Financial Systemic Risk: Taxation or Regulation?

Donato Masciandaro* and Francesco Passarelli†

First draft: February 2011

Preliminary - Comments Welcome

Abstract

In this paper we describe systemic financial risk as a pollution issue. Free riding leads to excess risk production. This problem may be solved, at least partially, either with financial regulation or taxation. From a normative viewpoint taxation is superior in many respects. However, reality shows that financial regulation is more frequently adopted. In this paper we make a politico-economic argument. If the majority chooses a tax, then it is likely to be too low. If it chooses regulation is will possibly be too harsh. Moreover, a majority of low polluting portfolio owners may have a strategic incentive to use regulation rather than taxes in order to charge the minority a large share of the externality reduction.

*Bocconi University, Milan, Centro Paolo Baffi
Email: donato.masciandaro@unibocconi.it

†Università di Teramo and Bocconi University, Milan.
Email: francesco.passarelli@unibocconi.it
1 Introduction

The dilemma between regulation and taxation of financial activities has come under a closer scrutiny as a result of the recent crisis. The main reason to consider this dilemma is that both regulation and taxation represent policy tools to curb system risk contagion, which is a peculiar case of externality. In a perfect Pigouvian world taxation and regulation would be equivalent policy tools: a first best outcome can be achieved by calibrating the policy on the features of the externality. In the real world, dominated by uncertainty and asymmetric information, the policymakers usually choose financial regulation to produce progressive effects in the agents’ risk taking (Claessens 2010), while taxation is used to produce proportional effects, using flax tax schemes (Goodhart 2010). Thus, from a normative viewpoint, the dilemma between regulation and taxation is solved by looking at the shape of externality and the distribution of sacrifices. In this paper we offer a positive perspective, based on a political economy argument first proposed for a general pollution problem by Alesina and Passarelli (2010). Suppose that regulation has a stronger impact on highly risk polluting portfolios, while a tax is levied also on low-polluting portfolios and that the choice between regulation and taxation is made by voting. A majority of low-polluting portfolio owners may have a strategic incentive to choose regulation in order to charge the minority a larger share of the externality reduction burden. This may lead to a suboptimal instrument choice. This also explains why regulation is so frequent in financial markets, whereas taxation is rarely observed as an instrument to face systemic risk problems.

J. M. Keynes (1936) was one of first proponents of a systemic risk tax. He identified security contracts as a source of instability. Thus he proposed to tax only those kinds of contracts. Many subsequent proponents took the same view (among others, Stiglitz, 1989). We claim that attention should be focused on the overall financial playing field, rather than on the banking industry only. The default of any specific financial contract may originate negative and amplifying effects not only on the lender’s and/or the borrower’s portfolios, but also on other interconnected operators’ claims. The possible failure of a specific portfolio can produce a generalized fear of counter-party credit risk, with potential domino effects that spread over the markets. An externality problem arises because these potential effects are not completely internalized by the contracting parties. In principle, any financial contract can be characterized by its level of toxicity in terms of system risk externality (SRE). In other words, any single financial portfolio produces a certain amount of systemic risk pollution, even an extremely small one. Therefore, curbing systemic risk is a general interest policy task and any citizen’s port-
folio choice is potentially affected by that policy.

Our attention here is mainly focused on the “political distortion” that occurs when the choice is made by voting. As in the political analysis of income taxation, distortion depends on the relative position of the median voter with respect to the average (see Persson and Tabellini, 2000). Taxes and rules however are different in the way they allocate the sacrifices of the externality reduction. In the case of regulation, most sacrifices are made by top risk producers. Thus, even when the median voter produces an amount of risk that is above the average, the majority prefers restrictive regulation. On the contrary, with a tax a consistent amount of sacrifices is made by low risk producers. Thus even a low median prefers low taxes. The two instruments are quite different in the political distortion: regulation is very likely to be too restrictive; taxation is likely to be too low.

This argument is based on the assumption that, independently of the toxicity measure adopted, regulation always has a more than proportional impact on more toxic instruments; i.e. it forces people to progressive toxicity reductions. For example, a full prohibition rule (such as, "all instruments whose toxicity level is above a given level are banned") has a dramatically progressive impact and it would resemble to an extremely curved tax schedule (such as: "a 100% toxicity tax is levied above a given level"). Taxation impact is less progressive, if not regressive.

Our assumption that regulation is more progressive than taxation is justified in the presence of a measurement problem. In principle, the base of either taxation or regulation should be a non-distorted toxicity measure. However, measuring toxicity may be quite costly, if not virtually impossible. Rules and taxes are applied to differently distorted measures of toxicity. In general, rules directly affect the supply of toxic instrument; this may cause progressive effects. Taxes usually are levied on non linear measures of toxicity, with a regressive effect. For example, a fixed tax on financial transactions is independent of actual risk production, thus it is regressive in SRE.

The measurement problem seems realistically more severe with taxation. This possibly explains why both the political debate and the academic debate have paid relatively little attention to taxation. A basic assumption of SRE taxation is that for each financial firm it is possible to evaluate its marginal systemic externality (Acharya et al. 2009, Adrian and Brunnermeier 2009). In the presence of a measurement bias taxation results to be highly suboptimal. Regulation is less subject to a measurement problem. Rules can be more detailed and easier to implement than taxation. Soft information is easier to use in regulation than in taxation (Claessens et al., 2010). We argue here that, due to a measurement bias, regulation is more progressive than taxation. As a consequence a majority of low-risk portfolio owners prefers
regulation.

The measurement bias may also explain why so far concrete proposals on financial taxation have concerned taxes that are different from an SRE tax: levies on banks on an ex post basis and based broadly on funding or on profits, taxes on banking bonuses (Claessens et al. 2010). Financial activity taxation does not follow the SRE principle, but time to time it has been applied on selected issues: securities transaction, currency transaction, capital levy, bank transaction, insurance premium, real estate transaction (see Matheson 2010 for a complete survey). In the last decade several G20 countries imposed different forms of financial transaction tax, with a general trend in reducing their application (Matheson 2010).

Of course, taxation is not necessarily a substitute of regulation. Reality shows that regulation is frequently the primary instrument to reduce systemic risk, while corrective taxation has a complementing role (Claessens et al. 2010). Moreover, taxation of financial industry can address goals that are different from externality reductions, such as: the implementation of general taxation design (Lockwood 2010); ensuring that banks meet the direct financial costs of possible bailouts; the implementation of bankruptcy schemes (Claessens et al. 2010); macroeconomic policies in managing aggregate demand (Tobin 1978).

In this paper we argue that regulation is more likely to be preferred to taxation in a direct democracy, in which citizens/voters are heterogeneous in their portfolio toxicity. One might object that a lobbying model a’ la Stigler is possibly more appropriate to address politico-economic issues in financial markets. In this case, however, one would need to explain why banks would lobby for regulation rather than for taxation. Moreover, the idea that financial policies are specific interest policies is questionable. We rather think that any policy intervention in financial market is in principle a general interest policy. Any citizen is a potential portfolio owner. Thus anyone perceives the private consequences of any policy measure that, directly or indirectly, may affect the relative cost of his portfolio alternatives and the relative benefits from systemic risk reduction.

This paper is organized as follows. Section 2 presents a general model with externality production. Section 3 studies the effects of regulation and how people vote on it. Section 4 does the same for a tax. Section 5 addresses the issue of instrument choice. Section 6 concludes.
2 The model

Consider a continuum of investors/voters, and denote with \( i \) a generic agent. Each agent makes a portfolio choice. Assume that a certain amount of systemic risk is associated to the financial instruments in any possible portfolio. Call \( t_i \), or “type \( i \)”, the risk produced when \( i \) chooses his most preferred portfolio. Let \( t_i \in [0, 1] \). In a sense \( t_i \) is a measure of the polluting activity of agent \( i \) when his portfolio choice is not constrained whatsoever. We say that \( i \) is a “low” type when the risk of his most preferred portfolio is low, and vice versa. A low type is an agent who unilaterally chooses a small amount of “toxic” instruments in his portfolio. We will also say that \( i \) is a low-polluting agent. Vice versa, high \( t_i \) means that \( i \) prefers polluting instrument. Call \( b_i \) the amount of systemic risk associated to \( i \)’s actual portfolio choice, with \( b_i \in [0, 1] \).

Let \( F(t) \) be the distribution of types in \([0, 1]\). This function describes how systemic risk is produced across population when people choose their most preferred portfolios. For example, a rightward slanted distribution means that there are relatively few big risk producers, whereas the majority of people prefer low amount of toxic instruments in their portfolios. Assume for simplicity that the population has unit measure: \( F(1) = 1 \). By definition, an investor maximizes his utility when his actual portfolio choice is his type: \( b_i = t_i \). Choosing a portfolio with a different amount of systemic risk, i.e. \( b_i \neq t_i \), entails a disutility, that we describe here with a cost function that is increasing and quadratic in the distance between \( b_i \) and \( t_i \):

\[
c(b_i, t_i) = (|b_i - t_i|)^2
\]

Let \( \varepsilon \) be the externality, or the social cost, of the systemic risk produced by \( i \)’s actual portfolio choice, \( b_i \). Assume that the externality function is linear in systemic risk:

\[
\varepsilon(b_i) = -b_i
\]

The idea is that if an agent produces an amount of systemic risk that is lower than his type ( \( b_i < t_i \) ), he generates a social benefit that spreads over the population, but he bears a private sacrifice given by \( (1) \). Let \( G(b) : [0, 1] \rightarrow [0, 1] \) be the risk distribution associated to agent’s actual portfolio choices.

---

1A fundamental assumption is that the cost function is convex. Assuming that it is quadratic greatly simplifies calculus. Below we discuss how our results are affected by different degree of cost convexity.

2Also linearity of \( \varepsilon \) is a simplifying assumption. Below we show how things change if one removes it.
Agent $i$'s utility function is:

$$U_i = -\int_0^1 b dG(b) - (|b_i - t_i|)^2$$  \hspace{1cm} (2)

Since any individual is infinitesimal in the population the private benefit that he gets out of his own externality reduction is infinitesimal too. Then he does not have any incentive to reduce unilaterally his portfolio's systemic risk below his types. Therefore, $b_i = t_i$ for all $i$, or $G(b) = F(t)$. In equilibrium, $i$'s utility is:

$$U_i = -\int_0^1 t dF(t)$$

A free riding problem eventually emerges. It is due to a discrepancy between private and social benefits from externality reductions. Agents make portfolio choices with too much systemic risk production. There is scope for government intervention; either regulation or taxation.

### 3 SRE regulation

By financial regulation we denote a policy that tends to directly prevent financial institutions from issuing instruments with too much systemic risk attached. The supply of large SRE instruments is strongly limited, therefore agents with those kind of instruments in their portfolios will have to make substantial changes. Arguably, this kind of policy has a quite strong impact on “highly polluting” portfolios while it only moderately affects the low polluting ones.

We can formalize this idea in our model by assuming that a rule forces investors to more than proportional reductions in systemic risk production. In other words, for any $t_i$, actual risk production, $b_i$, has to lower more than proportionally. Call $\rho$ the policy parameter that measures the regulation level (with $0 \leq \rho \leq 1$). Once $\rho$ is enforced individual $i$ must choose a portfolio with $b_i$ such that:

$$b_i(t_i, \rho) = (1 - \rho \cdot t_i) \cdot t_i.$$ 

For example, suppose that $\rho = 0.5$; for a low type with $t_l = 0.2$ actual risk production is 10% lower: $b_l = 0.18$. For a high type with $t_h = 0.8$ actual risk production is 40% lower: $b_h = 0.48$. Thus, for any level of the regulation parameter, risk production decreases more than proportionally for larger $t_i$.

The decision about the regulation parameter is made by voting. The timing is the following: at time 1, given the distribution of types $F(t)$, individuals compute their preferences regarding $\rho$; at time 2, they select a
Condorcet winner in pair-wise voting; at time 3, they choose their portfolios and their pollution levels, $b_i$.

The “policy” preferences of an individual $i$ are:

$$U_i(\rho) = - \int_0^1 t - \rho \cdot t^2 dF(t) - \rho^2 t_i^4$$

We can compute $i$’s most preferred rule, which is the solution of the following FOC:

$$\int_0^1 t^2 dF(t) = 2\rho t_i^4$$

(3)

Convexity of the cost function takes care of the SOC. The most preferred rule is set where the private benefit due to a marginal increase in the rule parameter (the left-hand side of (3)), equals the marginal private cost of complying with the rule (the right-hand side). All $U_i$’s are single peaked. This rules out strategic voting and allows for the existence of a Condorcet winner which is unique under the simple majority rule (Black, 1948). More precisely, call $\rho_i^*$ agent $i$’s most preferred rule, or the bliss point:

$$\rho_i^* = \frac{\int_0^1 t^2 dF(t)}{2t_i^4}$$

(4)

Observe that bliss points are negatively related to types: heterogeneity in policy preferences is due to differences in types. An investor with highly polluting portfolio (high $t_i$) wants a low rule, and vice versa. The reason is simple. Private benefits are the same for everybody, but for any rule a higher type bears larger private costs. Since costs are convex his utility is maximized with a lower rule. The median voter theorem applies: under the bare majority, the voting outcome is the bliss point of the median type, $m$:

$$\rho_m^* = \frac{\int_0^1 t^2 dF(t)}{2t_m^4}$$

(5)

Let us look at the efficiency of this policy outcome. Assume a benthamite social welfare function, $W(\rho)$, that is given by the sum of individual utilities:

$$W(\rho) = - \int_0^1 t - \rho \cdot t^2 dF(t) - \rho^2 \int_0^1 t^4 dF(t)$$

(6)

The socially optimal rule, $\rho^*$, maximizes $W(\rho)$; therefore:

$$\rho^* = \frac{\int_0^1 t^2 dF(t)}{2\int_0^1 t^4 dF(t)}$$

(7)
The difference between $\rho_m^*$ and $\rho^*$ can be viewed as a “political distortion” due to voting. We say that the rule adopted by the majority is too restrictive if $\rho_m^* > \rho^*$. By comparing (5) with (7) we see that this occurs if $t_m^4 < \int_0^1 t^4 dF(t)$. Let us see what this condition means. Observe that $t^4$ is a convex transformation of $t$. By Jensen’s inequality, $\int_0^1 t^4 dF(t) > \bar{t}^4$, where $\bar{t}$ is the average type. Suppose that $t_m < \bar{t}$, then the condition for a too restrictive rule is satisfied: $t_m^4 < \bar{t}^4 < \int_0^1 t^4 dF(t)$. Then a median lower than the average is a sufficient condition for a too restrictive rule emerging. But we can have restrictiveness also if the median is slightly above the average. It is easy to see that with more convex costs, the rule is too restrictive even if the median is consistently above the average. Observe that this result is not affected by the assumption of linear externalities.

The main idea is that when financial regulation is decided through voting, a too restrictive policy is rather easy to emerge. Even if the median voter pollutes more than the average, he opportunistically chooses a too restrictive rule in order to force the minority of top polluters to substantial portfolio changes. The reason is that regulation impacts mostly on top polluters, forcing them to large adjustments in their portfolio choices. The median voter does not consider the cost incurred by top polluters. He rather looks at regulation as a way to charge them the main burden of the externality reduction.

Thus voting on financial regulation is likely to yield socially too restrictive rules, as it happens in the model above. Voting outcome inefficiency is larger when costs are more convex and when the median is in a relatively low position with respect to the highest types.

4 SRE taxation

An SRE tax is aimed to increase the private cost of systemic risk production. The problem with this instrument is that risk is not usually not easy to measure. Thus the tax is often levied on distorted SRE measures, as for example the monetary amount of financial transactions. Agents who make the same amount of financial transactions pay the same amount of tax, independently of actual systemic risk produced. We will see below that taxing a biased measures of the externality is not only socially inefficient, but it also affects the “political” distortion.
4.1 Tax on systemic risk

Let us start by considering the policy benchmark. Suppose that the Social Planner is able to detect the true systemic risk in any portfolio; i.e. the actual externality level produced by any single agent. A basic result in optimal taxation theory applies here: welfare is maximized if, for any agent, after-tax private marginal cost equals social marginal externality. Since in our model the marginal externality is independent of \( t_i \), the optimal tax must ensure that marginal costs are the same for all agents. Assume that preferences are quasi-linear in money. Optimality condition is satisfied by a proportional tax with lump sum refunds of proceeds. To show this, call \( \tau \) the per-unit tax of pollution. Given \( \tau \), any agent \( i \) optimizes his portfolio by choosing a risk level, \( b_i(t_i, \tau) \), such that the marginal cost of decreasing risk equals the tax (or the price) for one unit of risk: \( c'(t_i - b_i) = \tau \). Thus:

\[
b_i = t_i - \tau / 2
\]  

(8)

This means that given \( \tau \) all agents reduce the systemic risk in their portfolios by the same amount, \( \tau / 2 \). Total externality becomes \( -\bar{b} = -(\bar{t} - \tau / 2) \). Socially optimal tax, \( \tau^* \), must ensure that total marginal cost equals total marginal externality, provided that individual risk choice satisfies (8):

\[
\int_0^1 [c'_b | b_i = t_i - \tau / 2] dF(t) = \int_0^1 [c'_b | b_i = t_i - \tau / 2] dF(t)
\]  

(9)

Observe that both sides of (9) are independent of \( i \); namely, the left-hand side is \(-1\) and the right-hand side is \(-\tau\). Therefore:

\[
\tau^* = 1
\]  

(10)

This is a first best, that is achieved thanks to the government’s ability to detect and tax actual systemic risk production.\(^4\) The policy runs as follows. The government sells (i.e. taxes) for one dollar any unit of systemic risk (\( \tau^* = 1 \)). Individual tax burden is proportional to the risk produced: \( \tau^* b_i = b_i \). All

\(^3\)Here we are assuming without loss of generality that the after-tax optimal \( b_i \) is interior for all \( i \).

\(^4\)It can be shown that the optimal tax decreases in the degree of cost convexity. For example, with \( c = (t_i - b_i)^\alpha \), we have that

\[
\tau^* = \left( \alpha (\alpha - 1)^{\alpha - 1} \right)^{1/\alpha}
\]

The reason is that with more convex costs, pollution reduction is socially more costly, thus the optimal tax must allow for more pollution; i.e. the tax rate must be lower. Changes when degree of convexity the optimal
investors bear the same marginal cost. Proceeds are lump sum redistributed. Per capita refund amounts to $\hat{b}$, where $\hat{b}$ is the after-tax average behavior.\footnote{Observe that, thanks to quasi-linear preferences, this tax schedule solves the Mirrlees problem. Thus, the schedule would be optimal even if the types were not observable. The government does not need to know anything about the cost incurred by any single agent. As for the assumption of linear externalities. No big changes occur if one removes it. The Social Planner we can establish a nice non-linear tax schedule, such that the (variable) marginal externality produced by any agent equals the marginal tax rate.}

## 4.2 Tax on transactions

As pointed out earlier, the problem with a tax is that in reality it is levied on distorted measures of systemic risk. Here we consider a tax on financial transactions. We will study the distortion that this may cause and we will discuss how our results can be generalized of other forms of taxation.

In order to study a transaction tax we have to specify how the tax is related to the risk produced. Arguably, the systemic risk in a portfolio is due to two factors: first, the number of toxic instruments; second, the portfolio dimension, i.e. the number of transactions made by the investor. With a proportional transaction tax, however, an agent pays only according to the second factor. Somehow a proportional transaction tax does not bear on the full amount of the externality produced. Thus we can realistically assume that a tax that is proportional to financial transactions is de facto regressive with respect to the externality produced. Let us formalize this idea. Denote by $\mu$ the transaction tax rate.

Assume a simple linear relation between the tax rate and the systemic risk produced: $\left(\mu - \frac{1}{\beta}b_i\right)$. Parameter $\beta$ is a measure of the amount of systemic risk that is actually taxed through the transaction tax $\mu$. High values of $\beta$ imply that transactions are a good proxy of risk, thus with a tax levied on transactions the amount of, say, tax-free risk is rather limited. In a sense, $\beta$ inversely captures the distortion due to the measurement bias. The amount of taxes paid by agent $i$ on a portfolio that produces $b_i$ units of risk is $\left(\mu - \frac{1}{\beta}b_i\right) \cdot b_i$. Individual optimal risk choice implies that the marginal cost from reducing risk equals the marginal tax: $c'(t_i - b_i) = \mu - \frac{2}{\beta}b_i$. Thus, each agent’s after-tax risk production is:

\[
b_i = \frac{\beta}{\beta - 1} (t_i - \mu/2)
\]

Observe that, due to regressiveness, large polluters reduce their risk produc-
tion by less than small polluters. Then, the latter’s marginal cost is larger.6

The tax chosen by the Government maximizes social welfare, subject to individual optimization constraint in (11). The FOC is:

\[
\int_0^1 \left[ \epsilon'_b \mid b_i = \frac{\beta}{\beta - 1} (t_i - \mu/2) \right] dF(t) = \int_0^1 \left[ \epsilon'_b \mid b_i = \frac{\beta}{\beta - 1} (t_i - \mu/2) \right] dF(t)
\]

(12)

The Government’s most preferred transaction tax, call it \( \mu^o \), solves (12):

\[
\mu^o = \left( 1 - \frac{1}{\beta} \right) + \frac{2}{\beta} \bar{t}
\]

(13)

This tax rate is a second best. Taxing transactions forces the government to adopt a tax that is de facto regressive in the externality, whereby the first best instrument would be a proportional tax. Departures from the first best occur because the government taxes a distorted measure of risk. The difference between first and second best decreases in \( \beta \), the measurement bias. If the ability to tax externalities through transactions is low (low \( \beta \)) then \( \mu^o \) is substantially lower than \( \tau^* \). In a sense this means that, when by \( \mu \) only a low amount of externality is taxed, then it is better to have a low \( \mu \). Vice versa, as the measurement bias tends to zero the socially optimal transaction tax approaches the first best (i.e. \( \lim_{\beta \to \infty} \mu^o = \tau^* \)). Finally observe that the second term in the left-hand side of (13) is increasing in \( \bar{t} \). This means that with a regressive tax, the optimal rate must be higher when the average type is larger, because in average the marginal cost decreases.

In synthesis, when the Social Planner a tax on financial transactions, it chooses a too low level. The reason is because a distorted measure of risk is adopted. Top risk polluters pay not enough taxes; their private marginal cost is too low, compared to marginal externalities, and vice versa low risk polluters pay too much.

4.3 Political distortions

This Section studies the political distortion that may occur when the decision about taxes is made by voting. First, consider the case in which a proportional tax is levied on risk production directly. Thus no measurement bias occurs.

6Without loss of generality, assume that \( t_i > \mu/2 \). This ensures that \( b_i < t_i \) for any \( i \).
4.3.1 Tax on risk

In this situation the Social Planner chooses the first best tax rate, $\tau^* = 1$. Below we show that, not surprisingly, the majority chooses a possibly different tax rate. Recall that tax proceeds are lump-sum redistributed out of a balanced Government budget. Any individual receives a refund that is equal to the average tax burden, $\tau \cdot \hat{b}$. Thus, agent $i$’s indirect utility is:

$$U_i(\tau) = -\int_0^1 b(t) dF(t) - (t_i - b_i(t_i))^2 - \tau \cdot (b_i(t_i) - \hat{b})$$  \hspace{1cm} (14)$$

Recall also that, for given $\tau$, any individual reduces the amount of risk in his portfolio by $\tau / 2$, as in (8). Note that (14) is concave in $\tau$. Thus, maximizing (14) subject to (8) yields $i$’s most preferred tax rate, $\tau^*_i$:

$$\tau^*_i = 1 + 2(t - t_i)$$

Higher types want lower tax rates. They pay larger amounts of taxes because their after-tax risk production is higher. Since bliss points are inverse-monotone in types, the majority chooses the median’s bliss point:

$$\tau^*_m = 1 + 2(\bar{t} - t_m)$$  \hspace{1cm} (15)$$

The difference between $\tau^*_m$ and $\tau^*$ is a measure of the political distortion due to majority decision:

$$\tau^*_m - \tau^* = 2(\bar{t} - t_m)$$  \hspace{1cm} (16)$$

If the median type is below (above) the average, the majority chooses a too high (low) tax rate. The distortion occurs because the amount of taxes paid by, say, a low median is lower than the average. Thus he has an incentive to fix a high rate in order to have others paying for a larger share of the pollution reduction cost. No political distortion occurs only if the median’s risk production equals the average.

When the Government is able to tax systemic risk the political distortion is only determined by the difference between median and average types. This result on externality taxation is similar to a well known result in public finance literature on income taxation (Roberts, 1977; Meltzer and Richard, 1981).

4.3.2 Tax on transactions

Consider now the political distortion when a tax, $\mu$, is levied on financial transactions. A measurement bias occurs: systemic risk is not entirely taxed. Individual policy preference is the same as (14). With a transaction tax
individuals’ after-tax risk production is given by (11). Taking this choice as a constraint in utility maximization, we get the following FOC:

$$\frac{\partial U_i(\mu)}{\partial \mu} = \frac{1}{2} + \frac{t_i}{\beta - 1} - \frac{\beta}{\beta - 1} \frac{\mu}{2} + (\bar{t} - t_i) = 0$$

The SOC is satisfied, thus $i$’s most preferred transaction tax is:

$$\mu_i^* = \left(1 - \frac{1}{\beta}\right) + \frac{2}{\beta} t_i + 2(1 - \frac{1}{\beta})(\bar{t} - t_i)$$

Bliss points are decreasing in $t_i$. Then the transaction tax chosen by the majority is the one preferred by the median type:

$$\mu_m^* = \left(1 - \frac{1}{\beta}\right) + \frac{2}{\beta} t_m + 2(1 - \frac{1}{\beta})(\bar{t} - t_m)$$ (17)

The difference between $\mu_m^*$ and $\mu^o$ in (13) gives an idea of where the political distortion comes from:

$$\mu_m^* - \mu^o = -\frac{4}{\beta} (\bar{t} - t_m) + 2(\bar{t} - t_m)$$ (18)

Political distortion is given by the sum of the two terms in the right-hand side of (18). This first term is positively related to the relative position of the median. The reason is that, due to regressiveness, a high median wants a too high tax because his marginal cost decreases. The second term is the “usual” political distortion, as in (16), and it works in the opposite way: a high median wants a low tax rate since he pays a large amount of taxes.

Interestingly, the net political distortion depends on parameter $\beta$. Suppose $t_m < \bar{t}$. If $\beta < 2$ the tax is too low. This means that if the median is lower than the average the “usual” political distortion occurs only if the ability to tax systemic risk through a transaction tax is sufficiently high ($\beta$ larger than 2). If this not the case, a low median chooses a too low tax because regressiveness, rather than low position, plays a major role.

Let us compare the political distortion in case of a transaction tax and in case of a rule. Consider the most interesting case: transactions are a bad measure of risk, $\beta < 2$. Suppose the median is lower than the average. A rule is always too restrictive: a low median uses the rule as a tool to charge high polluting portfolio the largest share of total cost, but this causes social welfare loss. On the contrary, a tax is too low: due to regressiveness a low median has too pay large amounts of it, thus he prefers a too low tax level.

This relationship between political distortions and median’s position is continuous. Thus, if the median is moderately above the average, the rule is
too restrictive and a tax is too permissive. With a very high median both a rule and a tax are too restrictive.

Summing up, with both instruments a political distortion due to voting occurs. This may cause large inefficiency losses. However, the distortion is considerably different when voting concerns a tax instead of a rule, especially if there is a problem of measurement bias. Too restrictive rules are more likely to emerge than too restrictive taxes. The reason is that rules are a progressive mechanism, whereas taxes on transactions are regressive. Thus, on the one hand a relatively low median, who is not necessarily below the average, prefers restrictive rules in order to force higher types to large risk reductions; on the other hand, he prefers a low tax rate because otherwise he would have to pay high taxes.

5 The instrument choice

Assume now that the majority determines not only the level of the policy, but also which instrument to adopt. We can realistically assume that voting takes place sequentially: first, the majority selects the instrument; then it chooses its level. Voters know that, whatever the instrument, the level that will pass at the second stage is the one preferred by the median. Any voter compares his own utility in both cases, and chooses his most preferred instrument. At the first stage, the majority behaves as a Stackelberg leader: it selects the instrument and it lets a possibly different majority choose the level at the second stage. No scope for strategic vote.

When does the majority choose a rule at the first stage? A low polluting portfolio owners has to make small adjustments with a rule, whereas with a tax he has to pay a relatively large amount of money, due to regressivity. Thus he prefers a rule. A top polluting type has reversed preferences: a tax is better than a rule because with a tax the burden of systemic risk reduction bears mostly on low polluters. A likely situation is that if the number of low polluters is sufficiently large, then a majority on the rule will form. Observe that we do not require that the median is below the average in this case. If the rule is strongly progressive then also moderately high types will prefer

\footnote{In general, with bi-dimensional policy issues the existence of a Condorcet winner cannot be taken for granted. However, with sequential voting in which the first issue is binary this problem does not arise.

Consider, however, that with bi-dimensional sequential voting the outcome is sensitive to the voting sequence. In our situation we do not have such a problem. An inverse sequence in which the majority decides the instrument after having decided the level of the policy is quite innatural. For an exhaustive analysis of sequential bi-dimensional voting, see De Donder, Le Breton and Peluso (2010).}
it. Vice versa, a regressive tax is preferred by top polluters. If regressivity is stronger more moderate types prefer the tax. Thus a majority on a tax will form if it is strongly regressive with respect to the rule and the population of low polluters is relatively small.

Let us consider the normative characteristics of these positive results. In our model the social cost of systemic risk is linear. Thus, the Social Planner is not interested in whom produces the externality, it is rather interested in choosing an instrument that shares costs evenly. A rule is strongly progressive. Thus the cost is concentrated on top risk owners. Vice versa, a tax levied on a biased risk measure may be regressive; thus the cost is concentrated on low polluters. The socially optimal instrument is a tax if regressivity is not too high; i.e. if the measurement bias is not too strong.

Consider however, that when the measurement bias causes strong regressivity or when the distribution is slanted towards top polluting portfolios a majority of people prefers the rule. In this case a double political distortion occurs. First, the majority selects the wrong instrument: regulation instead of a taxation. Second, the majority of low polluters chooses a too restrictive level.

6 Conclusion

The main point in this paper is that when policies to reduce financial systemic risk are made by voting, the political aspects of the decision are quite relevant and may cause significant distortions. These distortions are substantially different when taxation rather than regulation is under discussion.

We approached systemic risk contagion as an externality issue and we considered it as a general interest policy. In a sense, everybody is interested in reducing systemic risk and, as a consequence of the policy, everybody must make adjustments in his own portfolio or bear a cost. If regulation is adopted, most costs and adjustments are supported by high risk producers; with taxation, sacrifices are more evenly distributed across population. Political distortions hinge on the distribution of sacrifices for the externality reduction. A majority of small portfolio owners with low risk production will tend to choose regulation in order to concentrate sacrifices on high risk producers. Even a median that is above the average might prefer regulation. provided it has a sufficiently progressive effect on risk adjustments.

We showed that a rule may be highly inefficient. In particular, majorities tend to choose too restrictive rules. Loosely speaking, if “risk is due to everybody” (i.e. externalities are linearly related to risk), and the cost of complying with the rules grows at a fast rate, concentrating risk reduction
on top risk producers is not socially optimal. However, if the majority is made by low risk producers, the decision will be harsh regulation.

With a tax, the political distortion is quite different. Systemic risk is reduced by taxing distorted measures of risk, such as transactions, intermediaries’ profits or their turnover. We argued that this is likely to yield a regressive effect: small risk producers pay proportionally more than large risk producers. As a consequence a majority of small risk producers has less incentive to choose a tax, and should this happen, it chooses a too low tax.

This political economy argument is possibly helpful to understand reality in which taxes on risky financial instruments are usually rare and low, whereas financial regulation is much more frequent.

Of course there might be many other circumstances, not considered in this paper, that explain frequency and efficiency of policies. For example, taxes can be better calibrated to the financial activity, and produce more gradual externality reductions. Thus, from a normative viewpoint, taxation is preferable when the contributions to system risk is more evenly distributed across instruments and owners. Vice versa, rules are more effective when there are information concerns. If risk production is private information a rule that limits specific financial activities is more effective than a tax on those activities.

Financial risk externalities may clearly be an international issue. In these circumstances common decisions rely on the existence of institutions that ensure a sufficient degree of coordination among parties. Incentives and enforceability issues may severely limit the set of available policy options and distort common decisions. Finally, as already mentioned, financial intermediaries may find profitable engaging in lobbying activities in order to distort the political decision in a favorable direction.

These are relevant aspects of the policy making of systemic financial risk. They are not alternative, but rather complementary, to the points made in this paper and they may eventually suggest extensions of our approach, that we leave to future research.
References


