

The Global Diffusion of Regulatory Agencies:
Institutional Emulation and the Restructuring of Modern Bureaucracy

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Abstract

Once a distinctive feature of United States' exceptionalism and of the governance of central banking, autonomous regulatory agencies have recently become *the* 'appropriate model' of governance in capitalist economies. Our dataset, covering 16 sectors and 49 countries over 39 years (1964–2002), reveals the surge in the popularity of the regulatory agency and the radical restructuring of modern bureaucracy. We ask why these regulatory agencies have spread so widely in the last three decades. Using Event History Analysis and compound research design, we demonstrate the theoretical and empirical relevance of different channels of institutional transfer (within-country; within-sector; country-to-country; sector-to-sector) to the analysis of diffusion processes. The analysis asserts the importance of institutional emulation in the spread of change and hence represents an alternative to theoretical approaches that over-emphasize the economic and coercive aspects of global change.

Introduction

Once a distinctive feature of United States' exceptionalism and of the governance of central banking, autonomous regulatory agencies have recently become *the* 'appropriate model' of governance in capitalist economies. Our dataset, covering 16 sectors and 49 countries over 39 years (1964–2002), offers for the first time a comprehensive overview of the surge in popularity of the regulatory agency and the radical change in the organization of modern bureaucracy (see attached video). We identified, counted and classified public administrative agencies on the national level that are out of reach of the relevant ministry. Our data documents the widespread restructuring of the state which goes well beyond our initial expectations. The bureaucracy, the fourth branch of government, has been restructured globally and comprehensively, in a process that has passed largely beneath the radar of scholars. The process of creation of regulatory agencies or enhancing autonomy of existing ones exploded: from less than 5 new autonomous agencies per year from the 1960's to 1980's, to more than 20 agencies per year from the nineties to 2002 (rising to almost 40 agencies per year between 1994-1996). By the end of 2002, we identified an autonomous regulatory agency in about 60% of the possible cases. While the autonomy of these agencies varies widely across sectors and countries, they all signify an effort to upgrade the autonomy of professionals in the public policy process and to place the regulators in arm's length distance from political masters (Majone, 1994; 1997). The restructuring of the state may well represent the institutionalization of a new global order of regulatory capitalism (Levi-Faur, 2005; Jordana and Levi-Faur, 2005; Braithwaite, 2007).

This paper asks why these regulatory agencies proliferated so widely in sectoral, national and temporal clusters in the 1980s and 1990s. Regulatory agencification can be seen as yet another stage in the institutionalization of legal forms of domination (Weber, 1968).

With the rise of neo-liberalism and with the expectations for deregulation, many expected that deregulation would lead to *debureaucratization*. Our evidences on the scope of the creation of regulatory agencies suggest *rebureaucratization* and consequently, "a new iron cage".¹ For Weber, the engines of bureaucratic rationalization were mainly competition in the market place, but according to DiMaggio and Powell (1983) this is no longer the case. Structural change in organizations seems less and less driven by competition or by the need for efficiency. Instead, they contend, bureaucratization and other forms of organizational change occur through processes that make organizations more similar but not necessarily more efficient (DiMaggio and Powell, 1983, 147). Institutional isomorphism may best explain observations that organizations are becoming more homogeneous, while "at the same time enabling to understand the irrationality, the frustration of power, and the lack of innovation that are so common in organizational life" (DiMaggio and Powell, 1983, 157).

If regulatory agencies are part and parcel of the process of rebureacratization, what are the forces that propel their proliferation as best practice? Taking up DiMaggio and Powell's suggestion, we examine the creation of regulatory agency as a manifestation of institutional emulation (DiMaggio and Powell, 1983, 147). We examine institutional emulation as a global process and as an alternative to materialist interpretations. These interpretations still dominate the scholarly literature, leaving only a minor role for the socio-political aspects of globalization. Yet globalization, and the temporal and spatial clusters that characterize it, have increasingly become associated with the diffusion of ideas, practices and institutions within networks of peers that closely monitor, emulate and learn from each other

¹ According to Weber, the bureaucracy is not only a manifestation of rationality but also at the same time an instrument of human enslavement and impersonalization. The momentum towards ever-increasing efficiency leads humanity towards an 'iron cage' rather than emancipation. The iron-cage imagery and the irreversibility of the process have haunted students of society as the tempo of bureaucratization has quickened.

(Weiss, 1998; Scholte, 2000, Guillén, 2001; Hay and Rosamond, 2002; Slaughter, 2004; Polillo and Guillén, 2005).

This perspective on globalization leads us naturally to a diffusion perspective on the restructuring of the capitalist state. We focus on the import, export, adoption and adaptation of innovations from other jurisdictions by agents who interact within social, professional, political and economic networks (Coleman, Katz and Menzel, 1957; Rogers, 1995; Berry and Berry, 1990). The paper advances both theory and empirical analysis beyond the assumption of cross-national diffusion only (e.g., how regulatory reform in Germany affects the probability of similar reform in Spain). Instead of assuming that institutions, policies, ideas and practices diffuse exclusively from country to country, our analysis combines cross-national and cross-sectoral analysis.

We start our analysis bringing together globalization, diffusion and institutional emulation in the first section of this paper. Section two defines our working hypotheses related to the theoretical framework previously delineated. Section three presents the data gathered, defines the relevant variables, and sets out our methodological approach. Section four shows the findings obtained, aiming to confirm our hypotheses, and concentrates on an interpretative analysis of the results. We conclude with a broader view of the diffusion of regulatory institutions and the globalization process.

I. Institutional emulation and diffusion

The global spread of new institutions of governance across the world is one of the most sweeping and important changes that mark present-day capitalism. Yet we know only little about the conditions that underlie the spread of these institutions and the politics of import

and export that characterize them. We therefore ask how we can explain the mushrooming of regulatory agencies in the last few decades across countries and sectors. As demonstrated here, agency creation is a process clustered in time, in space, and across nations and sectors. A robust explanation for these clusters, it is suggested, lies in the theory of institutional emulation as a diffusion process.

We are not the first to apply diffusion to the study of political and institutional change (Biggs, 2005; Strang, 1991a; Brooks, 2005; Gilardi et al., 2007; Brune and Guisinger, 2006; Polillo and Guillén, 2005). The ways scholars have conceptualized and operationalized diffusion vary. For some the existence of diffusion derives from how observations increase (i.e., the S-shape function), while for others diffusion is defined by the process of adoption rather than its results (e.g., degree and scope of convergence). We share this latter approach and believe that analysing diffusion as a process should be separated from the outcome that it may or may not produce. Therefore, we focus on the endogenous processes that lead groups to converge in ideas, practices and institutions rather than the observed results.

Diffusion, we assert, is an increasingly significant phenomenon in our interconnected world. Ideas, institutions and people travel faster and more frequently than ever before. Global networks of scholars, professionals and consultants are increasingly effective means to diffuse new practices, ideas or institutions (Slaughter, 2004; Lazer, 2005). Accordingly, diffusion is defined here as the process by which practices, ideas or institutions are communicated through certain channels over time among the members of a social system in an uncoordinated manner, and where prior adoptions of an innovation affect the probability of adoption for some of the remaining non-adopters in the population (cf. Rogers, 1995, 5;

Strang, 1991b, 325; Elkins and Simmons, 2005).² We assess the diffusion perspective against the alternative explanation, often called pre-requisite or structural (Collier and Messick, 1975; Braun and Gilardi, 2006). Thus, while we advance this interpretation we explicitly acknowledge alternative explanations, where change is the result of a similar, yet independent or coordinated, response to external conditions.

A scholarly effort to study of the role of agents and their networks is increasingly necessary in an era where the boundaries between the global and the national are becoming ever more ambiguous and where power seems more diffuse and evasive than ever. Some elements of this approach are reflected in the growing literature on cross-national policy transfers (Bennett, 1991; Dolowitz and Marsh, 2000) as well as the emerging literature on cross-national policy diffusion (Brune and Guisinger, 2006; Gilardi, 2005; Brooks, 2005; Elkins and Simmons, 2005; Weyland, 2005). While there is growing number of useful and innovative case-studies of institutional transfers, and while comparativists have managed to expand and substantiate these studies (e.g., Murillo and Martínez-Gallardo, 2007; Weyland, 2005), a comprehensive empirical study of the spread of the institutions of governance is yet to emerge. With the exception of Polillo and Guillén (2005) and Henisz, Zelner and Guillén (2005) most scholars who opted for the study of the spread of global change focused on the spread of policies (e.g., Simmons and Elkins, 2004; Brooks, 2005) or rules, standards and laws (e.g., Guler, Guillén and Macpherson, 2002) rather than that of institutions. A fine but important distinction is to be made here. Investment in institutional building is long-term and aims at the building of the institutional environment of future decision making. Adoption of institutional innovations such as regulatory agencies does not pay in the short run, and the

² This definition draws on both the thin conceptualization that characterizes quantitative approaches (e.g., Strang, 1991a and 1991b) and the "thicker" qualitative approaches (e.g., Rogers, 1995) to the study of diffusion.

quality and effect of the investment cannot be evaluated easily in comparison to the adoption of new policies. All this should naturally draw one's attention away from utilitarian and coercive perspectives on the study of institutional change.

We focus on the spread of autonomous regulatory agencies, and ask why the spread of these agencies is so clustered across time, nations and sectors. We rest our case with the observation on the tendency of organizations to grow alike (DiMaggio and Powell, 1983; Meyer et al. 1997a; 1997b), of agents to find safety in numbers (Palley, 1995), create professional and policy networks (Atkinson, and Coleman, 1989; Rhodes, 1997; Burt, 1987) and follow the "logic of appropriate behaviour" (March and Olsen, 1989; 2006). Accordingly, the decision to adopt regulatory agencies as the preferred institutional designs across sectors and nations, irrespective of performance consideration, is suggested to be driven by institutional emulation, particularly its normative and mimetic mechanisms (DiMaggio and Powell, 1983). Normative emulation as a mechanism of institutional emulation reflects people's tendency to ground social cohesion in behavioural and normative similarities. Social networks in which actors share strong connections will tend to adhere to a strong group identity, solidarity, and conformity. DiMaggio and Powell suggest that normative emulation stems primarily from professionalization (1983, 152). The more cohesive a social or professional network, the more likely are the actors within it to imitate each other's patterns of behaviour, and this behaviour to be legitimized as a norm and best practice. A second mechanism of institutional emulation is mimetic, and is likely to exert an independent effect. Cohesive communities are not necessary for mimetic mechanisms to have an effect. Applying this notion to countries' adoption decisions, Polillo and Guillén expect like-behaving countries to emulate each other in this context "because they learn from their peers to become more effective at maintaining their status and prestige" (2005: 1780). Cues will be taken from

countries perceived as 'role equivalent' regardless of whether there are direct ties between these countries³

[Figures 1 & 2 about here]

We examined institutional emulation against the observation that the spread of regulatory agencies was clustered across countries (figure 1) and sectors (figure 2). Countries and sectors vary in the extent to which they were receptive for regulatory agencies. To get the most of these variations we combine two comparative approaches: the National Patterns Approach (NPA) and the Policy Sector Approach (PSA) (Levi-Faur, 2006). The NPA suggests that political processes and outcomes are shaped by a country's unique national and historically determined characteristics, and that the nation-level community of policy-makers has effective control over domestic political processes. The strength, aims and procedures of operation of this national policy community and the national institutions that shape its structure and preferences are distinct across countries. The NPA assumes this level of politics and policy is where power lies and where decisions to create regulatory agencies will be taken. Thus, institutional emulation will occur through the import and export of institutional designs at the country level. Patterns of institutional emulation that point to the adoption of regulatory agencies across all sectors within any country or following other countries serve as primary evidence in support of this approach. It therefore predicts the existence of significant effects for (a) within-country diffusion and the development of a normative structure that will reflect national characteristics and traditions of governance, and (b) country-to-country diffusion that reflects the assumption that policy communities at the national level are

³ They employ the concept of role equivalence as a variety of structural equivalence, and define it "as the overlap between two actors' role sets" (Polillo and Guillén, 2005: 1779), focusing on the content of the relations with third parties, not only on the existence of a similar link.

attentive to the decisions adopted by national policy communities in other countries. The PSA emphasizes the specific characteristics of distinct policy sectors, hence the multiplicity of political patterns in any country (Freeman, 1986, 486; Atkinson and Coleman, 1989). Institutional emulation will advance through the import and export of institutional designs on the sectoral level. Patterns of institutional emulation that point to the adoption of regulatory agencies across all countries within a generic sector, or from one sector to another, serve as primary evidence in support of this approach. More specifically it predicts (a) the existence of significant effects of within-sector diffusion and the development of institutional structures that will reflect the sector's characteristics, and (b) sector-to-sector diffusion that reflects an assumption that sectoral policy communities are alert to decisions of other sectoral communities.

To test these suggestions, or better so how they both give better picture of the changes, we examine four channels of diffusion. These channels identify differential impacts of any institutional innovation on the probability of creation of similar institutions (autonomous regulatory agencies) in the same country, in the same sector, in other countries, and in other sectors.⁴ Accordingly we identify the four channels of diffusion. First, as expected by PSA, the "within-sector" channel will trigger institutional emulation via regional and trans-national policy communities at the generic-sector level. Second, as expected by NPA, the "within-country" channel will operate through national level communities of policy makers. Third, as expected by NPA, the "country-to-country" channel will foster institutional emulation on the expectation that each agent will be sensitive to aggregate changes in other countries. This channel of diffusion focuses on how national communities influence each

⁴ This paper deals with the aggregated probabilistic effects of countries or sectors only, leaving the estimation of specific country and sectoral effects on the diffusion process for another study.

other. Fourth, as expected by PSA, the "sector-to-sector" channel suggests that the establishment of regulatory agencies in any sector is relevant for the decision to create a new one in any other sector, and therefore is grounded in the expectation that sector agents will be sensitive to aggregate changes in other sectors. This channel of diffusion focuses on how trans-national communities in different sectors influence each other (see table 1 for examples). The suggestion that channels matter can be assessed against suggestions that channels do not matter, and that the decision to establish a regulatory agency depends on the general information circulating in the system at the global level and where agents respond to prior decisions in all sectors across all countries (Lazer, 2005).

Table 1: Four channels of diffusion

I- *"Within-Sector" channel of diffusion*: The establishment of a regulatory agency in telecoms in Argentina in a certain year is influenced by the proportion of agencies established in the telecom sector in all other countries up to the year before.

II- *"Within-country" channel of diffusion*: The establishment of a regulatory agency in telecoms in Argentina in a certain year is influenced by the proportion of agencies established in all other sectors in Argentina up to the year before.

III- *"Country-to-country" channel of diffusion*: The establishment of a regulatory agency in the telecoms sector in Argentina in a certain year influences the probability of establishing an agency in each of the other countries (other than Argentina) in the following years.

IV- *"Sector-to-sector" channel of diffusion*: The establishment of a regulatory agency in the telecoms sector in Argentina in a certain year influences the probability of establishing an agency in each of the other sectors (other than telecoms) in the following years.

The ability to examine channels of diffusion sets us apart from all other diffusion studies that we are aware of. While they explore the role of various mechanisms across the whole process, we suggest that there is no reason to expect that the networks and the mechanisms that shape diffusion processes will have the same effect in each channel. It makes sense to suggest that normative emulation occurs where policy networks are strong: it

will be associated with the “within-sector channel” where sectoral policy networks are critical for the adoption decision and with the “within-country channel” where the national political network is critical for it. By contrast, we expect mimetic emulation mainly to take place in “country-to-country” and “sector-to-sector” channels of diffusion as these reflect a process of institutional transfer based on following distant others in reaction to uncertainty and rapid policy changes, and driven by the observed behaviour of equivalent units. While we validate channels, we expect also variations in their importance across the different stages of the diffusion process (i.e., incubation, take-off, and saturation), diverging from the "homogenizing assumptions" that are evident in most studies of diffusion.

II. Research Hypotheses

Our null hypothesis (H0) suggests that there are no channel effects, and that information relevant to the creation of regulatory agencies is dispersed globally. H1 to H4 examine each channel of diffusion on the probability of creation of new regulatory agencies. H5 examines the effects of channels over time and H6 the role of different domestic and cross-country variables.

H0. Channels of diffusion do not matter hence information flows across countries and sectors without regard to its source or channel (null hypothesis)

H0 suggests that *all prior decisions about the creation of regulatory agencies have an impact on the decision to create a new agency in any country and sector*. We determine this impact by calculating the probability of creating a new agency at time t [$P(RA_t)$]. For this purpose, we generate the variable *previous*, which is the sum of the agencies created up to time $t-1$ in all countries and sectors divided by the total number countries and sectors. We then estimate the probability function:

$$(1) P (RA_{ct}) = f \frac{\sum_{c=1}^x \sum_{s=1}^y RA_{c,s}^{t-1}}{x * y}$$

C is the vector of countries (Argentina, Austria...) of length x

S is the vector of sectors (central banking, competition...) of length y

H1. Institutional emulation occurs through a within-country channel.

H1 suggests that *all prior decisions in a country about the creation of regulatory agencies in a sector affect the probability of creation of a new agency in other sectors in that country.* To identify this effect we calculate the probability of country c to create a new agency at time t [P(RAct)]. For this purpose, we generate variable *within-co*, which is the sum of the agencies created up to time t-1 in country c divided by the total number of sectors. We then estimate the probability function:

$$(2) P (RA_{ct}) = f \frac{\sum_{s=1}^y RA_{c,s}^{t-1}}{y}$$

H2. Institutional emulation occurs through a within-sector channel.

H2 suggests that *all prior decisions in a sector about the creation of regulatory agencies affect the probability of creation of a new agency in that sector.* We identify this effect by calculating the probability of sector s to create a new agency at time t [P(RAst)]. For this purpose, we generate the variable *within-sec*, which is the sum of the agencies created up to time t-1 in sector s divided by the total number of countries. This variable is related to the estimated probability by a link function.

$$(3) P (RA_{st}) = f \frac{\sum_{c=1}^x RA_{c,s}^{t-1}}{x}$$

H3. Institutional emulation occurs through a country-to-country channel.

H3 suggests that *all prior decisions in a country about the creation of regulatory agencies affect the probability of creation of a new agency in any sector in other countries in the following years*. We identify this effect by calculating the probability of any country except c to create an agency at time t [$P(RA_{Mt})$, where M is the vector of all countries except the country under study, with length $x-1$]. For this purpose, we generate the variable *country-to-co*, which is the sum of the agencies created up to time $t-1$ in country c divided by the number of sectors. We then estimate the probability function:

$$(4) P (RA_{Mt}) = f \frac{\sum_{S=1}^y RA_c^{t-1}}{y}$$

H4. Institutional emulation occurs through a sector-to-sector channel.

H4 suggests that *all prior decisions in a sector about the creation of regulatory agencies affect the probability of creation of a new agency in any country in other sectors in the following years*. We identify this effect by calculating the probability of any sector except s of creating an agency at time t [$P(RA_{Nt})$, where N is the vector of all sectors except the sector under study with length $y-1$]. For this purpose we generate the variable *sector-to-sec*, which is the sum of the agencies created up to time $t-1$ in a sector s divided by the total number of countries. This variable is related to the estimated probability by a link function.

$$(5) P (RA_{Mt}) = f \frac{\sum_{c=1}^x RA_s^{t-1}}{x}$$

H5. The effects of each channel of diffusion vary at different stages of the process.

H5 suggests that *the combined effects of all channels of diffusion on the dependent variable are expected to vary* in the incubation, take-off, and saturation stages of the process of diffusion.

H6. The effects of domestic and cross-country variables vary at different stages of the process.

H6 suggests that *the effects of a country's domestic characteristics and the significance of the cross-national interdependencies vary* at the three different stages of the diffusion process, either preventing or restraining emulation, according to the specific character of each stage. These variations requires us to depart from the "homogenization assumptions" that are implicit in many, if not most, models of diffusion.

III. Data and methods

Since our primary interest is to model the probabilities of establishing regulatory agencies in relation to the timing of the process of diffusion, we opt to model the time process, and event history analysis (EHA) is the appropriate technique for analysing the patterns of regulatory agency creation over time. When the time spells are observed at discrete times, logistic regression is recommended with a time-independent variable to calculate the logged odds of establishing a regulatory agency and then to transform them into probabilities and obtain the hazard rate (Berry and Berry, 1999; Box-Steffensmeier and Jones. 1997). However, since the process is not monotonic or constant over time (see figures 1& 2), and since our main interest is the effect of the diffusion variables in that process, we use the percentage of units created

(sector*country) each year instead of the raw *Time* variable. This allows us to measure more accurately the differences in the effects of the diffusion variables while serving as a proxy of time progression.

Our dataset is wide in scope and unique in the sense that it covers variations across 49 countries (Latin America and all OECD countries) and 16 sectors (ranging from financial and utilities to social). While some important regions and families of nations (most Asian and African countries) are not covered, we still offer the widest existing overview of the emergence and diffusion of the new regulatory agencies in the second half of the 20th century. Given the nature of our data, namely annual records of each sector within each country, we consider time as a discrete, not a continuous sequence. Hence our dataset is a pool of cross-sections of countries and sectors with a time dimension from 1964 to 2002, and we consider that a regulatory agency can be established only once. In all, we analyse 784 units, or country-sector pairs, and taking into account the number of years covered (39), we have a total of 30,756 observations.

The analysis of relationships among countries and sectors requires a matrix design. We therefore created a large matrix that covers the countries of origin, the countries of destination, the sectors of origin, and the sectors of destination [$C_o * C_d * S_o * S_d$]. This approach, based on enlarging N, offers some advantages over time-series cross-section [TSCS] analysis using a weighting matrix when dealing with continuous dependent variables.⁵ Firstly, we can retain the time-dependence logic of EHA models, which in TSCS

⁵ Weighting matrixes are used in classic time-series cross-section models, as recent developments in spatial econometric models in political science show. A matrix of weights is inserted into the data matrices to control interdependencies among the units of analysis (see Beck, Gleditsch and Beardsley, 2005). Francese and Hays (2006) showed that this is a very common tool for understanding diffusion in policy analysis. However, this rather

is not fully developed yet (Beck, 2001: 287-8). Secondly, we are not interested in capturing the strengths of particular countries or sectors in the process of diffusion, but the strength of each channel. Since our aim is the global effect of country-to-country and sector-to-sector, we don't need exactly the same matrix structure, which TSCS does require.

Dependent variable

The dependent variable, *Creation of a regulatory agency*, is coded '1' for the year when the event occurs, '0' for all years before and censored after the year of the event. So when it is established, the size of the risk set – the remaining units that do not yet have agency – decreases. We estimate the probability of having a regulatory agency and this is measured by the hazard rate, namely the probability that a unit (country-sector) will experience the event of interest during a particular time (i.e., year of agency creation). In cases where agency was established but then reformed in a way that increased its formal autonomy and strengthened its identity as a regulatory agency, we record not the year of establishment but the first year of reform to enhance autonomy as the relevant indicator. This is the case mainly in central banking and to lesser extent in other financial sectors (banking regulation and securities commissions) that were the embryos of the current regulatory order (Jordana and Levi-Faur, 2006). Most of the countries in our dataset had central banks and some forms of financial agencies before the 1970s. So if we defined the new regulatory order on the basis of the time of the establishment of these 'old agencies' we would miss something important that has happened since the 1970s in the governance of these sectors. That is, we feel that recording

sophisticated technique proved to yield very different results according to the weights, and also implied some emphatic assumptions in the relationship of dependent and independent variables, which were even more emphatic when the dependent variable was a dummy.

the creation of the old regulatory institutions (those established from the 1920s to the 1960s) would result in a biased view of the rise and diffusion of the new order.⁶

Diffusion variables

The analysis includes four different diffusion variables – intended to identify the different channels of diffusion – and an additional variable intended to serve as a control on their effects. As illustrated and explained in the previous section, diffusion within a given sector is captured by the variable *Within-sec*; diffusion within a given country is captured by the variable *Within-co*; diffusion from country to country is captured by the variable *Country-to-co*; and diffusion from sector to sector is captured by the variable *Sector-to-sec*; finally, the control variable, indicating no channels matter but rather revealing the effect of all previous creations of regulatory agencies, is captured by the variable *previous*.

Cross-country variables

We include two bilateral trade variables to examine interdependencies among pairs of countries and their impact on the diffusion of regulatory agencies. The first identifies dyadic trade relations (variable name: *Trade relations*). These are measured by a non-symmetric indicator that represents the share of trade (imports plus exports) between country A and country B with regard to GDP in country A for each year in the database.⁷ Thus, we have a matrix of trade interdependence for all countries included in our sample, for each year.⁸ The

⁶ However, all regulatory agencies created before 1964, yet already with the formal characteristics delineated above and not reformed later, were considered left censored. See appendix A for data sources and detailed definitions.

⁷ To construct this indicator, we drew on the analysis using trade interdependences, which have been developed in the literature to examine the relationship between economic relations of country dyads and their propensity to engage in military conflicts (Oneal and Russett, 2001; Sandoval-Bustos, 2006).

⁸ Many different measures of foreign trade exist to identify commercial network relations. For direct relations we decided to measure the bilateral influence between two countries, aiming to capture how important economically country B is for country A. For example, if country A has a small GDP and a high share of trade with B, then this trade relationship with

bigger the share of trade against GDP, the stronger the dependence of country A on country B.

$$(6) \text{ trade.gdp}_{A,t} = \frac{\text{imports}(A \rightarrow B)_t + \text{Exports}(A \rightarrow B)_t}{\text{GDP}_{A,t}}$$

where A and B are country of origin and country of destination, respectively.

The second cross-country variable is a measure of structural equivalence in countries (variable name: *Trade equivalence*). This measure reflects how similar two countries are in their exports structure. It is calculated as the absolute value of the difference between the indices of concentration of export partners of every country for every year. We apply the *Herfindahl-Hirschmann* Index to countries' trade concentration; this measures trade concentration by adding the squares of the export trade shares of country A with all the other countries.

$$(7) \text{ ECI.diff}_{A,B,t} = \text{ES}_A - \text{ES}_B = \left(\frac{\text{Exports}(A \rightarrow B)}{\text{Exports}(A)} \right)^2 - \left(\frac{\text{Exports}(B \rightarrow A)}{\text{Exports}(B)} \right)^2$$

Where ES stands for export structure

The dimensions of both matrices are equal to those of the Country-to-co variable, and we also have annual observations; we then construct interaction variables between this channel variable and the two cross-country variables.

Domestic variables

B will be more important for A. In this case, we might expect country A to increase its propensity to emulate country B, in contrast to other countries with a different distribution of trade or larger GDP.

We examine three variables so as to capture some of the most important sources of variation on the domestic level. First we observe country's economic wealth, using as variable *GDP per capita* (gross domestic product) and including observations for all the years considered in our analysis. Second, to capture some political characteristics of countries we use a measure of the extent to which political actors at the national level are constrained in their choice of future policies. The variable *Veto-play* indicates the degree of constraint on policy change, using data on the number of independent veto points in the political system (executive, legislative, judicial and sub-federal branches of government) and the distribution of political preferences across and within these branches (Henisz, 2000: 4). Our third variable, *Country size*, is measured via a proxy of its population: we include a measure of the total number of population for each year and each country in the dataset. The number of people for each country is used as a rough indicator of the relevance of the markets, as well as the size of the public administration.

IV. Findings

Several models examine the hypotheses suggested. Our results as to H0 to H4 are presented in tables 2 and 3, where model 1 controls the null hypothesis, while models 2 to 5 contrast our hypotheses about the role of each channel of diffusion. Results for H5 and H6 are presented in tables 4 and 5. Models 6 and 7 include all channels of diffusion and domestic and cross-country variables. Model 6 is then examined in regard to three different stages of the diffusion process.

H0. Channels of diffusion do not matter hence information flows across countries and sectors without regard to its source (null hypothesis)

Our null hypothesis is rejected since models 1 to 5 (table 2) suggest that channels do matter. When the effects of all previous adoptions to each of the other channels of diffusion are compared, each channel is observed to be significant even after controlling the spread of prior regulatory agencies across all countries and sectors (variable Previous). However, model 1, which includes only the null hypothesis, shows us that this variable also may predict the probability of new agency creation, meaning that part of the diffusion process is probably not captured by our channels.

H1. Institutional emulation occurs through a within-country channel.

Model 2 confirms this hypothesis. The proportion of regulatory agencies already existing in the country is found to be a significant predictor of the creation of new ones. These results are better elaborated in Figure 3, where the contours describe the predicted probabilities of the creation of new agencies in relation to the proportion of agencies already created in a country (vertical axis) and across time (horizontal axis). Note that a rise from the lower contour (probability of 0.1) to the higher contours (up to 0.7) is conditioned on the timing of the event and on the number of agencies already established. The higher the proportion of agencies already created in a country (moving up on the vertical axis), the higher is the probability of new agency creation via the within-country channel.

Table 2: Logistic regression: creation of regulatory agencies (1964-2002). Partial models

	Model 1		Model 2		Model 3		Model 4		Model 5	
(Intercept)	-7.289	***	-4.56	***	-8.029	***	-7.309	***	-7.351	***
Previous	18.858	***	4.97	***	6.026	***	18.599	***	18.800	***
Previous2	-23.495	***	-9.62	***	-10.827	***	-23.037	***	-23.320	***
Within-co			22.52	***						
Within-co2			-40.34	***						
Within-co3			25.34	***						
Within-sec					17.865	***				
Within-sec2					-28.989	***				
Within-sec3					17.931	***				
Country-to-co							1.147	***		
Country-to-co2							-3.903	***		
Country-to-co3							3.278	***		
Sector-to-sec									0.031	***
Sector-to-sec2									-0.002	***
Sector-to-sec3									0.0001	***
Log(Veto-play)	0.286	***	0.51	***	0.240	***	0.287	***	0.287	***
Log(Country-size)	0.054	***	-0.064	***	0.070	***	0.054	***	0.054	***
Log(GDP per capita)	0.055	***	-0.11	***	0.045	***	0.055	***	0.055	***
AIC	174764		160378		158319		174739		2619913	

Note: Akaike information criterion (AIC) can be compared only for models calculated with the same dataset. In model 5 we use a bigger dataset, the one that includes $C_o * C_d * S_o * S_d * T$, so the AIC is greater and not comparable. In models 1-4 we use the dataset $C_o * C_d * S_o * T$, as we do not need to include sectors of destination. To better estimate the functional form of the model, we include also the quadratic values – and the cubic if significant – of each diffusion variable, insofar as they permit a better adjustment to obtain predicted probabilities of agency creation.

The number of other agencies within a country that is needed to trigger the creation of a new agency (moving up the horizontal axis) plunges steeply between 1985 and 1993 and increases thereafter. This is especially clear from the 0.1 contour. The contour graph thus reveals that the “within-country” channel was significant in all the periods under study, experiencing some higher degrees of effectiveness between 1985 and 1998. In that period (follow the dented shape of the 0.1 contour) the number of other agencies in the country that are needed to trigger creation of a new agency is the lowest. The figure also reveals that when the proportion of agencies already created in a country is high (moving up the vertical axis), the probability of creation of a new agency via the within-country channel is more stable over time.

H2. Institutional emulation occurs through a within-sector channel.

Since the proportion of regulatory agencies in a sector is a significant predictor of the creation of new agencies H2 is confirmed. Figure 4 presents the probability contours of creation of a new agency in relation to variation in the proportion of regulatory agencies already created in a sector (vertical axis) and across time (horizontal axis). The pattern is similar to the within-country channel of diffusion. The higher the proportion of regulatory agencies already created in a sector, the greater the probability of creating new ones. During late 1980s and early 1990s the proportion of agencies already created in a sector needed to boost the probability of creation of new ones up to 0.1 fell below 50%. Yet some differences can be observed in a comparison of the probability contours of within-country and within-sector channels, as seen in figures 3 and 4. The probability of new agency creation is more stable for the “within-country” channel than for the “within-sector” channel. Also, the rise in probability of agency creation in the early 1990s was more pronounced for the case of countries than sectors (which is more smoothed).

H3. Institutional emulation occurs through a country-to-country channel.

The estimation of model 4 confirms the significant effect of the creation of an agency in a country on the probability of agency creation in all other countries. Figure 5 suggests that this channel of diffusion had limited effect before the 1990s but increased in importance during that decade. The two humps portrayed by the contours in the top and bottom parts of the graphs suggest an increase of 0.08 and more in the probability of agency creation (between 1994 and 1998) for countries that only began to establish agencies (between 0.2 and 0.4 on the vertical axis) and for countries that created agencies in almost all sectors (above 0.8 on the vertical axis).

[Figures 3-6 about here]

H4. Institutional emulation occurs through a sector-to-sector channel.

The estimation of model 5 indicates that the number of agencies in a given sector influences significantly and positively the probability of creation of new agencies in other sectors, although the coefficient is very small. As the sample is extremely large, we may suspect that the effective impact of the variable is very close to zero, so we cannot confirm the existence of diffusion through this channel. In fact, from figure 6 effects are seen not to depend on the number of agencies created in other sectors and to be limited to later stages of the process.

H5. The effects of each channel of diffusion vary at different stages of the process.

Models 6a to 6c support the hypothesis. Table 3 also reveals that both variables' coefficients for "within-sector" and "within-country" channels are significant and positive for all stages, but the former is four times greater than the latter for the pre-1979 period, and 50% higher in the period 1979-1990. After 1990 both coefficients are very similar in size. The variables for

“country-to-country” and the “sector-to-sector” channels are not significant either during the early stage of diffusion. In the next stages, “country-to country” is significant but “sector-to-sector” is barely significant. Channels thus vary differently in institutional emulation at different stages of the diffusion process. Since two of these channels serve as proxies of normative mechanisms of institutional emulation (“within-country” and “within-sector”), while the other two do so for mimetic mechanisms (“country-to-country” and “sector-to-sector”), normative diffusion may perhaps have a stable effect across time for the global expansion of regulatory agencies. By contrast, the mimetic mechanisms have a fairly limited role, and they appear later in the diffusion process (e.g., during the 1990s). However, during their most intense period of diffusion the mimetic channels had the ability to spread their influence more widely than the normative channels.

H6. The effects of domestic and cross-country variables vary at different stages of the process.

Each stage of the diffusion process has a different type of interaction with these variables, as long as the logic driving new adoptions does not remain constant. The findings confirm H6 for most of the proxies (see table 3). The number of veto players has a negative and significant influence on the probability of creation of regulatory agencies, during the first stage of diffusion, but the influence becomes positive when diffusion gains some momentum. To analyse better the impacts of this variable on agency creation, we calculate the difference in the predicted probabilities when the variable is at their minimum and maximum values, as estimated by models 6a, 6b and 6c. We present the results in table 4, where we find that during the 1990s the probability of creating an agency was 0.017 higher in countries with the maximum of veto players than in countries with the minimum. With similar calculations but considering that diffusion variables had already half of the agencies created, results indicate a

very strong impact during the intermediate stage of 1979-1990 (about 0.29 difference in predicted probabilities between minimum and maximum values of this variable) and a considerable impact since 1990 (0.057 difference).

Table 3: Logistic regression: creation of regulatory agencies (1964-2002). Full Model

	Model 6 All	Model 6^a 1964-1978	Model 6b 1979-1990	Model6c 1991-2002	Model 7 All
(Intercept)	-3.169 ***	-8.639 ***	-1.846 ***	-1.832 ***	-2.790 ***
Previous	-6.038 ***	-27.586 ***	-4.972 ***	-6.963 ***	-5.988 ***
Within-co	5.832 ***	8.479 ***	6.247 ***	4.986 ***	5.827 ***
Within-sec	5.941 ***	24.309 ***	9.915 ***	5.086 ***	5.937 ***
Country-to-co	0.130 ***	0.696	0.653 ***	0.250 ***	0.095 ***
Sector-to-sec	0.002 ***	0.010	0.002 *	0.001 *	0.002 ***
Log (Veto play)	0.340 ***	-0.410 ***	0.472 ***	0.393 ***	0.334 ***
Log(Country size)	-0.056 ***	-0.104 ***	-0.233 ***	-0.024 ***	-0.056 ***
Log(GDP per capita)	-0.129 ***	0.323 ***	-0.013 **	-0.188 ***	-0.135 ***
Country-to-co:Log(Trade relations)	-0.004 *	0.054	0.028 ***	0.009 ***	
Country-to-co:Abs(Trade equivalence)	-0.362 ***	2.993 ***	-0.868 ***	-0.242 ***	
Log (Trade relations)					0.014 ***
Abs(Trade equivalence)					-0.167 ***
AIC	2043942	175689	526723	1268873	2043442

Note: Here we cannot compare AICs since we use different sub-samples of the dataset for each regression.

Table 4: Predicted probabilities of agency creation (variation in domestic and cross-country variables)

	1964-1978	1979-1990	1991-2002
Log(Veto-play)	Min: 0.0034 Max: 0.0009 Dif: -0.0025	Min: 0.0020 Max: 0.0094 Dif: 0.0074	Min: 0.0067 Max: 0.0242 Dif: 0.0174
Log(Country-size)	Min:0.0017 Max:0.0008 Dif:-0.0009	Min: 0.0177 Max:0.0033 Dif: -0.0145	Min:0.0210 Max:0.0176 Dif: -0.0034
Log(GDP per capita)	Min: 0.0005 Max: 0.0023 Dif: 0.0019	Max: 0.0073 Min: 0.0069 Dif: -0.0004	Min: 0.0315 Max: 0.0127 Dif: -0.0188
Log(Trade relations)	Min: 0.0011 Max:0.0012 Dif: 0.0001	Min: 0.0068 Max:0.0073 Dif: 0.0005	Min: 0.0189 Max: 0.0193 Dif: 0.0005
Abs(Trade equivalence)	Min: 0.0011 Max: 0.0015 Dif: 0.0004	Min: 0.0072 Max:0.0065 Dif: -0.0006	Min: 0.0192 Max:0.0187 Dif:-0.0005

Note: Min. refers to the predicted probability when the variable is at its minimum value, and max., when it is at its maximum. Dif. refers to changes in probability when the variable goes from the minimum to the maximum of its range. All other variables remain at their respective means (see appendix 2).

Source: Models 6a, 6b and 6c.

The size of a country and the GDP per capita significantly affect the dependent variable for all the models. For early stages of diffusion, richer countries show a higher probability of creation. However, the signs for the GDP per capita are negative for periods after 1978. We should then expect richer countries to show a lower probability of having regulatory agencies than poorer ones, particularly after 1990 (with a difference in the probability of creating an agency after 1990 between the poorest and the richest countries of 0.019 – which reaches a difference of 0.06 if we compute a proportion of 50% in diffusion variables). The negative sign in the country size variable should indicate that the larger the number of habitants in a country the smaller the probability of the establishment of a new agency. However, the negative effect of larger population on the probability of agency creation was strongly concentrated during the 1980s (about 0.015 difference from the smallest to the largest country, which reached 0.38 in case of computing a proportion of 50% in diffusion variables), while differences were almost irrelevant in the period before 1979, and not very important during the 1990s.⁹ We observe a similar pattern for all three domestic variables: in earlier stages of diffusion: more veto players prevent regulatory agencies, wealthier countries are more innovative; and bigger countries are less influential to foreign models. However, this pattern changes progressively in latter stages of diffusion, reversing most relationships. To explain this, we may suggest that progress in diffusion overcame domestic variables, being emulation progressively more effective for the institutionally weaker, poor and small countries.

⁹ These variations are not equal at different levels of policy constraints and GDP per capita as we used the logs. Hence, the effect of the policy constraints is higher when a change is made on its lowest levels than when it is made on its highest levels (also with GDP per capita and veto-players).

The cross-country variables vary as well with the diffusion process. In model 6a the variable Country-to-co: Log(Trade relations) is almost not significant. However, models 6b and 6c referring the periods 1979-1990 and 1991-2002 show the coefficients as clearly significant, with a positive sign. It is possible to suggest then, for late periods of diffusion, that the stronger the trade relations between pairs of countries, the greater the probability of creation of an agency in the country of destination when an agency was created in the country of origin. The other cross-country variable, country-to-co:Abs(Trade equivalence), indicates countries' structural equivalence, and it is significant for all the periods, being much the strongest coefficient, particularly during the 1980s. We can interpret this result as indicating that as absolute differences between pairs of countries grow, the probability of one country following the other decreases (this is the reason for the negative sign). Thus, as countries are more similar, despite the absence of strong direct trade connections, the creation of a regulatory agency in the country of origin increases the probability of creation of an agency in other countries. However, the positive sign of the coefficient in early stages of diffusion indicates that this variable only works as expected in later stages. Table 4 shows that the effects of changes in the values of this cross-country variable are also very low when diffusion variables are at their mean. However, further calculation based on model 6 shows that it is much stronger for the intermediate stage of the diffusion process when diffusion variables are at 50%.

These two variables are closely related to Polillo and Guillén's (2005: 1777-80) assertion that normative emulation occurs through countries having intense relations with each other, while mimetic emulation is behind the role equivalence effects among countries, because competition among peers encourages comparison and imitation. What we found here confirms their views, as far as the indicator of mimetic emulation impacts the dependent

variable much more strongly than the indicator for normative emulation in respect of the country-to-country channel. This also makes sense indeed with our interpretative framework, where we considered the country-to-country channel related to mimetic emulation (and for this reason, the structural equivalence indicator probably reinforces the effects of this channel, while the trade direct relations indicator weakens it).¹⁰

All in all, we found that in the incubation period (1964-1978) the spread of agencies was dominated by the “within-sector” channel of diffusion, delineating a process in which few policy sectors expanded. Wealthy countries and countries with few veto players were more likely to establish regulatory agencies in those early stages. Channels of diffusion identified with mimetic emulation were not influential, nor were the variables related to the expansion of trade. During the take-off period (1979-1990) the "within-sector" and "within-country" channels had more similar effects, suggesting the creation of a 'global' norm promoting agencification. In addition, the “country-to-country” channel became significant as well, as the indicator of structural equivalence in trade. This indicates some important mimetic effects during this period. National communities started to imitate others, and in consequence smaller countries showed in this period probably showed higher odds of creating regulatory agencies than larger countries. We also observe, against common wisdom, that poorer countries and those with more veto players were more likely to create regulatory agencies – most likely as a result of a stronger institutional emulation in the diffusion process. Finally, during the saturation period (1991-2002) the role of domestic political communities expanded the diffusion process. In addition to the role of the “within-country” channel, the

¹⁰ Model 7, which introduces the cross-country variables without interacting with the country-to-country channel, confirms this interpretation. Results show that the coefficient becomes significant and higher for direct trade relations, while the coefficient for the trade structural equivalence variable loses half its value. While for the former case a different emulation mechanism might be in conflict, for the latter both indicators refer to the same emulation mechanism: one more network-based, the other more structural (trade)-based.

“country-to-country” channel remained significant and coefficients of cross-country variables were less strong but still significant, indicating both mimetic emulation. In short, institutional emulation varied with the various stages of the diffusion process.

Conclusions

This paper has asked why autonomous regulatory agencies spread so widely and unexpectedly, and how they became the appropriate institutions to govern capitalism and its externalities. The answer we offer sheds some light on the process of change in the governance of capitalist economies. We contend that diffusion channelled via networks of cross-national and cross-sectoral nature made the autonomous regulatory agencies a "global" best practice. On the basis of our findings it is possible to assert that the study of the circulation of information across countries and sectors is of great value for understanding political and economic changes in an interdependent world and the recursion of the process of bureaucratization. Our ability to demonstrate the importance of institutional emulation reinforces conclusions of Polillo and Guillén (2005) and Simmons and Elkins (2004) about the role of other countries – particularly structural equivalents – in the decision to adopt institutions or policies.¹¹ We went beyond these authors however in the sense that this paper explored the role of emulation across different channels as indicators of diffusion across different policy communities.

We also demonstrated that institutional emulation was not a homogeneous process in the sense that the effects of the channels of diffusion or any other causal force were constant

¹¹ In both cases authors identify a network structure behind countries' attitudes, sharing the view that their connections may be relevant. While Simmons and Elkins claim that decision-makers will compete on rational grounds, Polillo and Guillén assume mimetic emulation among countries, but the structural forces they expect to operate are quite similar.

over time. Studies that overlook this heterogeneity may under-specify important dimensions of the diffusion processes, and more generally important aspects of global political and policy changes. Moreover, the increasing importance of networks of professionals and regulators, and the increasing embeddedness of the national in the global, and the global in the national, make the distinctions between different networks and between different channels of diffusion increasingly important. Accordingly, the growing awareness of the importance of multi-level analysis should be accompanied by growing awareness of the co-existence of various sectoral and national networks as facilitators and inhibitors of change, combining the NPA and PSA approaches. At the same time that we asserted the importance of sectoral diffusion we were able to confirm the importance of country-level diffusion and more generally the usefulness of the national patterns approach. The interaction between diffusion within countries and diffusion within sectors accelerated global diffusion. While the first steps of diffusion up to the late 1970s occurred basically within some selected sectors, late the “within-country” channel gained more relevance when domestic political communities started to diffuse norms of emulation across sectors in their countries. This stimulated the expansion of regulatory agencies to other sectors lacking strong policy communities at the global level. Country-to-country diffusion contributed critically to expanding diffusion to higher levels since the 1980s, until this institutional form finally became generalized as a global standard during the 1990s.

Our findings have several implications for the study of regulatory reforms and regulatory capitalism more generally. The empirical data show a sweeping process of regulatory agencification, which represents a significant change in the organization of the state and a qualitative change in the way capitalist economies are governed. Scholars of bureaucratization have paid only limited attention so far to the scope and implications of this

change. To the extent that they have, they tended to over-rationalize it. History seems to repeat itself, at least in this case. DiMaggio and Powell's (1983) warning against materialist interpretations of the process of bureaucratization, and their contention that that the state and the professions – rather than the market - became the major engines of rationalization is highly cited and acclaimed. Yet and unfortunately, these acclamations had little effect so far on the way regulatory reforms are interpreted. Materialist interpretations still dominate the literature on regulation and more generally the discussion of global change. We suspect that the current wave of reforms, very much like the earlier process of bureaucratization, is not leading to homogenization based on superior institutional design but on the forces of normative and mimetic emulation under conditions of uncertainty and growing professionalization of the state. Scholars of regulatory reforms are invited to revisit the iron-cage imagery yet again.

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Appendix 1: Data and sources

Our data documents the year of establishment of an agency and where relevant also the year of the reform that reinforced its autonomy. Rather than measuring autonomy, which is a controversial task and impractical for this kind of data, we took autonomy as an institutional feature: when an agency was declared autonomous and when it acquired a separate identity from its ministry we considered it autonomous. In order to capture delegation decisions in the research period we coded the dependent variable using a demarcation date for the start of the analysis, and took 1964 as the first year. This longitudinal variable, the creation of a regulatory agency, is codified according to the following criteria:

- a) The year of creation of autonomous regulatory authorities if established after January 1st 1964.
- b) Regulatory agencies that existed before 1964 are identified by the first date (after 1964) on which reforms enhanced the agency's regulatory identity and its formal autonomy.
- c) Autonomous regulatory agencies created before 1964 but were not reformed (i.e., placed more emphasis on regulation and enhanced formal autonomy) were left censored; while those which do not create any autonomous regulatory agency up to 2002 were right censored.

The database for the dependent variable (regulatory agency creation or reform) covers 49 countries and 16 sectors (784 cases in all). The unit of analysis was a country-sector-year for 39 years between 1964 and 2002 (29,792 observations in all). Countries were 19 Latin American, 15 European Union members (before 2005), and all other OECD countries (15 additional countries). At least one regulatory authority was identified in all the countries selected. When a regulatory institution had responsibilities for more than one sector, the same regulatory authority was considered repeatedly for as many sectors as applied. At some point a regulatory agency might have expanded its scope to other sectors after the year of its creation. In that case, we took the year of “creation” (of a new ‘country-sector’) as the year in which the agency assumed such additional responsibilities. Accordingly, the number of actual regulatory institutions might have been smaller than the total number of regulatory authorities identified for each country in the database. We did not identify a single case where legislation fully reversed agency autonomy in the period under study, nor did we record a case of agency ‘death’. There were few instances of agency restructuring (expanding the scope of authority) and changes of title, as well as mergers. The main source for the construction of the database

was information available on the websites of the regulatory authorities on the characteristics of each institution. This information was meticulously scrutinized. In most cases the information about most of the variables selected was drawn directly from the legal provisions for those institutions (laws, decrees, regulations, statutes, etc.); in others the general legislative frameworks of each country were used. Other sources include multilateral and international organizations of regulatory agencies, communication with regulators and professionals, and case-oriented secondary literature.

Sources:

Country population (Country size): World Bank, World Development Indicators (www.worldbank.org/data)

Country's veto players (Veto play): W. Henisz Polcon3 database (2000), updated 2005.

Country's wealth (GDP per capita): World Development Indicators, World Bank 2006

Countries' trade links (Trade relations): WTO, International Trade Statistics (http://www.wto.org/english/res_e/statis_e/statis_e.htm)

Countries' trade structural equivalence (Trade equivalence): WTO, International Trade Statistics (http://www.wto.org/english/res_e/statis_e/statis_e.htm)

Figure 1: Agency Creation and Reform: National Developments

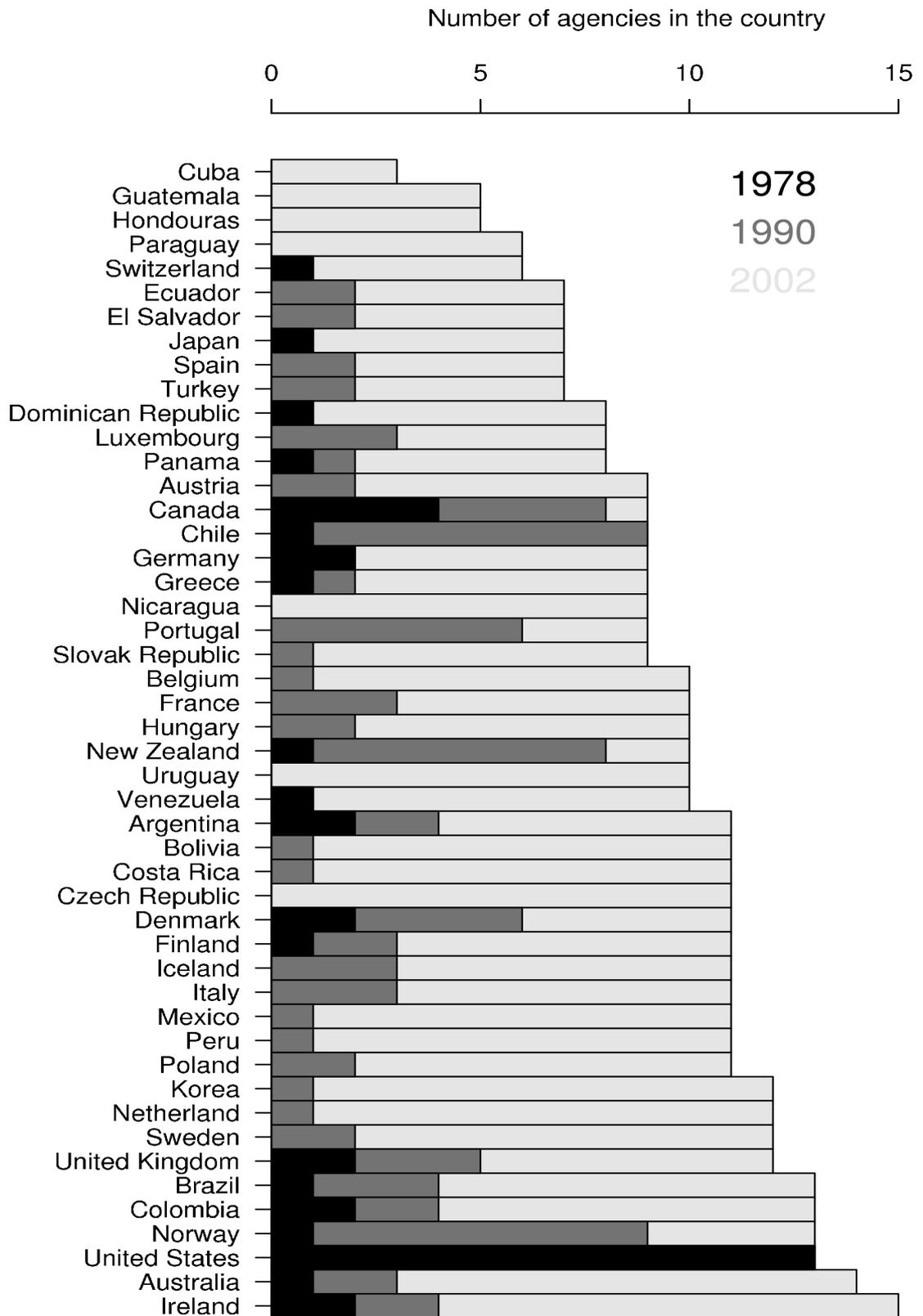
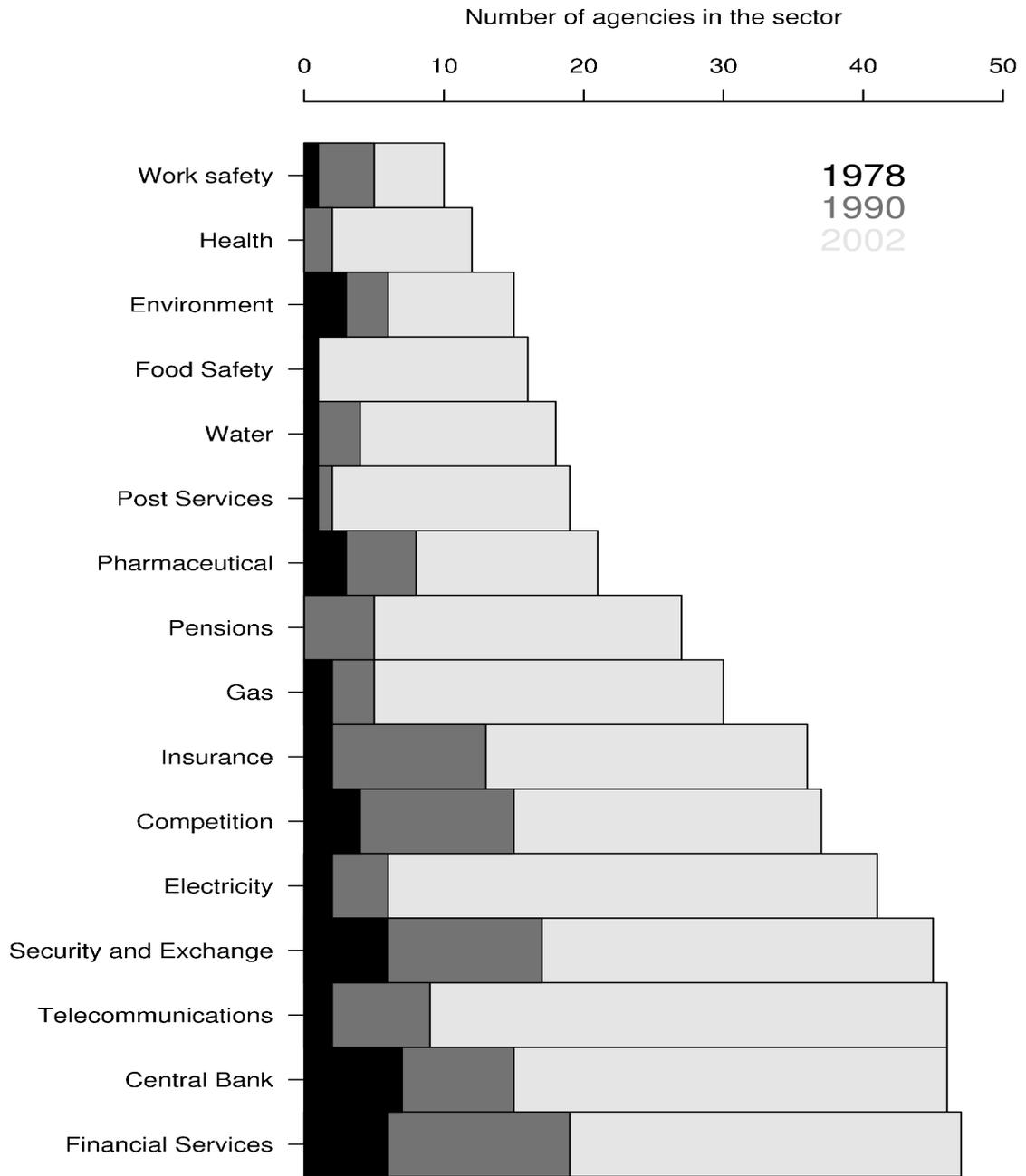


Figure 2: Agency Creation and Reform: Sectorial Developments



Figures 3/4/5/6: Predicted probabilities of the creation of a new agency over time: within-country channel; within-sector channel; country-to-country channel; and sector-to-sector channel (clock-wise order)

