare weights, etc.) conferring the very general character of the approach.

Reconciling actual practice and optimal tax theory The approach presented here leads the authors to compare their results and actual practices concerning five important tax policy debates: Pareto efficiency, optimal taxes with fixed incomes, free loaders, tagging, and poverty alleviation.

Pareto efficiency, which is desirable in most tax systems, is accounted for in the standard welfare approach as well as in the generalized social marginal welfare weights approach. However, discrepancies exist between actual practice and the results of the standard welfare approach concerning the four other issues. The innovative approach by Saez and Stantcheva leads to results that are coherent with actual tax practices, on the condition that the social marginal welfare weights are chosen correctly.

The new approach by Saez and Stantcheva is very useful in order to account for actual tax practices. In order to do this, it is necessary to correctly define the generalized marginal social welfare weights. These weights depend strongly on the social justice principles of the society we are studying and it is thus important to attempt to evaluate these principles when evaluating tax reforms in a society (the authors have conducted online surveys in order to attempt to evaluate these principles). In addition, these weights depend on the inequality of chances in the society we are studying. A thorough evaluation of these parameters are essential to a complete study of tax reforms.

1.2 Positive Approach

1.2.1 Introduction

France is said to be the worldwide tax champion: the average tax rate was 49% of the gross national income in 2010. Among them, income taxes are the most symbolic although they only represent 20% of the state revenue. There are numerous fiscal exemptions which are the result of political decisions – used to sway the electorate – and pressing economic needs.

In this section, we aim at depicting how complex and regressive the French income tax system is. In fact, most of the tax reforms are not approved by economists but by politicians. Hence the current system has significantly changed throughout many reforms and has become less effective. Next, we try to find out how the system can be reformed in order to palliate these issues.

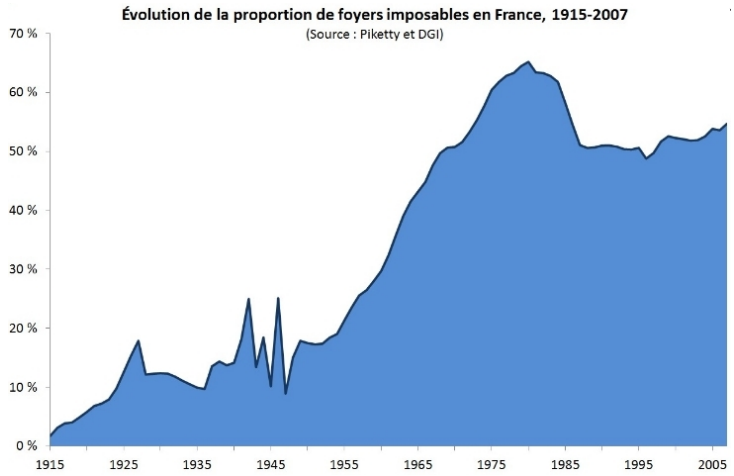
By studying the literature related to tax and politics, we will illustrate this analysis with theoretical models which disclose several mechanisms related to economic observations. We will describe the main hypotheses as well as the conclusions of these models.

1.2.2 History of Redistribution

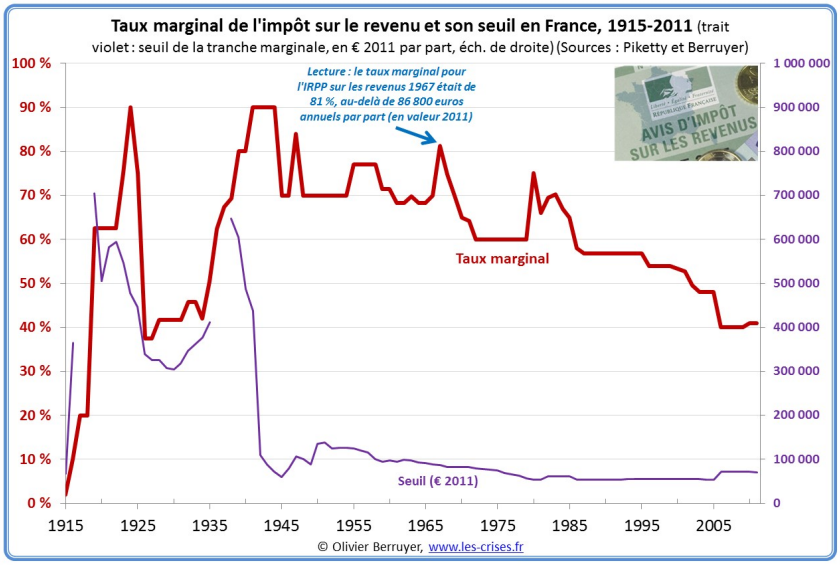
Income Taxes In France, the setting up of an income tax dates back to 1914. At the time, the project was extremely controversial because it consisted of:

- a tax form for every taxpayer (so the state infringes on their private wealth)
- a progressive shape which was utterly new in France

At the beginning, only 20% of households were affected by this tax. This proportion significantly increased to reach 50% in 1970. After a peak in 1980, the tax base is now stable (around 50%).



It's also interesting to consider the progression of the marginal tax rate towards the upper bracket. From 1940 to 1985, this rate was higher than 60%. In addition it utterly increased during both world wars. At the time, the government sought resources to finance the war effort. Now the marginal rate is significantly lower – 45% in 2016 – while the threshold has been stable since 1950.



Why did France choose a redistributive tax? Considering the other European countries, France was quite late. In fact, Great Britain implemented such a tax in in 1842 and Germany in 1893. Originally, political power was under the control of an elite. Through a long and laborious process, France has become a democracy with brand new social values. As a result, democratization enables the poor to accumulate more wealth through a redistributive program. But how does a country become a democracy?

In *Why did the West extend the franchise*, Acemoglu and Robinson try to understand why the political elite extended voting rights and implemented redistributive programs in the nineteenth century. They claim these decisions were made to prevent them from social unrest and revolution. They try to disclose precisely the link between democratization and redistribution.

The Model of Democratization In this part, the authors aim at showing that the elite extended the franchise because of the threat of a revolution. The model is implicitly related to game theory. Let's consider an infinite horizon economy with a continuum 1 of agents where:

- A fraction f are poor while the remaining $1 - f$ are rich. Because we assume the two groups are homogenous, they can be seen as two players: the poor agent versus

the elite. We also consider $f > \frac{1}{2}$, that is to say the median voter will be a poor agent in a democracy.

- The f poor agents have initially no political power but they can overthrow the government and take over the capital stock at any period $t \geq 0$. We consider that a revolution always succeeds. However, the large-scale redistribution program launched by a revolution depends on the conjuncture at t. In fact we consider a fraction $1 - \mu_t$ of the capital stock gets destroyed in the process where $\mu = \mu^h$ or $\mu^{'} = 0$. We assume the probability $\mu_t = \mu^h$ is equal to $P(\mu_t = \mu^h) = q$.

- In each period, the elite have to decide whether or not they extend the franchise. If they do so, the voting right is extended and the median voter sets the tax rate.

The rules of the game are in each period t are:

1. The state μ_t is disclosed

2. The elite decides whether or not to extend the franchise. If not, they set up the tax rate τ_t

3. The poor agents decide whether or not to trigger a revolution. If there is a revolution, they share the stock of capital. If the elite extend the franchise, the median voter chooses the tax rate τ_t.

4. The capital stock is allocated between market and home production. All the agents receive their incomes.

Results of the model The results of this dynamic model rely on the Markovian Equilibria. Under several assumptions, the authors aim at finding the equilibrium related to the strategy of the elite and the poor. The formalism is quite complex but considering the parameter q and q^* a constant implicitly defined, they demonstrate that there is a unique pure strategy Markov Perfect Equilibrium such as that:

- if $q < q^*$, then the revolution threat will be met by the franchise extension
  When q is low, redistribution is viewed as a non-credible promise. As a result, only a franchise extension can prevent the elite from a revolution.

- if $q > q^*$, then the revolution threat will be met by temporary redistribution
  When q is high, the poor are well organized and a revolution seems to be more favourable. However, because the revolutionary threat is more frequent, future redistribution become more credible.

Historical Perspective The authors discuss historical evidence in order to confirm whether or not their theory is relevant. Thanks to many examples – Britain, France, Germany or Sweden – they show the threat of a revolution spawned many democratic reforms in the West. Besides they mention three alternative hypotheses which could explain the democratization in the West:

1. **The Enlightenment** – Because their social values changed, the elite decided to extend the franchise. However the ideas of Enlightenment were disseminated way before democratization.

2. **Political Party Competition** – Political competition could trigger the extension of voting rights. Historical evidence in France -Orlenanists and Legitimists - shows it's not very relevant

3. **Middle Class Drive** – Other historical examples discredit this hypothesis

Conclusion The elite extended the franchise because of the fear of a revolution. As long as they can, the revolution threat will be met by temporary distribution. Even though it implies higher taxation in the future, extending the voting rights when social unrest is too high can be a relevant alternative. In France, the 1789 revolution was a landmark in the redistributive process. The franchise was extended, so that redistributive programs were carried out. Despite that the first Republic didn't last long, this period was a bedrock for all the following regimes.

From this result, we identify several hypotheses related to the political background. Even though France doesn't fear a new revolution, political circumstances such as the composition of the National Assembly or the Senate could be crucial for a fiscal shift. Besides the popularity of the executive seems to be a relevant indicator which embodies the population expectations. The number of political parties is related to the stability of the democracy: the more parties, the more time the government needs to convince a majority of members of Parliament.

Table 1: Selected Political Hypotheses

Political Variables	**Type of Data**
Color of the president	1 (Right) or 0 (Left)
Number of parties	Integer
Color of the National Assembly and the Senate	1 (Right) or 0 (Left)
Color of the President and the Prime Minister	Percentages (%)

1.2.3 A Regressive and Complex System?

La répartition des revenus en France en 2010				
Groupe	Nombre de personnes adultes	Revenu annuel par adulte	Revenu mensuel par adulte	Part dans le revenu total
Population totale	50 millions	33 000 €	2 800 €	100 %
Classes populaires : Les 50 % les plus pauvres	25 millions	18 000 €	1 500 €	27 %
Classes moyennes : Les 40 % du milieu	20 millions	35 000 €	3 000 €	42 %
Classes aisées : Les 10 % les plus riches	5 millions	103 000 €	8 600 €	31 %
dont classes moyennes-aisées (9 %)	4,5 millions	73 000 €	6 100 €	20 %
dont classes très aisées (1 %)	0,5 million	363 000 €	30 300 €	11 %

Income Distribution: the wealthiest 1% gather 11% of the gross national income In *Pour une révolution fiscale*, Piketty and Saez state that around 75% of income comes from labour and 25% from capital in France. Since the early 90's, the revenue of the wealthiest 1% has also boomed. However, this phenomenon is not as impressive as in the US where the percentage of the wealthiest 1% revenue has increased from 9% in 1976 to 24% in 2007.

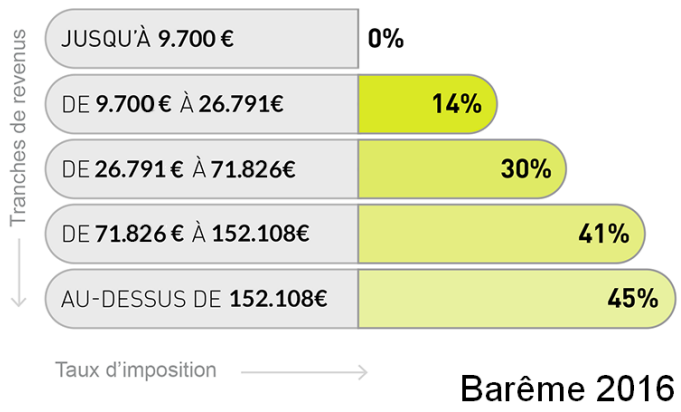
These discrepancies mainly rely on capital. In fact capital inequalities are quite high in France as far as the 10% wealthiest concentrated 62% of the whole capital in 2010. This situation was way worse in the early 1900's when the last decile had more than 90% of the global estate. Since the beginning of the 20^{th} century, the middle class drive has softened these discrepancies. In 2010, the middle class concentrated more than 1/3 of capital.

This concentration of capital can be explained by inheritance and its cumulative effects. In 1960 and 1970, capital was not very expensive whereas it's now very difficult to save money only with labour. Let's take the real estate market: the current owners in big cities had most of the time inherited their house or their flat.

La répartition des patrimoines en France en 2010			
Groupe	Nombre de personnes adultes	Patrimoine moyen par adulte	Part dans le patrimoine total
Population totale	50 millions	182 000 €	100 %
Classes populaires : Les 50 % les plus pauvres	25 millions	14 000 €	4 %
Classes moyennes : Les 40 % du milieu	20 millions	154 000 €	34 %
Classes aisées : Les 10 % les plus riches	5 millions	1 128 000 €	62 %
dont classes moyennes-aisées (9 %)	4,5 millions	768 000 €	38 %
dont classes très aisées (1 %)	0,5 million	4 368 000 €	24 %

1.2.4 Two income taxes: the IRPP and the CSG

The IRPP The *Impôt sur le Revenu des Personnes Physiques* (IRPP) is the successor of the 1914 income tax. It is still progressive with different tax brackets (from 0% to 45%). This tax represents almost 20% of the state's revenue.



The CSG The *Contribution Sociale Généralisée* was created more recently by the Rocard government in 1991. It's a flat tax which affects all kind of revenue (labor or capital). The tax base is way larger than the IRPP. There are five different rates according to the type of revenue. The ordinary rate is 7.5 %. We must also consider the *Contribution au remboursement de la Dette Sociale* (CRDS) which was created later, in 1996. The tax base is the same and the rate unique (0.5 %).

1.2.5 Tax Structure

According to the type of revenue or the personal situation, understanding all the specificity of such a system is a real challenge. There are numerous measures that reduce the tax base or provide tax allowances.

Family Quotient In France, the fiscal authority doesn't tax individuals but households. As a result, the whole tax rate depends on the family situation. For example, the more the family has children, the less the tax burden will be. More specifically, each household has a number of fiscal portions depending on its family situation, the number of children and the parents ages. Next the household divides its annual income by this number, calculates the tax related to this income and finally multiplicated this tax by the number of fiscal portion. Because the IRPP is progressive, the tax payed is lower. Besides the reduction is limited in order not to benefit the rich.

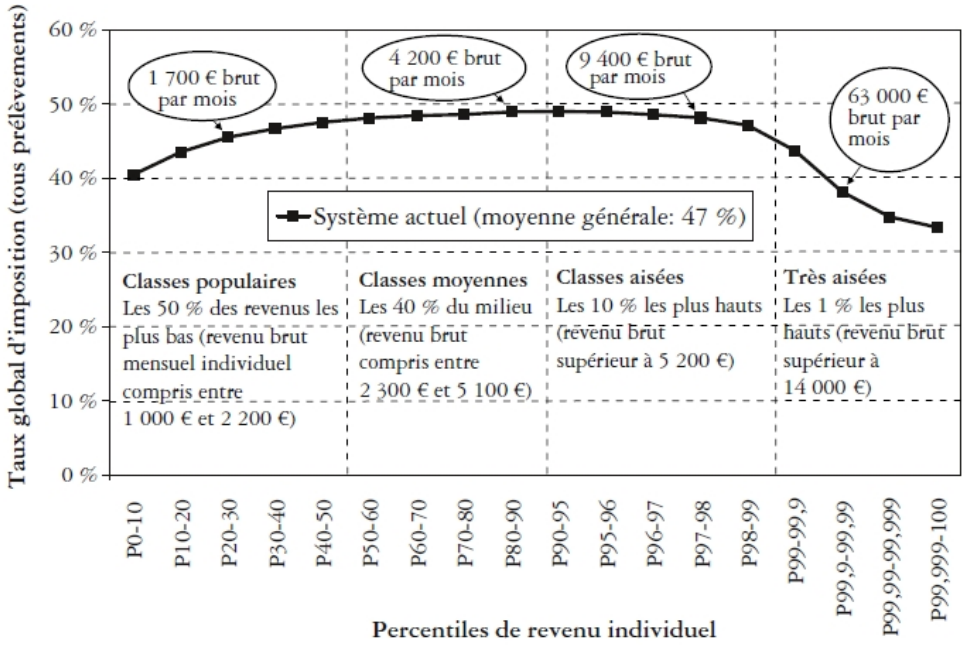
Tax Breaks In 2008, there were 508 tax breaks in France costing between 50 and 73 billion euros. According to the Fouquet report, the income tax concentrates around 200 tax breaks costing more than 39 billion euros in 2008. They mostly consist of a large diversity of tax allowances and exemptions. If we consider income taxes, the most well known tax break is towards donations to charitable or non-charitable associations. The public authority grants 75% or 66% tax reduction. There is also a similar tax break towards union dues. Income tax breaks concern a wide range of revenues – donation, real estate, unions –. Even though they are incentives which support specific policies, they dampen the public revenue and create distortion.

1.2.6 Is the Tax System Regressive?

The Whole Tax System Considering the tax distortions implied by tax breaks, the system is slightly progressive until the middle class. However, it is clearly regressive considering the wealthiest 5 % . The data is provided by Piketty and Saez. The tax rate is stable for incomes between 1700 and 6900 euros - from 40% to 48% - whereas it decreases to reach 35% for the wealthiest 0.1%.

The Income Tax System If we consider only income taxes, the trend is also progressive until the wealthiest 1%. This tax contributes to benefit the upper bracket. This is mostly due to tax breaks which plague the tax base. Fiscal exemptions – especially towards incomes from capital – have triggered this phenomenon.

In order to study the tax system evolution, we assume reforms are directly related to the former tax structure. The latter are modeled by tax revenue



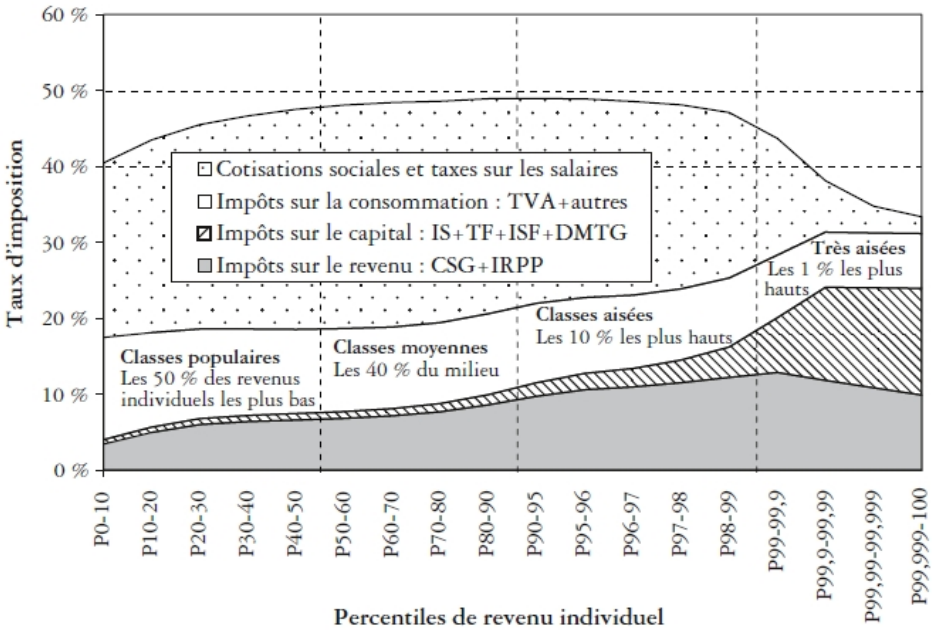
– what is taken –, share of social benefits in the gross household income – what is given – and share of property income – what are the consequences towards the largest fortunes –. Besides we assume the financial statement – the government deficit and the public debt – can impede or on the contrary favor tax reforms.

Table 2: Selected Economic Hypotheses

Select Economic Variables	**Type of Data**
Government deficit	Percentage (%)
Public Debt	Percentage of GDP(%)
Tax Revenue	Percentage of GDP (%)
Share of social benefits in the gross household income	Percentage (%)
Share of property income in the gross household income	Percentage (%)

1.2.7 Political Perspectives

Considering the lack of progressiveness in the income tax system, politicians must conduct fiscal reforms. Many economists have provided a wide range of projects to refund this system. However, these propositions have utterly failed to be implemented since politicians also think about their re-election. So why many reforms that seem economically optimal fail to be implemented? Thanks to the article "On the Political Economics of Tax Reforms"' by Castanheria and Profeta, the article explains the gap between the theoretical models and the current tax system.



Classical Income Tax Theories

The Ramsey Rule This rule states that taxation should be heavier on the less elastic bases. Yet some goods with the most inelastic demand related to taxes (food, fuel) are more consumed by the poor, so this principle can be regressive. Balancing equity and efficiency, we must consider who consumes the less elastic goods. Extending this rule to the incomes, the government should tax the different income source at different rates.

Why broadening the tax base? The previous model abstracts from two crucial issues. First it doesn't clearly define what is "income" as far as capital is taxed differently in many countries. Then taxing differently each sources of income could spawn new incentive to avoid tax. The individuals' behavior would be modified as well as their income elasticity (substitution effect). Finally, all taxable activities should have the same effective marginal tax rate, independently of the income source (labour, capital).

The major trend in the recent evolution of tax system is actually tax broadening and the reduction of the flat tax differentials. Thanks to a simple formal representation of taxes on personal incomes, the authors show four leverages of such economic policies:

- **Efficiency**: the distortionary effects of taxation tend to be reduced, partly because the elasticities of the different income sources get reduced.
- **Vertical equity:** under several assumption, the progressiveness of the tax system can be reached

- **Horizontal equity:** individuals with equal ability to pay taxes (measured by comprehensively defined incomes) should pay equal taxes regardless of the source of their income.

- **Complexity:** the simplicity is utterly increased by reducing the tax differentiate

1.2.8 Political Economy and Policy Strategy

The Median Voter The theory assumes that under some precise conditions, the median voter is the one eventually in control of policies. According to this result, the higher the tax rate is, the more unequal the income distribution among voters is. In fact, the lower the median voter is, the higher is his preferred tax rate. Yet the authors claim this theory doesn't explain the current tax system. Real tests which allow comparisons both over time and across countries disclose the median (5^{th} and 6^{th} deciles) losses from the redistribution transfers (3.6% and 10% on average respectively).

Probabilistic Voting Model: Lower Taxes for Swing Voters This model introduces a random component as far as the political parties try to maximize their expected number of voters. The most mobile groups across the political parties (i.e. the highest electoral elasticity) are called the swing voters. They are the most favored by the tax system. This theoretical model is described in the appendix B.

Reforms: how broad and how fast? A reform is a process of change from an existing system (status quo) to another. However, some reforms can be politically perilous: politicians can lost the support of their electorate. There are two ways to proceed:

- **Big bang strategy** i.e. implementing all reforms at once ;

- **Gradualism** i.e. dividing the reforms into smaller reforms ; it can decrease reversal costs and facilitate social acceptance of the whole reform project whereas reforms are often delayed

1.2.9 Conclusion

The French income tax system is definitely complex and regressive. Despite the IRPP progressiveness, tax exemptions have plagued the tax base as far as the richest 1% pay proportionally less than the others. That's why many economists such as Saez and Piketty call for fiscal reforms – cutting most of the tax breaks, implementing an unique income tax with the CSG tax base – in order to re-establish progressiveness and transparency.

However, this reforms are very delicate to conduct as far as politicians aim at being re-elected. They must be cautious enough to carry out their reforms without disrupting swing voters.

From the median voter theory, we realize studying the median income and the poverty rate could influence fiscal reforms. However taking into account the responsiveness of voting behavior is very difficult to quantify. The way reforms are implemented is also interesting: we choose to consider the electoral time-line of the reform to assess this effect.

Table 3: Select Economic Hypotheses

Economic Variables	**Type of Data**
Revenue of the median voter	Euros/Francs PPA
Poverty Rate	Percentage (%)

Table 4: Select Political Hypotheses

Political Variables	**Type of Data**
Electoral time-line of the reform	Fraction

2 Hypotheses

Thanks to the bibliography, we identified economic and political hypotheses which could influence fiscal reforms. We first chose a wide range of variables in order to not forget major causalities. Because some of them are certainly correlated, we planned to sort them in order to cut any endogenous effects. In addition to the factors identified in the previous parts, we select others which logically could have an effect on the results. However we couldn't choose too many variables because the data would be limited.

Table 5: Economic Hypotheses

Economic Variables	**Type of Data**
GPD Growth	Percentage (%)
Unemployment rate	Percentage (%)
Public Debt	Percentage of GDP(%)
Share of Social Benefits in the Gross Household Income	Percentage (%)
Share of Property Income in the Gross Household Income	Percentage (%)

Table 6: Political Hypotheses

Political Variables	**Type of Data**
Color of the president	1 (Right) or 0 (Left)
Color of the National Assembly	1 (Right) or 0 (Left)
Color of the Senate	1 (Right) or 0 (Left)
Electoral time-line of the reform	Dummy Variable ({0,1})
President Approval Rating	Percentage (%)
Prime Minister Approval Rating	Percentage (%)

3 Data

3.1 Introduction

The basis of our work consist in using econometric statistical methods. Since we only made assumptions about the impact of economic factors on political reforms, we used the largest number of parameters to identify patterns.

For these data search we used sites of the following renowned organizations: *Institut national de la statistique et des tudes conomiques*, the website of the national assembly, Kantar TNS and Ifop.

Thanks to the UN convention and the mandatory annual reports, almost all economic data of all countries are on the above sites. Thus we found the following data: GDP growth, general government gross debt GDP, unemployment rate, composition of the National Assembly and composition of the Senate.

We will focus on the description of tax reforms after 1958. Indeed we wanted to avoid constitutional changes which could disrupt the way the reforms are chosen.

3.2 The Explained Variables

3.2.1 The Number of Major Income Tax Reforms

We decided to differentiate the reforms according to their nature. We have considered variations of thresholds, rates and tax brackets since 1958.

- Between 1960 and 2014 threshold reforms are very common, 46 years out of 54 include such a reform. This is why we did not consider those reforms in the final regressions. Indeed, most of the governments seemed to have modified threshold following the inflation.
- During the same period 8 years include a modification of the number of tax brackets.
- Since 1990 when the CSG was introduced, it has been modified 8 times.
- During the same period 8 years include a modification of the number of tax brackets

Before 1960, rates modifications were quite common as the tax rules changed a few times between marginal tax rate and effective tax rate. We noticed also that during the post war period many tax reforms occurred and changed thresholds, rates and brackets.

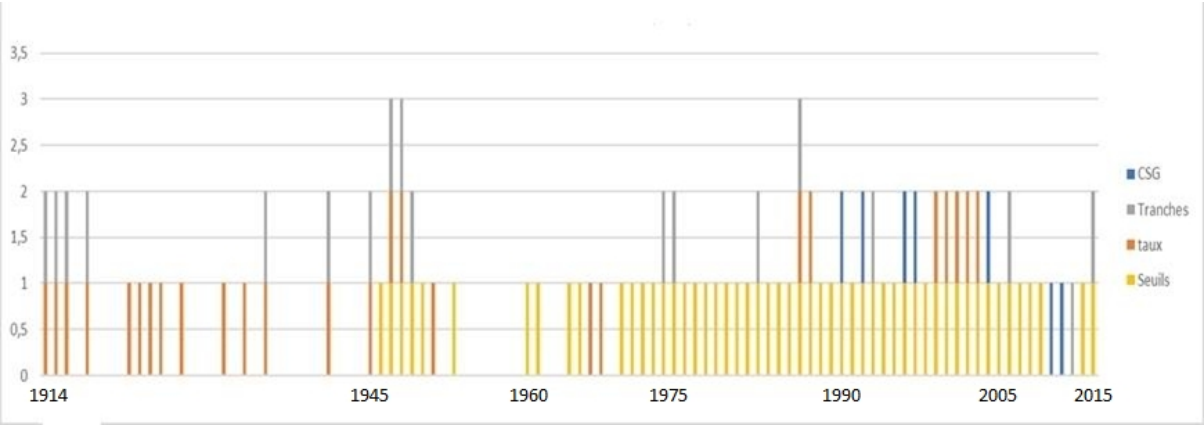


Figure 1: Number of Reforms per Year (1 corresponds with 1914)

3.2.2 The Tax Rate of an Upper Class Household

Thanks to the data provided by INSEE, it's utterly possible to determine how the income tax has evolved since 1914 for any households. Because the structure has been consistently transformed, we chose to study upper class households, so that we could focus on the upper bracket only. Let's take an individual which belongs to the richest 0,1% in France. The average annual taxable income was 370 704 euros in 2007. Because it is very high, **we assume only the part of the income over the last bracket is taxable**.As a result, we only study the upper tax bracket by disregarding the variation of all the other brackets.

According to this graph we can make several observations:

- The percentage boomed during each World War as well as during the aftermath. Indeed France needed to find more wherewithal in order to finance war effort and reconstruction. As a consequence, the share peaked in 1923 (71%) and in 1944 (69%).

- Between 1950 and 1980, the tax share remained stable – around 55% – but it slightly increased to reach almost 60% in 1981. This is probably due to the Mauroy plan initiated by the election of Mitterrand who initially opted for a Keynesian boost.

- Since 1983, the tax share has gradually decreased to reach 35% of the income in 2015. This reduction of the traditional income tax came with a new tax in 1991 – the CSG – which also affect the wage.

- In 2007, the percentage fell from 44% to 35% of the income. This drop was triggered by a controversial reform initiated by Sarkozy who claimed the middle class would benefit the most.

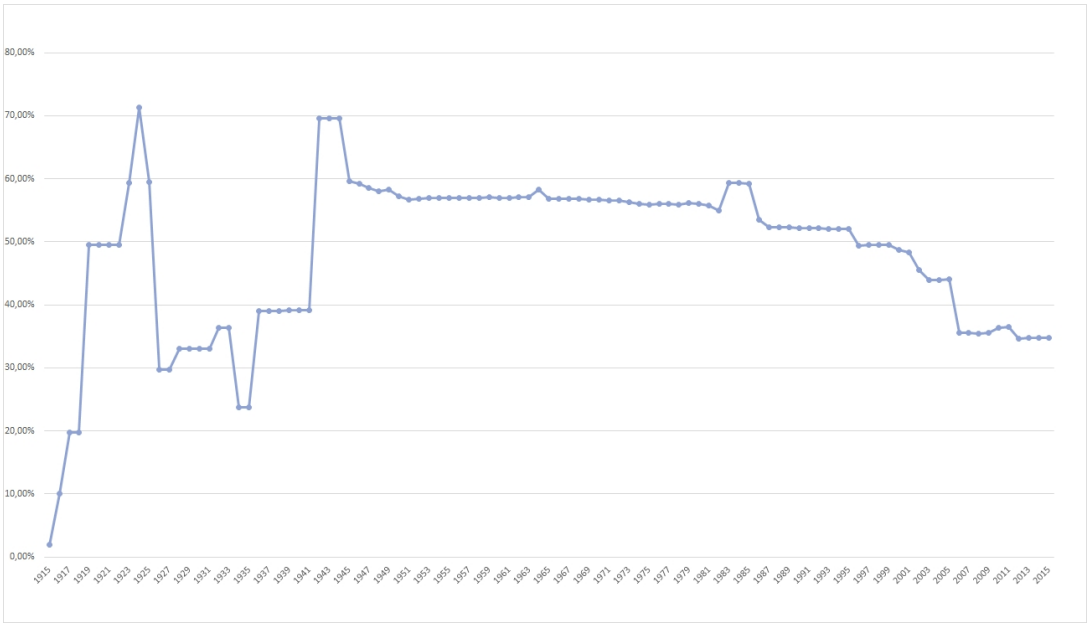


Figure 2: Effective Tax Rate of the Rich Individual Income

3.3 The Explanatory Variables

3.3.1 The GPD

Descriptive Analysis The GPD data is from the IMF website. It starts in 1958 and ends in 2015. There are different periods:

- **Years 1958 - 1974** From 1960 to 1974, France experienced a period of strong economic growth (+ 5.7% per year on average), based on the dynamism of household consumption and business investment. The dynamism of its economy ensures, since 1973, the status of 4th world economic power.

- **The End of the Bretton Woods Agreements and the 1973 -1974 crisis** The worst crisis since 1929 has affected all OECD countries. The French economy has experienced a sharp slowdown, which in 1975 is reflected in a year of recession: GDP then drops 1.0% in volume. The brief improvement that followed from 1976 to 1979 (+ 3.8% on average) is already a marked shift compared to the Thirty Glories. From 1980 to 1985, French growth fell to 1.6% per year on average. France enters permanently in the era of mass unemployment.

- **Years 1985 - 1990** The Fabius government and then the Chirac-Balladur cohabitation government return to most of the structural measures taken by the Mauroy governments. The Rocard governments are fully benefiting from a phase of high economic conditions in the world economy. The dollar is at its highest and gives an

exchange advantage to the French export economy. Between 1986 and 1990, GDP grew on average by 3.4%.

- **Controversy of the Global Crisis (1991 - 1993)** The increase in the world economy through debt has resulted in the severe corrections of the October 1987 stock market crash and the Japanese speculative bubble burst. The crisis is extremely harsh in Europe and in the world. In France, property speculation, particularly on offices, fueled by banks, which became very strong during the previous three years, suddenly turned around. In France, economic activity slowed sharply (+ 0.7% growth on average).

- **New Technologies (1994 - 2000)** In 1994, the global recovery took place (+ 2.0% annually between 1994 and 1997). In France, however, it was blocked by the initiatives of the Juppé governments, which are confronted with the drift of the public accounts, which is causing a real "tax cuts" that worsen the crisis and explains the poor result of 1996. The recovery is amplified by the "boom" of the new technologies at the dawn of the third millennium (+ 3.6% on average from 1998 to 2000).

- **The Atony (2001 - 2003)** The Jospin government, which has benefited from this period of strong growth, is taking a series of measures (the 35-hour law, labor market measures). The year 2001 marked the beginning of a new period of economic downturn: the bursting of the Internet bubble and the lack of competitiveness of France towards European countries like Germany, under Gerhard Schrder, which have carried out inverse measures leading to three years of sluggishness (+ 1.3% on average between 2001 and 2003).

- **Revenged growth (2004 - 2007)** Since 2004, however, growth has regained momentum with an average increase in GDP of 2.3% between 2004 and 2007.

Potential Correlation We expect that a decrease of the GPD pushes the government to vote fiscal reforms in order to boost the economy. As a result, we would expect a positive correlation. However, an important change of the growth rate of the GDP might require a new strategy of economic redistribution and require fiscal reforms. Therefore, the stability of the GDP growth rate might be the relevant variable here.

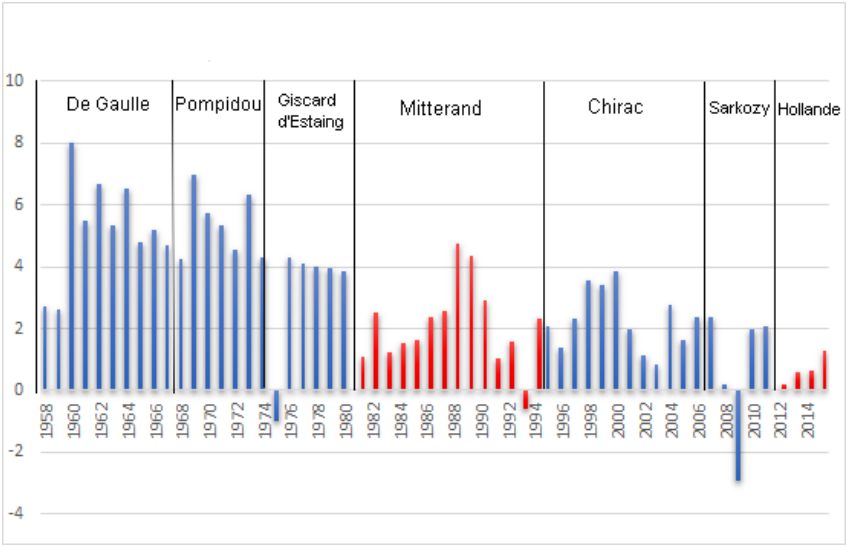


Figure 3: GDP Growth since 1958 in France

3.3.2 The Unemployment Rate

Descriptive Analysis The unemployment data is from INSEE. Our unemployment figures are related to the A group. The time interval starts in 1967 and ends in 2015. By studying the graph, we can identify four periods:

- **1967-1999** The unemployment rate has continuously increased from 2,5% (except in 1983 and in 1989-1991) to reach 10,9% in 1998. This trend corresponds to the end of the 'Glorious Thirty'.
- **1999-2008** The rate has slowly decreased to reach 7,4 % in 2007.
- **2008-2015** Because of the economic shift triggered by the subprime crisis, the unemployment rate has boomed to 10,4% in 2015.

Potential Correlation We have identified two main reasons that would favor a tax reform because of either an augmentation or a reduction of the unemployment level :

- Because the unemployment is a major political stake, we assume a high unemployment rate encourages the government to opt for a fiscal shift in order to help directly the unemployed person or to finance personalized social supports. Hence the probability of a reform is higher.
- However, a more favorable economic environment, implying less unemployment, could be an opportunity as well for a government willing to refund its previous

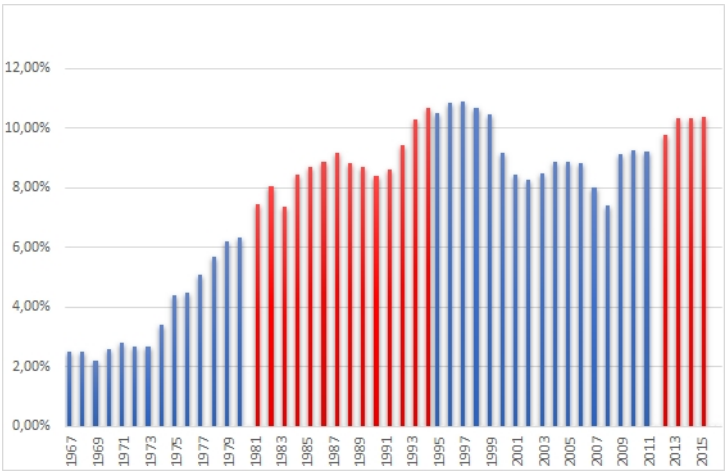


Figure 4: Unemployment Rate since 1967 in France

expenses incurred while the unemployment was high (tax rise). In addition, a government willing to invest in the long run and bring new businesses could implement a tax reform while the unemployment drop allows a tax reduction.

3.3.3 General government gross debt GDP

Descriptive Analysis The government debt data is from the IMF website. It starts in 1980 and ends in 2015. The global trend is a sharp rise of the government gross debt from 20,7 % in 1980 to 96% in 2015. Besides there are slight decreases in 2000-2002 and in 2006-2007.

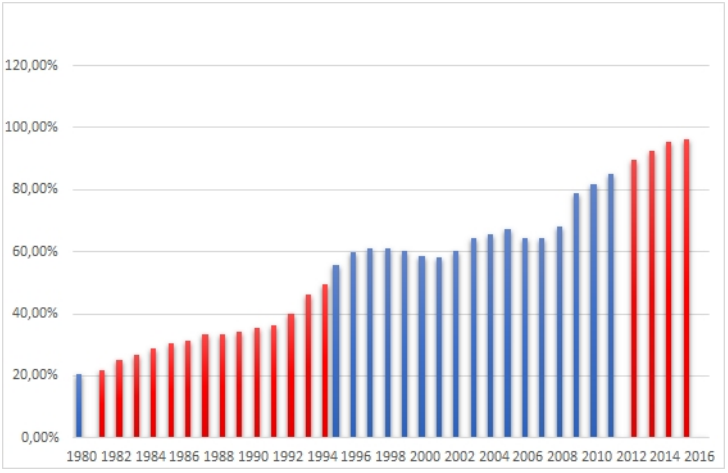


Figure 5: General government gross debt GDP since 1980 in France (percentage of GDP)

Potential Correlation Because the debt is related to the government budget, we assume an increasing of the gross debt could spawn two antagonistic effects:

- The government aims at finding new wherewithal to stem the debt rise. As a result, it can opt for a new fiscal reform to increase the tax income.
- The government is deliberately indifferent to the gross debt as far as the economic balance is not threaten.

Thus the global effect is unclear. More precisely, we assume there is a threshold above which the government starts to vote new fiscal reform because the debt becomes too high. The following tests would identify which effect is the strongest.

3.3.4 Share of property income in the gross household income:

Descriptive Analysis The graph shows that the fraction of real estate revenue in national revenue has increased significantly since 1959. This can be explained by the destruction of property due to the second world war. Throughout the second half of the 20th century, real estate capital accumulated and increased significantly in value conferring greater revenue to its owners.

Potential correlation: An increase of the real estate revenue can be seen as capital accumulation – more households are able to invest in real estate–. More households can thus afford to rent real estate. It could encourage the government to strengthen the tax for the rich in order to limit this accumulation. As a result, we expect a positive correlation.

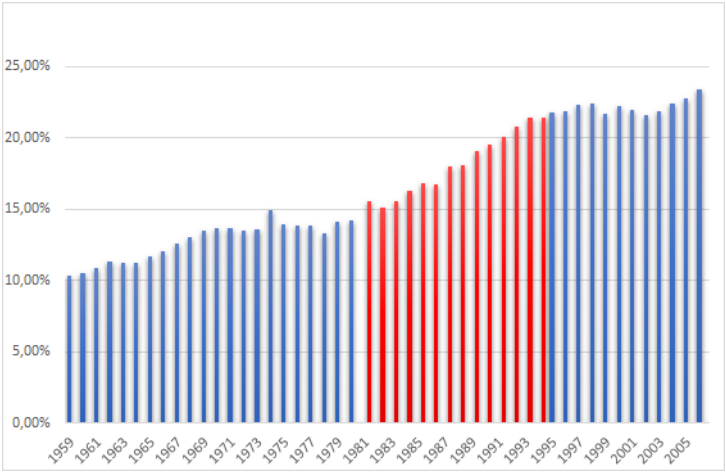


Figure 6: Share of property income in the gross household income since 1959

3.3.5 Share of social benefits in the gross household income:

Descriptive Analysis The graph shows that the share of social benefits in the gross household income has significantly increased between 1959 and 2005 (up by 13,4 %). We notice that the increase has been particularly important during the 1970s which can be explained by the economic downturn. Indeed, social benefits significantly increased during that time due to a sharp increase in unemployment and a stagnation of household income.

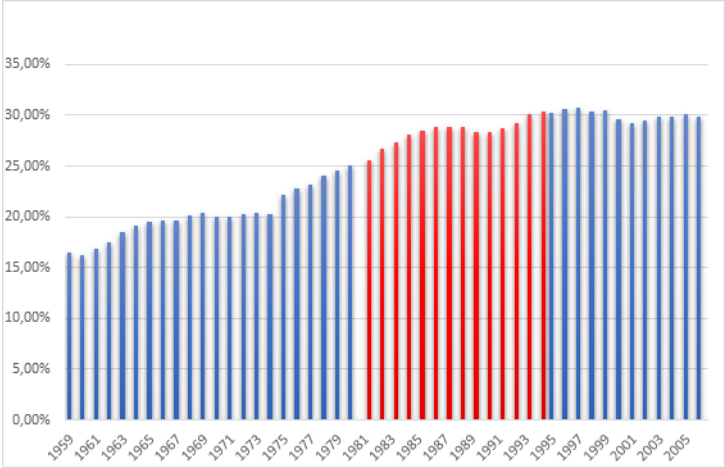


Figure 7: Share of social benefits in the gross household income since 1959 in France

Potential Correlation: We assume social benefits are positively correlated to the probability of a reform. In fact, an increasing of the social benefits could obliged the government to find wherewithal in order to finance the new systems, so the probability of a fiscal shift is higher.

3.3.6 Political Color of the President

Descriptive Analysis Since 1960, in France there has been only two periods with left-wing presidents Mitterrand and Hollande therefore the variable is likely to be significant as both of them embodied the political change. This may be why they opted for more reforms in order to set up a different tax system. A counter argument would be to claim that even when a president from the right party was in power, there were tax reforms as well. Besides we must also consider the three "cohabitations" – Mitterand/Chirac, Mitterand/Balladur and Chirac/Jospin – when economic shifts were under the prime minister responsibility.

Potential Correlation We assume that the president ideology is likely to increase or decrease the probability of a reform according to his political affiliation. Indeed, we sus-

pect that left-wing presidents – and left wing prime ministers during cohabitation – would opt for more reforms as they are more often willing to change the tax system, whereas right-wing presidents would not change the system a lot once it has been implemented.

3.3.7 Approval Rating of the President

Descriptive Analysis The approval rating of the president is strongly correlated with the mandate progress: a newly elected president has a high approval rating which decreases sharply afterward, and reaches its lowest level typically in one year, and rises again. Then, two cases appear: either the approval rating keeps rising for the next years and the president is re-elected, either it falls again one year later. The typical range of values is 15% to 65%. If we look at the approval rating month by month, some events – for instance terrorist attacks under Hollandes presidency or 1998 soccer world cup – can suddenly boost the approval rating . However, it always drops directly after and on a years average, these fluctuations are hidden.

Potential Correlation We expect a conflicting influence here.

- On the one hand, the higher the approval rating, the easier the enforcement of a fiscal reform:the president has no resistance to his endeavors to change the system.
- On the other hand, with a low approval rating, the president would not try to pass a fiscal reform not to make things worse.

However, it might be an endogenous issue: maybe approval rating does not cause reforms, but reforms cause approval rating. We believe that both are true but can not predict which aspect predominates. Indeed, such reforms are often controversial, at least the major ones. In that case, a popular president would not dare to present a reform that could make his approval rating plummet. Moreover, an unpopular president may not be subject to the influence of public opinion anymore: he has nothing to lose.

There is another way to consider the issue. We've seen that approval rating is correlated to the term progress. Maybe approval rating has no influence and the relevant variable is just the mandate progress: the president is elected with a program, and he enforces major reforms such as fiscal ones at the beginning of his term. This happens to be the time when his popularity is at its highest but it is nor a causality, nor a correlation. We will compare the results in our simulation for mandate progress and popularity.

In a word, we expect the approval rating to be a relevant variable in our simulation, but we can find arguments for a positive or a negative correlation.

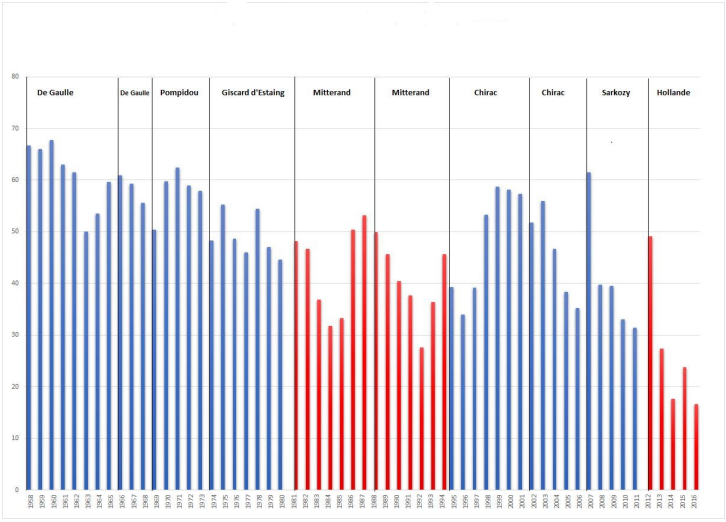


Figure 8: President Approval Rating since 1958

3.3.8 Political side of the National Assembly and the Senate

Descriptive Analysis During the period studied, right-wing parties had a majority in the National Assembly: 10 out of 14 terms. This is strongly correlated with the presidential colors. Indeed the presidential and legislative elections occur at almost the same time therefore the results are often similar.

The Senate gathers more political parties than the National Assembly. As a consequence, no majority – right and left – can usually emerge. Besides the Senate can balance the power of the National Assembly. In fact, the result of the senatorial election is not directly determined by the presidential election.

Figures about the National Assembly and the Senate were collected on the websites of the National Assembly and of the Senate. The political parties which were considered right-wing – respectively left-wing – are those who declare themselves as right-wing or center right-wing parties – resp left or center left–. Extreme left-wing parties were placed to the left. The political parties of the center are the political parties which declare themselves centrist or which do not declare themselves either to the right or to the left. They form a group of transition which is unpredictable but can influence the political decisions.

Potential Correlation We want here to find out which side enforces the more reforms. We might expect to find the same kind of correlations as the political color of president.

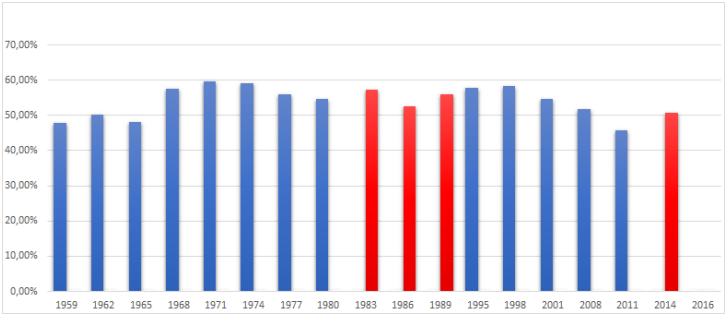


Figure 9: Proportion of the right-wing in the Senate since 1959

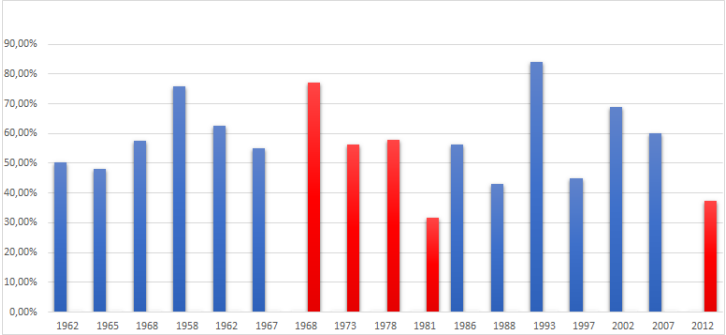


Figure 10: Proportion of the right-wing in the National Assembly since 1962

4 Test

4.1 The Econometrics Methods

4.1.1 The Probit Regression

In this part, we briefly describe the probabilistic model that we used for our analysis. Let us denote Y_i the binary variable which is equal to one if there is at least one major reform during the year i, Y_i^* the latent variable related to Y_i , $\mathbf{X}_i$ the vector of the explanatory variables during the year i and $\boldsymbol{\beta}$ the vector of coefficients such that:

- $Y_i^* = \mathbf{X}_i^T\boldsymbol{\beta} + \epsilon_i$ where $\epsilon_i \sim \mathcal{N}(0,1)$
- $Y_i = 0 \iff Y_i^* < 0$ and $Y_i = 1 \iff Y_i^* \geq 0$

Let as denote Φ the cumulative distribution of the normal distribution. We have :

$$Prob(Y_i = 0|\mathbf{X}_i) = Prob(Y_i^* < 0) = Prob(\epsilon_i < -\mathbf{X}_i^T\boldsymbol{\beta}) = \Phi(-\mathbf{X}_i^T\boldsymbol{\beta}) = 1 - \Phi(\mathbf{X}_i^T\boldsymbol{\beta})$$

$$Prob(Y_i^* = 1|\mathbf{X}_i) = Prob(Y_i^* \geq 0) = 1 - \Phi(-\mathbf{X}_i^T\boldsymbol{\beta}) = -\Phi(\mathbf{X}_i^T\boldsymbol{\beta})$$

In our model, we have:

$$\mathbf{X}_i = (GDP, debt, unemp, psoc, revprop, sen, ass, mandat, colpre, prop)$$
$$\boldsymbol{\beta}=(\beta_{GDP}, \beta_{debt}, \beta_{unemp}, \beta_{psoc}, \beta_{revprop}, \beta_{sen}, \beta_{ass}, \beta_{mandat}, \beta_{colpre}, \beta_{prop})$$

The coefficients of the vector $\boldsymbol{\beta}$ only provide us information about the sign of the effect of the explanatory variables on the explained variable. Therefore we chose to study the average marginal effects E^k.

For the dichotomous variable[1]:

$$E^k = \frac{1}{N}\sum_{i=1}^{N} \Phi(1 - \mathbf{X}_i^{-kT}\boldsymbol{\beta}^{-k} - \beta^k) - \Phi(-\mathbf{X}_i^{-kT}\boldsymbol{\beta}^{-k}) =$$
$$\frac{1}{N}\sum_{i=1}^{N} \Phi(1 - \mathbf{X}_i^{-kT}\boldsymbol{\beta}^{-k} - \beta^k) + \Phi(\mathbf{X}_i^{-kT}\boldsymbol{\beta}^{-k}) - 1$$

For the continuous variable:

$$E^k = \frac{1}{N}\sum_{i=1}^{N} \frac{\partial Prob(Y_i=1|\mathbf{X}_i)}{\partial X_i^k} = \frac{\beta^k}{N}\sum_{i=1}^{N} 1 - \Phi(\mathbf{X}_i^T\boldsymbol{\beta}) - \Phi(1 - \mathbf{X}_i^T\beta)$$

[1] u^k stands for the coefficient k of the vector $\mathbf{u}$ and $\mathbf{u}^{-k}$ the vector $\mathbf{u}$ without the coefficient k

4.2 The Results

In order to test the hypotheses, we built a database related to the selected variables that we renamed with abbreviations. Besides the sources are also showed in the appendix B.

Table of the marginal effects According to the results presented in the appendix D, we can determine the significant variables:

- The GPD growth, the public debt, the share of social benefits in the gross household income,the electoral time-line and the unemployment rate are not relevant.
- The color of the national assembly, the prime minister approval rating as well as the share of property income in gross household income are moderately significant ($p < 0.1$).
- The president approval rating, the the political color of the president, the political color of the president as well as the debt are significant ($p < 0.05$).

Because the number of observations is limited – the period starts in 1980 and ends in 2013 –, we only study the sign of the marginal effects.

- The marginal effect is positive for the president approval rating. This result confirms that fiscal shifts are decided when the president is enough – typically at the beginning of the term –.
- The effect is also positive for debt. This is logical because the state was already in debt – probably above the threshold we mentioned before – in 1980 so it opts for reforms to decrease debt.
- The marginal effect is negative for the color of the president and the color of the national assembly. As far as 0 stands for the left and 1 for the right, it confirms that the left-wing parties enforce more reforms.
- The effect is negative for the share of property income. However we expected a positive correlation. Maybe it's because most governments were right-wing during the studied period, so that they tend to encourage capital accumulation like real estates.

Correlation Cross-Table Thanks to the table presented in the appendix E, we can check that no variables are correlated to each other.

Regression with a larger period In this part, using only some of the variables we found significant previously : the color of the senate, the color of the president, the president approval rating and the share of property income. As a result, we could broaden the period. We did not select the debt because the value series is too limited. However we succeeded in finding new data related the approval rating of the president. The period starts in 1959 and ends in 2013.

According to the marginal effect – appendix F –, the share of property income is the most significant variable. This result is quite surprising: it suggests that the political variables were significant only after 1980. On the contrary, economic factors seemed to be dominating between 1959 and 1980.

5 Conclusion

According to the results, some political variables – the approval rating of the president, the political color of the president and the senate – have influenced tax income reforms since 1980. This phenomenon is brand new because we do not observe the same conclusion for the period 1959-2013. It suggests tax income reforms have been driven by political decisions only recently – after 1980 – whereas economic factors prevailed between 1959 and 1980.

Although the results must be taken cautiously – the amount of data is small –, the marginal effect of the approval rating of the president is positive. It means presidents would opt for fiscal shift only if they are popular enough. Otherwise they would not try to pass such a reform in order to limit the negative impact on their approval ratings. In a word, presidents prefer to have the confidence of the people to spawn fiscal reforms.

We could carry out the same analysis in countries with a similar political structure. As a result, we could get more data that will refer to the same period of time in different countries. Besides we could split the period into several intervals. Then we would conduct econometric analysis for each interval and finally monitor social changes more precisely in the different countries.

Appendix

A. ABC Formula

1. The maximization of each individuals' utility leads to the first order condition:

$$T'(y) = 1 - \frac{\partial k}{\partial y} \tag{9}$$

2. We can show that the condition that the allocation must be incentive compatible imposes that:

$$U'(\omega) = -\frac{\partial k}{\partial \omega} \tag{10}$$

3. We will now show that the resource-feasibility condition makes it possible to express U(omega underlined) as a function of

$$U(\omega) = U(\underline{\omega}) + \int_{\underline{\omega}}^{\omega} U'(s)ds$$

However, according to equation (7):

$$U(\omega) = U(\underline{\omega}) - \int_{\underline{\omega}}^{\omega} \frac{\partial k}{\partial \omega}(y(s), s)ds \tag{11}$$

Thus,

$$c(\omega) = U(\omega) + k(y(\omega), \omega) \tag{12}$$

$$c(\omega) = U(\underline{\omega}) - \int_{\underline{\omega}}^{\omega} \frac{\partial k}{\partial \omega}(y(s), s)ds + k(y(\omega), \omega) \tag{13}$$

$$E[c(\omega)] = U(\underline{\omega}) + E[k(y(\omega), \omega)] - \int_{\underline{\omega}}^{\overline{\omega}} f(\omega) \int_{\underline{\omega}}^{\omega} \frac{\partial k}{\partial \omega}(y(s), s)ds d\omega \tag{14}$$

$$E[c(\omega)] = U(\underline{\omega}) + E[k(y(\omega), \omega)] - \int_{\underline{\omega}}^{\overline{\omega}} \frac{\partial k}{\partial \omega}(y(s), s) \int_{\omega}^{\overline{\omega}} f(\omega)d\omega ds \tag{15}$$

$$E[c(\omega)] = U(\underline{\omega}) + E[k(y(\omega), \omega)] - \int_{\underline{\omega}}^{\overline{\omega}} \frac{\partial k}{\partial \omega}(y(s), s)(1 - F(\omega))d\omega ds \tag{16}$$

$$E[c(\omega)] = U(\underline{\omega}) + E[k(y(\omega), \omega)] - \int_{\underline{\omega}}^{\overline{\omega}} \frac{\partial k}{\partial \omega}(y(s), s)(1 - F(\omega))d\omega ds \tag{17}$$

$$E[c(\omega)] = U(\underline{\omega}) + E[k(y(\omega), \omega) - \frac{\partial k}{\partial \omega}(y(s), s)\frac{(1 - F(\omega))}{f(\omega)}] \tag{18}$$

Using the resource-feasible condition as well as the Pareto-efficency hypothesis:

$$E[y(\omega)] = E[c(\omega)] = U(\underline{\omega}) + E[k(y(\omega), \omega) - \frac{\partial k}{\partial \omega}(y(s), s)\frac{(1 - F(\omega))}{f(\omega)}] \tag{19}$$

4. We can now express the social welfare as a function of U($\underline{\omega}$):

$$S = E[g(\omega)U\omega)] \tag{20}$$

$$S = U(\underline{\omega})E[g(\omega)] + E[g(\omega)\int_{\underline{\omega}}^{\omega} U'(s)ds] \tag{21}$$

However, according to equation (7) and to the normalization condition:

$$S = U(\underline{\omega}) - E[g(\omega)\int_{\underline{\omega}}^{\omega} \frac{\partial k}{\partial \omega}(y(s), s)ds] \tag{22}$$

Using the same technique as previously:

$$S = U(\underline{\omega}) - E[(\int_{\omega}^{\overline{\omega}} g(\omega)\frac{(1-F(s))}{f(s)}ds)\frac{(1-F(\omega))}{f(\omega)}\frac{\partial k}{\partial \omega}(y(s), s)] \tag{23}$$

5. By eliminating U($\underline{\omega}$) from (17) and (21) we obtain:

$$S(y) = E[y(\omega) - k(y(\omega), \omega) + \frac{(1-F(\omega))}{f(\omega))}\frac{\partial k}{\partial \omega}(y(s), s)(1 - \int_{\omega}^{\overline{\omega}} g(\omega)\frac{(1-F(s))}{f(s)}ds)] \tag{24}$$

6. We will note ϵ the elasticity of labor supply with respect to the net wage rate and:

$$G(\omega) = \int_{\omega}^{\overline{\omega}} g(\omega)\frac{(1-F(\omega))}{f(\omega)}d\omega) \tag{25}$$

which corresponds to the average social marginal welfare weight of individuals with skills above ω. The maximization of the social welfare function using the enveloppe theorem leads to:

$$\frac{1 - \frac{\partial k}{\partial y}}{\frac{\partial k}{\partial y}} = (1 - G(\omega))\frac{(1-F(\omega))}{f(\omega)}(1 + \frac{1}{\epsilon}) \tag{26}$$

Taking into account (6):

$$\frac{T'(y)}{1 - T'(y)} = (1 - G(\omega))\frac{(1-F(\omega))}{f(\omega)}(1 + \frac{1}{\epsilon}) \tag{27}$$

B. Lower Taxes for Swing Voters

Let us consider a society where there are:

- a government providing a public good G and proportional tax rates t_h applied to the voter tax base B_h.
- H voters: $h = 1, .., H$ solving their economic problems by maximizing their utility function. It delivers the indirect utility function of the individual h $v_h(t_h, G)$.
- two candidates: the incumbent i and the opponent o with two different policy platforms: (t_{1i}, ..,t_{hi},G_i) and (t_{1o}, ..,t_{ho},G_o).
- the probability that voter h chooses the incumbent is $\pi_h = f_h(v_{ih} - v_{oh})$ where v_{ih} (resp. v_{oh}) is the indirect utility of voter h under the policies implemented by the incumbent (resp. the opponent) and f_h is a generic function which may include an ideological term.

The expected vote share of the incumbent i is: $EV_i = \sum_h \pi_h$. His strategy is to maximize the expected total support, given the platform of the opposition and the budget constraint:

$$max_(\mathrm{t}_{1i},\ ..,t_{hi},G_i)\ EV_i = \sum_h \pi_h = \sum_h \pi_h$$
$$\text{s.c.} G_i = \sum_{h=1}^{H} t_{hi} B_h$$

The first order conditions are the following ($h = 1, .., H$):

$$\frac{\frac{\partial f_h}{\partial v_h} \times \frac{\partial v_h}{\partial t_h}}{B_h(1+\epsilon_h)} = \lambda; \sum_{h=1}^{H} \frac{\partial f_h}{\partial v_h} \frac{\partial v_h}{\partial G_i} = \lambda$$

where ϵ_h is the income elasticity of base B_h with respect to t_h.

These conditions make clear that the government chooses the tax rates to equalize across tax payer the marginal political cost from raising an additional unit of money. Let us assume the equilibrium is symmetric and define $\theta_n = \frac{\partial f_h}{\partial v_h}$. We have:

$$\frac{\theta_n \times \frac{\partial v_h}{\partial t_h}}{B_h(1+\epsilon_h)} = \lambda$$

The weights θ_n represent the responsiveness of voting behavior to change in individual welfare. The voters with higher θ_n have a lower tax rate. This model illustrates well that the tax policies are designed to please swing voters. In fact, we observe that the political success of a party depends on its ability to attract swing voters.

C. Table of Variables

Variable	GPD Growth	Unemployment rate	Public Debt	Share of Social Benefits in the Gross Household Income	Share of Property Income in the Gross Household Income
Abbrevation	GDP	unemp	debt	revprop	psoc
Source	INSEE Database	La documentation franaise (INSEE)	INSEE Database	INSEE Database	INSEE Database

Color of the president	Color of National Assembly	Color of the Senate	Electoral time-line of the reform	President Approval Rating	Prime Minister Approval Rating
colpres	ass	sen	mandat	poppres	popprime
Wikipedia	National Assembly Archive	Senate Archive	Calculated thanks to the terms of the presidents	Kantar TNS (Probit 1) and IFOP (Probit 2)	Kantar TNS

D. Table of the marginal effects - Probit 1

	(1)
VARIABLES	Marginal effects
GDP	0.0598
	(0.294)
debt	0.499**
	(0.244)
unemp	-0.165
	(0.492)
psoc	7.379
	(100.0)
revprop	-112.0*
	(57.50)
sen	8.263**
	(3.452)
ass	-1.772*
	(0.949)
mandat	0.862
	(1.108)
colpre	-7.252**
	(3.688)
poppres	0.128**
	(0.0555)
popprime	-0.0802*
	(0.0464)
Constant	-8.356
	(21.20)
Observations	34

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

E. Table of correlations

Table 7: Cross-correlation table

Variables	GDP	unemp	psoc	revprop	sen	ass	mandat	colpre	poppres	popprime	popprime
GDP	1.000										
unemp	-0.595	1.000									
psoc	-0.738	0.941	1.000								
revprop	-0.655	0.817	0.949	1.000							
sen	-0.036	0.008	0.283	0.205	1.000						
ass	0.243	-0.457	-0.441	-0.309	-0.301	1.000					
mandat	-0.035	0.237	0.160	0.116	0.067	0.023	1.000				
colpre	0.371	-0.389	-0.379	-0.147	-0.301	0.622	-0.122	1.000			
poppres	0.417	-0.393	-0.662	-0.541	0.370	-0.074	-0.421	-0.050	1.000		
popprime	0.263	0.152	-0.189	-0.092	0.271	-0.265	-0.263	-0.054	0.601	1.000	
popprime	0.263	0.152	-0.189	-0.092	0.271	-0.265	-0.263	-0.054	0.601	1.000	1.000

F. Table of the marginal effects - Probit 2

	(1)
VARIABLES	Marginal effects
revprop	12.28***
	(4.323)
sen	-0.129
	(0.543)
pop	-0.00281
	(0.0182)
colpre	0.000100
	(0.434)
Constant	-2.294**
	(1.170)
Observations	55

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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