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Publisher: Routledge

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Journal of European Public Policy

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rjpp20>

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Published online: 04 Feb 2011.

To cite this article: Fabrizio Gilardi (2002) Policy credibility and delegation to independent regulatory agencies: a comparative empirical analysis, *Journal of European Public Policy*, 9:6, 873-893, DOI: [10.1080/1350176022000046409](https://doi.org/10.1080/1350176022000046409)

To link to this article: <http://dx.doi.org/10.1080/1350176022000046409>

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Policy credibility and delegation to independent regulatory agencies: a comparative empirical analysis

Fabrizio Gilardi

ABSTRACT Independent regulatory agencies are one of the main institutional features of the ‘rising regulatory state’ in Western Europe. Governments are increasingly willing to abandon their regulatory competencies and to delegate them to specialized institutions that are at least partially beyond their control. This article examines the empirical consistency of one particular explanation of this phenomenon, namely the credibility hypothesis, claiming that governments delegate powers so as to enhance the credibility of their policies. Three observable implications are derived from the general hypothesis, linking credibility and delegation to veto players, complexity and interdependence. An independence index is developed to measure agency independence, which is then used in a multivariate analysis where the impact of credibility concerns on delegation is tested. The analysis relies on an original data set comprising independence scores for thirty-three regulators. Results show that the credibility hypothesis can explain a good deal of the variation in delegation. The economic nature of regulation is a strong determinant of agency independence, but is mediated by national institutions in the form of veto players.

KEY WORDS Credibility; delegation; independent regulatory agencies; regulatory policy.

1. INTRODUCTION

In the past decade, the thesis of the ‘rise of the regulatory state in Europe’ (Majone 1994) has been widely discussed in the literature. Many authors have stressed that fundamental changes in the role of the state have recently occurred. On the one hand, the state retreats from sectors such as utilities, where it used to be highly interventionist, but, on the other hand, it reregulates the now-liberalized markets with less intrusive instruments. This implies a shift in the very functions of the state, notably from stabilization and redistribution to regulation.

In this article I wish to focus on one particular aspect of this thesis, namely delegation of regulatory powers to independent agencies. In fact, governments are increasingly willing to abandon some of their regulatory competencies in

favour of institutions that are not democratically accountable, and that are insulated from political influence. This is one of the main institutional features of the rising regulatory state (La Spina and Majone 2000).

To explain delegation, the 'credibility hypothesis', claiming that governments delegate powers in order to enhance the credibility of their policies, has been suggested and is now widely accepted. While this hypothesis is theoretically well founded, however, it is empirically deficient since, as far as I know, it has never been systematically tested. Hence, it seems to me that it is time to examine whether this hypothesis is consistent with empirical evidence.

This article contributes to the literature in at least three ways. First, it offers a first empirical assessment of one well-established hypothesis about a new institutional feature of most western European countries. Second, it suggests a detailed operationalization of agency independence leading to a single independence index. I argue that this is very much needed because, so far, we have had only a blurred understanding of what independence means. This is an unavoidable step for any research aiming to study independent agencies in a comparative way, and is particularly important because the institutional design of independent agencies, as is often stressed, is characterized by extreme empirical heterogeneity. Third, in this paper independent agencies are taken as *dependent* variables, whereas most of the literature shows how, as *independent* variables, agencies can have an impact on regulatory reform and outcomes (Thatcher 1994; this issue).

Moreover, I address explicitly some of the major themes of this special issue, including the role of transnational forces in shaping regulatory reform, and how national institutions mediate them.

The rest of the paper is structured as follows. I will first develop in detail the hypothesis, from which I will then derive several observable implications. In the empirical section I will discuss data, methods and results. Conclusions and suggestions for future research follow.

2. THE CREDIBILITY HYPOTHESIS

The 'credibility hypothesis' has most explicitly been discussed in Majone (1997), but has been addressed in some detail also in La Spina and Majone (2000: 142–50) and in Majone (1996a: 40–4; 1996b; 2001). The hypothesis is clear: 'political sovereigns are willing to delegate important powers to independent experts in order to increase the credibility of their policy commitments' (Majone 1997: 139–40). In other words, the need for credibility explains delegation. In the remainder of this section I will try to develop this argument, which is theoretically well founded.

The classic reference is the article by Kydland and Prescott (1977), where the question is whether governments should adapt their (monetary) policies to current conditions or conduct policy on the basis of fixed rules. The authors argue that there is potential conflict between policy-makers' discretion and policy optimality, which, on the contrary, can be enhanced by the capacity of

policy-makers to credibly commit themselves, i.e. to bind themselves to a fixed and pre-announced course of action.

This apparent paradox can be understood if it is considered that policy-makers' discretion can lead to time inconsistent policies, i.e. to policies that change over time.¹ In fact, policy-makers will usually have incentives to change their policies over time to adapt them to the new, maybe unforeseen context instead of sticking to a strategy that was chosen when full information on future developments and conditions was not available. Another source of time inconsistency may be simply a change in the preferences of policy-makers, owing, for example, to a new partisan composition of the government, or new public opinion pressures.

The problem is that, when the success of the policy relies ultimately on the response of rational individuals, as is often the case, even an adaptation made with the collective good in mind hinders policy-makers from reaching their objectives, so that the capacity of making credible commitments is a key resource for the government. In fact, it is claimed, rational actors anticipate the future moves of policy-makers and act accordingly, which prevents the latter from achieving their goals by routinely adapting policies to new contingencies.

The relevance of credible commitment capacity for policy outcomes is hardly questioned. In fact, it has been shown that no less than economic growth and a healthy economy depend on the capacity of the government to make credible commitments (North and Weingast 1989; Henisz 2000a).

Policy-makers need to be credible in particular when they cannot rely on coercion to implement their policies (Majone 1997). This is the case when they must cope with two different kinds of phenomenon that are becoming increasingly relevant for policy-makers. First, governments may face a high degree of international interdependence, which weakens the impact of policy actions on the home country and strengthens their impact on other countries. Second, they may have to deal with a high degree of complexity, which occurs when the effectiveness of a policy depends not only on the material resources that can be mobilized, but also on the successful modification of individual behaviour.

Majone (1997: 145) stresses that it is difficult for elected politicians to be credible, notably because they have a very short time horizon, namely the next election. Moreover, a legislature cannot bind a subsequent legislature, or a majority a subsequent majority, so that the coherence of policies over time is anything but assured. This problem is likely to be more acute when majority coalitions are easily mobilized (Shepsle 1991: 255) and when the decision-making process is more frictionless.

One possible solution to this credibility problem for governments is delegation of competencies to independent agencies (Shepsle 1991: 256; Dixit 1996: 65), because this implies that policy-makers give up their discretion and commit themselves to more or less fixed rules. Independent agencies have different incentives (either because of their preferences, as in the case of

'conservative' central banks, or their legal mandate, or both) and do not suffer from the short time-horizons imposed by the democratic process. Their capacity to credibly commit themselves is thus much greater than that of democratically accountable and elected bodies.

To sum up, the 'credibility hypothesis' states that governments delegate powers to independent agencies in order to increase the credibility of their policies. Credibility is problematic for elected politicians because their policy commitments tend to be time inconsistent, i.e. to change over time. When governments cannot rely on coercion to implement their policies, a lack of credibility is problematic because rational actors can anticipate future policy changes and thereby prevent the government from attaining its objectives.

This hypothesis is expressed in abstract terms in the literature, and as such it cannot be easily confronted with empirical evidence. In the following section, as a first step towards an empirical verification, I will therefore derive some observable implications from this general hypothesis.

3. OBSERVABLE IMPLICATIONS

Deriving observable implications from theory has at least two advantages (King *et al.* 1994). First, translating a causal relationship stated in abstract terms into a more concrete form makes its empirical verification easier. Second, increasing the number of observable implications of a theory improves not only its testability, but also its leverage.

The testable implications of the credibility hypothesis can be grouped under at least three headings, linking credibility respectively with interdependence, complexity and the decision-making process.

3.1 Credibility and interdependence

Majone (1996a, 1997) explicitly links the need for credibility to international interdependence, because the latter implies that the trade-off between credibility and coercion is no longer available. In fact, at the domestic level a lack of credibility can be at least partially compensated by the use, or the threat, of legitimate violence. If the government wants to convince foreign investors to put their money in its domestic firms, it cannot force them, but is obliged to persuade them that its policies will favour their investments. To this end, it must enhance its credibility. This argument is consistent with empirical evidence: it has been shown that multinational investment is sensitive to political hazard, defined as the feasibility of policy change by the host-country government (Henisz 2000b).

Further, Majone (1997: 144) advances a very precise claim: in his opinion, 'there is a definite correlation between the credibility issue and the increased openness of national economies and societies.' From these arguments we can draw at least one hypothesis, which postulates a positive link between delegation and international interdependence:

- *Hypothesis 1*: the more an economy is subject to ‘international interdependence’, the more delegation there should be.

3.2 Credibility and complexity

The argument of the missing trade-off between coercion and credibility is invoked also in relation to the growing complexity of public policy, i.e. the fact that ‘newer forms of economic and social regulation . . . aim ultimately at modifying individual expectations and behavior’ (Majone 1997: 144). Although credible commitments are necessary for attracting investment in general (North and Weingast 1989; Stasavage 2002), it seems widely accepted in the literature that this need is most urgent when governments engage in utilities privatization and liberalization (Spiller 1993; Levy and Spiller 1994, 1996). In this context, the main problem for governments is attracting private investments in freshly opened markets. Governments have incentives to delegate regulation to an independent authority because they need to credibly persuade investors that market functioning will not be biased by the nationalization legacy, typically in favour of the formerly state-controlled monopolist. Governments must then be able to credibly commit to an investor-friendly course of action. As a result, delegation and market opening can be linked:

- *Hypothesis 2*: delegation is more likely in sectors that have been recently subject to market opening.

3.3 Credibility and veto players

The link between credibility and veto players refers directly to the time inconsistency argument. Time inconsistency occurs when policy-makers adapt their policy to new circumstances. However, the capacity to produce policy change is not constant, but varies across political systems, and is even one of their main characteristics (Tsebelis, forthcoming). In this perspective, policy stability is a function of the number of veto players, their distance and their cohesion. If we assume that policy stability enhances the time consistency of policies, we should expect a negative relationship between the former and the extent of delegation. The relevance of institutional features is stressed also by Shepsle (1991), who argues that some institutional arrangements may guarantee government credibility.

Several analyses have discussed the relevance of veto players for the issues at stake here. In particular, authors studying central banks argue and show empirically that checks and balances of various kinds, including veto players, have an impact on central bank independence (Keefer and Stasavage 1998; Moser 2000: 127–62). The argument here, however, is different from that exposed above. The point is that delegation of monetary policy-making authority will have a greater effect on credibility when there is a larger number of veto players, because ‘the benefits of central bank independence depend on

the existence of some costs of withdrawing the independence' (Moser 2000: 129). As the benefits of delegation are greater, so should be the incentives for politicians to delegate. When, on the other hand, low checks and balances make delegation ineffective, governments are supposed to find alternative mechanisms to mitigate the consistency problem (Moser 2000: 130). This conclusion contrasts sharply with that of the argument exposed above. Veto players have here a positive impact on delegation.

The argument of a positive relationship between veto players and delegation belongs to a well-established literature, is theoretically well founded, and has survived several empirical tests. In addition, Keefer and Stasavage (1998: 3) explicitly state that, although they focus on central banks, 'we believe that our analysis generalizes to all forms of agency independence.' The opposite argument, on the other hand, is less developed, although Stasavage (2000) points out that governments in systems with low checks and balances should be expected to find alternative solutions to policy instability, and delegation is one possibility.

Eventually, the direction of the relationship is an empirical matter. Rather than univocally embracing either hypothesis at this stage, it seems more reasonable to simply hypothesize that veto players are significantly related to agency independence, and let the empirical evidence decide about the direction of the relationship.

- *Hypothesis 3*: there is a significant link between veto players and delegation.

4. EMPIRICAL ANALYSIS

4.1 Data and methods

To evaluate to what extent credibility concerns have an impact on the independence of regulatory agencies, I have constructed a data set² with information on regulators for five sectors (electricity, telecommunications, financial markets, food safety and pharmaceuticals) in seven countries (Belgium, France, Germany, Italy, the Netherlands, Sweden and the United Kingdom). These regulators are presented in Table 1.

On this empirical basis, I use OLS regression to estimate parameters from the following equation:

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

where

Y = an index of regulatory agencies' independence (see below);

X_1 = market opening (dummy variable);

X_2 = veto players, measured by the variable CHECKS3 in the Database of Political Institutions,³ version 3.0 (Beck *et al.* 2001). This variable is a

Table 1 Regulators in seven countries and five sectors (independence score in parentheses)

	Electricity	Telecom	Financial markets	Food safety	Pharmaceuticals
<i>Belgium</i>	Commission de régulation de l'électricité et du gaz (CREG) (0.75)	Institut belge des services postaux et des télécommunications (IBPT) (0.36)	Commission bancaire et financière (CBF) (0.47)	Agence fédérale pour la sécurité de la chaîne alimentaire (AFSCA) (0.44)	Government (0.00)
<i>France</i>	Commission de régulation de l'électricité (0.63)	Autorité de régulation des télécommunications (0.65)	Commission des opérations de bourse (0.60)	Agence française de sécurité sanitaire des aliments (0.37)	Agence française de sécurité sanitaire des produits de santé (n.a.)
<i>Germany</i>	Government (0.00)	Regulierungsbehörde für Telekommunikations und Post (RegTP) (0.48)	Bundesaufsichtamt für den Wertpapierhandel (BAWe) (0.51)	Government (0.00)	Bundesinstitut für Arzneimittel und Medizinprodukte (BfArM) (0.21)
<i>Italy</i>	Autorità per l'energia elettrica e il gas (0.75)	Autorità per le garanzie nelle comunicazioni (Agcom) (0.71)	Commissione nazionale per le società e la borsa (Consob) (0.64)	Government (0.00)	Government (0.00)
<i>Netherlands</i>	Office for Energy Regulation (DE) (0.46)	Independent Post and Telecommunications Authority (OPTA) (0.62)	Securities Board of the Netherlands (STE) (0.53)	Government (0.00)	Medicines Evaluation Board (MEB) (n.a.)
<i>Sweden</i>	National Energy Administration (STEM) (0.61)	National Post and Telecom Agency (PTS) (0.64)	Swedish Financial Supervisory Authority (FI) (0.54)	Swedish National Food Administration (SLV) (0.48)	Medical Products Agency (MPA) (0.69)
<i>UK</i>	Office for Gas and Electricity Markets (OFGEM) (0.64)	Office of Telecommunications (OFTEL) (0.74)	Financial Services Authority (FSA) (0.56)	Food Standards Agency (0.41)	Medicines Control Agency (MCA) (0.70)

good proxy for veto players (Tsebelis, forthcoming: 344). It is based on the number of parties in the executive and in the legislature, taking into account divided government and coalitional heterogeneity.⁴

X_3 = interdependence, measured by the sum of trade, foreign direct investment (FDI) and international portfolio investment as a share of gross domestic product (GDP) (Garrett 2000).⁵

The operationalization of the dependent variable deserves to be discussed in detail. In effect, not only are no data on agency independence readily available, but also a satisfying operationalization for this concept does not exist. I have thus developed an index of regulatory agencies' independence, and then used it to measure the independence of regulators in the cases mentioned above.⁶

A technique for measuring independence has only been developed for the special case of central banks (Grilli *et al.* 1991; Cukierman *et al.* 1992; Cukierman and Webb 1995; Elgie 1998; see Forder 2001; Mangano 1998 for critiques). With the exception of Kreher (1997), and Gonenc *et al.* (2000) and OECD (2000) for the case of telecommunications, whose operationalizations, however, are not very refined, no one has tried to measure the independence of regulatory agencies in general.

My operationalization of the independence of regulatory agencies is based on this literature, and in particular on the independence index developed by Cukierman *et al.* (1992), which is, however, quite strongly completed and corrected in order to fit the more general case of independent regulatory agencies.

The index is focused on formal independence. This can be divided into five main dimensions, namely the agency head status, the management board members' status, the general frame of the relationships with the government and the parliament, financial and organizational autonomy, and the extent of delegated regulatory competencies. The indicators associated to these variables are presented in detail in Table 2.

Each indicator is numerically coded on a scale of 0 (lowest level of independence) to 1 (highest level of independence). In order to construct a single independence index, the individual indicators are aggregated in two steps. First, the indicators are aggregated at a variable level. The value of the variable-level index is simply the mean of the corresponding indicators. Then, variable-level indexes are aggregated into a single independence index, which once again is simply the mean of the five variable-level indexes. In other words, to each variable is attributed the same weight and thus, implicitly, the same relevance. One could reasonably argue here that this or that variable, say agency head status, is more relevant and thus deserves to be weighted more. It seems to me that combining variables is unavoidably arbitrary. Hence, I cut this Gordian knot in the simplest way, by attributing the same weight to each variable.

It is worth stressing here a point on the issue of measurement validity⁷ that has recently been put forward by Adcock and Collier (2001). These authors

Table 2 Formal independence of regulatory agencies: operationalization

<i>Dimension</i>	<i>Indicators</i>	<i>Numerical coding</i>
<i>A) Agency head status</i>	<i>1) Term of office</i>	
	§ over 8 years	1.00
	§ 6 to 8 years	0.80
	§ 5 years	0.60
	§ 4 years	0.40
	§ fixed term under 4 years or at the discretion of the appointer	0.20
	§ no fixed term	0.00
	<i>2) Who appoints the agency head?</i>	
	§ the management board members	1.00
	§ a complex mix of the executive and the legislature	0.75
	§ the legislature	0.50
	§ the executive collectively	0.25
	§ one or two ministers	0.00
	<i>3) Dismissal</i>	
	§ dismissal is impossible	1.00
	§ only for reasons not related to policy	0.67
	§ no specific provisions for dismissal	0.33
	§ at the appointer's discretion	0.00
	<i>4) May the agency head hold other offices in government?</i>	
	§ no	1.00
§ only with permission of the executive	0.50	
§ no specific provisions	0.00	
<i>5) Is the appointment renewable?</i>		
§ no	1.00	
§ yes, once	0.50	
§ yes, more than once	0.00	
<i>6) Is independence a formal requirement for the appointment?</i>		
§ yes	1.00	
§ no	0.00	
<i>B) Management board members' status</i>	<i>7) Term of office</i>	
	§ over 8 years	1.00
	§ 6 to 8 years	0.80
	§ 5 years	0.60
	§ 4 years	0.40
	§ fixed term under 4 years or at the discretion of the appointer	0.20
	§ no fixed term	0.00

Table 2 Continued

<i>Dimension</i>	<i>Indicators</i>	<i>Numerical coding</i>
	8) <i>Who appoints the management board members?</i>	
	§ the agency head	1.00
	§ a complex mix of the executive and the legislature	0.75
	§ the legislature	0.50
	§ the executive collectively	0.25
	§ one or two ministers	0.00
	9) <i>Dismissal</i>	
	§ dismissal is impossible	1.00
	§ only for reasons not related to policy	0.67
	§ no specific provisions for dismissal	0.33
	§ at the appointer's discretion	0.00
	10) <i>May management board members hold other offices in government?</i>	
	§ no	1.00
	§ only with permission of the executive	0.50
	§ no specific provisions	0.00
	11) <i>Is the appointment renewable?</i>	
	§ no	1.00
	§ yes, once	0.50
	§ yes, more than once	0.00
	12) <i>Is independence a formal requirement for the appointment?</i>	
	§ yes	1.00
	§ no	0.00
C) <i>Relationship with government and parliament</i>	13) <i>Is the independence of the agency formally stated?</i>	
	§ yes	1.00
	§ no	0.00
	14) <i>Which are the formal obligations of the agency vis-à-vis the government?</i>	
	§ none	1.00
	§ presentation of an annual report for information only	0.67
	§ presentation of an annual report that must be approved	0.33
	§ the agency is fully accountable	0.00
	15) <i>Which are the formal obligations of the agency vis-à-vis the parliament?</i>	
	§ none	1.00
	§ presentation of an annual report for information only	0.67

Table 2 Continued

<i>Dimension</i>	<i>Indicators</i>	<i>Numerical coding</i>
	§ presentation of an annual report that must be approved	0.33
	§ the agency is fully accountable	0.00
	16) <i>Who, other than a court, can overturn the agency's decision where it has exclusive competency?</i>	
	§ none	1.00
	§ a specialized body	0.67
	§ the government, with qualifications	0.33
	§ the government, unconditionally	0.00
<i>D) Financial and organizational autonomy</i>	17) <i>Which is the source of the agency's budget?</i>	
	§ external funding	1.00
	§ government and external funding	0.50
	§ government	0.00
	18) <i>How is the budget controlled?</i>	
	§ by the agency	1.00
	§ by the accounting office or court	0.67
	§ by both the government and the agency	0.33
	§ by the government	0.00
	19) <i>Who decides on the agency's internal organization?</i>	
	§ the agency	1.00
	§ both the agency and the government	0.50
	§ the government	0.00
	20) <i>Who is in charge of the agency's personnel policy?</i>	
	§ the agency	1.00
	§ both the agency and the government	0.50
	§ the government	0.00
<i>E) Regulatory competencies</i>	21) <i>Who is competent for regulation in the sector?</i>	
	§ the agency only	1.00
	§ the agency and another independent authority	0.75
	§ the agency and the parliament	0.50
	§ the agency and the government	0.25
	§ the agency has only consultative competencies	0.00

Note: The higher the code, the more independent the agency. For the cumulated index, each dimension counts for 1/5.

argue that, when discussing the quality of a given measurement technique, one should focus exclusively on the relation between reality and the 'systematized concept', i.e. the concept as defined for the purposes of the research. This means that disputes about the 'background concept', i.e. the more general concept from which the systematized definition derives, should be set aside, despite their importance, as irrelevant for measurement quality. In the present context these reflections are especially useful because the 'background concept', namely independence, is most controversial. This means that any attempt to operationalize independence is bound to be contested on the basis of alleged misfit with this or that understanding of the background concept. Such criticism would be misplaced. The value of the operationalization which I propose here, rather, should be assessed against the systematized concept which I use, and in the context of the research question addressed. As the focus of the paper is on institutional design, it seems reasonable to define independence primarily in a formal way, as concretized in statutes. The point is then that the independence index which I develop here should not be evaluated against any possible conception of 'independence', but, rather, against the specific definition that is used here.

4.2 Results

Table 3 shows the results of the empirical analysis. Several specifications of the model are estimated in order to test the various aspects of the credibility hypothesis.

Model 1 tests the impact of market opening, veto players and globalization on agency independence. As expected, the market opening coefficient has a positive sign and is significant. Although this is far from surprising, it should be stressed that so far the argument linking market opening with the creation of independent agencies has been a plausible, theoretically founded, but hypothetical one. This result is, to the best of my knowledge, the first systematic evidence proving this claim.

The coefficient for veto players is also significant, though only at the 0.10 level, and has a negative sign. This result is interesting for two reasons at least. First, it confirms that veto players are a relevant variable behind the institutional design of independent agencies. This extends one result of the literature on central banks to the more general case of regulatory agencies. Second, and in opposition to this literature, the sign of this coefficient is negative: more veto players lead to less delegation. As theoretical arguments exist for both a positive and a negative relationship between veto players and delegation, it would be wrong to conclude that this result contradicts the credibility hypothesis, although it is true that the dominant hypothesis (for central banks) points to a positive relationship. Ultimately, however, the sign of this relationship can be assessed only empirically, and this is precisely what the results presented here do. Veto players are negatively associated to agency independence.

Table 3 Credibility and independence: OLS regression (dependent variable: independence index – INDEP1)

	(1)	(2)	(3)	(4)	(5)
Constant	0.879*** (3.495)	0.882*** (3.570)	0.453*** (11.585)	0.795*** (3.640)	0.445*** (13.852)
Market opening	0.402** (2.524)	0.402** (2.565)	0.405** (2.571)		
Economic regulation				0.577*** (4.196)	0.589*** (4.559)
Veto players	-0.335* (-2.030)	-0.328** (-2.092)	-0.331** (-2.100)	-0.339** (-2.465)	-0.347** (-2.690)
Globalization	0.027 (0.162)				
Opening* veto players			0.138 (0.876)		
Economic* veto players					0.289** (2.235)
Adj. R ²	0.188	0.214	0.208	0.396	0.467
F statistics	3.467	5.361	3.803	11.502	10.353
N	33	33	33	33	33

Notes:

Standardized regression coefficients; t-statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed test).

In Models 3 and 5, variables have been transformed (centred on zero) to mitigate multicollinearity.

Regressions on a different version of the index (INDEP2, where variables are weighted differently) provide similar, albeit not identical, results. In particular, the sign of the coefficients does not change, and size and significance levels change only slightly. The major differences are that, for Models 1 to 3, the veto players' coefficient is, in absolute value, larger than that of market opening, and, for all models, it is more significant. The interpretation of the results would be the same, with even more emphasis on the relevance of veto players.

Model 1 also permits us to discard one precise claim of the credibility hypothesis, namely that more economically interdependent countries are more likely to create independent regulators. The globalization coefficient in Model 1 is not significant at any reasonable level. Economic interdependence has thus no impact on delegation.

This latter conclusion is corroborated by Model 2. When globalization is dropped, the adjusted R² increases, and t-statistics values increase for both market opening and veto players, whose significance level rises at the 0.05

level. This indicates clearly that Model 1 suffers from a specification error: globalization is irrelevant and should thus be dropped, because it introduces imprecision in the form of higher standard errors and lower t-scores for the other variables (Studenmund 2001: 394). Doing so corroborates the relevance of both market opening and veto players.

Model 3 investigates a further implication of the credibility hypothesis, namely a joint impact of market opening and veto players on delegation. In effect, the role of veto players should be amplified in the presence of market opening, because the latter creates credibility problems, while the former contributes to mitigating them, or, in other words, they are an alternative to delegation for coping with time inconsistency. As a result, the impact of veto players should be stronger precisely when they have a function to fulfil with respect to credibility. Conversely, and maybe more intuitively, the impact of market opening should depend on veto players: it should be weaker when more veto players are present, as these are a functional equivalent to delegation as a means to increase time consistency. In other words, the opening of markets should create fewer credibility problems when the polity includes many veto players: in this case market opening should be a weaker determinant of agency independence.

To test this argument, an interaction term is introduced in the equation. To get rid of multicollinearity, variables have been transformed (centred on zero), as suggested by Jaccari *et al.* (1990: 31). The variance inflation factor (VIF) test indicates that in effect multicollinearity is not a problem in Model 3. When controlling for the independent impact of market opening and veto players, the joint impact of market opening and veto players turns out to be irrelevant, as the coefficient of the interaction term is not significant, and the adjusted R^2 is smaller than in Model 2. My interpretation is that this result is not compatible with the credibility hypothesis, because the relevance of one variable should depend on the value of the other. What should be expected is that, since market opening and veto players work in opposite directions with respect to agency independence, the coefficient for the interaction term should be somewhere in between those of market opening and veto players taken independently.

To the extent that Model 3 tests the joint effect of market opening and veto players, and to the extent that this argument belongs to the credibility hypothesis, these results cast serious doubts on the relevance of credibility concerns in explaining delegation to independent regulatory agencies.

Although Models 1 to 3 give us important insights into what factors can explain agency independence, their overall fit is less satisfying. The best one explains slightly more than 20 per cent of the total variation in independence. This is not too bad a result, considering the parsimony of the model. It would be desirable, however, to have a fuller picture of the phenomenon without abandoning the credibility hypothesis altogether. To this end, I stretch the hypothesis to generalize to economic regulation the arguments made to justify the link between credibility problems and market opening. This step remains

faithful to the literature (Stasavage 2002) as well as to the overall argument of the hypothesis, namely that delegation may help governments to mitigate time-inconsistency problems when dealing with investors. The new hypothesis then is that delegation is more likely for economic rather than for social regulation.⁸

In Model 4 I replace the dummy for market opening with a dummy for economic regulation.⁹ This model performs sensibly better than Model 2. The overall fit is nearly 40 per cent, and the coefficients are significant. The economic regulation coefficient is higher and sharply more significant than the market opening one, and the veto players' coefficient keeps the same sign and roughly the same value while increasing its significance.

These results sharpen our understanding of delegation to independent regulatory agencies. First, they confirm the relevance of veto players, as well as the direction of their impact on delegation. This is a strong result, considering Tsebelis' scepticism about his own theory's usefulness in explaining agency independence (Tsebelis, forthcoming: 341). Second, these results show that market opening does not give rise to specific problems. Rather, these are common to other fields of economic regulation, and are better understood in this context.

The latter result may look trivial, but I think it has great merit. First, and as in the case of market opening, this is the first systematic evidence demonstrating the link between economic regulation and agency independence. Second, it should not be forgotten that Majone's original argument (Majone 1997) points to a positive relationship *not* between economic regulation and delegation, but, more generally, between the need to influence a multitude of individual decisions and delegation. This problem, in his opinion, is common to both economic and social regulation. I have shown that this is not the case.

As for market opening, a joint effect of economic regulation and veto players on agency independence should be expected. This is tested in Model 5, where an interaction term is added in the equation.¹⁰ The coefficients for economic regulation and veto players barely change, and the t-statistics of economic regulation and veto players increase slightly. In opposition to Model 3, the coefficient for the interaction term is significant. Note that the coefficient has a positive sign. I interpret this result as supportive of the credibility hypothesis. In effect, the value of the interaction coefficient lies in between those of economic regulation and veto players, which is plausible since they work in opposite directions. What seems to happen is that, when considered jointly, market opening and veto players moderate their respective influence on agency independence. In other words, economic regulation alone has more impact on delegation than in combination with veto players, which matches the theory. Veto players are a sort of functional equivalent of delegation; economic regulation is then less problematic, in credibility terms, in institutional contexts featuring many veto players.

This result also reinforces the argument that market opening does not give rise to specific problems. In terms of credibility, sectors that have recently been subject to market opening seem to be better understood within the more general category of economic regulation.

Note also that the adjusted R^2 for Model 5 is 0.467. This means that this model explains more than 40 per cent of the variation in agency independence. Given the parsimony of the model, this is a very good result. On the other hand, this also indicates that other factors will have to be integrated in the analysis to reach a full explanation of the phenomenon.

Before popping the champagne, however, some sensitivity analysis should be carried out, as small N studies may suffer from a variety of statistical problems. In particular, parameter estimates may be strongly affected by an individual case (Bollen and Jackman 1990: 257).

Several techniques can be used to detect outliers and influential cases. Standardized and studentized residuals indicate which observation possesses unusually large residuals. Examining the residuals of Model 5, the Belgian food safety regulator (AFSCA) and the German electricity regulator (the Ministry) appear to be outliers, as their values exceed, or are very close to, the usual cut-off of ± 2.0 (Bollen and Jackman 1990).

Two statistics, Cook's Distance and Difference in Fit Value (DFFITS), measure leverage, i.e. the potential for a model as a whole to be influenced by a few cases (Bollen and Jackman 1990). For Model 5, Cook's Distance confirms that the two cases mentioned above are problematic. DFFITS, on the other hand, does not highlight any problematic observation. Another diagnostic, Difference in Beta Values (DFBETA), measures the effect of deleting one observation on each parameter estimate (Bollen and Jackman 1990). No observation behaves oddly with respect to this statistic.

Overall, the diagnostics seem to show that the parameters estimate of Model 5 are not unduly influenced by individual cases. Although residuals and Cook's Distance do signal some problematic cases, DFFITS and DFBETA show no anomaly. It is, however, wise to further check the robustness of the results presented above. One way to do so is using a dummy for influential cases; another is to delete these cases from the sample (Bernhard 1998: 319–20). In both cases,¹¹ the independent variables continue to be significant and in the same direction. The values of the coefficients also remain roughly the same. This indicates that the parameter estimates obtained in Model 5 are robust and can therefore be meaningfully interpreted.

5. CONCLUSION

In this paper I have performed an empirical analysis of one increasingly relevant form of institutional change, namely the creation of independent regulatory agencies in Western Europe. More specifically, one particular explanation of this phenomenon has been investigated, i.e. the credibility hypothesis. This explanation stresses the need for governments to be able to

credibly commit to given choices, and postulates that creating independent agencies is a means to increase the credibility of regulatory policies. While the empirical relevance of the phenomenon can hardly be questioned, that of the hypothesis should. This is precisely what has been done here.

The results of the analysis have an interest for both the narrow question explored here and the broader theme of this special issue.

First, I have shown that the credibility hypothesis has great merit. Sectoral features (the economic nature of regulation) and national institutional features (veto players), as well as their interaction, can explain a good deal of the cross-national and cross-sectoral variation in agency independence. Economic interdependence, on the other hand, is not a relevant explanatory factor.

These findings sharply advance our knowledge on delegation to independent regulatory agencies. Partly this is because of a sort of first-comer advantage: the origins of independent regulatory agencies are still very much under-researched. This analysis, however, also has the merit of addressing a series of questions that have been around in the literature for a while without attracting the empirical attention they deserve. Credibility issues are relevant for independent regulatory agencies in general, but also, and foremost, for central banks, where the issue of institutional design has not been popular. This analysis might have some use also for research on delegation to central banks.

Future work should be conducted in two directions. Broader data sets should be constructed and used to test these hypotheses, and, most importantly, alternative hypotheses should be developed and tested. In effect, we have seen that the credibility hypothesis cannot explain all the variation we observe in agency independence. Within the rational choice framework, alternative explanations would stress the role of political uncertainty (Gilardi 2002). In the historical-institutionalist tradition, factors such as policy learning, institutional isomorphism, state traditions and structures, political leadership, and the broader institutional context are at the centre of the analysis (Thatcher 2002). These and other perspectives should be further investigated.

Second, this analysis also provides insights with broader interest with relation to the themes raised in this special issue.

Some of the papers have studied the role of transnational factors in the transformation of state structures and policies (van Waarden and Drahos, Vivien Schmidt). I have shown here that while some transnational factors do matter, others do not. The institutional framework of regulatory policy is in part shaped by sectoral, not national, characteristics. In particular, economic regulation is much more likely to be carried out through independent agencies than social regulation. On the other hand, one powerful transnational force, i.e. economic globalization, has been shown to be irrelevant.

Other papers have addressed (Susanne Schmidt, Vivien Schmidt), and sometimes seriously questioned (Serot), the role of national institutions for regulatory policy. I have found strong support for the argument that national

institutional features mediate transnational forces. Specifically, I have shown that functional pressures linked with credibility problems are moderated by veto players. At a theoretical level, what is particularly interesting here is that the veto player theory offers the possibility to integrate national institutions into a rational choice framework in a comparative way. To this extent, it seems that a little of the comparative advantage of historical institutionalism in taking country-specific factors into account has been eroded.

In conclusion, the credibility hypothesis is corroborated by the analysis presented here. When designing regulatory institutions, governments seem to care about the credibility of their policy commitments. Whether we can be happy with this explanation, however, can only be assessed by future research.

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ACKNOWLEDGEMENTS

This is a major revision and extension of a paper originally presented at the 2001 ECPR Joint Sessions in Grenoble, 6–11 April. Other versions have been presented at the eleventh Annual Congress of the journal *Politiques et Management Public*, Nice, 4–5 October 2001, and at the first YEN research meeting on Europeanization, Siena, 2–3 November 2001.

For comments, I wish to thank Adrienne Héritier, Mark Thatcher, workshop participants, and an anonymous referee, as well as Michelle Beyeler, Dietmar Braun, Thomas David, Olivier Giraud, Andrea Goldstein, Silja Häusermann, Hanspeter Kriesi, Jan-Erik Lane, André Mach, Giandomenico Majone, Yannis Papadopoulos, and Claudio Radaelli. Special thanks to Florence Passy for her help with statistics. Any errors are mine.

NOTES

- 1 Time inconsistency occurs 'when a policy which appears optimal at time t_0 no longer seems optimal at a later time t_n ' (Majone 1996a: 41) and policy-makers modify the policy accordingly.
- 2 The complete SPSS data set can be downloaded at <http://www.people.unil.ch/fabrizio.gilardi/index.html>.
- 3 The Database can be freely downloaded from the website of the World Bank (www.worldbank.org).
- 4 The Database comprises data for the years 1975 to 1997. The variable 'veto players' used in the analysis is, for each country, the average value of CHECKS3 over this period.
- 5 Average 1990–1996 for trade, 1990–1997 for FDI and international portfolio investment.
- 6 Concretely, data have been collected through questionnaires sent to agency officials. Questionnaires are based on the indicators used to construct the inde-

- pendence index. Data at the indicator level for all regulators can be downloaded at <http://wwwpeople.unil.ch/fabrizio.gilardi/index.html>.
- 7 Where the basic question is: 'do the observations meaningfully capture the ideas contained in concepts?' (Adcock and Collier 2001: 529).
 - 8 Regulation is termed 'economic' when it deals with the price, entry, exit and service of an industry, while it is termed 'social' when it concerns non-economic issues such as health and safety (Meier 1985: 3).
 - 9 Electricity, telecommunications and financial markets are coded 1 (economic regulation), while food safety and pharmaceuticals are coded 0 (social regulation).
 - 10 As for Model 3, variables have been transformed (centred on zero) to mitigate multicollinearity.
 - 11 The analysis is available at <http://wwwpeople.unil.ch/fabrizio.gilardi/index.html>.

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