Tax competition and the move from insurance to assistance

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Abstract: The funding of social protection has strongly evolved in Bismarckian countries: whereas social protection used to rely on social contributions, since the 1990s most of the new expenditures have been funded through taxation, leading to a more balanced mix in the structure of social protection revenue. I propose a formal model in which two social protection systems may coexist: insurance funded through social contributions and assistance funded through taxation. Insurance level is set by consensus between firms and unions, whereas assistance expenditures are set by a majority vote in parliament. Social insurance can be manipulated to influence preferences in respect of assistance. It is shown how an exogenous increase in tax competition in a Bismarckian context can lead to the emergence of a mixed model: assistance increases to complement existing insurance, not to replace it.

Keywords: assistance, institutional change, insurance, political economy, tax-competition, veto.

Mots-clés: changement institutionnel, cotisations sociales, finances publiques, économétrie comparative, microéconomie de la protection sociale, taxation.

JEL: P16, H5, H2

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1. Introduction

In this paper, I argue that the development of tax-funded assistance and the relative decline of insurance in Bismarckian countries can be traced back to the intensification of tax competition. The development of Bismarckian social insurance was the historical outcome of a corporatist compromise in response to political demand for social protection. Business had an incentive to compromise because of the threat of statist intervention: social insurance was a means of preventing the implementation of a universal scheme associated with a high level of taxation of profits. The increase in tax competition associated with financial openness changed the political equilibrium by offering most profitable firms a better exit option.

Amable and Palombarini (2009) argue that the causal determinant of institutional change is the dynamics of the socio-political coalitions that support institutions. The defeat of one coalition by another, a change in the economic interests of one or several of its members, or a change in the balance of power within the coalition can trigger institutional change. In this perspective, this paper intends to explore the material determinant of social protection institutions by paying attention to the interests of socioeconomic groups and the modality of the political mediation between them.

I propose a framework in which two possible social schemes coexist: insurance and assistance. For a stylised representation, both systems differ in their funding structure (contributions vs taxation) and their benefit calculations (earnings-related vs flat-rate benefits), but not in their scope or coverage.[2] Insurance is governed by corporatist bargaining between firm representatives and unions, whereas assistance depends on fiscal policy, i.e. on parliament and its constituency – namely taxpayers. Using a formal model, I show how these dimensions can interact: social insurance can be manipulated to influence preferences on assistance. I analyse the conditions under which a Bismarckian compromise emerges in favour of the development of social insurance. It is shown how an exogenous increase in tax competition[3] in a Bismarckian context can lead to the emergence of a mixed model: assistance

[2] I am aware that this is generally not the case: insurance coverage is generally limited to workers, whereas assistance is not necessarily universal and may be targeted on the poorest. Yet I have assumed that coverage is the same so as to focus on the taxation and benefit-calculation aspect. Moreover, it has often been argued that the change in social protection funding can be explained by the universalisation of social protection (see literature section). I show in the model that this is not necessarily true: it is quite possible that unions prefer social insurance to social assistance, even if insurance is very broad-based and includes a redistributive portion.

[3] The intuition that tax competition is liable to undermine the stability of an existing political arrangement comes from Amable and Gatti (2004) on another topic. The model presented in section 4 is also inspired by this work.

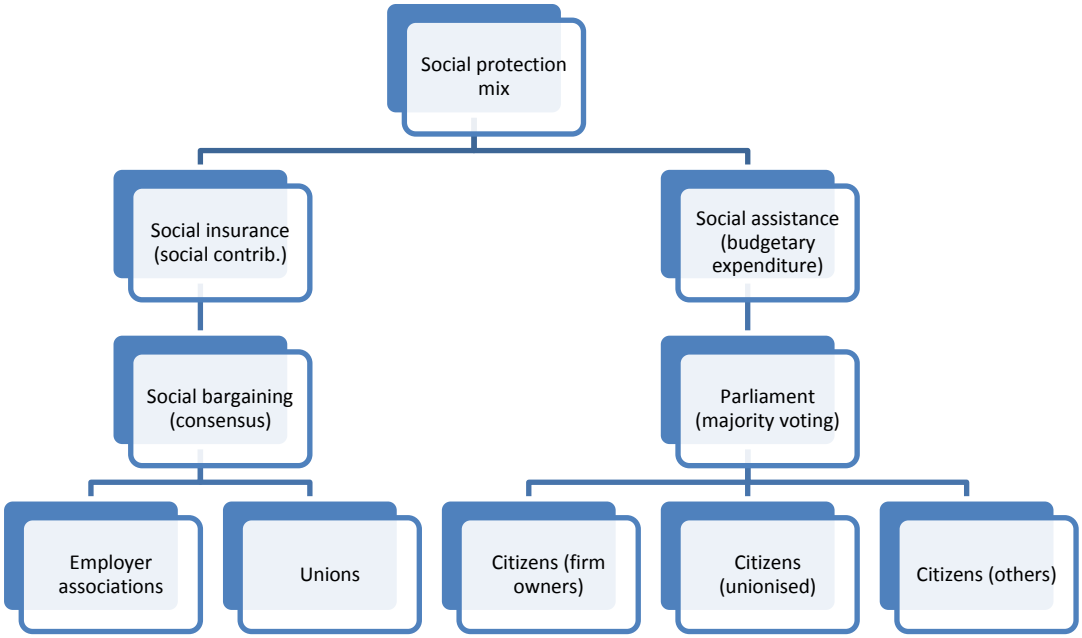
increases to complement existing insurance, not to replace it, just as it has been observed in Bismarckian countries. A time series cross-section analysis on nine countries over 25 years supports the idea that a drop in the corporate tax rate can trigger a shift in the tax structure of social protection funding.

1.1. The argument

In corporatist countries, the power of raising taxes and budgetary expenditure is not identical to the power of raising or lowering social contributions (elaboration on this point can be found in Bonoli an Palier [1996, 2000], Palier [2005] and Koreh and Shalev [2009]). In a nutshell, budgetary expenditure (and taxation) depends solely on the government and on a decision by parliament, but changing the contribution rate depends on an agreement being reached between unions and employer associations. If no consensus is reached to change the contribution rate, the former rate applies[4] (Figure 2).

[4] This is clearly a very stylised picture: the role of the government may be much more important and the role of social partners may vary across countries and social schemes. Nonetheless, the fact that social insurance is a matter of social bargaining whereas social assistance is in the hands of the state (or an infra-state entity) is an established fact.

Figure II- 1: A model of decision making in social protection



It is assumed that the decision taken in social bargaining (on the left hand side) precedes the parliamentary decision (on the right).

Thus, there is no unified governance of social protection as a coherent system.[5] On the contrary, the level of social contributions and the level of public social protection expenditure stem from two separate decisions, made in interaction, by different actors under specific rules. This can easily be understood if one has in mind, for instance, the interaction between unemployment insurance (governed by unions and employers) and minimal income (French RSA, German Harz IV, etc.), which is dependent on the government. One of the contributions of this dissertation is seriously to consider this institutional distinction as a means of comprehending trends in social protection.

Consequently, the decline of corporatist social protection should be analysed as the product of two mechanisms (Figure 1 and 2): i) the freeze of the contribution rate and ii) the existence of a parliamentary majority in favour of raising budgetary expenditure dedicated to social protection.

Based on this analysis, I propose an argument explaining the political sclerosis of the corporatist part of social protection over the last 20 years.

[5] Except if a general consensus among all stakeholders is built, as may have been the case in the Netherlands.

In the advanced democracies, there is broad demand for a public social protection scheme to shelter against social risk. By default (i.e. in the absence of any other scheme), this demand will be addressed by the state through the implementation of assistance (if there is a majority to implement such a system). But social partners have at their disposal the means to avoid state intervention by setting up an alternative system:[6, 7] social insurance. Indeed, if social insurance is important enough (in terms of generosity and coverage), it can reduce political demand for a statist schemes to a negligible level. Firms will support corporatist social protection when the expected cost of the social contributions borne by employers is lower than the taxation expected to fund assistance. This support accordingly depends on the effective ability of the state to tax profits: if this ability is low (because of capital mobility and intense tax competition), firms will prefer an increase in assistance to an increase in insurance because assistance-related taxation will cause little damage to their profits.[8] Labour unions support corporatist social protection as long as they consider assistance as too redistributive towards the poor (and possibly less generous for workers).[9]

At the constitutional stage, if the context makes firms and unions supportive of social insurance, a Bismarckian outcome will emerge: social insurance crowds out assistance. Should one or the other parties be opposed to it, a statist assistance scheme will prevail. But this can also happen in a context where Bismarckian insurance already exists: if at a given time, one of the social partners prefers statist social protection to social insurance, it will become impossible for the other one to obtain an increase in social insurance. Conversely, the social partner supportive of assistance will be unable to obtain a substantive cut in social insurance without a consensus. If such a situation were to arise in a Bismarckian framework, social insurance would be frozen at its previous level and variation in demand for social protection would be addressed by assistance. This is my reading of Figure 1: after decades of dynamism, social insurance is almost frozen at its historic level. At least one of the social partners (unions I argue) still prefers social insurance: were this not to be the case, there would have been a massive transfer from insurance to assistance.

[6] This is historically documented, at least for Germany at the end of the 19th century, and for France after WW2.

[7] On the emergence of corporatism in general (not in the single dimension of social protection), Jo Martin and Swank (2012) make the same argument concerning the Danish case.

[8] In a recent note, Askenazy (2012) endorses a similar view on the link between social contributions and profit taxation: "Today, we cannot rule out seeing a reduction in labour costs through reduced employer contributions translating simply into (...) [a] transfer of surplus profits generated in countries with lower corporate tax and growth in dividends (…)".

[9] This assumption is in line with the results obtained by Conde-Ruiz and Profeta (2007), except that they do not include the specific role of firms.

The increase in budget-funded social protection can be seen as government's response to political demand for more social protection (especially because of ageing) in a context where corporatist social protection is frozen.[10] This response is probably supported by labour: even though unions prefer corporatist social protection to universal assistance, they will clearly prefer social assistance to nothing as a means of addressing new needs.

To return to the puzzle of the globalisation-social protection nexus, the hypothesis tested here is that the increase in tax competition did not primarily affect the level of social protection, but rather the way in which social demand is politically addressed.

2. The economic model[11]

2.1. Foreword

The purpose of the model presented here is to exhibit the distributive mechanism implied by the coexistence of social insurance and assistance, how these consequences can be affected by tax competition and how several political equilibriums arise, explaining the different national choices between insurance and assistance. The model is inspired by Casamatta et al. (2000) for social schemes and by Person and Tabellini (2000) for its political features. As in many articles focusing on social insurance systems (Casamatta et al. [2000], De Donder and Hindriks [1998], Conde-Ruiz and Galasso [2005]), I ignore the effect of taxation on the labour-market equilibrium[12] to focus on the distributive consequences of taxation and social policy. An innovation of the model in comparison with political economy literature is to endogenise both the deadweight loss implied by labour taxation and the way this cost is shared between agents. In particular the deadweight loss will not be the same for all workers and for insurance and assistance schemes.

2.2. Basic framework

The economy includes three kinds of agents: firms (F), skilled workers (SK) and unskilled workers (U). For what follows, I assume that the agents of each group adopt a homogeneous

[10] The item "budgetary expenditure" includes the public deficit, but a closer look at the national accounts shows that deficit spending has not been used to boost social protection expenditure: tax-funded social protection has been paid either by higher taxation or by cuts in other public expenditure (Appendix 7.5).

[11] The reader not interested in algebra can jump to subsection 3.9, which presents the results of the model.

[12] I deliberately omit this effect here, assuming that the distributive effect of taxation strongly dominates the possible consequences on (un)employment. A more accurate picture could be obtained in further work by combining both effects.

political attitude. Moreover I assume that no group can alone obtain a majority of votes. So, as in Person Tabellini (2000), I model the whole population as if it were comprised of three representative agents, one of each kind.

The production is organised as follows:

-SK, who earns a wage w_{sk} when at work.

-U, who earns a wage w_u when at work. It is assumed that $w_W > w_u$.

-For each worker i at work, F makes a constant pre-tax profit π_i.

Each worker i faces an exogenous probability φ_i of wage loss (unemployment, sickness, etc.).

It is assumed that $\varphi_{sk} < \varphi_u$. For simplicity, I normalise φ_u at 1, thereby assuming that unskilled's utility strictly increases with the generosity of social benefits.[13]

Two social schemes coexist: social insurance and universal assistance.

2.3. Social insurance

Social contributions are levied on wages at a rate c[14]. Worker i gets an earnings-related benefit $\alpha * c * w_i$ when the social risk is realised, where α is a structural parameter of the scheme.

The saturation of budgetary constraint yields:

$$\alpha = \frac{(1 - \varphi_{sk})w_{sk}}{\varphi_{sk} * w_{sk} + w_u}$$

2.4. Universal assistance

Labour is taxed at a rate t and profit at a rate $\mu * t$, where μ accounts for the ability of the state to tax profit as opposed to labour.[15] In what follows, I interpret μ as the intensity of tax competition.

[13] Put another way, it corresponds to the idea that their taxable income is so low and their risk exposure so high that the utility of the expected benefit always exceeds the disutility of taxation. This assumption seems highly reasonable for labour-market outsiders but also for low-wage workers.

[14] It is assumed here than even unskilled workers are eligible for social insurance. This is to make the least restrictive assumption possible with respect to my results, but one can obtain the very same result by assuming that unskilled workers are not entitled to social insurance.

[15] Formally, μ is the profit-labour tax ratio. It can be affected either by profit shifting (a share of profit realised is practically excluded from the tax base), or by the implementation of an official dual taxation favourable to profit.

For simplicity and without loss of generality, taxation is re-expressed *as if* wages were the only tax base. So t' is the tax rate, such as:

$$t' \equiv \frac{t * (\pi * \mu + w_{sk})}{w_{sk}}$$

All workers get the same benefit $D * t'$ when the risk is realised, where D is a structural parameter of the scheme.

The saturation of budgetary constraint yields:

$$D = \frac{(1 - \varphi_{sk}) w_{sk}}{\varphi_{sk} + 1}$$

2.5. The utility function of agents

The utility functions of firms and workers are as follows:[16]

Firm:

$$U_{firm} = \sum_i (1 - \varphi_i)[\pi_i - \left((1 - \gamma_i)c + (1 - \theta_i)t'\right) * w_i]$$

Workers:

$$U_i = (1 - \varphi_i) * \text{Log}[w_i * (1 - \gamma_i * c - \theta_i * t')] + \varphi_i * \text{Log}[\alpha * w_i * c + D * t']$$

Where γ_i and θ_i are the cost of social contributions and taxation supported by worker i. The complementary share $1 - \gamma_i$ and $1 - \theta_i$ are borne by the firm.

2.6. Fiscal incidence of taxation and social contribution

Based on the literature on taxation (Salanié [2011]), it is assumed that the cost sharing of labour taxation between firms and workers is as follows:

- the share of taxation perceived by workers as expectable benefits for him/herself (auto-insurance), is a pure substitute of the net wage and is thus entirely paid by workers (through a moderation of the net wage);

[16] These formal representations of utility functions and social insurance (earnings-related or uniform) are attributable to Casamatta et al. (2000). I do however introduce two modifications: i) the utility of agents is log-linear to simplify the algebra, and ii) while Casamatta et al. (2000) study the case of a single scheme more or less earnings-related, I present the case in which two schemes coexist and interact.

- the distortive share of taxation perceived (the *"deadweight loss"*, i.e. the portion that cannot be considered as auto-insurance) is shared between employers and employees within the wage-bargaining process, according to their respective bargaining power;
- Taxes levied on profits are paid solely by firms.[17]

The share γ_i of social insurance c paid by worker i is thus:[18]

$$\gamma_i = \frac{\varphi_i * \alpha * (1 - k_i)}{(1 - \varphi_i)} + k_i$$

where k_i is the relative bargaining power of the firm taking values between 0 and 1.[19]

The share θ_i of social assistance borne by worker i is:[20]

$$\theta_i(\mu) = \frac{\varphi_i * (1 - k_i)}{(\varphi_{sk} + 1)} + k_i * \frac{w_{sk}}{\pi * \mu + w_{sk}}$$

Clearly, the higher the tax competition (i.e. the lower the value of μ), the heavier the cost of assistance borne by workers.

2.7. The political system

Both schemes are associated with specific decision-making procedures:[21]

- Social insurance level c is bargained between SK and F against the status quo c_0. The outcome of the bargaining is denoted c_b.

$$c_b = \begin{cases} c_b(c_0) \neq c_0 \; if \; \dfrac{dU_F(c_0)}{dc} * \dfrac{dU_{SK}(c_0)}{dc} > 0 \\ c_0 \; else \end{cases}$$

  Meaning that c changes only if both social partners have a common interest in raising or lowering c in relation to its past value c_0.

[17] A slight share of profit taxation is however indirectly shifted back on to workers through the taxation of labour: higher taxation of profits induces higher benefit expectations for workers, thereby leading them to accept a higher share of taxation on labour.

[18] Proof in appendix 7.1.1 a/.

[19] k_i=1 is absolute power to the firm.

[20] Proof in appendix 7.1.1 b/ and c/.

[21] The coexistence of social bargaining and majority voting is used among others by Iversen and Soskice (2009) and Amable and Gatti (2004).

- Universal assistance is set at the preferred level of the median voter among the three agents (which is a representation of majority voting).

The timeline of the decision is the following:

T=0: Initial setting; agents observe exogenous parameters $c_0, t_0, \varphi_i, k_i, w_i, \mu$

T=0.1: Bargaining on c

T=0.2: Vote on t

T=1: Risk is realised, payoffs.

The model will be solved by backward induction.[22]

2.8. Solving the model

2.8.1. Vote on social assistance level t′ given the level of contribution c

First- and second-order conditions yield:

$$t'^{*}_{firm}(c) = 0$$

$$t'^{*}_{i}(c) = \begin{cases} \frac{\varphi_i}{\theta}(1 - c * \gamma_i) - (1 - \varphi_i) * \alpha * c \; for \; c \leq \bar{c} \\ 0 \; else \end{cases}$$

Where $\bar{c}$ is the solution of $t'^{*}_{i}(\bar{c}) = 0$.

It can easily be shown that SK is the median voter on t', so that the political outcome of the vote on social assistance, given c, is:

$$t'^{*} = t'^{*}_{sk}(c)$$

[22] The result of the model is obviously not independent of the order in which decisions are made. However, there is no structure-induced equilibrium: if decisions on *c* and on *t* are taken repeatedly, convergence will not happen. But admitting that the decision sequence is not infinite but restricted to a pair of decisions (one on *c* and the other on *t*), the timeline we propose (bargaining on *c* before voting on *t*) would be chosen by the majority over the alternative possibility (voting on *t* before bargaining on *c*): if firms and unions have a common interest in changing the level of *c*, they will prefer to do so before the level of *t* is set. Thus, they will support an agenda putting bargaining first. On the other hand, if they are against modifying the level of *c*, the result will not depend on the decision-making order.

2.8.2. Bargaining on social insurance between F and SK

The bargaining on c takes place before the vote on t', so that everybody has preference over c taking into account the future level of $t'^{*}(c)$.

The value of t' can thus be replaced by $t'^{*}_{sk}(c)$ in each utility function.

$$U_{firm}(c) = \pi - \sum_{i} \left((1-\gamma_i)c + (1-\theta_i(\mu))t'^{*}_{sk}(c)\right) * (1-\varphi_i) * w_i$$

$$U_i = (1-\varphi_i) * \text{Log}\left[w_i * \left(1-\gamma_i * c - \theta_i(\mu) * t'^{*}_{sk}(c)\right)\right] + \varphi_i * \text{Log}[\alpha * w_i * c + D * t'^{*}_{sk}(c)]$$

Given this (computation in Appendix 7.1), one obtain this table of preferences of social partners in respect of the level of social contributions. In the following table, + means that the agent locally prefers[23] an increase in *c* to obtain a cut in *t*.

$\frac{dU}{dc}$	$0 < \theta(\mu) < \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$	$\frac{D * \gamma_{sk}}{\alpha * w_{sk}} < \theta(\mu) < \overline{\theta_{firm}}$	$\overline{\theta_{firm}} < \theta(\mu)$
Firms	+	+	-
Unions	-	+	+
Outcome	Frozen	Bargaining on c possible	Frozen

Since θ is a strictly decreasing function of a state's ability to tax profit μ, it becomes clear how a strong increase (or a strong decrease) in μ precludes any bargaining on the level of social contributions, because firms' and unions' interests are no longer aligned.

In such cases, one can expect the level of social contributions to remain constant (because one of the actors wants this to be the outcome) and any adjustment to the level of risk or change in the wage distribution to be set by an adjustment on the assistance side, i.e. a change in $t(c)$ but not in *c*.

Let $c_b(c_0)$ be the outcome of the bargaining between unions and firms on c_0.

[23] Meaning for value of *c* belonging to [0; $\bar{c}$]. For value above $\bar{c}$ there is no longer a trade-off between assistance and insurance.

The political outcome of social protection is:[24]

	$0 < \theta(\mu) < \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$	$\frac{D * \gamma_{sk}}{\alpha * w_{sk}} < \theta(\mu) < \overline{\theta_{firm}}$	$\overline{\theta_{firm}} < \theta(\mu)$
c	c_0	$c_b(c_0)$	c_0
t	$t^*_{median}(c_0)$	0	$t^*_{median}(c_0)$
	Post corporatist	Corporatist	Universalist

Thus, the type of equilibrium (corporatist or not) depends on $\theta(\mu)$.

2.9. Conclusion of the model

To summarise these result in words, given an initial mix in social protection (c_0, t_0), the political response to any change in risk level/wage distribution/profit level will depend on a state's ability to tax profit.

- When the state can tax profit at a relative high rate, unions have no incentive to increase social insurance: the burden of assistance will be borne chiefly by profits, and workers (a coalition of skilled and unskilled) will be able to reach a majority to implement it. In the latter case, firms will veto any cut in social insurance, because maintaining a certain level of social insurance prevents unions from demanding additional assistance.
- When capital mobility and/or tax competition strongly limits the ability of the state to tax profits, any increase in assistance will rely primarily on workers. In the latter case, firms will have no interest in negotiating an increase in social insurance; conversely, unions will oppose any cut in social insurance because substituting assistance for insurance will be costly for their constituency. However, if the level of existing social insurance is insufficient in respect of demand for social protection, unions will back an increase in assistance (as a feasible second best).
- The corporatist compromise to manage demand for social protection by increasing/decreasing social insurance only happens when both unions and firms prefer social insurance to tax-funded assistance. Regardless of other determinants included in the model (risk level, risk distribution, wage distribution, profit-wage ratio, bargaining power of social partners), this is only possible when the ability to tax profits is high enough (so that firms have an incentive to make a deal with the unions),

[24] Here again it is assumed that c_0 belongs to $[0; \bar{c}]$.

but not excessively high (so that the unions cannot expect social protection to rely solely on the taxation of profits).

Moreover, the model predicts that, all things being equal, a significant decrease in the state's ability to tax profits is likely to break the compromise in a formerly Bismarckian country: social insurance will be frozen (but will not collapse), and any new social protection expenditure will be funded through a tax-based assistance scheme. This is the general trend observed in Bismarckian countries over recent years.

The model also highlights an interesting dimension of social protection: the distinction between the preference for one scheme and the demand for a certain level of social protection. All agents have preferences for a certain type of arrangement to deal with social risk (social insurance or social assistance). But the preference for one scheme over the other and does not determine the absolute level of social insurance preferred by the agent. This offers an original explanation for the apparent paradox current in political economy:

-Firms absolutely prefer zero social protection but may support social insurance as opposed to social assistance, even if social insurance is more generous at the aggregate level.

-Skilled workers may absolutely prefer social insurance as opposed to social assistance (because of its less redistributive design), but simultaneously support an increase in social assistance (because an increase in social insurance is not achievable).

2.10. Discussion on the level of generality

The model displayed here presents the case of a trade-off between earnings-related insurance and flat-rate-benefit models. It can thus be applied to several kinds of social risk, such as unemployment, old age or sick leave. It has a relatively high level of generality, since non-contributors (unskilled in the model) are also entitled to insurance benefits, and as such it allows social insurance to operate cross-class redistribution. So, whereas it is generally admitted that universal coverage is a reason for unions to switch from social contributions to taxation, the model shows that this is not necessarily the case. Obviously, relaxing this assumption reinforces the bias of both firms and skilled workers in favour of insurance.

The model does not however correspond to the representation of health insurance or other flat-rate-benefit schemes (e.g. family). For those schemes, the sole distinction between insurance and assistance will not be in the definition of benefits (earnings-related vs flat-rate benefit) but in coverage. In this case, the same mechanism as displayed above may only apply if I relax the assumption that insurance and assistance have the same coverage. Conversely, once it is accepted that health insurance provides universal coverage, the model gives no reason for unions to support funding through social contributions alone.

3. Conclusion

This paper proposes a new theoretical explanation of the unexpected emergence of a model mixing insurance and assistance in Bismarckian countries. To summarise, whereas the level of social protection expenditure has kept growing, the social contribution rate has been virtually frozen at a point in time (varying from one country to another). Surprisingly enough, there was no massive shift in social contribution revenue to other taxes: the biggest change in social protection funding structure was attributable to increases in budgetary expenditure, not the collapse of social security contributions.

I argue that this change can be traced back to change in economic interests among social partners: whereas the level of social protection expenditure is driven by social demand, its funding (and it in turn the greater or lesser focus on insurance or assistance in its design) depends on the strategic interaction between economic and political actors. As long as unions' bargaining power was backed by the credible threat of taxing profit at a high rate, firms had a strong incentive to support the Bismarckian compromise and to prefer social insurance to universal assistance. Let us be clear that it is not assumed here that firms used to support

social insurance for itself (as it is sometimes claimed in the *variety of capitalism* literature, e.g. Estevez-Abe et al. [2001]), but they supported it as the best possible alternative in a constrained context.

Globalisation precisely changed this context. First, in the discourse, salient issues such as the high level of unemployment or the fear of relocation gave arguments to support supply-side policies: public debate on social protection funding permanently underlined the fact that any option would work as a disincentive for investment.[25] But beyond these elements, probably the most important change has in fact been the decreasing ability of governments to tax the profits of multinational firms, because of tax competition and increasing financial openness. Given this new context, employers' associations have defected from the historical compromise of funding social protection through social contributions levied on wages.

This analysis may contribute to existing literature in several ways. First it tends to show that, as expected by scholars in the 1990s, tax competition triggered institutional reform and had distributive consequences. But contrary to what was expected, it did not immediately entail a collapse in social protection expenditure. Instead, it led to a search for a new tax base (household capital, income and consumption) to fund new benefits, and in turn to complement existing social insurance by assistance schemes (because it was impossible to increase the scope of insurance).[26]

Second, it stresses that political economy modelling of social protection should pay attention to the coexistence between insurance and assistance to cover the same risk. Indeed, even in the simple model presented above, it is shown that the political interactions between insurance and assistance may be of a different nature: choosing between insurance and assistance not only implies the choice between more or less generous or redistributive benefits, it also implies the choice of a tax base, which is likely to have major distributive consequences, not only between workers, but also between capital and labour. Moreover, the political attitude of individuals in respect of one scheme (insurance or assistance) may be modified or manipulated by modifying another scheme. For instance, support for an earnings-related scheme (pensions or unemployment) among low-wage workers may vary as a function of the

[25] An illustration of this discourse one can be found in a column by Bourdieu (1996) and a quote from former Bundesbank chairman Hans Tietmeyer: "The challenge today is to create the conditions for sustainable growth and investor confidence. We must therefore control government budgets, reduce the level of taxes to bring them to a sustainable long-term level and social protection systems."

[26] Appendix 7.3 propose a decomposition of budgetary social expenditure by type of tax base and type of taxation.

generosity of the assistance covering the same risk. Conversely, since nobody wants to pay twice for the same risk, the presence of social insurance covering a large share of the population may be an obstacle to the implementation of an assistance scheme targeted on the poor (witness so-called "Obamacare").

Ultimately, it adds support to the claim that the politics of social protection in Bismarckian countries cannot be addressed properly if the governance mechanism of the various schemes is not addressed. Whereas this has been widely documented in qualitative political science literature, this dimension is generally overlooked by formal and quantitative analysis, in which social security expenditure is generally not distinguished from other forms of tax and transfers.

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5. Appendices

5.1. Model

5.1.1. Cost-sharing of taxation when funding flat-rate or earnings-related benefits

In this appendix, I endogenise the cost-sharing of labour taxation between firms and workers. The basic idea is that the share of tax that is perceived as an expected benefit is entirely borne by the employee i. The remaining part (the *"deadweight loss",* or the distortive share of taxation) is shared between the employer and employees, in accordance with their relative bargaining power k_i. k_i takes a value of between 0 and 1, 1 being the case where the relative bargaining power of the employer is infinite.

a/The cost of taxation funding earnings-related benefits (i.e. social security contributions)

Distortive share:

The distortive share is the share of taxation that is not perceived as funding expected benefits. For the individual i it is:

$$c * w_i(1 - \varphi_i) - \varphi_i * \alpha * c * w_i = c * w_i * ((1 - \varphi_i) - \varphi_i * \alpha)$$

share of c borne by worker i:

$$\gamma_i * (1 - \varphi_i) = \varphi_i * \alpha + k_i * ((1 - \varphi_i) - \varphi_i * \alpha)$$

it yields:

$$\gamma_i = \frac{\varphi_i * \alpha * (1 - k_i)}{(1 - \varphi_i)} + k_i$$

is the share of social security contributions supported by worker i

b/Taxation funding of flat-rate benefits (taxes)

Deadweight loss:

$$t * w_i(1 - \varphi_i) - \varphi_i * B * t = t * ((1 - \varphi_i)w_i - \varphi_i * B)$$

share of t borne by worker i:

$$\delta_i * w_i * (1 - \varphi_i) = \varphi_i * B - k_i * ((1 - \varphi_i)w_i - \varphi_i * B)$$

It yields:

$$\delta_i = \frac{\varphi_i * B * (1 - k_i)}{(1 - \varphi_i)w_i} + k_i$$

with

$$B = \frac{(1 - \varphi_{sk})}{\varphi_{sk} + 1} * (\mu * \pi + w_{sk})$$

thus,

$$\delta_i = \frac{\varphi_i * (\mu * \pi + w_{sk}) * (1 - k_i)}{(\varphi_{sk} + 1)w_i} + k_i$$

Comment:

When the ability to tax profit μ increases, the share of labour taxation borne by labour also increases (because the expected benefits increase). Indirectly, this is a channel through which a share of profit taxation is shifted back to workers.

c/Taxation funding of flat-rate benefits (taxes) re-expressed with the help of θ and *t'*

$$\theta = \frac{\delta * t}{t'} = \frac{\delta * w_{sk}}{(\pi * \mu + w_{sk})}$$

$$\theta(\mu) = \frac{\varphi_i * (1 - k_i)}{(\varphi_{sk} + 1)} + k_i * \frac{w_{sk}}{\pi * \mu + w_{sk}}$$

$\theta(\mu)$ is thus a decreasing function of μ: when the ability to tax profits increases, the distortion of labour taxation decreases (because the amount of the expected benefit increases).

d/ Important comment

It is possible for γ_i or δ_i to have a value higher than 1: if the expected benefit is higher than the taxation levied on the wage, an increase in taxation (and the expected benefit) can entail a decline in labour cost. To put it differently, theoretically, there is no reason why a distortion of the labour cost due to taxation can only raise the labour cost. Most probably, it is likely to raise the labour cost of some workers and lower that of others (those who are included in the scheme but whose wages are taxed less than their expected benefit).

5.1.2. Model: Preferences of skilled workers and firms in respect of *c*

Preference of skilled workers in respect of social insurance:

$$U_{sk}(c) = U_{sk}\left(c, t'^{*}_{sk}(c)\right)$$

$$\frac{dU_{sk}\left(c, t'^{*}_{sk}(c)\right)}{dc} = \frac{\alpha * \theta * w_{sk} - D * \gamma_{sk}}{D * (1 - \gamma_{sk} * c) + \alpha * c * \theta * w_{sk}}$$

and the preference of SK in respect of c is given by

$$\frac{dU_{sk}\left(c, t'^{*}_{sk}(c)\right)}{dc} > 0 \Leftrightarrow \theta < \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$$

SK prefers to increase the level of social insurance (and decrease the level of social assistance) as long as θ is higher than $\frac{D*\gamma_{sk}}{\alpha*w_{sk}}$.

Notably the sign of $\frac{dU_{sk}(c,t(c))}{dc}$ does not depends on c.[27] Put differently, skilled workers either prefer a pure assurance or a pure assistance equilibrium. An outcome in which insurance and assistance coexist can only be reached as a second best.

Preference of firms in respect of social insurance:

$$\frac{dU_{firm}(c,t'(c))}{dc} = -w_{sk}(1-\varphi_{sk}) * ((1-\theta) * \frac{dt'(c)}{dc} + (1-\gamma_{sk}))$$

$\frac{dU_{firm}(c,t\prime(c))}{dc}$ is constant in respect of c and continuous in respect of c=(0;1).

That is to say that firms also prefer a pure insurance or a pure assistance solution, according to the sign of $\frac{dU_{firm}(c,t\prime(c))}{dc}$.

This sign varies over the value of θ:

$$\frac{dU_{firm}\big(c,t'(c)\big)^2}{dc * d\theta} = -w_{sk} * (1-\varphi_{sk}) * \left[\frac{\varphi_{sk} * \gamma_{sk}}{\theta^2} + \alpha * (\varphi_{sk}+1)\right] < 0$$

Thus $\frac{dU_{firm}(c,t\prime(c))}{dc}$ continuously decreases over θ, as long as $\theta > 0$.

By computing values of $\frac{dU_{firm}(c,t\prime(c))}{dc}$ for different values of θ,[28] it can be shown that:

$$\exists!\ \bar{\theta}\ \epsilon\ ]0;1]\ so\ that\ \frac{dU_{firm}\big(c,t'(c)\big)}{dc}(\bar{\theta}) = 0$$

and

$$1 > \bar{\theta} > \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$$

[27] At least as long as $t' = t'^{*}_{sk}(c)$, i.e. as long as there is a possible trade-off between *c* and *t*.

[28] Limit in 0+, in $\frac{D*\gamma_{sk}}{\alpha*w_{sk}}$ and in 1