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DEREGULATING TELECOMMUNICATIONS IN EUROPE:
TIMING, PATH-DEPENDENCY,
AND INSTITUTIONAL COMPLEMENTARITIES

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Abstract

We investigate institutional and policy drivers of telecommunications deregulation in Europe. In particular, we focus on those determinants which received so-far a comparatively little attention: policy speed and timing, path-dependency, institutional complementarity. We find that: first, cross-effects from privatizations to liberalizations reveal to affect the liberalization process; second, the telecommunications industry is shown to play a 'pivotal role' in the liberalization patterns of European countries; third, 'path dependency' turns out to be a crucial driver for telecommunications' liberalizations; fourth, liberalizations in telecommunications result to be linked across European countries; fifth, 'institutional complementarities' between liberalization initiatives and regulatory authorities are shown to significantly shape the telecommunications market structure. Finally, we interpret our findings in light of the evolution of the European regulatory framework and suggest that these results may represent important lessons for policy design in other network industries.

Keywords

Telecommunications, liberalizations, competition, panel regression.

Jel Classification: L43, L96, C23.

1. Introduction*

A growing diffusion of market-oriented policies in OECD countries has been observed over the last thirty years (Conway and Nicoletti, 2006). There is nowadays a wide consensus that a clear paradigm shift occurred from state-owned firms managing natural monopolies to the ‘regulatory state’ promoting competitive markets (Gilardi, 2002; Levi-Faur, 2005) and that telecommunications played a pivotal role in driving policy reforms in other network industries.

The last release of OECD’s indicators of entry barriers reduction (OECD, 2009) shows that, in the telecommunications sector, European countries are on average aligned towards the highest value of the indicator measuring market openness. Thus, according to these indicators, telecommunications liberalization in Europe represents a successful story, approaching its end.

Despite the wide empirical literature devoted to the issue, a comprehensive analysis aimed at disentangling the institutional features which affected the observed deregulation processes, is still in its infancy. Several dimensions of the deregulation process still need to be ascertained. Policy issues like timing and sequencing, path dependency and institutional complementarity are far from being fully measured and assessed. We believe that understanding the role of such neglected determinants of deregulation is crucial, not only for the appraisal of the evolution of telecommunications sector, but also for the lessons that we could derive for deregulating other network industries.

The vast array of available empirical analyses confirms each, some specific, but certainly nonexhaustive features of the many determinants of telecommunications deregulation: the economic rationale behind the dis-integration of natural monopolies and the introduction of downstream competition through nondiscriminatory access to essential facilities (Armstrong and Sappington, 2006); the rise of the ‘regulatory state’, as a new institutional model based on the removal of barriers to entry, privatization programs, independent regulatory agencies and antitrust enforcement (Majone, 1997; Gilardi, 2005; Levi-Faur, 2005; Gual and Trillas, 2006); the impact of globalization and Europeanization on policy diffusion (Bartle, 2002; Levi-Faur, 2003, 2004; Clifton, *et al.*, 2006; Thatcher 2007); the pressure towards internationalization of national champions beyond national and European frontiers (Chari and Gupta, 2008; Clifton *et al.*, 2010); the role of governmental ideology in promoting privatization (Bortolotti and Pinotti, 2005; Duso, 2002) and liberalization of network industries (Pitlik, 2007; Potrafke, 2010), also through a process of growing convergence between right-wing and left-wing liberalization, after the so-called second-wave neo-liberalism (Belloc and Nicita, 2011a).

In this paper we contribute to the empirical literature on the determinants of market-oriented policies in European telecommunications, by investigating three dimensions of the deregulation process, which have received so-far comparatively little attention: (i) policy timing and sequencing; (ii) path dependency; and (iii) institutional complementarity.

In particular, we perform an econometric analysis on the European countries’ experience, analyzing the institutional determinants of telecommunications liberalization in Europe, i.e. of those policies aimed at reducing sectoral barriers to entry in the sector we investigate. We use data from various sources over the 1975-2007 period, covering 22 countries.

With reference to *policy timing and sequencing*, we investigate whether countries followed a sequencing strategy in the adoption of market reforms, and, specifically, in the way they combine liberalization and privatization policies (Belloc and Nicita, 2011b). Despite they received so-far a very limited attention (Bagdadioglu and Cetinkaya, 2007), timing and sequencing may matter in terms of the effective degree of market competition they induce (De

* We would like to thank participants to the Seminars and Lectures at the Florence School of Regulation (RSCAS-EUI), where the paper was presented. Usual disclaimers apply.

Fraja, 1991, 1994; Stiglitz, 1999; Newbery 2004;) and thus remain important dimensions of liberalization policy to be investigated. Our findings show that timing and sequencing between liberalization and privatization reveal to affect the liberalization process, as higher levels of privatization induce greater intensity of liberalization. Moreover, our results show that the telecommunications industry played a ‘pivotal role’ in the liberalization patterns of European countries, as the telecommunications induced liberalization interventions in other network industries.

The second dimension we analyze – *policies’ path-dependency* – refers to the analysis of the intertemporal causality in distinct domains: within the adoption of the same policy over time and among a given policy and other market oriented policies. Again, it is interesting to investigate the emergence of any path-dependent process between liberalization and privatization within the telecommunications sector on the one side, and among this sector and the same policies adopted in other network industries. In our view, this is an important issue, in order to ascertain whether and to what extent liberalization in telecommunications followed a cumulative or a ‘punctuated’ process. Our findings show that ‘path dependency’ turns out to be another relevant driver for telecommunications liberalizations, as the actual decision to liberalize explains subsequent relative liberalization outcomes in the telecommunications sector. This means that, on average, liberalization policies in the sector showed a cumulative continuous process over the years, without reversals. Furthermore, our path dependency analysis unveils some systemic features of the liberalization process. First, individual countries tend to delay the complete liberalization of telecommunications if the other sectors are still far from being fully liberalized. Second, liberalizations in telecommunications are linked across European countries, in such a way that each country reduces the intensity of its sectoral liberalization in telecommunications, if other nations are liberalizing relatively less.

The third dimension we investigate is the *institutional complementarity* surrounding liberalization policy in European telecommunications. We believe this is a crucial dimension, as the emergence of institutional complementarity may show that the outcomes of a certain institution/policy are positively related to the presence of another institution/policy (Aoki, 2001). Again, while the empirical literature on this issue is fairly limited (Gual and Trillas, 2006; Gual and Jodar-Rosell, 2008), it is important to ascertain under which institutional conditions liberalization policies increase their performance, relative to other institutional constraints. In particular, we have empirically investigated whether liberalization policy and regulatory authorities reveal to be institutional complements, enhancing the mechanism of competition, measured by pro-competitive changes in the market structure. Gilradi (2002), for instance, highlights how regulatory agencies represent one of the main institutional features of the regulatory State in Europe. We find that ‘institutional complementarity’ reveals to be statistically significant as liberalization initiatives under the presence of regulatory authorities have a positive joint effect on the telecommunications market structure, in terms of entrants’ market share. Specifically, the presence of regulatory authorities increases the marginal effect of the intensity of liberalization interventions on the entrants’ market share. This result unveils that, while sectoral liberalizations play a positive effect in shaping the telecommunications’ market structure, such effect is likely to be undermined if independent regulatory authorities are not yet established, i.e. legal liberalizations alone are not sufficient to fully manifest the expected benefits of substantially liberalized markets.

Our findings reveal that the institutional determinants of the deregulation process we investigate play a relevant role and affected the intensity of deregulation process in European telecommunications. Our results may shed new lights on our understanding of ‘the market deregulation paradigm’, thus providing important guide-lines for other countries and/or other network industries, which actually stand behind the deregulation wave observed in the European telecommunications sector.

The paper proceeds as follows. In section 2 we outline the main stylized facts emerging from OECD data, focusing in particular on the pattern of liberalization and entrants’ market share in

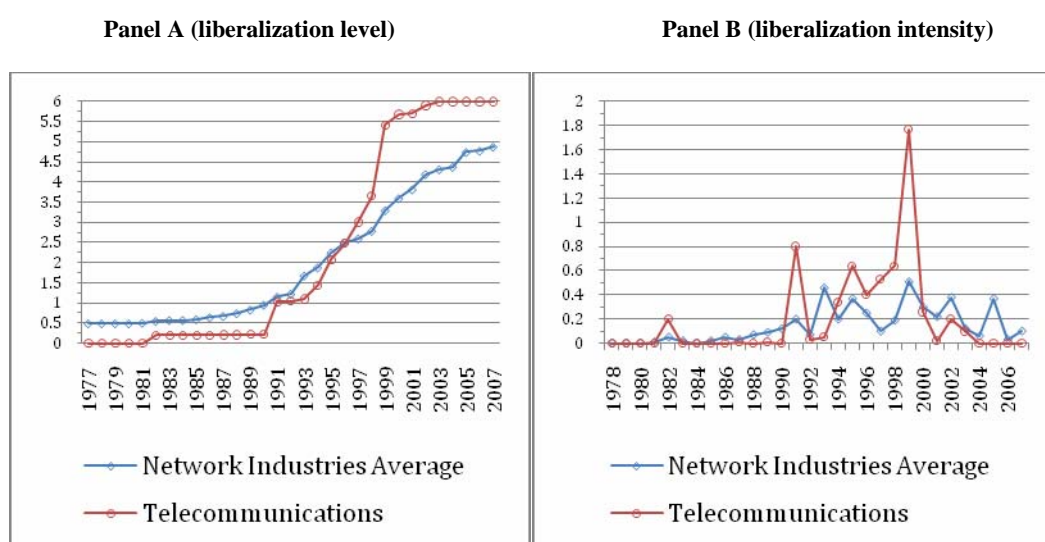
the telecommunications sector, relative to the average value of liberalization in other network industries. Section 3 reports our econometric analysis along the three institutional dimensions we disentangle. Section 4 concludes.

2. The liberalization wave in European telecommunications: some stylized facts

The OECD data (OECD, 2009) show that, over the last decades, the EU's telecommunications sector experienced relatively deeper liberalization interventions, in terms of the reduction of barriers to entry, comparatively to other network industries (such as passenger air transport, electricity, gas, post, and rail).

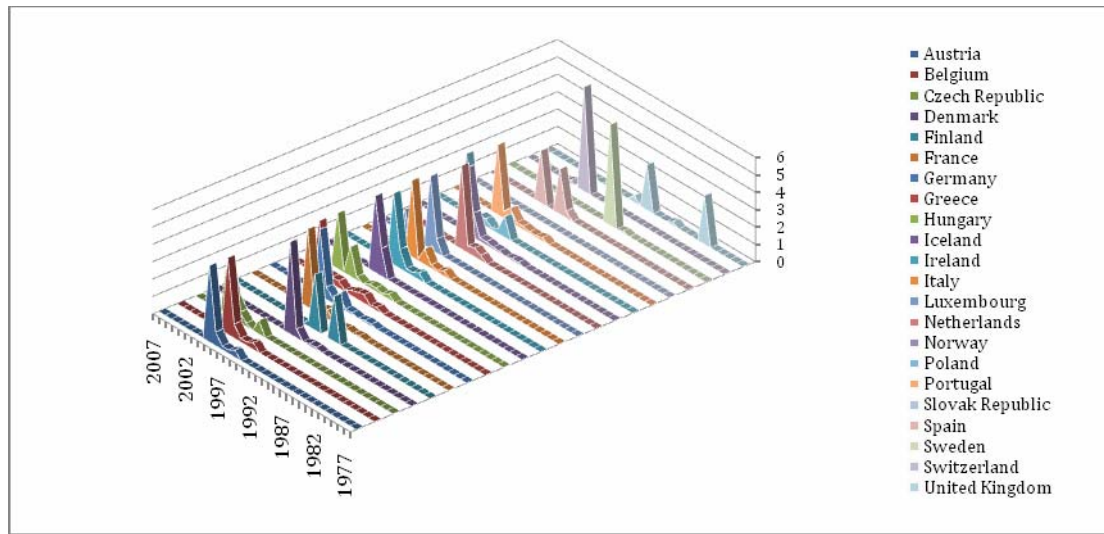
As many scholars have observed, from 1990 to 2000, European countries removed all the entry barriers to the telecommunications market, while other sectors still stay behind (Figure 1, panel A). On average, telecommunications experienced a relatively faster and deeper liberalization wave, as it is clearly outlined by comparing the intensity of the liberalization interventions in telecommunications with the average intensity of the liberalization initiatives in the other network industries (Figure 1, panel B). Moreover, the observed process of liberalization outlines that countries followed a cumulative approach in their policy adoption, progressively increasing the intensity of their telecommunications liberalization measures with a pick around the end of the Nineties and then reducing the magnitude of the interventions. While this may suggest a sort of 'wait and see' strategy, no reversals have been observed over time. European countries, thus, tended to converge towards full liberalization, probably as the result of the EC policy pressure, although some governments launched liberalization before others and with different intensity (Figure 2).

FIGURE 1. Liberalization levels (left panel) and liberalization intensity (right panel) over the 1977-2007 period in EU15 (source: elaboration from OECD (2009)).



Note: liberalization (left panel - Y axis) is measured by subtracting the OECD's (2009) indicator of entry barriers from its maximum value (the liberalization index thus ranges from 0 – minimum liberalization – to 6 – maximum liberalization –). The liberalization initiatives' intensity (right panel - Y axis) is calculated as one-year variations of the liberalization index. The network industries' average comprises six sectors: passenger air transport, telecommunications, electricity, gas, post, and rail.

FIGURE 2. Liberalization intensity over the 1977-2007 period for 22 European countries (source: elaboration from OECD (2009)).



Note: the liberalization initiatives' intensity (Y axis) is calculated as one-year variations of the liberalization index.

Figure 3 shows the liberalization paths of 22 European countries over the 1977-2007 period. This comparative representation of individual countries' patterns is particularly useful in order to outline – from a descriptive point of view – how European nations followed on average a similar sequencing in liberalizing the telecommunications industry. While some Northern countries did start the liberalization process before the others (this is the case of the United Kingdom at the beginning of the Eighties and, to some extent, of Sweden and Finland some years later), it is also possible to notice that almost all the countries followed a cumulative continuous process over the years, without reversals, completing the entry barriers to market reduction by the end of the Nineties.

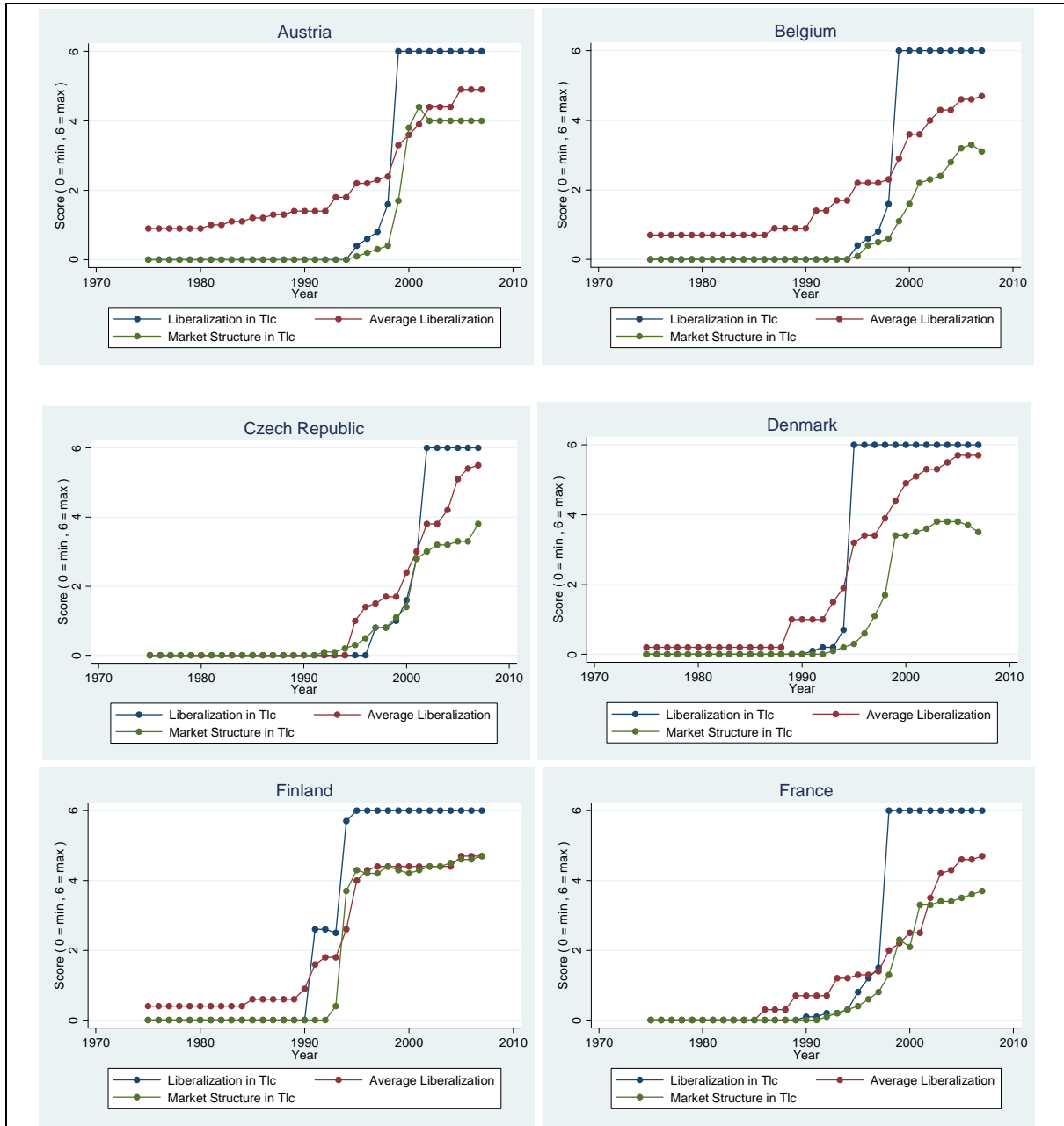
The descriptive evidence presented in Figure 3 suggests that, on average, the first liberalization interventions in telecommunications were little in terms of intensity, but also that all the European countries rapidly increased the magnitude of their reforms after few steps – bringing the entry barriers to the telecommunications market below the national network industries' average –, so that liberalizations in telecommunications seem to have played a 'drawing role' in the liberalization patterns of European network sectors.

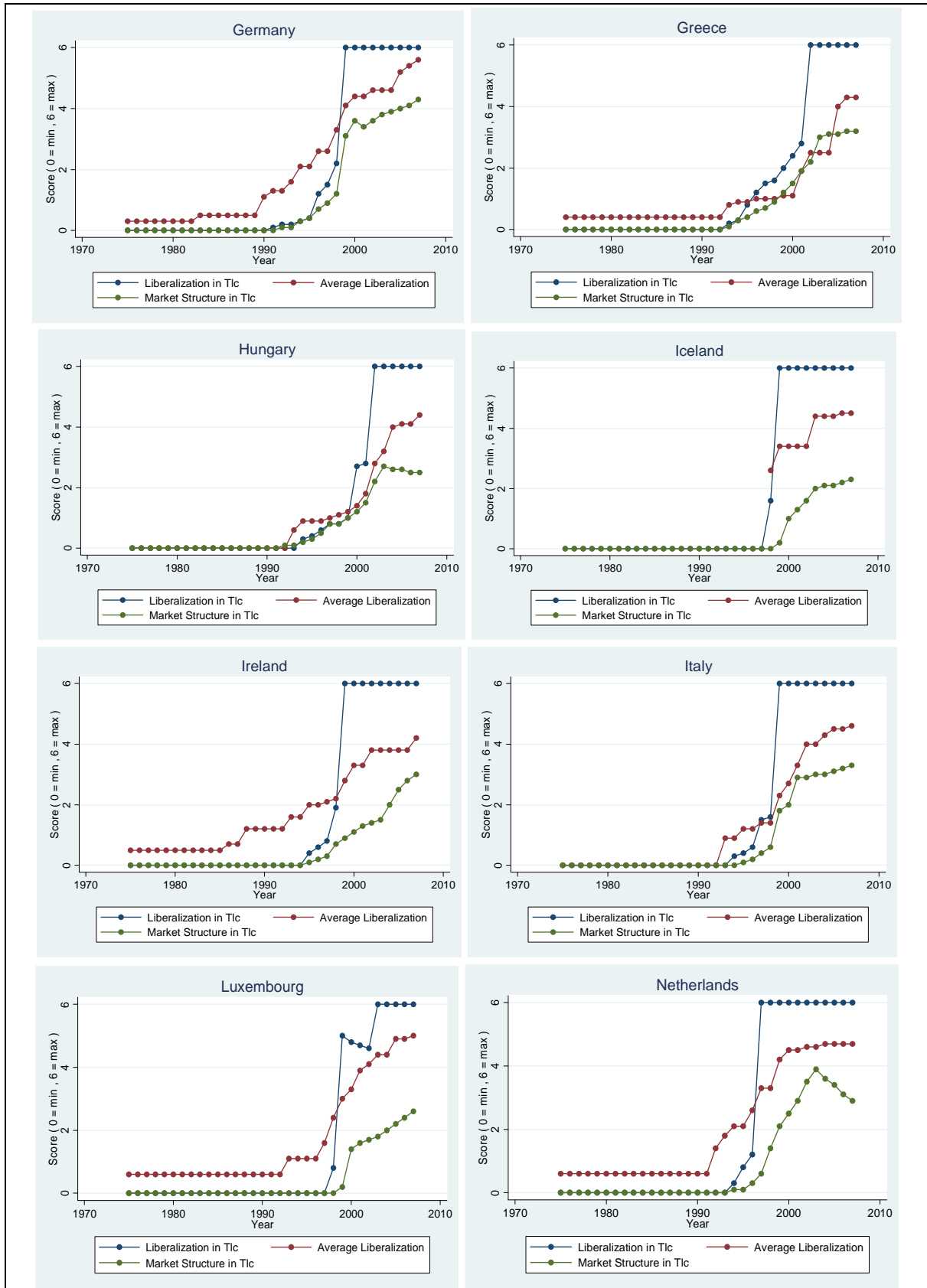
Moreover, Figure 3 shows that the evolution of the telecommunications market structure, differently from that of the liberalization reforms, presents rather strong differences across European nations, with many countries progressively increasing the new entrants' shares to the detriment of the incumbent's ones and some others (such as Belgium, Denmark, Hungary, Netherlands, Switzerland and United Kingdom) even experiencing a reduction of the competition level in the last few years.

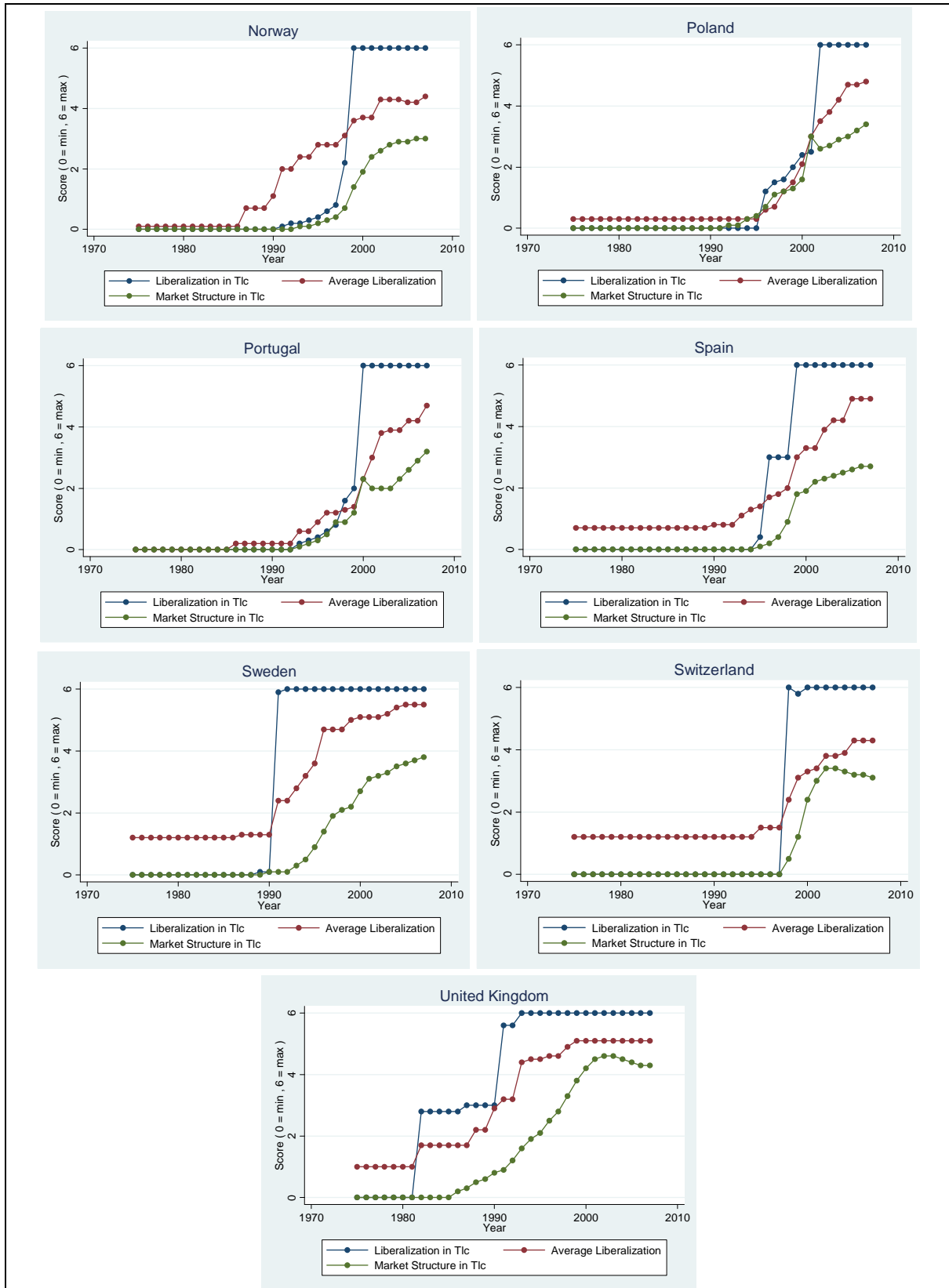
The above stylized facts suggest new research questions on some dimensions of European telecommunications liberalization which need further investigation. First, we need to ascertain whether the decision to liberalize a network industry depends on the individual country's characteristics and how these local conditions affect the pace of liberalization. Second, we still need to understand the way in which liberalization measures interact with others reforms (such as privatization). Third, we need to investigate the differences between the liberalization patterns in telecommunications and in other sectors. In particular we want to investigate whether there is any path dependency in the telecommunications liberalizations' patterns of European

countries. Fourth, we need to understand why the evolution of the telecommunications market structure does not perfectly mirror the liberalization reforms' pace. We try to give an answer to these questions in the following section.

FIGURE 3. Liberalization patterns in the telecommunications sector, compared with the average entrants' market share in the telecommunications market and with the average liberalization levels in seven network industries, over the 1977-2007 period for 22 European countries (source: elaboration from OECD (2009)).







Note: liberalization is measured by subtracting the OECD's (2009) indicator of entry barriers from its maximum value (the liberalization index thus ranges from 0 – minimum liberalization – to 6 – maximum liberalization –). The market structure is expressed through an index calculated as a weighted average of the market share of new entrants in the trunk telephony market, in the international telephony market, and in the mobile market; we obtain this index by subtracting the OECD's (2009) indicator of incumbent's share from its maximum value (the market structure index we use thus ranges from 0 – minimum entrants' share – to 6 – maximum entrants' share –). The network industries' average comprises six sectors: passenger air transport, telecommunications, electricity, gas, post, and rail.

3. Three neglected dimensions of liberalization in European telecommunications

As outlined in the previous section, in the last few decades, especially from the mid-Eighties thereafter, European telecommunications experienced a deep wave of liberalization interventions. The European Commission's approach to regulation in telecommunications acknowledged this trend, encouraging the promotion of competition rather than maintaining natural monopolies in the industry.

While many dimensions of telecommunications liberalizations have been analyzed by the economic literature, the empirical evidence linking the evolution of liberalization policy to its institutional determinants (Levy and Spiller, 1996) is still in its infancy. In this section we attempt to fill this gap through the empirical analysis of three institutional dimensions of liberalizations which have received a comparatively little attention so far: policy timing and sequencing, path dependency, and institutional complementarity.

3.1. Policy timing and sequencing

The issue of policy speed and sequencing has been largely investigated by the literature on the optimal design of market-oriented reforms in transition countries (Frydman and Rapaczynski, 1991; Lipton and Sachs, 1990; Blanchard *et al.* 1991; Roland, 1994; Dewatripont and Roland, 1995; Joskow, 1998). Relative to privatization policy, the issues of the proper policy timing and sequencing have been referred to the dilemma on whether to privatize before or after economic restructuring, or to proceed simultaneously. Moreover, the reform should be gradually implemented or should they follow a 'big bang' (Wallsten 2001, 2002, 2003, Lipton and Sachs, 1990; Kirkpatrick *et al.*, 2005)?

De Fraja (1991, 1994) addresses the trade-off between privatization and liberalization policies in network industries. He outlines that privatization may not enhance efficiency in the industry, as a full liberalization program would do, with private firms competing against an inefficient public owned incumbent. Moreover, he shows that the long run market competitiveness and the privatized firm efficiency are highly sensitive to whether privatization precedes liberalization or vice versa. In some cases, a liberalization program preceding privatization Pareto dominates the opposite sequencing. This theoretical conclusion is further acknowledged by Stiglitz (1999) and Newbery (2004).

With reference to the empirical literature, little of it analyzed the role of sequencing. Bagdadioglu and Cetinkaya (2007), analyzing the case of Turkey, summarizes the few empirical investigations that have been focused on the telecommunications industry. Wallsten (2001), using data concerning 30 African and Latin American countries, concludes that privatization positively affects the telecommunications sector only when implemented under a pro-market regulation. Fink *et al.* (2002), analyzing a panel data set from 86 developing countries for the period 1985-1999, conclude that it is welfare enhancing to introduce competition either before or simultaneously with privatization. On a similar vein, Li and Xu (2004) suggest that in order to maintain its desired efficiency outcomes the privatization process should be coupled with substantial competition.

In this section we try to investigate whether and to which it is possible to identify a policy sequencing in European telecommunications liberalizations (i.e. the interaction between past and present liberalization measures and the interaction between liberalization and others reforms – such as privatization –). In doing so, we also control for socio-economic features of countries and for unobservable sector-specific characteristics which may play a role in explaining the intensity of liberalization interventions.

In order to perform the empirical analysis we collect a well-suited data set in which we link information on countries' liberalization and privatization outcomes to socio-economic characteristics of countries. We use data from various sources over the 1975-2007 period. The

base sample we use covers 22 countries.¹ Note that our sample period includes the entire liberalization wave observed in European countries in the last three decades until 2007.

We consider an index of the intensity of liberalization interventions on a one-year basis (which we call *LiberalizationIntensity* in our empirical analysis) as the dependent variable. To construct such index, we use the OECD (2009) indicator of entry barriers. The OECD indicator of entry barriers is based on the *OECD Regulatory Indicators Questionnaire*, which collects information on the ranking of explicit policy settings (see Conway and Nicoletti (2006)) and measures the liberalization levels in seven sectors (passenger air transport, telecommunications, electricity, gas, post, rail, and road) through sectoral indicators. The sectoral indicators, specifically, measure for each country and sector the strictness of the legal conditions of entry, which we interpret as a proxy for sectoral liberalization. We measure liberalization levels by subtracting – for each country and sector – the OECD entry barriers index from its maximum value (let us call this variable *LiberalizationLevel*), and then calculate the intensity of sectoral liberalization interventions (*LiberalizationIntensity*) by looking at the one-year differences of *LiberalizationLevel*.²

Sectoral liberalizations may be dependent on past deregulation choices, on socio-economic characteristics of countries, and on unobservable sector-specific factors. In our analysis we consider all these three dimensions.

First, we model past deregulation choices. In particular, we consider a set of one-year-lagged deregulation choices adopted by governments. On the one hand, we consider the *LiberalizationIntensity* variable and the absolute level of sectoral liberalization (*LiberalizationLevel*) at $t-1$. On the other hand, we include two variables accounting for past privatization interventions. Firstly, we consider the absolute level of sectoral privatization (*PrivatizationLevel*) at $t-1$. To construct such index, we use the OECD's (2009) indicators of public ownership, which measures the public ownership levels through sectoral indicators. The sectoral indicators, specifically, measure for each country and sector the extent of public ownership in the companies operating in the considered network industries, which we interpret as a proxy for sectoral privatization. Secondly, we consider the intensity of the one-year-lagged privatization interventions (*PrivatizationIntensity*) by looking at the one-year differences of *PrivatizationLevel*. Potrafke (2010), among others, suggests that past deregulation initiatives are likely to affect subsequent policy interventions.

Second, as socio-economic characteristics of countries, we consider several variables. We consider a legislature-specific indicator of political concentration (*Herfindahl*), i.e. the sum of the squared seat shares of all parties in the governments (source: World Bank, 2008). As suggested by Bortolotti and Pinotti (2008), the level political competition, and so the effective lawmaking power of the government, is (possibly) relevant to the executive's capacity to implement economic policies. We also include a vector of socio-economic indicators: *EuMember*, i.e. a dummy variable that equals one when the country is a member of the EU, 0 otherwise (source: authors' coding); *EmplIndustry*, i.e. civilian employment in industry as a percentage of the total employment in the economy (source: Armingeon *et al.*, 2010); *Unemployment*, i.e. the unemployment rate as a percentage of civilian labor force (source: Armingeon *et al.*, 2010); *OpenEc*, i.e. the degree of openness of the economy, measured as total trade (sum of import and export) as a percentage of GDP (source: Armingeon *et al.*, 2010); and *Debt*, i.e. the gross government debt (financial liabilities) as a percentage of GDP (source:

¹ Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, United Kingdom. Note, however, that in the estimation analysis we drop from the sample the Czech Republic's and Hungary's observations referring to the years of communist dictatorship and those Slovakia's observations that refer to the period before it was declared a sovereign state.

² Note that in our empirical analysis we do not use data on the road sector, as, for such sector, information on privatization levels (that we consider as one of the covariates) are not provided.

Armingeon *et al.*, 2010). In this way, we are able to measure the effects of the economic characteristics of nations (both those concerning the industrial structure – through *EmplIndustry* and *Unemployment* – and the central governments’ financial situation – through *Debt* –), and of the countries’ exposure to policy initiatives of other countries and of supranational institutions (by using the two variables *EuMember* and *OpenEc*). Simmons and Elkins (2005), Dobbin *et al.* (2007), and Pitlik (2007), among others, suggest that domestic liberalization choices may be determined by transnational diffusion of public policies. Generally, policy initiatives take time to generate an observable economic (or legal) outcome (Potrafke, 2010). For this reason, we regress our *LiberalizationIntensity* variable on one-year-lagged covariates. In this way, we do not incur endogeneity or reverse causality problems due to the simultaneous determination of liberalization interventions and the given countries’ characteristics.

Third, to measure the role played unobservable industry-specific factors, we include in our model a set of sector fixed effects (by means of sectoral dummy variables, which we call *Tlc*, *Electricity*, *AirTr*, *Gas*, *Post*, and *Rail*), which account for the heterogeneity due to unobservable sectoral factors (assumed to be both country- and time-invariant). This allows us to isolate the effect due to technological unobservable characteristics of each industry.

Descriptive statistics of the control variables considered in our analysis are provided in Table 1.

TABLE 1. Descriptive statistics.

Variable	Obs.	Mean	Min	Max	Source
<i>LiberalizationIntensity</i>	3617	0.155	-0.199	6.000	Authors’ elaboration on OECD (2009) data
<i>LiberalizationLevel</i>	3730	1.944	0.000	6.000	Authors’ elaboration on OECD (2009) data
<i>PrivatizationIntensity</i>	3653	0.075	-1.000	6.000	Authors’ elaboration on OECD (2009) data
<i>PrivatizationLevel</i>	3762	1.453	0.000	6.000	Authors’ elaboration on OECD (2009) data
<i>Herfindahl</i>	3816	0.291	0.000	0.580	Armingeon <i>et al.</i> (2010)
<i>EmplIndustry</i>	3564	0.301	0.190	0.453	Armingeon <i>et al.</i> (2010)
<i>Unemployment</i>	3564	6.694	0.184	24.17	Armingeon <i>et al.</i> (2010)
<i>OpenEc</i>	3564	80.25	27.81	312.5	Armingeon <i>et al.</i> (2010)
<i>Debt</i>	3132	59.98	4.638	140.7	Armingeon <i>et al.</i> (2010)
<i>EuMember</i>	3948	0.338	0.000	1.000	Authors’ own coding

Formally, we consider the following cross-country panel model:

$$\begin{aligned}
 'LiberalizationIntensity'_{i,s,t} = & \beta_0 + \beta_1 'LiberalizationIntensity'_{i,s,t-1} + \beta_2 'LiberalizationLevel'_{i,s,t-1} + \\
 & + \beta_3 'PrivatizationIntensity'_{i,s,t-1} + \beta_4 'PrivatizationLevel'_{i,s,t-1} + \\
 & + \beta_5 'Tlc'_s + \beta_6 'Electricity'_s + \beta_7 'AirTr'_s + \beta_8 'Gas'_s + \\
 & + \beta_9 'Post'_s + \beta_{10} 'Rail'_s + \beta_{11\dots Z} \mathbf{V}_{i,t-1} + c_i + u_t + \varepsilon_{i,s,t}
 \end{aligned} \tag{1}$$

with $t = 1975, 1976, \dots, 2007$, and where \mathbf{V} is the vector of socio-economic control variables, c and u soak up the heterogeneity due to unobservable country and time factors (they capture, respectively, time-invariant country fixed effects and country-invariant time fixed effects), parameters from β_0 to β_Z define the parametric structure, ε are idiosyncratic disturbances that change across countries (i), sectors (s), and years (t). We perform a random-effects estimation.

We also consider a further model specification in which the sector fixed effects are interacted with the time fixed effects. Indeed, to assume that technological unobservable characteristics of each industry are time invariant – through a set of sectoral dummy variables (i.e. *Tlc*, *Electricity*, *AirTr*, *Gas*, *Post*, and *Rail*) – may be too restrictive, while industry effects

might play a different role, or might even change sign, over time. In order to account for this possibility, we estimate a further model where we introduce a set of unobservable sectoral factors interacted with a set of time dummy variables identifying each of the three decades included in our period coverage (i.e. the time period until 1990, that from 1990 to 2000, and that after 2000). As a result, we obtain a set of 6×3 dummies, which we include in place of the 6 time invariant sectoral dummies.

The estimation results are reported in Tables 2. We have considered eight panel model specifications. Specifications from (I) to (VI) have been obtained by adding one-by-one the socio-economic control variables. In specification (VII), the control variables are added all together. In specification (VIII), the sectoral dummies are substituted with the interaction terms between industry and time dummies.

The estimated parameters concerning past deregulation choices are broadly stable across different model specifications. Models from (I) to (VIII) show several results. First, the one-year-lagged liberalization intensity ($LiberalizationIntensity_{i,s,t-1}$) does exert a positive and statistically significant effect on the intensity of current liberalization initiatives. Second, the intensity of current liberalization initiatives is positively affected also by the absolute level of sectoral privatization at $t-1$ ($PrivatizationLevel_{i,s,t-1}$), so that the higher is the degree of private ownership in the market, the higher will be the intensity of subsequent liberalization campaigns. Third, the intensity of one-year-lagged privatizations ($PrivatizationIntensity_{i,s,t-1}$), instead, seems not to affect the intensity of current liberalizations. Fourth, one-year-lagged liberalization's levels ($LiberalizationLevel_{i,s,t-1}$) negatively affect the liberalization's intensity, i.e. sectoral liberalization interventions proceed at a slow pace when, in the given sector, entry barriers to market are already substantially removed. Socio-economic characteristics of countries, at the opposite, seem to be less relevant.

While models from (I) to (VI) show that the degree of political concentration ($Herfindahl_{i,t-1}$) and the employment in industry ($EmplIndustry_{i,t-1}$) do have a negative effect on the liberalization's intensity, and that the unemployment rate ($Unemployment_{i,t-1}$), the degree of openness of the economy ($OpenEc_{i,t-1}$), the government debt ($Debt_{i,t-1}$), and the EU membership ($EuMember_{i,t-1}$) a positive one, once all the control variables are included simultaneously (as in models (VII) and (VIII)), only $EmplIndustry_{i,t-1}$ and $EuMember_{i,t-1}$ turn out to have a statistically significant effect. This is an important result, as it reveals, on the one hand, that largely industrialized economies, in terms of number of employees, tend to be object of smaller liberalization interventions, and, on the other hand, that the country's exposure to supranational policy initiatives, such as those directed by the EU, acts as a strong positive stimulus for liberalization policies.

TABLE 2. The determinants of sectoral liberalization.

	I	II	III	IV	V	VI	VII	VIII
Dep.Var.:	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
<i>LiberalizationIntensity</i> _{<i>i,s,t</i>}	(Std.Err.)	(Std.Err.)	(Std.Err.)	(Std.Err.)	(Std.Err.)	(Std.Err.)	(Std.Err.)	(Std.Err.)
Past deregulation choices								
<i>LiberalizationIntensity</i> _{<i>i,s,t-1</i>}	0.070 *** (0.018)	0.071 *** (0.020)	0.066 *** (0.020)	0.069 *** (0.020)	0.066 *** (0.020)	0.077 *** (0.018)	0.074 *** (0.019)	0.054 *** (0.019)
<i>LiberalizationLevel</i> _{<i>i,s,t-1</i>}	-0.031 *** (0.005)	-0.050 *** (0.007)	-0.026 *** (0.005)	-0.030 *** (0.005)	-0.038 *** (0.006)	-0.060 *** (0.007)	-0.084 *** (0.009)	-0.099 *** (0.010)
<i>PrivatizationIntensity</i> _{<i>i,s,t-1</i>}	0.053 (0.037)	0.070 (0.043)	0.077 * (0.045)	0.078 * (0.045)	0.065 (0.045)	0.041 (0.036)	0.050 (0.043)	0.048 (0.040)
<i>PrivatizationLevel</i> _{<i>i,s,t-1</i>}	0.026 *** (0.008)	0.028 *** (0.008)	0.020 *** (0.008)	0.023 *** (0.008)	0.028 *** (0.009)	0.022 *** (0.007)	0.029 *** (0.008)	0.034 *** (0.009)
<i>Herfindahl</i> _{<i>i,t-1</i>}	-0.186 * (0.105)						-0.224 * (0.124)	-0.164 (0.123)
Socio-economic characteristics								
<i>EmplIndustry</i> _{<i>i,t-1</i>}		-1.739 *** (0.253)					-1.143 *** (0.275)	-0.655 ** (0.283)
<i>Unemployment</i> _{<i>i,t-1</i>}			0.005 ** (0.002)				-0.002 (0.003)	-0.000 (0.003)
<i>OpenEc</i> _{<i>i,t-1</i>}				0.001 ** (0.000)			-0.000 (0.000)	-0.000 (0.000)
<i>Debt</i> _{<i>i,t-1</i>}					0.001 *** (0.000)		0.000 (0.000)	0.000 (0.000)
<i>EuMember</i> _{<i>i,t-1</i>}						0.242 *** (0.036)	0.266 *** (0.040)	0.185 *** (0.046)
Time invariant industry effects								
<i>Tlc</i> _{<i>s</i>}	Benchmark	Benchmark	Benchmark	Benchmark	Benchmark	Benchmark	Benchmark	Benchmark
<i>AirTr</i> _{<i>s</i>}	-0.019 (0.042)	-0.023 (0.042)	-0.032 (0.043)	-0.027 (0.043)	-0.043 (0.047)	-0.010 (0.041)	-0.020 (0.046)	
<i>Rail</i> _{<i>s</i>}	-0.092 ** (0.040)	-0.128 *** (0.040)	-0.107 *** (0.040)	-0.103 *** (0.040)	-0.133 *** (0.045)	-0.139 *** (0.041)	-0.207 *** (0.048)	
<i>Electricity</i> _{<i>s</i>}	-0.020 (0.043)	-0.032 (0.044)	-0.021 (0.045)	-0.022 (0.045)	-0.032 (0.050)	-0.035 (0.042)	-0.058 (0.049)	
<i>Gas</i> _{<i>s</i>}	-0.073 * (0.041)	-0.085 ** (0.043)	-0.070 (0.043)	-0.073 * (0.043)	-0.091 * (0.049)	-0.089 ** (0.040)	-0.122 ** (0.048)	
<i>Post</i> _{<i>s</i>}	-0.025 (0.038)	-0.010 (0.037)	-0.034 (0.038)	-0.025 (0.038)	-0.038 (0.042)	-0.015 (0.037)	-0.008 (0.041)	

Deregulating Telecommunications in Europe: Timing, Path-Dependency, and Institutional Complementarities

Interaction terms between time and industry effects

<i>Tlc_{s,t}</i> (Eighties)								Benchmark
<i>AirTr_{s,t}</i> (Eighties)								-0.232 *** (0.038)
<i>Rail_{s,t}</i> (Eighties)								-0.271 *** (0.040)
<i>Electricity_{s,t}</i> (Eighties)								-0.298 *** (0.041)
<i>Gas_{s,t}</i> (Eighties)								-0.243 *** (0.043)
<i>Post_{s,t}</i> (Eighties)								-0.088 ** (0.041)
<i>Tlc_{s,t}</i> (Nineties)								Benchmark
<i>AirTr_{s,t}</i> (Nineties)								0.228 *** (0.089)
<i>Rail_{s,t}</i> (Nineties)								-0.218 *** (0.073)
<i>Electricity_{s,t}</i> (Nineties)								-0.050 (0.085)
<i>Gas_{s,t}</i> (Nineties)								-0.277 *** (0.057)
<i>Post_{s,t}</i> (Nineties)								0.023 (0.062)
<i>Tlc_{s,t}</i> (Two thousands)								Benchmark
<i>AirTr_{s,t}</i> (Two thousands)								-0.023 (0.054)
<i>Rail_{s,t}</i> (Two thousands)								-0.183 ** (0.073)
<i>Electricity_{s,t}</i> (Two thousands)								0.193 ** (0.077)
<i>Gas_{s,t}</i> (Two thousands)								0.162 * (0.087)
<i>Post_{s,t}</i> (Two thousands)								0.084 (0.062)
Constant	0.263 *** (0.049)	0.753 *** (0.100)	0.157 *** (0.038)	0.150 *** (0.038)	0.151 *** (0.045)	0.190 *** (0.032)	0.675 *** (0.130)	0.558 *** (0.132)
No. observations	3426	3151	3151	3151	2817	3458	2805	2805
Prob. > <i>chi</i> ²	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R2	0.015	0.031	0.015	0.015	0.021	0.034	0.055	0.087

Note: * < 0.10, ** < 0.05, *** < 0.01 statistical significance. Robust variance estimates.

Finally, sector specific effects unveil that the unobservable characteristics of the telecommunications sector have a positive and statistically significant effect on liberalizations in such sector. Indeed, model specification (VII) shows that, being the telecommunications the benchmark, all the dummies referring to the other sectors are associated to a negative parameter (statistically significant for the rail and gas industries, not statistically significant for the others). More specifically, model (VIII) reveals that unobservable industry factors led the telecommunications to be more intensively liberalized (relatively to the other sectors) especially in the Eighties, corresponding all the interaction terms between industry effects and time effects for this decade to negative and statistically significant parameters (note that, again, the telecommunications are the benchmark). In the Nineties, differently, the telecommunications have been more intensively liberalized only relatively to the gas and rail sectors, while after 2000 only the rail industry results to be associated to a negative and statistically significant coefficient. This finding suggests the ‘pivotal role’ played by the telecommunications industry in the liberalization patterns of European countries (Joskow, 1998), where the telecommunications seem to have opened up the way for the sectoral liberalization interventions of the other network industries.

Thus, summing up, as the first conclusion of our analysis we obtain a two-fold result concerning policy timing and sequencing. First, we observe the existence of cross-effects from privatizations to liberalizations in the European network industries deregulation. Second, in such deregulation process, the liberalizations of the telecommunications industry appear as force underpinning the liberalizations in the other network sectors.

3.2. Path dependency

In this section we empirically explore the path of liberalizations in the telecommunications sector, looking at its relative course with respect to the other network industries. We are thus interested in analyzing whether the wave of deregulation in network industries did follow a path-dependent process, affected by initial conditions or whether, instead, it has been determined by discontinuous phenomena of ‘stop and go’, in which systemic conditions did not play any significant role.

With respect to the speed and sequencing issue, the analysis of path-dependency of deregulation policies outlines the ‘systemic’ conditions which may have favoured or hindered the adoption of market-oriented policies. While this issue has been almost neglected in the relevant literature, we claim it allows to understand the extent to which market-oriented policies depend on local conditions, in order to assess the probability of success due to policy diffusion or ‘transplant’ among sectors and/or countries.

In this section we then investigate how European countries, on average, achieved the present level of market openness in telecommunications. We thus analyze the (possible) path dependency of telecommunications’ liberalizations by investigating how and to which extent liberalizations in telecommunications were affected by the past deregulation choices of each country.

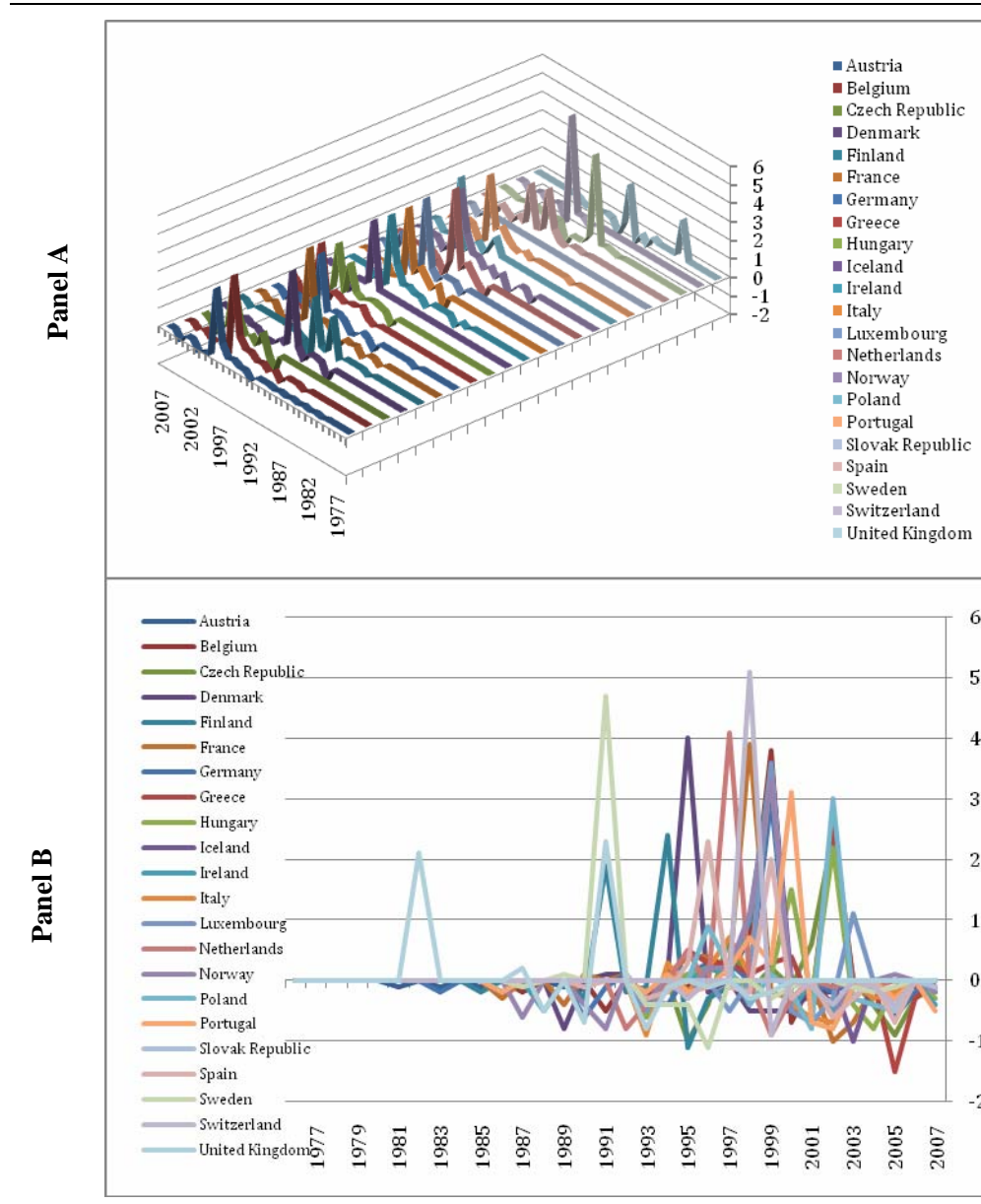
Figure 4 shows such patterns of relative liberalizations in telecommunications for 22 European countries over the 1977-2007 period. In particular, Figure 4 displays the relative intensity of liberalizations in telecommunications, obtained as the difference – for each country and year – between the liberalization’s intensity in telecommunications and the average liberalization’s intensity for all the six network industries considered in this paper (i.e. passenger air transport, telecommunications, electricity, gas, post, and rail).

Panel A of Figure 4 clearly shows that, over the last three decades, the intensity of liberalization interventions in telecommunications tended to be higher than that of the liberalizations in the other industries. Only after 2000, as it is shown by panel B of Figure 4, the

European countries progressively reduced the relative intensity of liberalization initiatives in telecommunications, and this is probably due to the fact that entry barriers to market in telecommunications were by then almost completely removed in EU nations.

To investigate path-dependency issues, we perform an econometric analysis, in which we model the difference in the intensity of liberalization between telecommunications and the other sectors as the dependent variable, and in which we consider the past relative deregulation choices as the explanatory regressors. Formally, we estimate a sector-specific panel model.

FIGURE 4. Relative liberalization intensity in telecommunications over the 1977-2007 period for 22 European countries (source: elaboration from OECD (2009)).



Let us define:

$$('LiberalizationIntensity'_{Tlc,i,t} - 'LiberalizationIntensity'_{SectoralAverage,i,t}) = 'SecRelativeLibIntensityTlc'_{i,t} \quad (i)$$

$$('LiberalizationLevel'_{Tlc,i,t} - 'LiberalizationLevel'_{SectoralAverage,i,t}) = 'SecRelativeLibLevelTlc'_{i,t} \quad (ii)$$

$$('PrivatizationIntensity'_{Tlc,i,t} - 'PrivatizationIntensity'_{SectoralAverage,i,t}) = 'SecRelativePrivIntensityTlc'_{i,t} \quad (iii)$$

$$('PrivatizationLevel'_{Tlc,i,t} - 'PrivatizationLevel'_{SectoralAverage,i,t}) = 'SecRelativePrivLevelTlc'_{i,t} \quad (iv)$$

$$('LiberalizationIntensity'_{Tlc,i,t} - 'LiberalizationIntensity'_{EuTlcAverage,t}) = 'EuRelativeLibIntensityTlc'_{i,t} \quad (v)$$

where the subscripts *Tlc*, *SectoralAverage*, and *EuTlcAverage* define, respectively, the telecommunications industry (for each country and year), the average over all the network industries (for each country and year), and the average of the telecommunications sector over all the European countries (for each year). We consider the following model:

$$\begin{aligned} 'SecRelativeLibIntensityTlc'_{i,t} = & \beta_0 + \beta_1 'SecRelativeLibIntensityTlc'_{i,t-1} + \\ & + \beta_2 'SecRelativeLibLevelTlc'_{i,t-1} + \beta_3 'SecRelativePrivIntensityTlc'_{i,t-1} + \\ & + \beta_4 'SecRelativePrivLevelTlc'_{i,t-1} + \beta_5 'EuRelativeLibIntensityTlc'_{i,t-1} + \\ & + c_i + u_t + \varepsilon_{i,t} \end{aligned} \quad (2)$$

with $t = 1975, 1976, \dots, 2007$, and where c and u soak up the heterogeneity due to unobservable country and time factors (they capture, respectively, time-invariant country fixed effects and country-invariant time fixed effects), parameters from β_0 to β_5 define the parametric structure, ε are idiosyncratic disturbances that change across countries (i) and years (t). Notice that, in this case, we perform a fixed-effects estimation.

The estimation results are reported in Table 3.

TABLE 3. Path dependency in telecommunications' liberalizations.

Dep.Var.:	Coeff.	(Std.Err.)	Stat.Sig.
<i>SecRelativeLibIntensityTlc</i> _{<i>i,t</i>}			
<i>SecRelativeLibIntensityTlc</i> _{<i>i,t-1</i>}	0.275	(0.112)	**
<i>SecRelativeLibLevelTlc</i> _{<i>i,t-1</i>}	-0.242	(0.035)	***
<i>SecRelativePrivIntensityTlc</i> _{<i>i,t-1</i>}	-0.055	(0.078)	
<i>SecRelativePrivLevelTlc</i> _{<i>i,t-1</i>}	0.156	(0.037)	***
<i>EuRelativeLibIntensityTlc</i> _{<i>i,t-1</i>}	-0.211	(0.107)	*
Constant	0.051	(0.027)	*
No. observations		560	
Prob. > <i>F</i>		0.000	
R2		0.099	

Note: * < 0.10, ** < 0.05, *** < 0.01 statistical significance. Robust variance estimates.

Relative liberalizations in telecommunications are shown to be strongly path dependent, since past deregulation choices at an industry level do affect in a statistically significant way current relative liberalization outcomes of telecommunications. In particular, our estimation results unveil several interesting relationships between past and present liberalization initiatives in telecommunications.

First, the one-year-lagged relative intensity of liberalization in telecommunications (*SecRelativeLibIntensityTlc*_{*i,t-1*}) has a positive and statistically significant effect on subsequent relative liberalizations in telecommunications. This means that, once a given country has implemented relatively more intense liberalizations in telecommunications, it will tend to

continue to implement deep entry barriers reductions in the given industry until the sectoral liberalization process is completed.

Second – and this is complementary to the first result –, we find that the relative intensity of liberalization in telecommunications tends to be reduced when the relative level of liberalization in telecommunications ($SecRelativeLibLevelTlc_{i,t-1}$) is high relatively to the other industries. Phrased differently, sectoral liberalization interventions in telecommunications proceed at a slow pace when the given country has achieved in telecommunications an absolute level of liberalization which is much higher than that of the other sectors. This might suggest that individual countries tend not to complete liberalizations in telecommunications if the other sectors are still far from being fully liberalized.

Third, the relative intensity of liberalization initiatives in telecommunications seems also to be positively associated to the one-year-lagged relative level of privatization ($SecRelativePrivLevelTlc_{i,t-1}$), while it is not affected in a statistically significant way by the relative intensity of past privatization interventions in telecommunications ($SecRelativePrivIntensityTlc_{i,t-1}$). This reveals that, while the intensity of relative liberalization and privatization in telecommunications are probably independent, large liberalization campaigns in telecommunications are implemented only if the degree of public ownership in the market is sufficiently low.

Fourth, finally, the relative intensity of liberalizations in telecommunications tends to be reduced when the given country shows entry barriers levels in telecommunications relatively higher than the European average. This result unveils that liberalizations in telecommunications are linked across European countries, in such a way that each country reduces the intensity of its sectoral liberalization in telecommunications after that it realizes that the other nations are liberalizing relatively less.

In conclusion, hence, sectoral liberalizations in European telecommunications are showed to be strongly path dependent both with respect to past within-country deregulation choices and with respect to past liberalizations of the other countries. In other terms, the decision to implement a certain liberalization intervention in telecommunications does not result from a one-period policy setting, but it is likely to be a step of an inter-temporal deregulation patterns in which past and present policy decisions are deeply linked to each other.

3.3. Institutional complementarity and market structure

Liberalizations in telecommunications played a ‘pivotal role’ in the liberalization patterns of European countries, as telecommunications were object of a deeper and faster liberalization wave with respect to the other network industries (Joskow, 1998). As we have showed, moreover, liberalizations in European telecommunications followed a cumulative continuous process over the years, without reversals, with a progressive increase in the intensity of liberalization measures until a complete entry barriers to market reduction was reached in almost all the European nations. Nonetheless, as we have commented in Section 2, the evolution of the telecommunications market structure (i.e. the level of actual competition in the market) did not perfectly mirror the liberalization reforms’ pace. Thus, one might ask whether and to which extent such a complex liberalization path has actually affected the effective market structure of the telecommunications industry in Europe, and whether legal liberalizations alone (i.e. without independent regulatory authorities) are sufficient for having substantially competitive markets. As Gilardi (2002) shows, indeed, regulatory agencies are a central institution in the European regulatory State.

In this section we try to answer this question. In order to do so, we estimate an econometric model in which the variations in the telecommunications’ market structure is expressed as a function of past liberalization and privatization choices and in which the presence of a regulatory authority is explicitly modeled as one of the covariates. Specifically, we estimate

both the effect of the liberalization intensity and that of the presence of a regulatory authority – taken in isolation – on the telecommunications market structure, while in two further model specifications we introduce an interaction term between the two regressors in order to identify (possible) complementarities between regulatory authorities and liberalizations.

Let us define the telecommunications market structure through a composite index which expresses a weighted average of the market share of new entrants in the trunk telephony market, in the international telephony market, and in the mobile market. This index (that we call *MrkStructureTlc* in our empirical analysis) is provided by OECD (2009). In our analysis we consider the one-year differences of *MrkStructureTlc* as the dependent variable (we call this first-differentiated variable $\Delta MrkStructureTlc$). On the other hand, in order to measure the presence of a regulatory authority in telecommunications we use a dummy variable that equals one when the regulatory authority is in place and 0 otherwise (in order to build this indicator we made our own calculation from information provided by Gilardi (2002, 2005); we call this variable *Authority*).

Formally, we estimate the following sector-specific panel model:

$$\begin{aligned} \Delta MrkStructureTlc'_{Tlc,i,t} = & \beta_0 + \beta_1 'LiberalizationIntensity'_{Tlc,i,t-1} + \beta_2 'LiberalizationLevel'_{Tlc,i,t-1} + \\ & + \beta_3 'PrivatizationIntensity'_{Tlc,i,t-1} + \beta_4 'PrivatizationLevel'_{Tlc,i,t-1} + \\ & + \beta_5 'Authority'_{Tlc,i,t-1} + \beta_6 ('LiberalizationIntensity'_{Tlc,i,t-1} \times 'Authority'_{Tlc,i,t-1}) \\ & + \beta_{7...K} \mathbf{W}_{i,t-1} + c_i + u_t + \varepsilon_{i,t} \end{aligned} \quad (3)$$

with $t = 1975, 1976, \dots, 2007$, and where \mathbf{W} is a vector of political and institutional control variables, c and u soak up the heterogeneity due to unobservable country and time factors (they capture, respectively, time-invariant country fixed effects and country-invariant time fixed effects), parameters from β_0 to β_K define the parametric structure, ε are idiosyncratic disturbances that change across countries (i) and years (t). In equation (3), an interaction term between the liberalization intensity and the presence of a regulatory authority is explicitly modeled as one of the covariates. The subscripts *Tlc* indicates that each variable refers specifically to the telecommunications industry. Again, a fixed-effects estimation is performed.

In this estimation analysis, the vector \mathbf{W} of political and institutional control variables includes the following covariates: a legislature-specific indicator of political concentration (*Herfindahl*), a dummy variable that records the EU membership (*EuMember*), an indicator of the degree of openness of the economy (*OpenEc*), and a political ideology index (*Ideology*). In particular, the variable *Ideology* is a composite index coded by Potrafke's (2010), that takes the value 1 if the share of governing rightwing parties in terms of seats in the cabinet and in parliament is larger than 2/3, 2 if it is between 1/3 and 2/3, and 3 if the share of centre parties is 50%, or if the left-wing and right-wing parties form a coalition government that is not dominated by one side or the other. Symmetrically, the index takes the values 4 and 5 if the left-wing parties dominate. Consequently, the final *Ideology* index ranges from 1 to 5, and opposes right-dominated governments (when *Ideology* equals 1) to left-dominated governments (when *Ideology* equals 5). A detailed description of the variables *Herfindahl*, *EuMember*, and *OpenEc* is provided above in the paper.

Table 4 presents the estimation results.

TABLE 4. The role of liberalizations in shaping the telecommunications market structure.

Dep.Var.: <i>MrkStructureTlc</i> _{Tlc,i,t}	I	II	III	IV	V
	Coeff. (Std.Err.)	Coeff. (Std.Err.)	Coeff. (Std.Err.)	Coeff. (Std.Err.)	Coeff. (Std.Err.)
<i>LiberalizationIntensity</i> _{Tlc,i,t-1}	0.112 *** (0.029)		0.007 (0.022)	0.005 (0.027)	-0.006 (0.027)
<i>Authority</i> _{Tlc,i,t-1}		0.221 *** (0.028)	0.174 *** (0.026)	0.162 ** (0.071)	0.131 * (0.075)
<i>LiberalizationIntensity</i> _{Tlc,i,t-1} × <i>Authority</i> _{Tlc,i,t-1}			0.115 *** (0.039)	0.117 *** (0.042)	0.125 *** (0.042)
<i>LiberalizationLevel</i> _{Tlc,i,t-1}				0.000 (0.012)	0.001 (0.013)
<i>PrivatizationIntensity</i> _{Tlc,i,t-1}				0.006 (0.028)	0.001 (0.027)
<i>PrivatizationLevel</i> _{Tlc,i,t-1}				0.002 (0.015)	-0.007 (0.014)
<i>Ideology</i> _{i,t-1}					0.016 (0.012)
<i>Herfindahl</i> _{i,t-1}					-0.394 *** (0.149)
<i>OpenEc</i> _{i,t-1}					-0.001 * (0.000)
<i>EuMember</i> _{i,t-1}					0.101 ** (0.048)
Constant	0.089 *** (0.011)	0.019 *** (0.006)	0.021 *** (0.006)	0.019 *** (0.007)	0.182 * (0.093)
No. observations	527	544	527	527	522
Prob. > F	0.000	0.000	0.000	0.000	0.000
R2	0.097	0.126	0.205	0.206	0.211

Note: * < 0.10, ** < 0.05, *** < 0.01 statistical significance. Robust variance estimates.

Our estimation results suggest very interesting relationships. On the one hand, sectoral liberalizations taken in isolation seem to have a positive and statistically significant effect on the telecommunications' market structure. On the other hand, however, the liberalizations' effect disappears once we control for the presence of the regulatory authority, which in its turn results to play a positive and statistically significant role. At the same time, the intensity of sectoral liberalization and the presence of the authority are showed to have complementarity effects, since the interaction term between the two is associated to a positive and statistically significant parameter. This result unveils that, while sectoral liberalizations may play a positive effect in shaping the telecommunications' market structure, such an effect is likely to be very low if independent regulatory authorities are not established, i.e. legal liberalizations alone are not sufficient for having substantially liberalized markets. Rather, liberalization initiatives and the presence of authorities have a joint effect on the telecommunications market structure. Specifically, the presence of authorities increases the marginal effect of the intensity of liberalization interventions on the market structure; in other terms, liberalization and authorities are complementary.

Further important results are obtained.

First, estimated parameters reveal that executives' ideology (*Ideology*_{i,t-1}) does not have a statistically relevant influence on the market structure resulting from liberalization interventions, once the implementation of such interventions is controlled for in the econometric estimation. This result is complementary to previous findings showing that political orientation of the governing parties shape liberalization policies (see Belloc and Nicita, 2011a); indeed, it

shows that, while political ideology does affect the choice for liberalization reforms (Belloc and Nicita, 2011a), it does not affect *per se* the post-reform competition level.

Second, we find that the degree of political concentration ($Herfindahl_{i,t-1}$) has a negative effect on the market share of new entrants, and that the EU membership ($EuMember_{i,t-1}$) acts as a positive influence on the degree of actual competition in the market.

Third, finally, we find that the degree of openness of the economy ($OpenEc_{i,t-1}$) is associated to a negative and statistically significant parameter. This might suggest that, while the degree of economic openness encourages liberalization reforms (as we have showed above in the paper), it also sustains higher concentration levels in the market in response to tighter international competition.

4. Conclusions

In this paper we have systematically studied the determinants of liberalization policies in European telecommunications. In particular, we have empirically investigated three dimensions of the deregulation process which have received so-far comparatively little attention: (i) policy timing and sequencing; (ii) path dependency; and (iii) institutional complementarity.

We have found several results. First, cross-effects from privatizations to liberalizations reveal to affect the liberalization process, as higher levels of privatization induce greater intensity of liberalization. Second, the telecommunications industry is shown to play a ‘pivotal role’ in the liberalization patterns of European countries, as the telecommunications induced liberalization interventions in other network industries. Third, sectoral ‘path dependency’ turns out to be another relevant driver for telecommunications’ liberalizations, as the actual decision to liberalize explains subsequent relative liberalization outcomes in the telecommunications sector. Fourth, liberalizations in telecommunications result to be linked across European countries, as each country reduces the intensity of its sectoral liberalization in telecommunications if other nations are liberalizing relatively less. Fifth, finally, also ‘institutional complementarities’ reveal to be statistically significant, as liberalization initiatives under the presence of regulatory authorities are shown to have a positive joint effect on the telecommunications market structure, in terms of entrants’ market share (i.e. legal liberalizations alone are not sufficient to fully manifest the expected benefits of substantially liberalized markets).

This liberalization process in telecommunications, progressive and convergent among European countries, can be rationalized in three phases along the evolution of the EU regulatory framework (see Manganelli, 2010).

A first phase has been that of ‘entry regulation’, characterized by progressive abolition of exclusive and special rights (i.e. the pre-requisite for competition development in the market). This phase can be referred to the implementation of a list of directives such as: the Terminals Directive (88/301/EEC), the Service Directive (90/388) - enlarging liberalization to fixed phone added value services -, the Directive 94/46 on satellite communications, the Directive 96/2 on Mobile Services, the Directive 95/51 on cable services, and the Directive 96/19 (full competition directive) that was the first directive not allowing exclusive rights also on fixed phone service. As a result, we have indeed observed a pick in the intensity of the liberalization process exactly between the early and the mid Nineties, when most of the directives were adopted.

A second phase moved from formal entry liberalization to substantial pro-competitive liberalization. In this phase, under art. 106.3 of the TFEU, in many countries there has been a prominent role of competition authorities in the substantial de-regulation, through (a) ‘strict interpretation’ in excluding specific anti-competitive conduct from the scope of competition law, (b) ‘extensive interpretation’ of liberalization directives and the competition role of

competition authorities with the objective of enhancing effective competition, and (c) ‘disapplication’ of anti-competitive national law and regulation under art. 101(1) and art. 102 of the TFEU, in combination with art. 4(3) of the TEU and 106(3) of the TFEU. In this phase we have observed a substantial change in the telecommunications market structure, characterized by an increase in the new entrants’ market share.

Finally, in a third phase, a new regulatory framework was promoted (with the Framework Directive (2002/21/CE (FD)), Access Directive (2002/19/CE (AD)), Authorization Directive (2002/20/CE (AD)), and Universal Service Directive (2002/22/CE (USD)), in which the competition principle was ‘internalized’ in the framework, i.e. the regulatory output now depends on the actual market dynamics. This stage of regulation (internalization of competition principles) aims at preventing abusive behaviors in the market, not necessarily implying a reduction of incumbent market shares. As a result, thus, while the market share of new entrants increased following formal liberalizations in the ’80 and ’90, after 2000 the level of new entrants’ market shares has remained substantially unchanged in large part of European countries, some of them (Belgium, Denmark, Hungary, the Netherlands, Switzerland and United Kingdom) even experiencing a reduction of the new entrants’ market share.

We believe that our analysis may shed new lights on the understanding of ‘the market deregulation paradigm’, in which the evolution of the European regulatory framework results to be characterized by important dimensions (concerning policy timing and sequencing, path dependency, and institutional complementarity), which surprisingly have received so-far comparatively little attention in the existing literature. Therefore, our study provides important guide-lines for other countries and/or other network industries, which actually stand behind the deregulation wave observed in the European telecommunications sector.

Moreover, an almost neglected issue in applied research is the question of whether liberalization processes, beside reducing barriers to entry for incumbent’s competitors (the supply-side of the liberalization) – which has been the almost exclusive focus of the related literature –, have also enhanced consumers’ choices, attitude and perception (i.e. the demand-side). In conclusion, given that almost all European countries have completed the entry barriers to market reduction, we thus suggest that for governments it is time to focus on demand-side regulatory policies and on the ‘empowerment’ of consumers as new ground for future reforms.

Appendix A: OECD's (2009) indicators of regulatory reforms in telecommunications.

[Extracted from OECD's (2009) database]

Sectoral indicator of regulatory reform: Telecom				
Weights by theme (b _j)	Question weights (c _k) ¹	Coding of data		
		Free entry	Franchised to 2 or more firms	Franchised to 1 firm
Entry regulation:	1/4			
What are the legal conditions of entry into the trunk telephony market?	$1/4 * w^l * (1 - w^m)$	0	3	6
What are the legal conditions of entry into the international market?	$1/4 * (1 - w^l) * (1 - w^m)$	0	3	6
What are the legal conditions of entry into the mobile market?	$1/2 * w^m$	0	3	6
Public ownership:	1/4			
What percentage of shares in the PTO are owned by government? ²	$1 - w^m$	% government ownership / 100 * 6		
What percentage of shares in the largest firm in the mobile telecommunications sector are owned by government?	w^m	% government ownership / 100 * 6		
Market structure:³	1/4			
What is the market share of new entrants in the trunk telephony market?	$1/4 * w^l * (1 - w^m)$	6-normalised market share ²		
What is the market share of new entrants in the international telephony market?	$1/4 * (1 - w^l) * (1 - w^m)$	6-normalised market share		
What is the market share of new entrants in the mobile market?	$1/2 * w^m$	6-normalised market share		
Country scores (0-6)		$S_j b_j S_k c_k \text{ answer}_{jk}$		

1. The weight w^m is the OECD-wide revenue share from mobile telephony in total revenue from trunk, international, and mobile. The weight w^l is the OECD-wide revenue share of trunk in total revenue from trunk and international telephony.

2. "PTO" stands for "Public telecommunications operator".

3. For the purposes of calculating the indicator the market share of new entrants has been normalised to be between 0 and 6 with 6 being the smallest market share over all countries and time and 0 being the largest.

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