SECOND ANNUAL CONFERENCE ON
COMPETITION AND REGULATION IN NETWORK INDUSTRIES

20 NOVEMBER 2009

CENTRE FOR EUROPEAN POLICY STUDIES, BRUSSELS, BELGIUM

The Impact of Different Regulatory Approaches on Postal Markets

Sven Heitzler
DIW Berlin and TU Berlin
Mohrenstrasse 58, D-10117 Berlin
sheitzler@diw.de

Abstract

The paper uses a small dataset containing market, operator, policy, and general conditions data to gain some estimates on policy impact and shows how such data could be useful to analyze and evaluate policy settings for the postal industry. The estimation outcomes from Fixed Effects regressions suggest that there might be significant policy influences on volumes, prices, markets, employment, and agents' behavior which should be taken into account when economically sound policies are to be designed.
Therefore, public data providers like the Universal Postal Union or Eurostat should harmonize and improve data collection and supply in order to achieve the goal of sound policy analysis and optimization. Even the operators should have an interest in the provision of such data in order to gain an even better understanding not only of their respective home market but on regulation and optimal strategies in regulated environment in general.

Keywords
[Postal regulation, empirical analysis, data availability]

1. Introduction / Motivation

> "Although there has been much theoretical and empirical research on the effects on privatization and competition in infrastructure in general, relatively little work has been done on how the degree of privatization and competition affects performance and how components of the policies interact in shaping the reform outcomes."[1]

Especially in physical infrastructure industries like, e.g., telecommunications, electricity, railways, and nevertheless in the postal industry, regulatory policies have a major impact on the outcome of the market. This includes quantities, prices, and productivity, but also the industry structure and the conduct of the players on the markets.

While the literature on policy analysis and evaluation mainly focused infrastructure-tied industries in the past, with the ongoing regulatory reform and the high importance of the postal markets – not alone in terms of the product market size, but also in employment terms – the postal industry get focused increasingly. Against the background of the ongoing process of liberalization especially throughout Europe, and the contemporarily difficult overall economic conditions which even seem to accelerate the trend of declining mail volumes, the importance to regulate markets in an optimal way in order to minimize potentially negative effects of regulation has become increasingly important.

Therefore, I consider the effect of different economic, social, and demographic factors for the countries Finland, France, Germany, the Netherlands, Spain, Switzerland, the United Kingdom as well as the United States. The variables contain factors that already have been identified to be of significant drivers of mail volumes including population data, telecommunications penetration data (as a proxy for possible e-substitution), and introduce regulatory variables to analyze their impact on the market development. Thereby, we employ fixed effects (FE) least squares (OLS) and a FE logit regression.

High overall product market regulation as well as access regulation tends to affect market volumes (employment) negatively (positively), whereas independence and corporatization of the incumbent operator tend to affect volumes and turnover positively. Unfortunately, the data is very limited and statistical significance cannot be achieved. Due to the lack of sufficiently complete and precise data, at the moment, no database seems to be suitable for cross-country policy analysis in the postal industry.

2. Literature review

The work is motivated by the existing literature on postal demand estimation, papers on electronic substitution and – more in general – the drivers of different mailstreams, as well as papers on regulatory impact analysis.

So far, the main drivers of mail demand have been mainly the gross domestic product (GDP), prices, and other variables reflecting economic activity, for example income. But since quite a while, the explanatory power of these models appears to be decreasing and the portion of unobserved heterogeneity increased over time.[2] E.g., Diakova (2005) shows, that total mail

[1] Li / Xu (2004), p. 1.

[2] Cf. also Diversified Specifics (2002) for the disaggregated view on different mailstreams.

volumes so far have been explained to a large extent by real GDP (with 85% of the variance observed explained solely by this factor), but since 1998, the correlation has been falling behind (at least for the US). This is especially observable if different types of mail purposes are considered separately.

Harding (2004) provides an extensive overview over the models used up today and proposes to include the distribution of the incomes to be included in order to correct for some deviances.[3] He also finds, that GDP is able to explain a large share of the observed variance, although also proxies for economic activity such as households having a bank account, having a phone and so on contributes a lot if explanation to the data observed.

Nader and Lintell point to some further aspects that should be included in the analysis, for example the possibility that the volume gains by competitors might offset the decline in mail volumes delivered by the incumbent National Postal Operators (NPOs), that quality improvements lead to the shift of mail from priority to economy categories as well as quality improvement in targeting customers with direct mail might lead to a shift to mail categories of higher quality or even to small promotional parcels at the expense of the amount of direct letter mail sent.[4] Common to all authors is the proposal to disaggregate the mailstream and to add additional explanatory variables.

Substitution not between different mail types but to electronic alternatives is another central issue for the postal industry, since the choice of mailers and the receiver preferences are also not fully understood yet.[5] One example for an extensive econometric model of the US market based on the Household Diary survey predicts further decline of mail demand with rising personal computer penetration, growing stamp prices, and declining telephone service prices,[6] whereas other authors additionally predict an increased pace of the decline in the current economic downturn, albeit the impact on the various mail categories differs substantially between short and long run, different mail attributes and contents, and depending on the different needs of senders and receivers.[7] Surprisingly, at least in the volumes from 1999 until 2009, the OECD does not include letter mail in their *Communications Outlook*, but concentrates on electronic communication and broadcasting, but on the other hand issued a report on the *Impact on Substitute Services on Regulation*.[8]

The articles on regulatory analysis in the postal sector start from verbal discussions of postal reforms like the the seminal article of Coase (1939), to theory-based qualitative assessments concerning the optimal regulation of the postal market.[9] Additionally of high importance is to embed the postal service markets and the governing regulation into the communications market as a whole.

---

[3] E.g., Jimenez / Harding / Lintell (2007) propose the inclusion of income dispersion (inequality) measures in order to improve model fits to some remarkable extent.

[4] Nader / Lintell (2007), based on Nader (2004).

[5] Cf., e.g., Nader / Jimenez (2005) and Szeto / Jimenez (2005).

[6] Hong / Wolak ().

[7] Although mainly the sender chooses the communication channel (because she is the party that pays), it has to fulfil the need of both, the senders and the recipients. Koppe / Hömstreit (2009).

[8] Cf. OECD (1999, 2001, 2003, 2005, 2007, 2009) and OECD (2006).

[9] Cf., e.g., Baake / Wey (2007), De Bijl / Van Damme / Larouche (2005), Heitzler (2009).

Closely related to the regulatoni of competitioin in these markets especially is the impact of the Universal Service Obligations on consumers and on competition. Overall, the right assessment of these services of public interest and the right policy implications might substantially improve the preconditions for competition to evolve, if no operator is restricted overly and the mandated services are adapted to the preferences and need of the consumers.[10] The result of efficient regulatory policies might not only be optimal conditions for the consumers and customers, but also efficient competition patterns to evolve.[11] Game-theoretic models of the industry thereby provide additional valuable insights into the postal industry.[12]

The articles on regulatory reform in a broader context comparing international product and labor market reforms either are not industry-dependent, for example if they employ a macroeconomic *General Equilibrium* model [13] or if they empirically analyze macro effects and the interdependence of labor and product market institutions and/or reforms and the related outcomes[14], or these papers are mainly dealing with other issues than the postal industry. Prominent examples are the papers dealing with the regulation, market structure and performance of telecommunications and other physical network industries.[15]

For example, Grajek and Röller (2009) analyze the trade-off between access and investment incentives using a dataset covering over 70 fixed line operators in 20 countries over 10 years. Data source include the Amadeus firm level database for capital stock levels and investments, the Plaut Economics telecoms regulatory index amongst others. Not surprisingly, these studies provide very robust results. They find that a regulatory commitment problem which leads to the fact that access regulation negatively impacted overall and individual carrier investments (including individual entrants) and regulatory endogeneity which leads to the problem, that the higher the incumbents' investments, the higher the probability that mandated access had to be provided, additionally undermining the investment incentives.

Koedijk, Kremers et al. (2006) find a clearly negative relationship between regulation and economic performance, both of labor and product market regulation. They state the view, that it is key to avoid unnecessary restrictive regulations, although not all regulation has a negative impact on the overall development of the market, for example regulations which increase market transparency or facilitate market entry might be well in place.

Waverman, Meschi et al. (2007) examined also the telecommunications sector and the impact of access regulation (local loop unbundling, *LLU*) on investment in infrastructures including alternative access platforms in order to capture the most important aspect of telecommunications regulation and competition, namely sustainable inter-modal competition between different platforms. Their main result is, that low local loop access prices cause a strong substitution from broadband over alternative platforms towards access-based competition, which leads to massive distortions concerning the market evolution and innovation.

---

10 Cf., e.g., Finger (2006).

11 De Bas / van der Lijn (2008).

12 Cf., e.g., Crew / Kleindorfer (1998), Dietl / Felisberto et al. (2006) or Mizutani / Uranishi (2003).

13 Cf., e.g., Blanchard / Giavazzi (2003).

14 E.g., Koedijk / Kremers et al. (1996), Loayza / Oviedo / Servén (2004).

15 E.g., Boylaud / Nicoletti (2000), Grajek / Röller (2009), Li / Xu (2004), Nicoletti / Scarpetta / Lane (2003), Röller / Waverman (2001), Wallsten (2001), Waverman / Meschi et al. (2007).

Similarly to *End-to-End competition* (vs. *Worksharing*) in the postal industry, greater diversity of access platforms can be expected to provide greater opportunities for innovation and product differentiation.[16] Factoring in the impact of access regulation (and even worse in combination with regulated low access and end prices) leads to the effect of overall decreased access lines. Their findings included, that low LLU prices prevented the roll-out of competing access networks as well as the upgrading or increasing the footprint of existing networks, thus limiting last mile innovations.

Common to these papers are sophisticated econometric models and the use of data compiled from different sources in order to obtain a dataset which allows for very detailed analysis of the question in doubt. For this paper, the data availability for the postal industry was explored with the goal to see, whether it was possible to conduct a similar analysis for the postal industry to bridge the gap between the methods employed in the papers mentioned and to obtain insights that could be useful for the recommendation of postal policies based on econometric analysis.

3. Data

In order to estimate a model of similar value, data of similar extent and quality is necessary. Therefore we tried to collect the data relevant for postal policy and to understand the effect of regulation on the interdependencies between neighboring sectors from exiting sources (cf. Table 1 : Data and data sources).

Starting point was a set of eight countries, namely Finland, France, Germany, the Netherlands, Spain, Switzerland, the United Kingdom and the United States. These industrialized countries were expected to have relatively large amount of data available and heterogeneous enough to allow for estimations. The timeframe was set to include the year 1992 to 2006. 1992 was chosen as the starting year of the European postal reforms with the publication of the *Green Paper* by the European Commission,[17] including Switzerland and the US as countries intentionally not covered by the European reform agenda.

Most of the data is relatively easy and freely available. This includes all data on the country characteristics, such as size, population, degree of urbanization and macroeconomic factors such as gross domestic product, national income, or price indices.

Especially the data on the postal sector was very difficult to find for the years before 2000 and 1994 in particular; therefore the dataset had been restricted to the years 1994 – 2000. Especially surprising was the fact, that Eurostat had dropped gathering data on the postal sector, although the liberalization agenda had been initiated by the European commission and started the collection of data on postal markets not before 2005 again. Unfortunately, all data is characterized by many missing values and aggregates on the firm level, which has been an especially difficult issue to deal with due to the high level of merger, divestiture and diversification activities, so that much of the data had to be examined very carefully. The market and operational data was especially difficult to deal with due to reluctance concerning their publication and the high levels of aggregation.

---

[16] Waverman / Meschi (2007), p. 2, cf. also Baake / Kamecke / Wey (2007).
[17] EU (1992).

Table 1 : Data and data sources

Market and operator data (on Postal services and Telecommunications)	Universal Postal Union International Post Corporation International Telecommunications Union OECD Eurostat National statistics offices Annual reports and webpages of operators and NRAs Publicly available consulting reports
Regulatory data and indices (on Postal services and Telecommunications)	Fraser Institute's *Economic Freedom of the World* indicator OECD (530) Product market indicator The World Bank (*Doing business* index)
National economy, geographic, and demographic data	OECD Eurostat The World Bank CIA World Factbook Governmental webpages

Further limitations of the data include that there was a relatively small number of observations left, especially if growth rates or differences were computed, leading to the loss of another year in the time dimension. An ideal dataset would include harmonized and complete data from official statistics. Price data and competition measurements, such as Herfindahl indices or concentration ratios like the market share of the largest firm in a well-defined market (CR1) or the joint market share of the three biggest companies (CR3) were completely unavailable.

The variables of the uniquely constructed dataset which will be used for the following preliminary assessment are outlined briefly in the appendix (cf. Table 3 : Data and data description). The according summary statistics are given in the following table (cf. Table 4 : Summary statistics).

4. Econometric Model

Due to the limitations of the dataset, only Fixed Effects (FE) estimations are used in order to capture all unobserved heterogeneity. The regressions (1) to (4), (6), and (7) thereby employ FE Ordinary Least Squares (OLS) regressions, whereas in regression (5) a FE Logit estimation was run. Fixed effects have been chosen due to the clear advantage that it allows to correct for a (presumable) *omitted variable bias*, as it captures all individual time invariant information on the fixed effect, which implies that only information that is varying over time is used to determine the coefficients, meaning a restriction to the used sample.

As mentioned above, statistical significance is only achieved in the estimation (5), where the dependent variable is binary only, assuming the value 1 if the volume of the letter post items has grown compared to the previous period, and zero otherwise. In this simple case, GDP growth leads to letter mail volume growth as expected (even at the 99.9% confidence level), whereas regulations proxied by the *Economic Freedom of the World* indicator by the Fraser institute have significant negative impact at the 95% level.

Table 2 : Estimation outputs

	(1) npo_lpi_gro	(2) npo_lpi_gro	(3) npo_lpi_gro	(4) npo_letrev_gro	(5) npo_lpi_gro_bin	(6) npo_fte_gro	(7) npo_letrev_gro
main							
m_gdp_gro	0.707*	0.612*	0.590*	0.353	0.975***		
	(2.60)	(2.20)	(2.05)	(0.89)	(3.62)		
reg_fraser_5	-1.170	-0.883	-1.332	-1.249	-2.040*		
	(-1.19)	(-0.84)	(-1.29)	(-0.87)	(-2.39)		
tk_inetusrs	-0.0764	-0.0545***	-0.0822*	-0.0181			
	(-1.96)	(-3.78)	(-2.01)	(-0.31)			
tk_mobilesub	0.0309		0.0275	0.0185			
	(1.16)		(1.01)	(0.48)			
npo_indep		2.895	2.657	2.284			
		(1.99)	(1.84)	(1.13)			
npo_corp		1.875				-2.567	2.038
		(1.55)				(-1.84)	(1.46)
d_pop_gro		0.610					
		(0.55)					
reg_access			-0.400				
			(-0.36)				
d_population			5.21e-08	7.87e-09			
			(0.64)	(0.07)			
npo_govshare						0.0181	0.0395
						(0.79)	(1.60)
_cons	8.145	3.630	4.314	7.372		-0.911	-2.197
	(1.26)	(0.52)	(0.45)	(0.56)		(-0.41)	(-0.93)
N	97	97	97	96	97	98	96

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The estimations (1) to (3) all show some impact of the explanatory variables on the volume of letter post items of the NPO. Although not all estimators are significant, their sign is almost in the expected direction. GDP growth has a positive impact on volumes as well as independence and corporatization of the NPO and population growth. Negative impact could be expected from the share of users with access to the Internet (presumably proxying e-substitution), while the regulatory index and access regulation itself would have been expected to exhibit negative signs. The rate of mobile subscribers within the population is close to zero – which could be interpreted either as being zero or in a way, such that the additional volumes offset pretty exactly the letter substituted with these phones, but this remains open to speculation. Estimation (4) is just a regression of the regulatory index and

the GDP growth rate on the growth rate of NPOs' revenues from letter mail. Here also the signs at least point to the right direction.

Regression (6) point towards the suspect, that corporatization might lead to a decrease, while government ownership tends to increase employment at the NPO, (7) provides a first suspect, that corporatization increases the revenues from letter mail, while government ownership seems to have very little impact at best.

But in order to test for causality of these apparent numbers, a number of exclusion restrictions should be tested first, which also would in this "test case" not be very reliable due to the restrictions of the underlying data. Also, with more reliable data, before any policy decisions are drawn from such data, the assumption of FE should be tested using at least an F-test for FE and using an LM-test for Random Effects (RE) in order to be sure, that the model should use an FE specification.

5. Results

Although the direct estimation results here provide no statistical evidence for the value of the estimation of the influence of explanatory variables concerning regulations, a model comparable to this (or the better the more sophisticated approaches cited above) should be applied as soon as a suitable dataset comes at hand. The "results" are well in line with many theoretical papers for the postal industry as well as with many empirical papers examining other industries.

Since such a simple model cannot capture all economic and technical relationships, it does suggest that there might exist relevant policy influences on volumes, prices, markets, employment, and agents' behavior which should be taken into account when economically sound policies are to be designed.

Although firms are generally reluctant to provide precise data, the data for research not necessarily has to be up to date. If there would be a lag of two or three years between the generation and the disclosure of the data, there could be a useful set provided which keeps the interests of the research community, the policy-making institution as well as the firms active on the markets in balance.[18]

6. Conclusion

Overall, the importance of precise data to evaluate policies and estimate the likely impact of different regulatory settings being discussed is especially high in industries which are undergoing rapid changes as the postal industry at the moment. The test of the inclusion of a variety of new indicators and variables could provide significant advantages when it comes to the creation of the optimal regulatory conditions in order to focus on market growth.

Deeper understanding of the regulatory influence on the overall market development not only could lead to improved regulatory conditions but could also uncover further driver of business development. This study is therby thought to serve as a starting point for a debate

[18] A view which is clearly shared by Boldron, Cazals et al. (2009), which also state „a need for a better database" (p. 13).

about the impact of postal regulation based on solid statistical evidence rather than a final conclusion.

Although the postal sector is much older than the telecoms sector, data availability is much more limited due to the slower introduction and development of regulation and competition than it is in the telecommunications sector. Especially when it comes to future regulation, improved data availability might be of particular advantage; although theory says, that most of the market can be left unregulated, it could be expected, that regulators might try to "advance" competition in a direction they believe it is right rather than to know what the real impact and possible costs are.

Therefore, a comprehensive database containing much more detailed information than the existing databases would be very helpful if it would be available for research and policy work. Data availability, comparability and correctness thereby are more important than immediate disclosure.

Appendix

Table 3 : Data and data description

COUNTRY	Country name
CID	Country ID (1 to 8)
CC	Country code (short descriptor)
YEAR	Year
D_POP_GRO	Growth rate of population
D_POPULATION	Population (Number of inhabitants)
M_GDP_GRO	Gross Domestic Product Growth Rate
NPO_CORP	Corporatization of National Postal Operator
NPO_FTE_GRO	National Postal Operators' staff growth rate (in full time
NPO_FTE_LS	National postal operators' employees (FTE, letter segment)
NPO_GOVSHARE	Share of National Postal Operator held by government
NPO_INDEP	Independence of National Postal Operator
NPO_LETREV_GRO	National Postal Operators' letter mail revenues growth rate
NPO_LPI_GRO	National postal operators' Letter Post Items Growth Rate
NPO_LPI_GRO_BIN	National postal operators' Letter Post Items Growth (Bin)
REG_ACCESS	Access to the postal network is mandated by regulation
REG_FRASER_5	Fraser Institute's Economic Freedom of the World (subind. 5)
TK_INETUSRS	Internet users per 100 inhabitants
TK_MOBILESUB	Number of mobile subscribers per 100 inhabitants

Table 4 : Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
COUNTRY	0				
CID	120	4.5	2.300895	1	8
CC	0				
YEAR	120	1999	4.338609	1992	2006
D_POP_GRO	112	0.5528202	0.3902987	-0.1127073	1.671469
D_POPULATION	120	6.84E+07	8.39E+07	5035000	2.98E+08
M_GDP_GRO	112	2.530666	1.462679	-1.031505	6.091118
NPO_CORP	120	0.4666667	0.5009794	0	1
NPO_FTE_GRO	98	-0.6063324	3.332847	-9.435067	9.187724
NPO_FTE_LS	106	179281.5	247807.7	15076	851780.5
NPO_GOVSHARE	120	92.31667	20.98355	0	100
NPO_INDEP	120	0.7833333	0.4137009	0	1
NPO_LETREV_GRO	96	2.411153	3.384417	-3.989182	16.00538
NPO_LPI_GRO	97	0.8751374	2.795438	-5.262009	8.100731
NPO_LPI_GRO_BIN	97	0.5257732	0.5019293	0	1
REG_ACCESS	120	0.2041667	0.4021781	0	1
REG_FRASER_5	120	6.95825	0.8021648	5.37	8.29
TK_INETUSRS	120	29.05833	25.84612	0	81
TK_MOBILESUB	120	45.09167	36.67275	0	115

References

BAAKE, P. / KAMECKE, U. / WEY, C. (2007): "Efficient Regulation of Dynamic Telecommunications Markets and the New Regulatory Framework in Europe", chapter 13 in Haucap, J. and Dewenter, R. (eds.): *Access Pricing: Theory and Practice*. Elsevier Science, pp. 379-386.

BAAKE, P. / WEY, C. (2007) *How to regulate the Postal Industry – an Economic Approach.* International Post Corporation (IPC) and German Institute for Economic Research (DIW Berlin), Brussels and Berlin, 2007.

BLANCHARD / O., GIAVAZZI, F. (2003) "Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets", *The Quarterly Journal of Economics*, 118 (3): 879-907.

BOLDRON, F. / CAZALS, C. / FLORENS, J.-P. / LECOU, S. (2009) "Some Dynamic Models for Mail Demand: the French case", mimeo.

BOYLAUD, O. / NICOLETTI, G. (2000) *Regulation, Market Structure and Performance in Telecommunications.* Paris: OECD Economics Department Working Paper ECO/WKP(2000)10.

COASE, R. H. (1939) "Rowland Hill and the Penny Post", *Economica*, New Series, 6 (24): 423-435.

CREW, M. / KLEINDORFER, P. (1998) "Efficient entry, monopoly and the universal service obligation in the postal sector", *Journal of Regulatory Economics*, 14 (2): 103-126.

DE BAS, P. / VAN DER LIJN, N. (2008): "Development of competition in EU postal markets: the influence of the regulatory framework on the pattern of competition", chapter 15 in Crew, M. A. and Kleindorfer, P. A. (eds.): *Competition and Regulation in the Postal and Delivery Sector*. Edward Elgar, Cheltenham, UK.

DE BIJL, P., / VAN DAMME, E. / LAROUCHE, P. (2005) *Light is right. Conditions for competition and regulation in the postal market.* University of Tilburg: TILEC working paper.

DIETL, H.M. / FELISBERTO, C. ET AL. (2006) *The Effect of Regulation on Innovation in the Postal Sector*. Paper presented at the 14th Rutgers CRRI conference on Postal and Delivery Economics.

DIVERSIFIED SPECIFICS (2002) *Executive summary: Small letter volume forecasting analysis.* Report to Australia Post, Melbourne.

EU (1992): *Green Paper on the Development of the Single Market for Postal Services* ("*Green Paper*"). Commission of the European Communities, COM/91/476, Brussels.

FINGER, M. (2006) *The postal network between competition and Universal Service provision.* Lausanne: EPFL MIR CDM Working Papers Series 2006-002.

GRAJEK, M. / RÖLLER, L.-H. (2009) *Regulation and Investment in Network Industries: Evidence from European Telecoms.* Berlin: European School of Management and Technology (ESMT) and Humboldt University (HU Berlin), SFB 649 Discussion Paper 2009-39.

HARDING, M. C. (2004) *Mail Demand Models.* Pitney Bowes Background Paper No. 1, November 12, 2004.

HONG, S.-H. / WOLAK, F. A. (2008) "Relative prices and electronic substitution: Changes in household-level demand for postal delivery services from 1986 to 2004", *Journal of Econometrics,* 145: 226-242.

HEITZLER, S. (2009) "Traditional Regulatory Approaches and the Postal Service Market", *Competition and Regulation in Network Industries,* 10 (1): 77-105.

JIMENEZ, L. A. / HARDING, M. / LINTELL, M. (2007) *The Impact of Economic and Demographic Dispersion on Aggregate Mail Volumes.* Pitney Bowes presentation at the 15th Rutgers CRRI conference on Postal and Delivery Economics, May 2007.

KOEDIJK, K. / KREMERS, J. ET AL. (1996) "Market opening, regulation and growth in Europe", *Economic Policy,* 11 (23): 445-467.

KOPPE, P. / HÖMSTREIT, S. (2009) *The economic crisis as reinforcement of e-Substitution in the mail market.* Paper presented at the 17th Rutgers CRRI conference on Postal and Delivery Economics.

LI, W. / XU, L.C. (2004) "The Impact of Privatization and Competition in the Telecommunications Sector around the World", *Journal of Law and Economics,* XLVII (October 2004): 395-430.

LOAYZA, N. V. / OVIEDO, A. M. / SERVÉN, L. (2004) *Regulation and Macroeconomic Performance.* Washington, D.C.: The World Bank and University of Maryland Discussion Paper.

MIZUTANI, F. / URANISHI, S. (2003) "The post office vs. parcel delivery companies: competition effects on costs and productivity", *Journal of Regulatory Economics,* 23 (3): 299-319.

NADER, F. H. (2004) *Mail Trends.* Pitney Bowes Background Paper No. 2, Version 3, December 2004.

NADER, F. H. / JIMENEZ, L. A. (2005) *Substitution Patterns.* Pitney Bowes Background Paper No. 5, April 7, 2005.

NADER, F. H., / LINTELL, M. (2008) *Mail Trends Update.* Pitney Bowes Background Paper No. 2008-1, February 2008.

NICOLETTI, G. / SCARPETTA, S. / LANE, P. R. (2003) "Regulation, Productivity and Growth: OECD Evidence", *Economic Policy*, 18 (36): 9-72.

OECD (530): Economics Department Working Paper No. 530: "Product market regulation of non-manufacturing sectors in OECD countries: measurement and highlights".

OECD (1999, 2001, 2003, 2005, 2007, 2009) *Communications Outlook.* Report series, OECD, Paris.

OECD (2006) *The Impact of Substitute Services On Regulation.* Report DAF/COMP(2006)18, OECD, Paris.

PERELMAN, S. / PESTIEAU, P. (1994) "A Comparative Performance Study of Postal Services: A Productive Efficiency Approach". *Annales d'Économie et de Statistique*, 33: 187-202.

RÖLLER, L.-H. / WAVERMAN, L. (2001) "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach", *American Economic Review,* 91 (2001): 909-923.

SZETO, C. / JIMENEZ, L. (2005) *Consumer Preferences for Communications Media.* Pitney Bowes Background Paper No. 4, Version 1, April 7, 2005.

VISCO COMANDINI, V. (2007) *Trade offs between competition and universal service in liberalized postal markets.* Milan: Conference paper to the 3rd annual conference of the Società Italiana di Diritto ed Economica.

WALLSTEN, S. J. (2001) "An Econometric Analysis of Telecom Competition, Privatization, and Regulation in Africa and Latin America", *The Journal of Industrial Economics,* 49 (1): 1-19.

WAVERMAN, L. / MESCHI, M., ET AL. (2007) *Access Regulation and Infrastructure Investment in the Telecommunications Sector: An Empirical investigation.* LECG, London.