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The Effects of Labor Market Regulations on Employment Decisions by Firms: Empirical Evidence for Argentina

By

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***IERAL de Fundación Mediterránea**

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Abstract*

There are few Latin American countries that produced such a remarkable turnaround in policies and outcomes as Argentina did in the 1990s. The large number of reforms yielded surprisingly strong growth and the near-disappearance of inflation. The change of "economic paradigm" led to behavioral changes that reflected themselves in a number of other areas. Perhaps the most striking change took place in the labor market, where job creation and destruction reigned in earnest. There, where reforms were moderate, high open unemployment was the result.

This paper looks at the potential effect regulations might have on labor demand dynamics. In particular, we try to ascertain how movements in labor costs influence firms' decisions regarding job creation.

The paper first presents descriptive evidence on who benefits from regulations and how much they cost. The evidence is based on PHS Microdata and identifies the effects on individuals' labor market outcomes stemming from varying regulations. The paper then turns to labor demand estimation.

We exploit a panel data set that comprises some 1,300 manufacturing firms for the period 1990-1996. The panel provides information on employment and hours worked, as well as overtime hours, wages and physical production. We exploit the hours worked/jobs relation to shed some light on labor market dynamics. It is found that regulations do have a sizable and significant negative effect on employment decisions. In particular, it appears that severance payment regulations do hurt employment decisions. It is also found that firms rationally substitute workers for a more intensive use of hours.

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I. Introduction

Few Latin American countries produced as remarkable a turnaround in policies and outcomes as Argentina did in the 1990s. After half a century of low growth, high and volatile inflation and stagnating living standards, Argentina introduced a vast number of reforms that yielded surprisingly strong growth at the same time that inflation disappeared. The change of "economic paradigm" led to a number of behavioral changes that reflected themselves in other areas. Perhaps the most striking change took place in the labor market. There, where reforms were moderate, the most noticeable difference appeared. High open unemployment was the outcome. Could it be that the lack of ambitious reforms in labor market practices was behind this unfortunate outcome ?

Historically, Argentina's labor market had been characterized by the relative scarcity of unskilled labor. This was reflected in moderate open unemployment in the urban sector and in the need to resort, periodically, to foreign labor to cover for labor shortages. Wages and other hiring conditions were in keeping with the greater bargaining power stemming from the excess labor demand. In particular, the dominant economic model limited the need for the economy to reallocate resources and hence job creation and, in particular, destruction was kept at low levels. This made a number of union and government-sponsored demands compatible with the opportunities faced by firms. However, the low growth and high and accelerating inflation that characterized the period pushed the economy into a crisis. The far reaching reforms that followed, in the 1990s, took place mainly in monetary affairs and in the behavior of goods and service markets, not the labor market. This asymmetry in changes has been blamed, by many, as the underlying factor behind the appearance of high unemployment.

Table 1
Macroeconomics Indicators: 1974-1998

	GDP per capita (1)	Jobs per Capita (2)	GDP / Jobs (3)=(1)/(2)	Unemploy Ment* (4)	Inflation Rate ** (5)	Labor Force*** (6)
	Index 1980=100					
1974	91.9	100.9	91.1	3.3	24.2	102.9
1980	100.0	100.0	100.0	2.6	100.8	100.0
1985	83.9	95.6	87.8	6.1	672.2	99.2
1988	86.7	98.2	88.3	6.3	343.0	102.8
1989	79.4	97.2	81.7	7.6	3079.5	103.5
1990	77.0	96.3	80.0	7.5	2314.0	102.3
1991	84.1	98.4	85.5	6.5	171.7	103.5
1992	90.9	99.2	91.6	7.0	24.9	105.8
1993	95.0	98.5	96.5	9.6	10.6	109.9
1994	101.3	96.3	105.2	11.5	4.2	109.4
1995	96.1	91.9	104.6	17.5	3.4	112.1
1997	106.6	95.1	112.1	14.9	0.5	114.4
1998	109.8	97.6	112.5	12.8	0.9	115.1

Notes: * GBA: Gran Buenos Aires; ** Annual Rate ;*** GBA. Index 1980=100
Source: IERAL of Fundación Mediterránea.

Indeed, Argentina's labor market performance is puzzling and provocative to most observers. It has evidenced remarkably stable growth in employment during the 1980s (at a 1.1% annual rate, barely enough to accommodate population growth) while GDP was shrinking (-0.9

annually). Conversely, in the 90s the rate of growth of GDP has not only been strong but also quite sustained (on average 5.2% per year including the 1995 recession). The behavior of employment, once again, did not match that of GDP (0.9% per year). See Table 1.

Unemployment in the 1990s reached record levels (18.6% in 1995) and has scored two digits since 1994. Obviously, changes in the rate of unemployment could be explained by movements in demand or supply. If labor market regulations were to seriously hinder the job creation process, they would have to operate on the demand side.

Labor demand dynamics could arise from a number of factors. In particular, given our interest in the potential effect of regulations, it appears crucial to evaluate how movements in labor costs could influence job creation dynamics. The question of whether or not labor market regulations adversely affect labor market flexibility is a matter of substantial controversy. Critics claim that strong job rights prevent employers from adjusting to economic fluctuations.[1] It is also alleged that, by inhibiting layoffs during downturns, strong job rights reduce the employer's willingness to hire people during recoveries, thus contributing to unemployment. Supporters of strong workers' rights argue that job security provisions have no observable effects. However, in the case of Argentina, these measures have not been carefully evaluated and there is no solid evidence to support either side of the debate.

In Argentina, workers have historically enjoyed strong job rights (including the right to advance notice of layoff and the right to severance payments). During the 1990s, and following the rapid growth in unemployment, these regulations came under attack. Many argued that the cost equivalent of these provisions had become an increasing nuisance. Graph 1 shows an approximation to the cost burden implied by job security provisions split into its three main components: average tenure of formal wage earners, layoffs over labor force and average salary of formal wage earners.[2] The three panels show substantive changes in the components of cost expected by firms. As the economy went deeper into restructuring and reform (1991-97), the regulation became increasingly binding. Remarkably, as mean real wage earnings were growing, the probability that a worker would be laid off (approximated by the fraction of lay-offs) tripled, while the average tenure was cut by 20%.[3]

It is possible that the rise in regulatory cost had a substantive impact on labor demand. The puzzling increase in output per worker, presented by the Argentine data, could then be the result of an optimizing behavior where firms attempted to increase output without employing more workers to save on the anticipated growing costs of severance. Output per worker would grow in part from genuine increases in labor productivity and partly from an increased use of overtime workers.

In this paper we provide some evidence on these issues. We exploit, for the first time, a panel data set that comprises over 1,300 manufacturing firms for the period 1990-1996. The panel provides information on employment and hours worked, as well as overtime, wages and physical production. The data, however, is constrained to a limited sector and, most importantly, a relatively short period of time. Unfortunately, most of the sizable changes in labor market regulations occurred by the end of 1995, making it harder to identify the effects on labor demand. We nevertheless, exploit the hours worked/jobs relation to shed some light on labor market dynamics.

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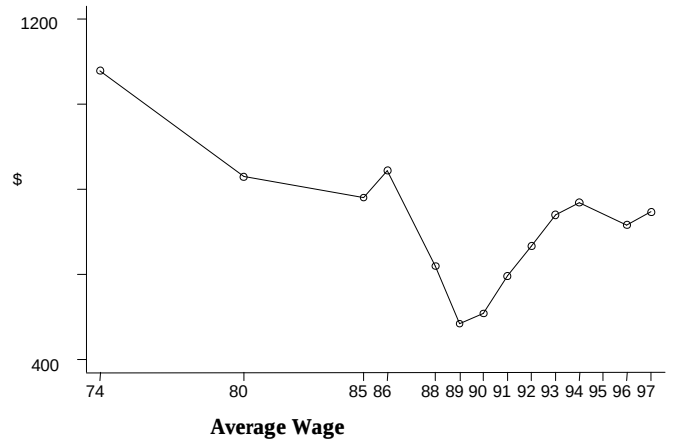
[1] Lucas and Fallon (1991); Oi (1962) .

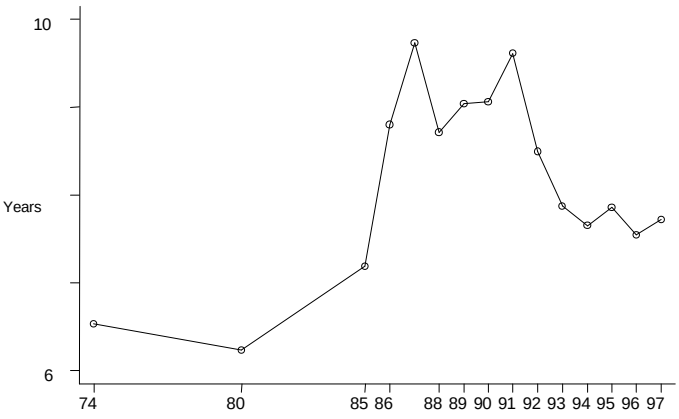
[2] The fourth component is the legal provision mandating the number of salaries per years of tenure. Over the two decades, legislative changes focused only on changing the maximum number of salaries that might be paid. Since these changes were minor and are hard to identify for the aggregate labor force the pattern observed in graph 1 should appropriately proxy for severance payments cost.

[3] It is very difficult to construct an aggregate proxy for the average severance costs because of the non-linearity of the severance compensation scheme.

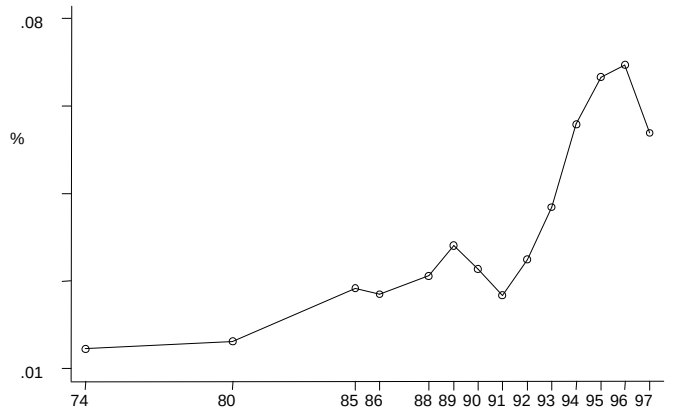
Graph 1
Expected Severance Payment
Gran Buenos Aires 1974/97



Average Wage



Average Tenure Formal Wage-Earners



Layoffs/Labor Force

Source: IERAL of Fundación Mediterránea based on PHS.

We structure the rest of the paper by presenting, in Section II, some selected institutional

features of Argentina's labor market, focusing on job security regulations and payroll taxes. Section III then considers two important descriptive issues First, who benefits from regulations? And second, how much do they cost? The evidence is based on PHS Microdata and identifies the effects on individuals' labor market outcomes stemming from varying regulations. We then turn to labor demand estimation. In Section IV we present a number of estimation exercises based on firm-level data. We then document the dynamic responsiveness of employment and hours to changes in output and labor costs at the firm level. Section V concludes.

II. Institutional Background

Argentina's labor market, like those of many other developing nations, differs in important ways from those operating in industrial countries. Perhaps the most symptomatic differences are the relative importance of self-employment and informal work practices (defined as those not covered by regulations or contributing to social security). These observations have often been taken as evidence of asphyxiating regulations and steep taxation. Furthermore, and as a natural extension, it is argued that wage formation depends critically on labor market institutions and government regulations.

Trade union activity and minimum wage laws are important features in the Argentine labor market. The legal setting that conditions employment contracts could potentially be a significant hindrance to adjustment.

There are three layers of legal regulations governing worker-firms relations that are binding. They are, in terms of decreasing importance:[4] a) Workers Statute (Ley de Contrato de Trabajo - 20.744) and the rest of the general legislation, such as the superior rank laws which establish many of the labor relations rules and the framework for collective bargaining; b) Centralized Collective Bargaining at the "sector level," operating as a second tier; c) Firm level contracts (which, if they exist, can only build upon the previous two).[5]

Labor regulations also introduce other distortions. The workers statute introduces specific job security provisions in the form of expensive costs of dismissal. The statute also restricts hiring by limiting try-out periods. Sick leave, vacations and pregnancy provisions are also quite generously provided at the most general level. A 13th wage is also mandatory and must be paid in halves at mid-year and year-end. Similarly, contributions to union-sponsored health programs are required (independently of whether the services are being used).[6]

Current Picture of Employment Legislation

Non-wage labor costs include a number of items other than the usual social security contributions. A number of these costs, which arise from different regulations, have been the subject of changes over the last few years. A basic characterization of labor regulations/taxes is:

a) Legislative framework for individual contracts. The most important provisions are:

- *Types of contracts*: The most prevalent is the indeterminate duration type or lifetime contract, which enjoys the highest degree of "protection." In the case of dismissal, it is always presumed "unfair." Some types of temporary contracts were allowed and used previous to 1995, but they

4 That is, if contracts are signed taking into consideration agreements at level (c) they cannot be in disagreement with terms established at level (b) and much less at level (a). In other words, level (a) sets a minimum standard.

5 Some areas are outside the scope of the general laws and the collective agreement is set up as a "statute" with rank of law. Examples are the rural sector worker statute, the journalist statute and others.

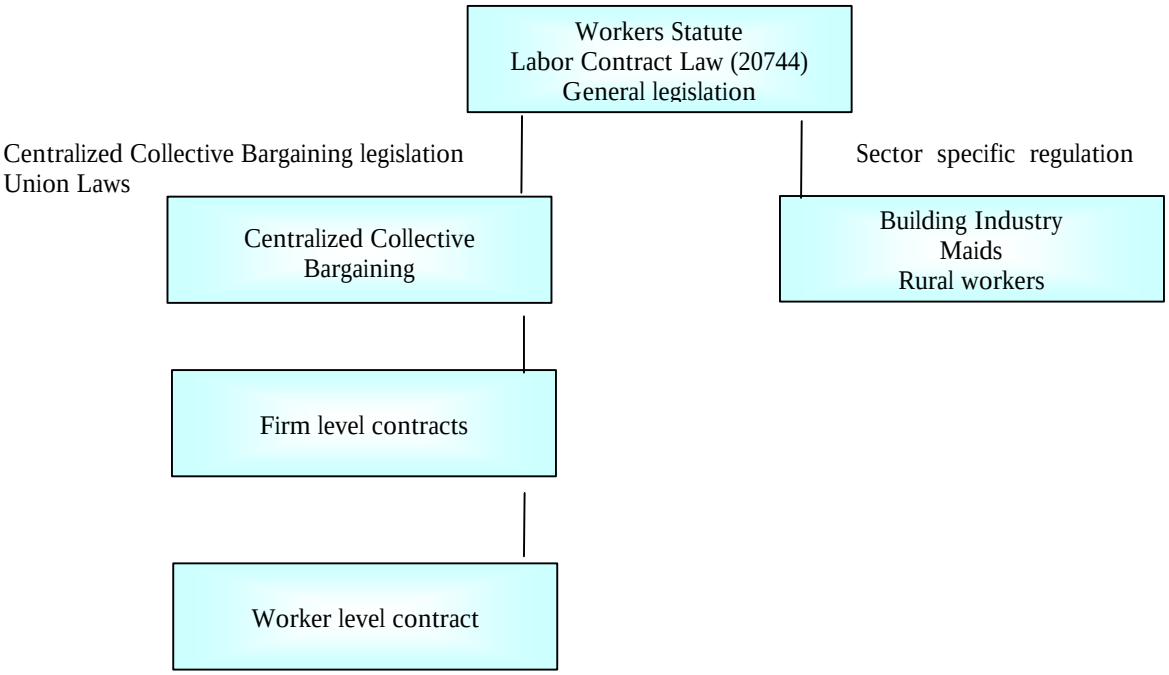
6 An additional source of cost is the contribution of active workers to the pensioner's health program (PAMI).

were considered exceptional, while permanent arrangements were the rule. The reforms introduced new types of fixed-term contracts since December 1995. Their main features were: lower severance payment, extended try-out period with reduced social security contributions and other benefits to make them more attractive for employers. This regulatory change added a new dimension to an already complex labor market. Since the beginning of 1999 those contracts were legislated away. [7] [8]

- *Job security provisions*: the costs associated with firing include advance notice, in writing, and severance payments. Costs increase with tenure (See Annex 1, Graph A-1).
- *Working hours, holidays and sick leave*. There are limited opportunities for micro-level decisions concerning the distribution of hours worked, overtime, night work and vacation periods. There is generous maternity and sick leave.[9]

b) Collective Labor Laws: The basic laws are Union Laws (called Professional Associations); sector wage bargaining, framed as Collective Agreements, has been the predominant mode of bargaining in Argentina. As mentioned above, they often set floors which can only be built upon at lower levels of negotiations.

Graph 2
Labor Law Mechanism



Source: IERAL based on legislation forced each period.

7 The changes introduced in 1995 were marginal and aimed at addressing the increasingly complicated employment outlook as well as adding some flexibility to a very sclerotic market. In particular, the choice was to enhance the flexibility of hiring for the new cohorts of workers that entered the market from 1995 onwards.

8 The number of fixed term contracts rose from less than 1% of formal wage-earners in 1995 to almost 5% by the end of 1998. This steep increase in short-term employment contrasted with moderate growth in total dependent employment. The share of short-run employment (fixed-term plus trial period contracts) is about 10% of total formal employment.

9 Sometimes the restrictions arise from the law. Others stem from collective agreements. The problem is that many of these agreements date from a period of extensive government presence in the economy. It is one thing for sector-level unions to negotiate with private firms subject to strict budget constraints and quite another to do it with a government owned-corporation with soft budget constraints. The banking sector contract is an example of this problem, among many others.

The interaction of the two laws defines a sticky situation. On the one hand, Collective Agreement delimits the basic features of contracts. On the other hand, the Union Law identifies the participants in any collective bargain and defines the conditions under which anyone but the sectoral/regional level (third grade) association could sign a collective agreement.[10.] They together have very important implications for the functioning of markets and industrial relations. For instance, regional shocks cannot be easily accommodated since they cut across many sectors but, not being wide-spread enough, they will not trigger renegotiations at the sector specific level.

That is, in spite of individual firms and workers having strong incentives to revise their contracts, the regulations make such revision illegal. This has, effectively, been one of the greatest restrictions on renegotiation of contracts in the last few years and does the most damage to relatively smaller and more remote firms, and to workers with the least say in negotiations.

The above problem is compounded because of the automatic renewal clause, called "ultractividad." This clause automatically extends the terms of an earlier collective agreement if the parties do not reach a new one. This situation is reached if any one party is in disagreement

c) Social Security: Pension Law; Family Allowances; Worker's Compensation Law; Health care Funds ("Obras Sociales"); Unemployment Insurance; Pensioners Health Care Scheme (PAMI).[11]

Table 2 shows the current picture of labor cost in Argentina for a lifetime contract.[12]

Table 2
Non-Wage Labor Cost Structure
(percentage over gross wage)

Contributions	Normal Contract	Share Over Total Cost
Pension fund	**27**	**47.4**
Employee	11	19.3
Employers'	16	28.1
PAMI	**5**	**8.8**
Employee	3	5.3
Employers'	2	3.5
Family allowances(**)	**7.5**	**13.2**
Unemployment fund(**)	**1.5**	**2.6**
Health care scheme	**9**	**15.8**
Employee	3	5.3
Employers'	5	8.8
Worker's Comp(**)	**2.5**	**4.4**
Social Security Overall Cost	**52.5**	**92.0**
Severance payment (*)	**5**	**8.8**
Advanced notice (*)	**0.5**	**0.9**
Employee's cost	**17**	**29.8**
Employers' costs	**40**	**70.2**
Non-Wage Labor Cost	**57**	**100**

(*) Estimates- Employer's Cost; (**) Employer's Cost

10 The so-called Ley de Asociaciones Profesionales defines the structure of the Union sector. The Third Grade Associations of national rank, the most powerful, are the only ones that can sign a collective agreement and, eventually, give authorization for decentralized negotiations.

11 Worker's compensation was reformed in July 1996 by the introduction of a new system with costs that average 2.5% of gross wages. The previous scheme was highly unfair and arbitrarily opened up opportunities for expensive litigation and corruption. The reformed system introduced mandatory insurance, the organization of a market and specific limits on the magnitude of compensation. It is widely regarded as a massive improvement over the previous legislation.

12 Employer's contributions are since 1995 subject to deductions according to region and branch of activity of the firm.

Source: IERAL of Fundación Mediterránea based on Legislation.

During this decade, reforms have concentrated on two basic aspects: social security and its financing and the above mentioned introduction of fixed-term contracts.

The importance of reforming the social security system is evident from the imbalance between the magnitude of the sacrifice involved in its financing compared with the meager benefits offered. While the social security system represents over a third of total labor force costs, it is a fact that its benefits are a source of general dissatisfaction. A major share of social security contributions operates in practice as a payroll tax. The above cost-benefit imbalance triggers corrective activities which end up generating inequalities and inefficiencies and favoring the precariousness of labor relationships.[13]

The pension reform, on the other hand, was aimed at all workers in the market place. It induced a transfer of individuals from the pay-as-you-go system to its newly created, fully funded successor. The two systems would coexist, at least for a long time, as the switch was made voluntary. The success of the reform, introduced in 1994, is indicated by the very high rate of adoption of the new system.[14]

The Informal Sector

Informality usually has two definitions. The first focuses on the role of small firms. In this view the informal sector consists of small enterprises where job instability is pervasive, underemployment is high, and wages highly flexible. The formal sector consists, typically, of medium and large enterprises. Workers and employers are subject to various labor market regulations (among them payroll taxes and severance payments).

The second definition focuses specifically on the issue of having or not having "protection" and defines as informal those workers who lack protection from labor laws. The extent of informality changes with the particular definition chosen, even though descriptive statistics show that in some cases the two categories overlap.

A traditional view ascribes informality to disadvantaged workers in a dual labor market segmented by rules or legislated rigidities that introduce high costs in the "formal" sector. The main characteristic of such an informal market is sensitivity to business cycles, without income rigidities, which allows it to absorb displaced formal workers during downturns.[15]

Because of this broad definition we label as informal those workers who remain outside the formal regulatory structures. Only wage earners declare whether or not they are protected by labor legislation and how their situation relates to the social security system. As it turns out, the correlation between enjoying regulatory coverage and social security registration is close to one. As a matter of fact all wage-earners registered in the Social Security System enjoy that protection. The converse is not necessarily true. We thus defined as informal a wage-earner who declares himself as not registered in the social security system.

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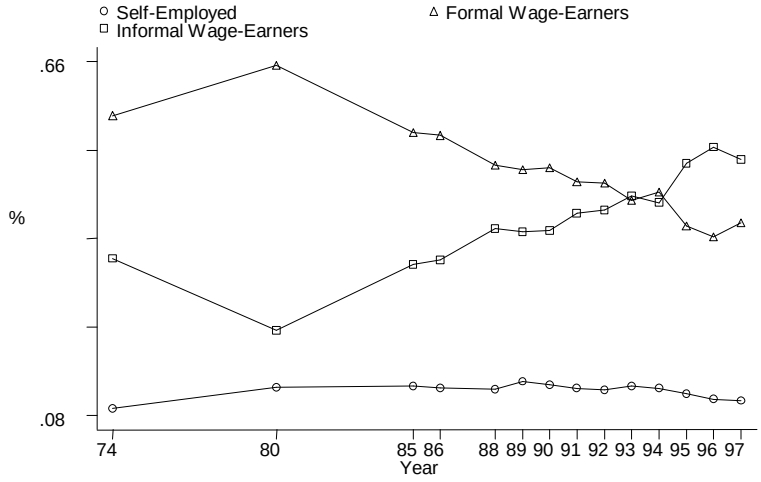
13 Graph A-2 shows the evolution of social security financing from 1960, the starting period of a more structural social security system. Until 1990 the different programs functioned with great difficulties because of the existence of different institutions performing the same role.

14 Currently, over 60% of all workers and over 90% of new hires belong to the fully funded scheme. The difficulty, however, is that the transitional phase has to be financed. Current retirees must be supported via contributions by those who remain in the pay-as-you-go plan and through taxes by those in the fully funded plan. The high rate of taxation necessary to balance the system became a serious policy issue as it clashed with employment needs. For this reason, in 1994 a system of graduated labor tax reductions was put into place. The reductions were moderated in 1995, after high fiscal needs, and brought back much more aggressively in 1996.

15 An interesting feature of this segment is that it is hard to establish the most important reason why firms opt to operate there. While regulations may be suffocating, the opportunities for tax evasion are also important. Indeed, if the firm holds informal labor contracts, it cannot contribute to social security. But then, it must have a source of unreported revenue to pay those wages. This revenue stems from tax evasion in the goods market. The decision to operate informally thus depends on a complicated set of opportunities.

Graph 3 shows the breakdown of employment and its evolution for the main urban center of Argentina, Gran Buenos Aires, over the last two decades. The labor market is segmented into at least two branches:[16] self-employment and wage earners. Self-employed workers operate mostly in the provision of services. Wage earners, on the other hand, are more evenly distributed across sectors. Previous work for Argentina shows that self-employment constitutes an alternative to formal sector employment desirable in itself. [17] / [18]

Graph 3
Labor Force Composition
Gran Buenos Aires 1974/1997



Source: IERAL of Fundación Mediterránea based on PHS.

Let us turn to the analysis of the trends in informal employment over the recent years. PHS data shows an upward trend in non-registered employment over the last twenty years. This trend was closely tied to general macroeconomic conditions. Faced with a depressive economic environment and low demand, firms resorted to "black" or informal hires as well as to part-time labor utilization.

III. The Effects of Labor Market Regulations: Evidence from Household Micro Data

Job security provisions are, in general, regulatory measures enacted as social protection to mitigate the risk of unemployment among workers by forcing firms to provide subsidies during downturns. The main mechanism is large severance payments preventing workers from being laid-off during downturns. In Argentina it also implies lengthy and expensive procedures that inhibit layoffs by driving up firing costs. It is sometimes argued that the macroeconomic adjustment is

16 The idea of segmentation is used loosely here. We do not mean two completely separate markets but rather two segments of a market that present different prices and somewhat different properties. Because of the nature of many choices in the labor markets (i.e., the large fixed costs and/or irreversibility of some decisions) many times the pattern of response is different whether we are considering wage earners or self-employed people. What we imply by segmentation in such a case is that the rate of transformation between them is limited.

17 The same kind of evidence is available for Mexico. See Maloney (1997) and Maloney (1998) for details.

18 The residual employment category remained stable over the period under consideration.

further shifted towards the informal sector. Hence many perceive JS provisions as inequitable for unprotected workers.[19] [20]

Those who support regulations in the job market claim that they are commendable to the extent that their objective is the protection of workers against unsafe work practices and unjustified dismissals. They also state that regulations protect the weakest members of society, that they help to redistribute income and that they stabilize earnings for those people subject to greater risks.

Job Security is one form of non-wage compensation. Besides inducing greater immobility, JS increases labor costs to the firm. The increase in labor costs depends on how workers value JS and, specifically, on whether JS is a substitute for or a complement to wage compensation .

Who benefits from regulations? Do they cost something, at least in terms of foregone earnings? Could we predict which individuals are the most likely to profit from deregulation? These questions have no simple answer but deserve serious consideration before any action is taken to alter the current regulatory standing.

Who "Benefits" from Regulations?

Because of the labor market's segmentation, the probability of benefiting from regulations varies across individuals. For this reason, it appears interesting to run a descriptive analysis of the beneficiaries of regulations.

We report results for a sample of wage-earners from the Buenos Aires Metropolitan Area for the 1975-97 period. We divided the sample between males and females. The model we estimate is a simple probit equation where the dependent variable is a dummy over whether the worker can claim severance payments in case of dismissal. (See Annex 2, Table A-1 for description of the variables). The correlates included are:

Educational level: Higher educational level implies higher productivity and should increase the probability of being in the formal sector. Lower educational level workers could be pushed to the informal sector because their low productivity may not be enough to counter the costs of minimum wage and other laws

Experience: As with any Mincer equation, experience increases general human capital and, hence, productivity.

Tenure on the job: Longer tenure must reflect a better match and greater job specific human capital. If a firm could choose the type of jobs to offer job security it would provide it to workers that have accumulated a high level of firm-specific human capital. Workers would in return pay back in the form of higher productivity.

Branch of Activity: A purely empirical set of correlates to account for sector specific differences in the enforcement capabilities of control agencies, the degree of monopsony power, unionization and instability of activities.

The size of the company: Similar to the one above.

Regulatory status of another family member: It is quite possible that workers become increasingly prone to accept job offers with regulatory coverage when the household has diversified risks, in particular, when the spouse or another family member enjoys regulatory coverage. Moreover, in Argentina the regulatory framework favors precarious insertion for so-called

19 In studies that deal with segmented labor markets, an increase in JS leads to greater labor spillover to informal activities, causing a decline in labor earnings and a higher rate of "quasi-voluntary" unemployment.

20 Riveros and Paredes (1990); Rosenweig (1988).

"secondary" workers. There is no incentive to register, since health and other programs will not recognize more than one contribution per household.

Marital status: this variable is introduced in the female regression bearing in mind the gender biased features of the legislation. We should anticipate a negative sign.

Children under 6: similar to the one above.

Table 3 reports the results for females and males of the derivates of a probit model where the dependent variable is the possibility of claiming severance payment compensation if the worker is laid off.[21]

The results are quite interesting. It appears that regulations are increasingly prevalent the higher the human capital of the individual. The chances that regulations are present grow with educational level. Males show, however, that for those with a college education the probability decreases a bit. Those with a university level education select themselves out of wage-earning jobs and into self-employment to avoid the impact of high taxation.[22]

Table 3
Probit Estimation: Jobs with Severance Payment Rights
Gran Buenos Aires 1975-1997- Wage-Earners Sub-Sample

	Women			Men		
	dF/dx	**Z**	**X-bar**	**dF/dx**	**Z**	**X-bar**
Primary *	0.0466	2.14	0.3911	-0.0008	-0.07	0.5542
High-School*	0.2134	9.24	0.3572	0.0979	7.73	0.2571
College*	0.2565	10.59	0.1720	0.0773	4.43	0.0849
Exper	0.0207	11.82	20.1224	0.0164	13.48	22.3182
Exper**2	-0.0003	-8.75	577.0800	-0.0003	-11.85	670.0120
Tenure	0.0016	3.58	6.8277	0.0025	7.07	7.9136
Construction/ Maids*	-0.4622	-20.98	0.1645	-0.2952	-18.93	0.0679
Manufacturing*	0.2169	2.15	0.0035	0.1213	3.44	0.0134
Retail*	0.0679	4.16	0.1399	-0.0436	-4.32	0.1607
Trans*	0.1367	4.28	0.0277	-0.0680	-5.89	0.1232
Finan*	0.1299	6.86	0.1017	0.0156	1.12	0.0897
Private and Social Services *	0.1732	11.25	0.5452	-0.0057	-0.58	0.2184
Size<25*	0.1755	13.54	0.2025	0.1251	16.59	0.2362
Size<100*	0.3035	21.91	0.1781	0.2284	28.37	0.1734
Largest*	0.3052	21.26	0.1827	0.2730	33.9	0.2332
Flia_Reg *	0.4455	39.67	0.3276	0.3280	41.86	0.2672
Ptime*	-0.2022	-16.55	0.3532	-0.1992	-17.31	0.1160
Household Head*	0.0082	0.49	0.1787	0.1422	14.8	0.6723
Child <6	-0.0054	-0.5	0.1948			
Married*	-0.0504	-3.58	0.4727			
Observations	**13202**			**21618**		

(*) dF/dx is for discrete change of dummy variable from 0 to 1. z is the test of the underlying coefficient being 0. NOTE: See ANNEX 2 , Table A-1 for description of the variables.
Source: IERAL of Fundación Mediterránea based on PHS.

21 Raw results of Probit regressions are reported in Table A-2.

22 Women, because of their specializations (e.g., teaching, nursing, medicine), have a higher probability of being covered than their male counterparts. The reason is that their employer is the government.

As with most Mincer equations, experience shows the normal concavity, nd, here also increases the probability of having regulatory coverage. Tenure also shows a positive and significantly different from zero coefficient.

Family status is also important. Mothers with young children tend to be less protected. The legislation intends to provide coverage for women (maternity leave, special leaves) yet it ends up with a strong market outcome biased against them.

We also find that if another family member happens to enjoy the coverage of regulations, it is more likely that the worker in question has a regulated match. A plausible explanation is that couples are formed with individuals of equivalent condition.

Part-time activities are less protected. The regulatory framework does not favor registration for part-time contracts. Moreover, there are no incentives to do so. Contributions to the social security system (the major component of non-wage labor cost) were calculated, until late 1996, as if the worker were employed on a full-time basis. The growth of part-time employment played an important role in the expansion of non-registered employment.

Finally, we find that larger firms appear more likely to offer regulated jobs.

Summarizing, the probit analysis confirms that regulations tend to segment the market and provide protection to those workers with greater human capital. In other words, the regulatory structure is regressive and, whatever protection it might provide, it does not appear to benefit those people who are objectively worse off. At the same time, the results show the natural response one would anticipate from rational private decision making. More exposed sectors to supervision and control (namely larger firms) are more compliant with regulations.

Effects on Earnings

The previous section established that labor market regulations unequivocally affect labor market outcomes in non-random ways. It is clear than some groups of workers have a greater chance of having jobs that are under legally enforced regulations. What we have not established, though, is whether workers and firms with those jobs sacrifice something. That is, could it be that a regulated job pays less than a non-regulated one?

One should expect employment protection practices to affect both sides of the labor market, workers and employers. Costs to employers depend not only on the wage paid and the benefit package included but also on labor productivity. Employers should be indifferent to the composition of the total compensation between money wages and benefits.

Employees, though, do have preferences between wages and benefits. A crucial parameter in analyzing the size and composition of employer-provided benefits is the wage workers would forego to obtain benefits; the market value of these trade-offs between wages and fringe benefits is an old research question. This is a difficult empirical issue that, in the literature, does not appear to be resolved. The theoretically predicted negative trade-off has been difficult to prove.[23]

In this section we present some estimates of a hedonic wage function. We expect a negative relationship between wages and benefits if productivity is effectively held constant. The problem, of course, is to hold productivity constant in practice. If there are unobserved factors affecting productivity, the negative trade-off is no longer true since benefits may be related to the unobserved productivity factors.

23 For a discussion see Smith and Ehrenberg (1983), Leibowitz (1983 and Oi (1983)).

Econometric Problems

The worker's decision to accept a job depends on his/her subjective evaluation of the characteristics of the package. In equilibrium, this interaction of workers and employers should yield a locus of job matches that trace out the rate at which the market trades off wages and benefits. In our empirical formulation, we use an extended Mincerian framework.

The regression model we estimate is,

$$\text{Ln } Y_{i,t} = \alpha_t + \beta_t X_{i,t} + \theta Regs + \mu_{i,t} \qquad (1)$$

Where $Ln\ Y_{i,,t}$ is the natural log of monthly individual (i) earnings at time t. $X_{i,t}$ is a vector of individual and firm characteristics that encompasses variables such as Education, Experience, Firm Size, sector of employment and so on. Regs reports the legally enforced fringe benefits that characterize the match. The theoretical arguments suggest θ should be negative.[24.]

There are several econometric problems that must be handled. The first one is the typical Heckman sample selection bias: we only observe wages for those employed but not for those that decided not to join the labor force. The typical result of this bias is that the conditional mean for the sub-sample exceeds the mean for the whole distribution. In this situation the straightforward OLS estimates, not corrected for selectivity bias, would be inconsistent. Our estimation strategy takes this problem into consideration and implements a multi-layered decision process.

An important issue in Mincer type equations is that of unobserved heterogeneity. This comes from the fact that people differ in their ability and capacity to acquire human capital. This misspecification error typically results in inconsistent estimates of parameters. To somewhat mitigate this problem we will condition on Tenure on the job. Hopefully, an individual with longer Tenure is one who evidences greater abilities, at least in regard to his current position.[25.26]

Econometric Specification

The regression model we estimate follows, to a great extent, Heckman's (1979) suggestions. We further take into account the difference between the decision to participate in a job search and that of accepting a job offer. This difference takes particular importance in an environment with high unemployment such as that observed in the 1990s. Formally, we estimate the likelihood of the individual's reporting income as arising from a bivariate probit considering the individual's decision to join the labor force as well as his probability of finding a job.

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24 To empirically prove the rather simple theory we need data that does not normally exist in standard household surveys. In the case of Argentina the PHS is the only source. Workers report whether they get regulatory coverage. Unfortunately some fringe benefits can only be found in firm-level data sets. High ability workers (highly motivated, dependable, aggressive) oftentimes receive higher wages and higher fringe benefits. These benefits, not proportional to wages, are very difficult to measure.

25 An additional problem springs from measurement error. It is very likely that those workers who are not covered by regulations underreport their true earnings. If this source of measurement error was present we could get reverse signs in our estimated coefficients on regulations. Now, regulatory benefits could misleadingly turn out greater reported earnings, even though true returns are lower. One could interpret the coefficient on pensions as controlling for this bias and focus the analysis on the coefficients for the other variables. The problem, however, remains in that pensions and the other regulations are highly correlated. Furthermore, regulations could be a last resort to remain competitive. The wages inefficient firms pay are lower than those of the high productivity, law abiding firms. The observed "black" matches could then report lower wages. To introduce some controls for firm efficiency we use the only two pieces of information in the household survey relating to firms, firm size and sector. Of course, many other sources of unobserved productivity differences remain.

26 Since our estimates are conducted on an artificial panel (stacked cross sections), another serious problem threatens the reliability of the estimates. If the economy has been subject to large structural shocks, as indeed it has, then the returns to human capital or the wage bargaining conditions are likely to have changed drastically over time. We introduced a year fixed-effect to absorb some of those changes. Pessino (1995) argues that these changes have considerably affected outcomes in the labor market. Garcia (1996) has shown that the Argentine skill premia has moved remarkably over the last few years. He finds that large changes in relative prices (associated with trade reform and deregulation) and technological change explain the large demand shifts necessary to explain skill premia movements.

The Model

To estimate the rates of return of the different educational levels a linear version of equation (1) is estimated:

$$\text{Ln } Y^{*} = \alpha + \beta' X + \theta Regs + \mu \qquad (2)$$

where X is the matrix of independent variables affecting the individual's income level and μ is the vector of disturbances. The coefficients of education in (2) are the average returns to education.

This equation if estimated by OLS -ignoring the two sources of selectivity bias- can lead to biased parameters. To deal with that problem Heckman (1979) proposed estimating a model of two simultaneous equations, with the endogenous variables being the income and the unobservable reservation wage. Considerations about high unemployment rates lead us to use an extension of Heckman's methodology.

The likelihood of the individual's reporting income is estimated from a bivariate probit considering both the individual's decision to join the labor force as well as his likelihood of getting a job.

Thus, it is assumed that:

$$I_{1i}^{*} = \delta' Z_i + \mu_{1i} \qquad (3)$$

$$I_{2i}^{*} = \eta' W_i + \mu_{2i} \qquad (4)$$

where Z_i and W_i are independent variables and I^{*}_{1i} and I^{*}_{2i} are non-observable variables associated with an individual's decision to participate and his likelihood of obtaining employment, respectively. What we observe are those individuals who participate and those who obtained employment. Details of the model can be found in Tunalli (1983).

Summarizing, the two-step decision process is the following:

Table 4
Two Step Selectivity Bias Process

Individual				
Decision Process	**Labor Force Status**	**Decision Process**	**Job Status**	**INCOME**
I_1	0 Non Participant	-	-	Unobserved
	1 Participant	**I_2**	0 Unemployed	Unobserved
			1 Employed	**Observed**

So, the equations to be estimated are:

$$I_{1i,t}^{*} = \delta' Z_{it} + \mu_{1i} \quad (5)$$

$$I_{2i,t}^{*} = \eta' W_{it} + \mu_{2i} \quad (6)$$

$$Ln\ Yit^{*} = \beta it' X\ it + \theta Regs + \mu 3i \quad (7)$$

$$Corr(\mu 1i, \mu 3i) = \rho_{13}$$

$$Corr(\mu_{2i}, \mu_{3i}) = \rho_{23}$$

$$Corr(\mu_{1i}, \mu_{2i}) = \rho_{12}$$

Following Heckman's two step procedure we estimate equation

$$Ln\ Y_{it}^{*} = \beta_{it}' X_{i,t} + \theta Regs + \gamma_1\lambda_{1i} + \gamma_2\lambda_{2i} + v_{1i} \quad (8)$$

Where λ_1 y λ_2 are the well-known "Inverse Mill's ratios"

$$\lambda_1 = f(\rho_{12}, \delta' Z_{it}, \eta' W_{it}) \text{ and } \gamma_1 = \rho_{13}\sigma_3 \quad (9)$$

$$\lambda_2 = f(\rho_{12}, \eta' W_{it}, \delta' Z_{it}) \text{ and } \gamma_2 = \rho_{23}\sigma_3 \quad (10)$$

The Data

Again, we use PHS data. Workers report there their regulatory status. The questions are quite specific and focus mainly on legally enforced benefits, with details for each of them: severance payments, paid holidays, sick leave, social security, etc. The possible combinations are sixty-four. However, benefits are highly correlated: workers who are registered in the social security system typically have the right to severance payments as well as the rest of labor legislation provisions. Otherwise they don't have any benefits. For this reason, we define the *Regs* variable as 1/0. Voluntary fringe benefits provided by employers are not reported to the PHS. [27] We included the following variables.

X: Human Capital (Educational level, Mincerian Experience), Current job Tenure.

Job Status: category, occupation (self-employed, wage earner), Firm Size, Branch of activity.

***Regs*:** 1 if the person is covered by labor legislation; 0 otherwise

Z including: Marital status, head of household, number of children, children <6 (0 or 1).

W including: *Z plus Job Status*

Table 5 reports the results for females and males separately. We chose to report here the estimates for 2 step and OLS regressions.[28] We introduced year fixed effects.

As can be seen in the tables the estimates show an economically and statistically significant effect of regulations on earnings. A male individual appears to sacrifice about 8% of his earnings when regulations are present. A female, on the other hand, sacrifices less, though a still-significant 2.8% of her earnings. It is intuitive that females present lower coefficients. Since the reduction in earnings will come out of the equilibrium match, and since both the demand and supply side are likely to shift down with regulations, one would anticipate a smaller movement the more elastic the supply side is. There is considerable evidence that the female labor supply is more elastic than that for men.

27 It is likely that these benefits are most valuable to the highest-wage employees. This could result in a bias arising from the omission of some kinds of fringe benefits.

28 Tables A-3 and A-4 report results of the selection process.

A large number of other interesting results come out of Table 5. The traditional returns to schooling and experience, as well as those to tenure, appear consistent and rather strong. The size of corporations where the individual works is also quite important. Large corporations appear to be more productive and pay, accordingly, higher wages (conditional on regulatory benefits).

Summarizing, our results indicate that regulations do have an important impact on earnings. While we cannot say that they are welfare reducing, it is quite obvious that a job with regulatory coverage does not come for free. One must sacrifice earnings in order to have access to it. At this point it is very important to emphasize that we have estimated reduced forms. Hence, no inference on the elasticity of labor demand or on the marginal rate of substitution in welfare can be made. Yet the result is quite illuminating, particularly when paired with those of the previous subsection.

Moreover, regulations are not fairly distributed. They tend to benefit those with higher earning potential and segment the market. Those who do get some coverage, however, must sacrifice a portion of their earnings. Still, as we just mentioned, we have not connected the potential impact of regulations with labor demand. For this reason, it is difficult to make any structural inferences as to how the market would clear once they are eliminated. In the next section, we turn to a different exercise and estimate labor demand for a large number of manufacturing firms in Argentina.

Table 5
Regression Results: Trade-off Wages-Fringe Benefits
Dependent Variable: Lnyh

	Females		Males	
Variable	**2 Step**	**OLS**	**2 Step**	**OLS**
Lamp	-.2343		-.1815	
	(-6.558)**		(-3.378)**	
Lame	.9478		-.5816	
	(1.612)		(-4.421)**	
Primary	.1199	.3343	.2210	.2475
	(5.191)**	(8.184)**	(14.131)**	(18.039)**
High-School	.5649	.886	.6799	.7589
	(21.62)**	(18.349)**	(31.033)**	(47.85)**
College	1.0448	1.3646	1.264	1.3857
	(12.315)**	(24.691)**	(44.595)**	(69.289)**
Exper	.0256	.0371	.013	.0312
	(7.216)**	(11.856)**	(4.448)**	(24.885)**
Exper**2	-.0003	-.0005	-.0008	-.0004
	(-4.515)**	(-8.293)**	(-1.463)	(-17.420)**
Tenure	.0064	.0056	.0072	.0071
	(7.956)**	(4.161)**	(16.579)**	(16.351)**
Manufacturing	-.1085	.0368	.0458	.0479
	(5.100)**	(.912)	(3.212)**	(3.352)**
Public Services	.1212	.1299	.1402	.1428
	(1.477)	(.617)	(3.241)**	(3.294)**
Construction/Maids	.1587	.3129	.0088	.0116
	(6.401)**	(6.797)**	(.503)	(.664)
Retail	-.1800	-.0401	-.003	-.0033
	(-.7329)	(-.922)	(-.198)	(-.213)
Private Services	.1307	.2563	.0632	.0648
	(5.937)**	(6.113)**	(4.367)**	(4.47)**
Public Administration	.0119	.1052	-.0094	-.0105
	(.583)	(2.621)**	(-.489)	(-.542)
Social Services	.1666	.3116	.0089	.0061
	(3.226)**	(3.963)**	(.336)	(.23)
Size5	.0063	.2158	.008	.0018
	(.238)	(4.335)**	(.049)	(.112)
Size<25	.0682	.2875	.0785	.0811
	(2.685)**	(5.850)**	(4.801)**	(4.954)**
Size<100	0.0984	.3072	.1346	.1384
	(3.804)**	(6.037)**	(7.697)**	(7.900)**
Largest	.1654	.3953	.2222	.2278
	(2.89)**	(7.739)**	(13.236)**	(13.553)**
Self	.0762	.0682	.0474	.0538
	(3.996)**	(2.047)**	(3.605)**	(4.091)**
Regs	-.0284	-.0039	-0.0826	-.0757
	(-1.687)	(-.123)	(-7.363)**	(-.6744)**
Constant	1.7757	1.0312	10.7873	10.435
	(10.561)**	(13.262)**	(221.212)**	(345.769)**
AR-Squared		.8709		0.9612

*Absolute value of t-statistics in parentheses; * significant at 5% level; ** significant at 1% level.*
NOTE: See ANNEX, Table A-1 for description of the variables.
Source: IERAL based on PHS.

IV. Labor Demand Estimation

We argued above that most of the regulatory impact would operate through the demand for labor. Theoretical arguments suggest that regulations in the form of taxes will have a negative impact on employment and/or wages. Contributions to social security are typically thought to affect negatively the demand for labor as well since the effects through labor supply are probably modest (in countries like Argentina, where workers do not perceive the contributions as deferred or indirect wages, this effect is likely to be very small). Theory, however, provides relatively less guidance over the effects of severance payments on employment. While they are likely to change the ease with which payroll is managed, it is not clear that they reduce the aggregate demand for labor. It appears crucial to have an empirical estimate of how firms respond, in their labor demand decisions, to the presence of regulations.

Hamermesh (1986), summarizing the literature, provides empirical estimates of the employment/labor cost elasticities for various industrial countries. He found the parameter to be low in the sample (.1 to .5) suggesting that policies that increase the fixed cost of employment may reduce the employment-hours ratio only slightly. However, these elasticities could be biased downward as they may reflect the effect of prevailing JS since these regulations would have induced a substitution away from labor.

Less controversial than the effect of JS on the adjustment process is its effect on the employment level. An increase in JS increases the cost of hiring due to the change in the expected future severance payment and the cost of foregone output due to potential mismatches. In the context of shocks to output, demand firms must strike a balance between hiring more workers or waiting a few periods to forego the high potential future severance payment.

This section presents the results of the estimation of a homogeneous labor equation with a previously unexploited balanced panel of Argentine manufacturing firms. Our empirical analysis considers the adjustment of employment and hours over the 1990/1996 period.

One of the rich features of the dataset is the availability of employment and hours worked. Since one of the effects of stiffening regulations is likely to be a more intense use of hours, we are likely to uncover features here that papers with more aggregate data sources cannot. Of particular interest is the adjustment in the intensive margin (hours) that can follow an increase in the perceived cost of severance. For instance, increases in the demand for goods accompanied by higher severance costs are likely to lead to a reasonably constant level of employment but a more intense use of overtime.

Panel data estimations such as those pursued here present some drawbacks. To begin with, the relatively short period of time spanned restricts the variability of regulations. In particular, as mentioned before, there were relatively few changes in the period under consideration, and those that took place happened towards the end of the sample. In any event, as we will see, the effects of regulations come out strongly and highly significant. A second limitation is that the period was one of extraordinary change in a number of dimensions. These included a large number of firm deaths and births (unfortunately not adequately captured by the sampling technique used to create the panel) and, most remarkably, a period of such strenuous firm re-engineering that it raises concerns over the value of long run elasticities. On the other hand, the high variance in some of the forcing variables allows a more efficient estimation of the parameters.

The Model

Our empirical approach models labor demand through a fairly general setting. We characterize employment choices as the dynamic interaction of employment and hours adjusting to fluctuations in output, factor prices and regulations. While the system that will be estimated is unconstrained, the specifications for the demand system correspond to a substantial number of production structures.[29] The system is summarized by the following two equations,

$$\text{Ln } E_t = a_1 + \alpha_2 \text{Ln} E_{t-k} + \alpha_3 \text{Ln } Regs + \alpha_4 \text{Ln } H_{t-k} + b \text{ Ln } Sat + gLinP_t + e_{1t} \qquad (11)$$

$$\text{Ln } H_t = a_1 + a_2 \text{Ln} H_{t-k} + \alpha_3 \text{Ln } Regs + \alpha_4 \text{ Ln } E_{t-k} + b \text{ Ln } Sat + gLinP_t + e_{2t} \qquad (12)$$

Where E_t is employment, H_t are production hours, *Pt* is industrial production. *Regs* measures the cost equivalence of regulations, which presumably affect not just the level of demand but also the dynamics. Finally *Sat* captures the product wage.

The model assumes that employers seek to maximize the expected value of current and future profit and that the costs of adjusting labor input are a quadratic function of the size of the adjustment made.

The specification is quite flexible, as we mentioned above. It is consistent with a number of production structures with smooth substitution between workers and hours, including varying degrees of returns to scale or, what is even more likely, the presence of imperfect competition in goods markets. In other words, the model does not restrict the source of curvature of the profit function.[30] Given this generality, care must be taken to make explicit the maintained hypotheses if the coefficients are to be identified as technology parameters.

It is important to consider the theoretical model on which the specification is based so as to understand the true significance of the parameters. If the production process is assumed to have the features of a Cobb-Douglas production function, labor costs and production parameters are interpreted as labor and return to scale parameters, respectively. If, on the other hand, it is assumed that a CES production function explains the model better, the corresponding coefficients represent the capital-labor substitution elasticity and the scale parameter, respectively. In any case, in the estimations presented herein, no restrictions on production function or underlying cost structure will be imposed.

Econometric Specification

The system represented by (11) and (12) presents a number of econometric problems that must be addressed.

First, the model, being based on a panel, will be estimated with fixed effects to control for firm idiosyncratic factors. We will also introduce a quarter dummy to correct for any seasonality in the data, which was not previously adjusted.[31]

Under most reasonable assumptions (local returns to scale, imperfect competition, bargaining structures and so on) firm output and shocks to the demand decision are likely to be correlated. The same can be said about real wage determination. This, of course, requires the

29 The corresponding derivations may be consulted in Varian (1984), Mascollel (1996), Chambers (1988) and Hamermesh (1986,1993).

30 For instance, the model is consistent with a setting where firms are imperfectly competitive and face constant marginal costs as well as with one where firms face a competitive market with decreasing returns to labor.

31 Theory indicates that when estimating labor demand conditioned on production (not value added) we should include other factor prices. Non labor inputs were unavailable for the estimation.

estimation through instrumental variables. At a micro level, the choice of instruments becomes a bit easier than in aggregate models. However, finding firm specific instruments proved to be very difficult as the data set did not include truly exogenous variables. For this reason, we used a number of aggregate variables and estimated different correlations for each firm.[32] The instruments used are GDP, the specific branch openness indicator (export plus imports over output), the aggregate unemployment rate, capital price index, log of ratio of wholesale prices to consumer prices and lagged values of all variables. We report results from OLS and IV estimations. Following Bentolilla and Saint Paul (1992) we did not expect labor demand to be stable over the firm's cycle.[33] To partially account for this we defined a dummy variable to capture recessions and expansions when instrumenting. We defined both states as occurring when the real output index (log) growth reached a threshold arbitrarily imposed. (See Annex 4, Table A-5 for details).

The model specification introduces an unrestricted dynamic adjustment. This, of course, is motivated via a cost of adjustment technology that depends in part on the hurdles imposed by regulations. The specification we chose was to introduce up to three lags to capture all seasonal as well as inertial factors. To allow for a richer interaction with hours, we also introduced lagged terms of hours in the employment equation and vice versa. As for adjustment costs, we also introduced as an explanatory variable the price of overtime hours. Presumably, a higher number of (relative) overtime hours should induce an increase in the level of employment next period. The fact that overtime hours are being used at all is probably a good indicator of significant adjustment costs. [34]

The Data

The data set includes a sample of 1,398 private manufacturing firms. The panel does not provide much information on the type of firms included. For instance, we have no knowledge of whether the employment relations are informal. The panel presents other problems too. Not all firms systematically answer all questions. Similarly, many firms drop out of the sample and the replacement criteria are not clear. The panel is also stable as it does not include newly created firms. We report results from estimating a restricted balanced panel and an unbalanced one. The balanced panel drops all those firms that do not answer the relevant questions or that have dropped out of the sample, leaving 200 firms in the data set with all the complete answers for the whole period. This decision could, clearly, create a selectivity bias problem.[35] The unbalanced panel, on the other hand, clears out those firms that do not answer the relevant questions all quarters. The number of remaining firms was 549 of the original 1398.[36] Sources and additional details concerning the data are explained in Annex 4.

The available data is in index number format. The definition of each variable has its own complexities. We defined employment as the total number of workers within the firm (white and blue collar). Production is measured via physical production as reported by firms;. multiproduct firms aggregate it according to a set of fixed weights. There is no control for changes in product

32 The instruments, while the same for each firm, did vary in that they were not restricted to share the same first stage coefficients for all firms.

33 Bentolilla and Saint-Paul (1992) argue that a decrease in firing costs affects more firing decisions than hiring decisions.

34 In estimating the interaction between hours and employment, it is clear that both of them respond to a correlated set of innovations. In this paper we estimated them separately. A refinement would estimate them jointly, allowing for a free correlation between both residuals. This could be done by running a 3SLS estimation.

35 The problem is complex. First, the methodology claims to replace small firms in the sample but not large ones. Second we cannot distinguish between firms that didn't answer because they decide not to do so (perhaps for taxation fears) from the ones that were closed. Finally, there is no information in the data that could allow us to identify firms that are likely to be dropped out of the sample to attempt a solution to the selectivity bias (i.e., we have no way in which to identify if a firm is large or small).

36 We considered the possibility of reweighting the panel but it proved impossible as, in the balanced one, entire branches were lost . Therefore we did not have any criteria for expanding the sample.

design. Wages were defined by dividing payroll expenses by the number of employees. Since we have data on expenses due to overtime hours, we netted it out to compute regular wages. The survey does not include product price information. We estimated the real wage as the ratio of wages to wholesale prices for the sector. (For description of the variables see Annex 5, Table A-5.)

Table 6 shows some features of the firms in our sample. The table presents the average growth rate of a few variables. LnReg is the variable that encompasses labor regulation costs. We included as payroll taxes pensions, family allowances, health care system and PAMI (see Table 2 for details). We also introduced a measure of labor regulation provision through expected severance payments (ESP). We didn't include other labor regulations due to the difficulties involved in imputing costs. This was the case of paid holidays, sick leave and specific collective agreement provisions.

Table 6

Descriptive Statistics of firms in the sample
Annual average growth rate

	Average Growth Rate	
INDEX	**(1)**	**(2)**
Employment	-3.0	-2.7
Hours	3.2	1.1
Total Wage	10.9	10.6
Hourly Wage	7.5	9.9
Regulation Cost	-1.3	4.0
Output	8.0	5.7

NOTES: (1) based on extremes values on the series; (2) Based on the slope of the trend line.
Source: IERAL-Fundación Mediterránea based on Manufacturing Survey – INDEC.

IV.3.1. The Index of Regulations Construction

LnReg is estimated every period for each branch of activity. LnReg has two main components: taxes and expected severance payment (ESP). ESP is calculated as a percentage of normal wage through the following formulae:

$$ESP_{it} = U_{it} * F_{it} * T_{it} * P_{it} \quad (13)$$

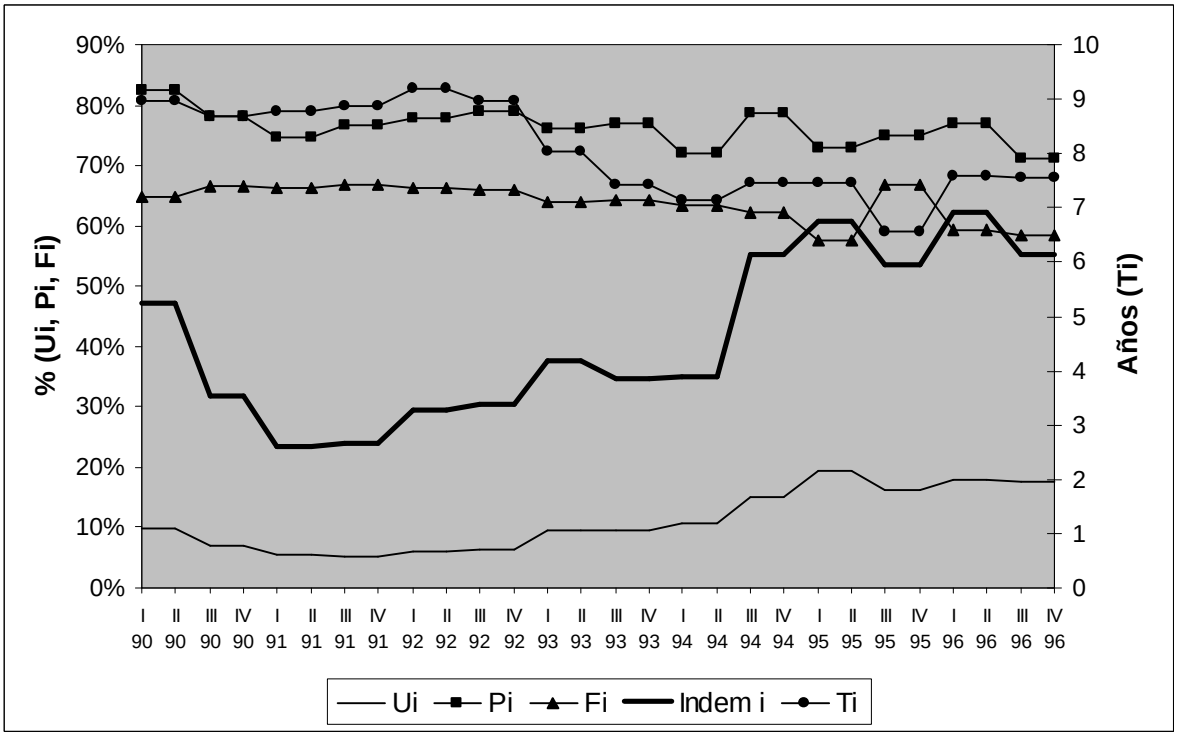
Where i refers to the firm's branch of activity and t refers to time (quarter and year); U is the unemployment rate , F is the percentage of fired people over unemployment; T is average tenure and P is the probability of having the right to severance (the fraction of formal wage earners over total wage earners). We have each period as many ESPs as branches of activities aggregated at two digits of CIIU 3rd Rev. Since the PHS is gathered twice a year and we have quarterly data we use the same figure for every two quarters of the Manufacturing Industrial Survey.

We add the taxes to ESP to obtain the whole cost of regulation as a proportion of wages.

$$Regs_{it} = ESP_{it} + Taxes_{it} \quad (14)$$

The variable is expressed as an index base (1990=100) and expressed in logarithm for the regressions. The behavior of the different components of the index are in Graph 4.

Graph 4
Decomposition of Expected Severance Payment



Source: IERAL-Fundación Mediterránea based on Manufacturing Survey – INDEC.

Results

Table 7 presents the results of estimating through OLS. Our first specification treats output as exogenous. Estimates for jobs and hours are reported for the unbalanced and the balanced panel, respectively. We estimated introducing individual firm fixed-effects correcting for serial correlation. The reported z score is heteroskedasticity consistent.

The results show that all variables are statistically significant. A 1% increase in real wages decreases the level of employment 0.15% while hours go down 0.20%. A common pattern in our results and the literature is that hours appear more responsive to changes in costs or scale factors. This is likely the effect of costs of adjustment. Theory indicates that with costly changes in manpower, a firm is much more likely to rely on adjustments in hours per worker than on the number of jobs offered.[37]

Both jobs and hours do not appear insensitive to fluctuations in output. As we mentioned in the introduction, one of the surprising features of Argentina's job market has been the apparent low responsiveness of employment to output. In fact if output grows 1%, hours increase almost .04 % and workers 0.07%.

37 It must be remembered, however, that overtime hours are costlier and thus firms have to take this into account.

A feature of the results is that output and wage elasticities are higher in the unbalanced panel than in the balanced one. Unfortunately, the selection rule to stay in the panel is unclear. Firms could die or simply not answer in some periods. Thus, there is no basis to conclude that regulations do have an impact in pushing firms into bankruptcy.

The model reported in Table 7 shows, in both panels, fairly similar results. Employment and hours appear sensitive to wages. Remarkably, the cost of regulations (severance costs and taxes) always appears to affecting significantly the demand for workers. The results, however, assumed that physical volume of production as well as wages could be treated as exogenous, ignoring questions of simultaneity in the determination of output, employment and prices.

Table 7:
Manufacturing Survey / OLS Results

	Unbalanced Panel		Balanced Panel	
	Employment (1)	**Hours per Worker (2)**	**Employment (3)**	**Hours per Worker (4)**
Normal Wage	-0.151	-0.197	-0.119	-0.180
	(21.23)**	(41.78)**	(14.40)**	(29.63)**
Output	0.117	0.061	0.103	0.071
	(33.22)**	(24.22)**	(20.01)**	(17.08)**
Output_1	-0.048	-0.023	-0.049	-0.035
	(12.50)**	(8.23)**	(8.94)**	(7.95)**
Overtime Wage	0.015	0.063	0.018	0.062
	(8.21)**	(49.52)**	(7.03)**	(31.46)**
Employment_1	0.815	-0.059	0.878	-0.077
	(88.69)**	(9.06)**	(64.26)**	(7.13)**
Employment _2	-0.239	0.026	-0.277	0.051
	(21.48)**	(3.28)**	(15.67)**	(3.64)**
Employment _3	0.275	-0.030	0.270	-0.023
	(31.17)**	(4.72)**	(20.41)**	(2.19)*
Hours per Worker_1	0.022	0.172	0.037	0.251
	(2.00)*	(21.57)**	(2.42)**	(20.37)**
Hours per Worker_2	0.073	0.001	0.007	0.015
	(6.56)**	(0.16)	(0.50)	(1.30)
Hours per Worker_3	0.042	0.014	0.084	0.033
	(4.13)**	(1.87)*	(6.46)**	(3.18)**
Second Quarter	-0.033	0.100	-0.040	0.100
	(7.89)**	(33.32)**	(8.57)**	(25.99)**
Third Quarter	-0.032	0.099	-0.032	0.089
	(7.39)**	(31.49)**	(6.44)**	(22.32)**
Fourth Quarter	-0.018	0.085	-0.015	0.075
	(4.59)**	(29.42)**	(3.29)**	(20.59)**
Regulations	-0.013	0.031	-0.009	0.028
	(2.04)*	(6.80)**	(1.22)	(4.82)**
Constant	0.441	4.322	0.277	3.689
	(5.20)**	(70.69)**	(2.63)**	(42.81)**
AR-Squared	.89	.70	.86	.67
Observations	**11061**		**4997**	

Absolute value of z-statistics in parentheses; significant at 5% level; * significant at 1% level
NOTE: See Table A-5 for description of the variables.
Source: IERAL-Fundación Mediterránea based on Manufacturing Survey – INDEC.

When using micro-data the simultaneous problems of output determination and employment are typically avoided. The reason is simple: under perfect competition, demand is given and hence firms only choose how many workers to hire. Unfortunately, in the case of Argentina, the assumption of competitive markets may be a bit strict–at least for the first few years of the sample, when the economy was quite closed and a few firms disputed the local market. Under imperfect competition the decision to hire workers and sell goods is closely intertwined and disturbances that affect one will probably affect the other. For this reason we should instrument for movements in the final goods demand.[38]

Table 8
Manufacturing Survey
IV- Endogenous: Wages and Product

	Unbalanced Panel		**Balanced Panel**	
	Employment (1)	**Hours per Worker (2)**	**Employment (3)**	**Hours per Worker (4)**
Est. Normal Wage	-0.118	-0.022	-0.041	-0.038
	(10.27)**	(2.61)**	(3.09)**	(3.61)**
Est. Output	0.110	0.103	0.050	0.124
	(9.72)**	(12.11)**	(3.68)**	(10.75)**
Output_1	-0.042	-0.045	-0.030	-0.065
	(6.61)**	(9.30)**	(3.58)**	(9.04)**
Overtime Wage	0.016	0.062	0.022	0.055
	(6.29)**	(32.96)**	(6.61)**	(20.37)**
Employment_1	0.825	-0.056	0.910	-0.071
	(76.24)**	(6.94)**	(59.58)**	(5.50)**
Employment_2	-0.260	0.042	-0.317	0.063
	(19.16)**	(4.00)**	(16.03)**	(3.64)**
Employment_3	0.310	-0.051	0.294	-0.032
	(28.22)**	(6.29)**	(20.14)**	(2.66)**
Hours per Worker_1	0.038	0.202	0.015	0.279
	(2.90)**	(20.70)**	(0.85)	(19.08)**
Hours per Worker _2	0.076	-0.015	0.001	0.021
	(5.99)**	(1.51)	(0.05)	(1.47)
Hours per Worker _3	0.036	0.013	0.051	0.026
	(2.95)**	(1.42)	(3.34)**	(2.05)*
Second Quarter	-0.028	0.123	-0.033	0.112
	(5.97)**	(33.08)**	(6.24)**	(24.36)**
Third Quarter	-0.029	0.122	-0.021	0.105
	(5.74)**	(31.44)**	(3.87)**	(22.08)**
Fourth Quarter	-0.020	0.100	-0.013	0.084
	(4.11)**	(27.50)**	(2.40)**	(18.95)**
Regulations	-0.022	-0.012	-0.021	-0.003
	(3.04)**	(2.15)*	(2.59)**	(0.45)
Constant	0.159	3.548	0.310	2.989
	(1.53)	(43.68)**	(2.54)**	(27.35)**
AR-Squared	.89	.72	.86	.69
Observations	**10532**		**4997**	

Absolute value of z-statistics in parentheses; significant at 5% level; ** significant at 1% level

NOTE: Instruments are Normal Wage_1; Output_2; Output_3; Output_4, Consumer Price Index, Capital Services Price Index, Wholesale Price Index, Aggregate Unemployment Index, dce; dca. See Table A-5 for a description of the variables.

Source: IERAL-Fundaciòn Mediterránea based on Manufacturing Survey – INDEC

[38] Table A-6 in the Appendix shows the results of instrumenting the level of output assuming wages to be exogenous.

As for wages, firms have limited say on the wage offer. The institutional setting in Argentina limits that discretion. The centralized bargaining process restricts the choices for a firm and only upward deviations in wages are allowed. Furthermore, the price deflator used to construct the real wage, like the level of output, is endogenous under imperfect competition. For this reason, in Table 8 we report instrumental variable estimations assuming both wage costs and output as jointly determined with employment.

The instrumental variable estimation changes little the short run output elasticities in the employment equations. The elasticity for the hours equation, on the other hand, doubles. Interestingly, it appears that the endogeneity problem was more serious for the hours equation, the margin where most changes would take place when in the presence of adjustment costs. This pattern is present in both tables and most remarkable in the unbalanced panel estimates.

The responsiveness of employment to changes in wage costs is a bit more of a concern. When we only instrument for output, the elasticity remains stable at a 0.15 – 0.20 level (in the unbalanced panel case). However, when we instrument for the potential endogeneity of wages, the cost elasticity drops substantially in both equations with a more dramatic impact on the hours equation. Since we measure wages by dividing the wage bill by employment we could have introduced an upward bias in the least square estimates of labor cost elasticity.

A pattern in our results is that hours appear less responsive than jobs to fluctuations in costs or scale factors. Theory indicates that with costly changes in manpower, a firm is much more likely to rely on adjustment in hours than on the number of jobs offered. We failed to find support to these arguments as other studies using quarterly data had previously done.[39]

When we consider the regulatory burden the results change. To begin with, as regulations get stiffer, employment drops more than hours. That is, firms substitute away from both types of labor. Workers and hours, thus, appear to be *p-complements*. An increase of 1% in the estimated regulatory burden produces a short run drop in employment of around 0.02% while hours would drop by 0.01 or 0.003% (unbalanced and balanced respectively). This is exactly what we would have expected. As regulations get tighter, firms are more likely to get rid of workers. It is quite remarkable that regulations do have this effect, completely counter to that sought by regulators. Job security provisions are typically introduced to protect workers, yet they tend to reduce the number of jobs and increase only in the margin the effort demanded from those lucky ones who can keep their jobs.

To summarize, upon impact, the presence of regulations seems to disturb the behavior of the labor market. Theoretically, in the presence of high fixed costs firms could substitute away from labor into capital or other inputs. Yet, while firms have to pay the additional hours at the overtime rate (+50%/+100%), plus proportional payroll taxes,[40] the expected severance payments are invariant since the regulation recognizes the straight-time rate as the severance cost. Hence, the theoretical elasticity prediction is ambiguous.[41] Our results suggest that an increase in the regulatory burden reduces the employment/hours ratio somewhat. But the negative effect on the total workers-hours employment is a fact that shows substitution away from labor.

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[39] Hamermesh (1993), chapter 7.

[40] Table 2 showed that 92% of non-wage labor costs are social security contributions proportional to wages.

[41] The long run trade-off between jobs and standard hours has been difficult to find in the literature.. See Hamermesh (1993).

Robustness

The cost of severance was calculated using sector specific data. It is possible, however, that some sectors with low employment levels might also show high turnover rates. Under those circumstances, the cost of severance would be high and a spurious negative correlation might develop. The problem could be more severe, the less time variability the index of regulations shows. That is, when most of the regulation variability comes from the between component across sectors, other unobserved components could explain the sign and size of the estimated coefficient.

To check for the existence of spurious correlation we ran our labor demand equations on an aggregate index of regulations. That is, we recalculated the index of regulation for the aggregate of the manufacturing sector. Now the index becomes

$$Regs_t = Taxes_t + ESP_t = U_t * F_t * T_t * P_t \quad (13)$$

Where U is the aggregate unemployment rate , F is the fraction of the unemployed who were laid off. T is average tenure and P is the probability of having severance payment (the percentage of formal wage earners over total wage earners). The results are reported in table 9.

Little changes from the results previously reported. The wage elasticity is somewhat lower but roughly equivalent. The output elasticity remains the same. The lagged terms remain invariant as well, ensuring that the dynamics will look the same. Finally, the impact of regulations on employment is even stronger than the one reported above. Now the impact elasticity climbs to 0.09, at a level equivalent to that of wages. The effect on hours appears to dwindle away. The coefficient is now economically and statistically indistinguishable from zero (and the sign becomes positive). Overall, the specification appears robust to this source of spurious correlation.

It would seem appealing to evaluate the differential impact that the different components of the regulatory index have on employment. In table 10 we report the results of conducting three exercises. All of them limit the time variability and focus on the cross sectional factors. The first, which we call option A, holds unemployment and the probability of having been laid off fixed at the mean for the period. Option B assumes that the tenure structure has remained constant over the time. Option C holds unemployment, the fraction of the laid off and the probability of access to severance payments constant.

Somewhat limiting the time variability of the index of regulations has a very modest effect on our estimates. In all cases, the jobs elasticity increases. At the same time, the hours response deteriorates, turning economically and statistically insignificant. All the other parameters remain largely unaffected.

The deleterious effects of regulations on employment seem robust to alternative specifications. Restricting neither the cross section nor the time series variability seems capable of reducing the size or significance of the estimates. In fact, in all cases the impact elasticities increase, sometimes making them equivalent to the wage cost. Conversely, in the case for hours, the effects are weakened.

Table 9
Manufacturing Survey
IV- Endogenous: Wages and Product
Unbalanced Panel- Aggregated Regulation Index

	Employment (1)	Hours per Worker (2)
Est. Normal Wage	-0.097	-0.032
	(-7.834)	(-3.628)
Est. Output	0.115	0.096
	(10.164)	(11.319)
Output_1	-0.042	-0.046
	(-6.634)	(-9.616)
Overtime Wage Indexe	0.014	0.063
	(5.019)	(33.478)
Employment_1	0.821	-0.050
	(75.662)	(-6.292)
Employment _2	-0.260	0.032
	(-19.187)	(3.213)
Employment _3	0.306	-0.048
	(27.847)	(-5.846)
Employment _1	0.036	0.204
	(2.763)	(20.923)
Hours per Worker_2	0.075	-0.028
	(5.935)	(-2.951)
Hours per Worker _3	0.037	0.013
	(2.979)	(1.471)
Second Quarter	-0.026	0.123
	(-5.553)	(32.769)
Third Quarter	-0.027	0.121
	(-5.508)	(30.734)
Fourth Quarter	-0.020	0.099
	(-4.074)	(27.156)
Regulation	-0.091	0.004
	(-5.545)	(0.291)
Constant	0.059	3.570
	(0.580)	(45.026)
AR-squared	0.86	0.68
Observations	10532	10532

Absolute value of z-statistics in parentheses; significant at 5% level; ** significant at 1% level
NOTE: Note: Regulation Index = Uit × Fit × Tit × Pit + Taxes, with i = sectors and t = quarters NOTE: Instruments are Normal Wage_1; Output_2; Output_3; Output_4, Consumer Price Index, Capital Services Price Index, Wholesale Price Index, Aggregate Unemployment Index, dce; dca; See Table A-5 for description of the variables
Source: IERAL-Fundaciòn Mediterránea based on Manufacturing Survey – INDEC

Table 10
Manufacturing Survey - Alternative Regulation Index
IV- Endogenous: Wages and Product -Unbalanced Panel-

	Regulation Index, option A		**Regulation Index, option B**		**Regulation Index, option C**	
	Employment (1)	**Hours per Worker** (2)	**Employment** (1)	**Hours per Worker** (2)	**Employment** (1)	**Hours per Worker** (2)
Est. Normal Wage	-0.105	-0.028	-0.114	-0.029	-0.095	-0.029
	(-8.636)	(-3.195)	(-9.846)	(-3.466)	(-7.649)	(-3.284)
Est. Output	0.113	0.097	0.109	0.096	0.116	0.096
	(9.939)	(11.477)	(9.651)	(11.545)	(10.187)	(11.361)
Output_1	-0.042	-0.046	-0.041	-0.046	-0.042	-0.046
	(-6.571)	(-9.669)	(-6.395)	(-9.673)	(-6.667)	(-9.633)
Overtime Wage Indexe	0.015	0.063	0.016	0.063	0.014	0.063
	(5.643)	(33.529)	(6.155)	(33.680)	(5.134)	(33.458)
Employment_1	0.823	-0.051	0.824	-0.051	0.821	-0.051
	(75.960)	(-6.407)	(76.088)	(-6.400)	(75.745)	(-6.368)
Employment _2	-0.260	0.032	-0.261	0.032	-0.260	0.032
	(-19.176)	(3.209)	(-19.182)	(3.207)	(-19.166)	(3.213)
Employment _3	0.308	-0.048	0.309	-0.048	0.306	-0.048
	(28.057)	(-5.938)	(28.185)	(-5.933)	(27.876)	(-5.904)
Employment _1	0.036	0.204	0.037	0.204	0.036	0.204
	(2.751)	(20.958)	(2.786)	(20.957)	(2.701)	(20.942)
Hours per Worker_2	0.075	-0.028	0.075	-0.028	0.075	-0.028
	(5.884)	(-2.952)	(5.854)	(-2.955)	(5.913)	(-2.950)
Hours per Worker _3	0.037	0.014	0.036	0.014	0.037	0.014
	(2.984)	(1.505)	(2.944)	(1.494)	(3.014)	(1.494)
Second Quarter	-0.028	0.123	-0.028	0.123	-0.028	0.123
	(-5.880)	(33.269)	(-5.826)	(33.352)	(-5.901)	(33.156)
Third Quarter	-0.028	0.121	-0.028	0.121	-0.028	0.121
	(-5.726)	(31.127)	(-5.655)	(31.194)	(-5.722)	(31.015)
Fourth Quarter	-0.021	0.099	-0.020	0.099	-0.021	0.099
	(-4.234)	(27.408)	(-4.095)	(27.399)	(-4.364)	(27.381)
Regulation	-0.062	-0.008	-0.039	-0.006	-0.084	-0.004
	(-4.361)	(-0.788)	(-3.911)	(-0.766)	(-5.431)	(-0.373)
Constant	0.064	3.560	0.088	3.563	0.044	3.564
	(0.628)	(44.836)	(0.869)	(45.174)	(0.436)	(44.735)
AR-squared	0.86	0.68	0.86	0.68	0.86	0.68
Observations	**10532**		**10532**			**10532**

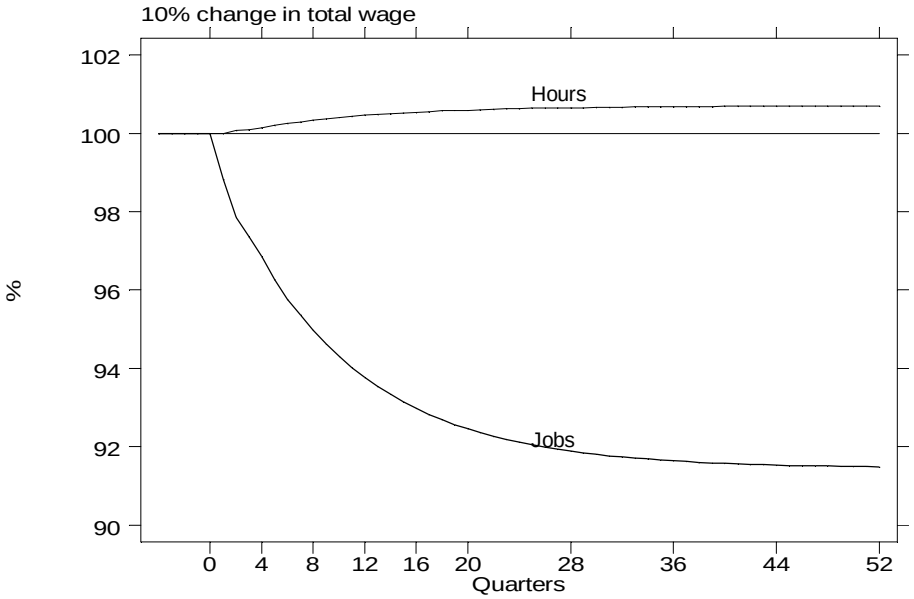
Absolute value of z-statistics in parentheses;
NOTE: Note: Regulation Index = Uit × Fit × Tit × Pit + Taxes, with i = sectors and t = quarters Option A: Uit and Fit fixed to the mean of the period. Option B: Tit fixed to the mean of the period. Option C: Uit, Fit, Pit fixed to the mean of the period.
Instruments are Product: linsat_1; linpf_2; linpf_3; linpf_4, lipc, lipk, lipm, lni_uag, dce; dca; Wages: linsat_1; linpf_2; linpf_3; linpf_4, lipc, lipk, lipm, lni_uag, dce; dca
See Table A-5 for description of the variables

Source: IERAL-Fundaciòn Mediterránea based on Manufacturing Survey – INDEC

Dynamics: The Speed of Adjustment

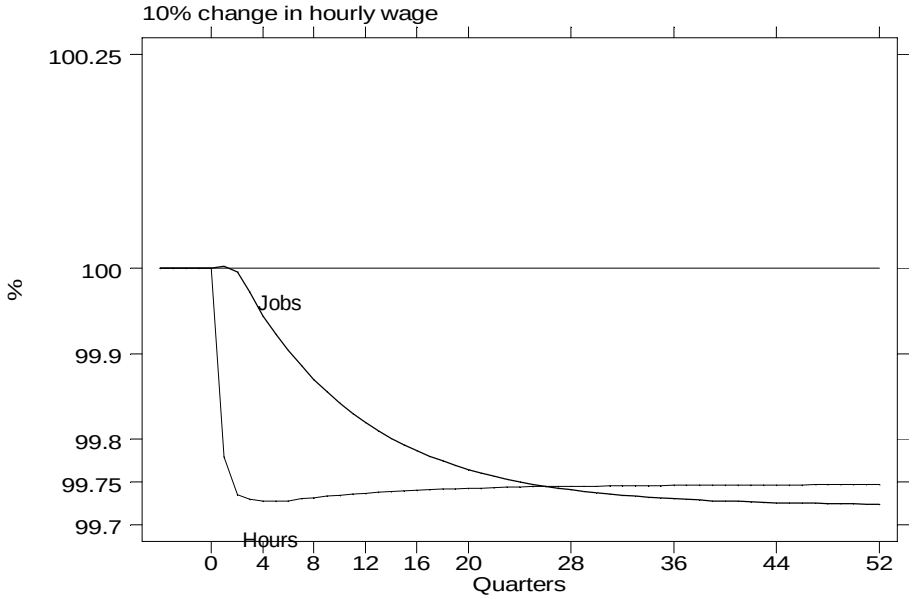
So far we have discussed the static, short run response of employment and hours worked to changes in wage costs, output and labor regulations. Next we turn to the adjustment process that firms will follow when one of these variables is shocked. We next present a set of graphs of the dynamic response of firms to 10% changes in output, wages or the costs of regulations. The exercise is conducted based on the regressions presented in table 8 above. We selected the unbalanced panel estimates. We allow for the interaction between hours and employment as we shock both equations simultaneously. Graphs 5 and 6 show the response to a 10% change in total wages and in hourly wages. Graphs 7 and 8 illustrate the response to a 10% increase in output and in regulatory costs.

Graph 5
Impulse-Response Function
Change in Total Wage



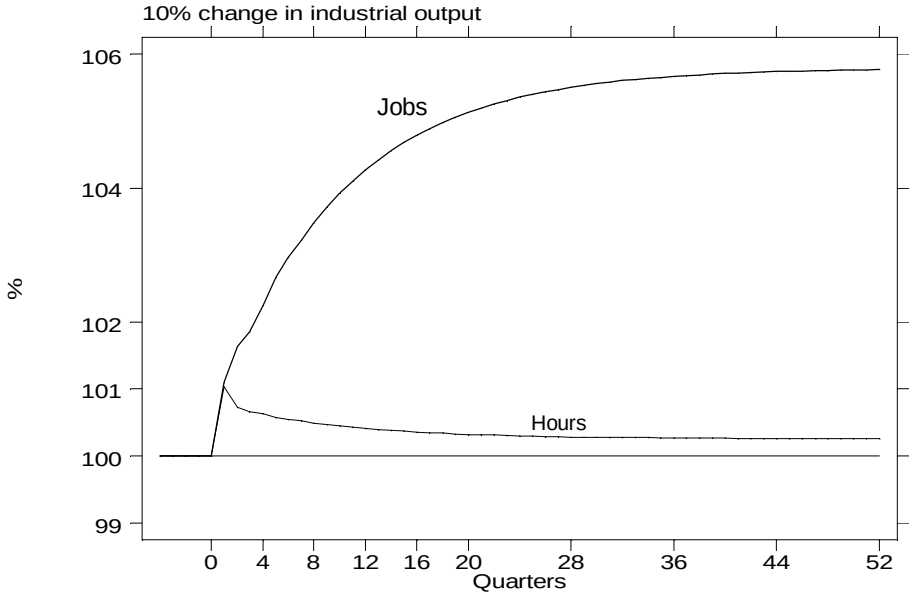
Source: IERAL-Fundación Mediterránea based on Table 9.

Graph 6
Impulse-Response Function
Change in Hourly Wage



Source: IERAL-Fundación Mediterránea based on Table 9.

Graph 7
Impulse-Response Function
Change in Industrial Output



Source: IERAL-Fundaciòn Mediterránea based on Table 9.

Graph 8
Impulse-Response Function
Change in Regulations

Source: IERAL-Fundación Mediterránea based on Table 9.

The median lags are 1.5/2.5 years for output and wage shocks. They also illustrate that the response is always greater in employment than in hours. There we observe again the damaging effect of regulations on labor demand. This can only be the case when firms substitute workers in the extensive margin for hours in the intensive one. Firms increase almost 1% the hours per worker while an equivalent increase in wages would have reduced employment 8.%. The bivariate hours-workers micro-data estimation allows us to draw some important conclusions. Regulations do have a negative impact on labor demand. The impact grows over time.

Another interesting finding is that when we allow for dynamics we find that the response of employment to output is substantially higher than the short run estimate. While the short run elasticity is fairly low, the long run response appears more respectable and close to 0.57.

Tables 11 and 12 present the estimated coefficients and long run responses of hours and employment. For comparison purposes we first reproduce the coefficients from the labor demand model under different assumptions.

Table 11 present estimates of the labor demand elasticity under the different models reported in Tables 7 and 8 and IV-Product reported in Table A-6. The median speed adjustment is among the values reported in the literature for estimates using quarterly data: 5.5 quarters for jobs and a quicker adjustment for hours. The median for hours adjustment implies a lag on the order of one quarter.

We consider the terms that describe the simultaneous adjustment of employment and hours. We found $\lambda_{EH} > 0$ in our specifications, suggesting workers and hours to be dynamic p-

complements. The estimate of λ_{HE} <0, statistically significant, with absolute values smaller than λ_{EH} in our specifications, suggests workers and hours are dynamic *p-complements.* Results suggest that for a

10% long-run decrease in employment there is a 4 % increase in the demand of hours per worker. The net effect is still a substitution away from labor.

Table 11

Labor Demand Coefficients under different alternatives

	Coefficients					
	Wage		**Regs**	**Output***	l_{EH}**	l_{HE} **
	Total	**Hourly**				
OLS						
Hours	-	-0.197	0.031	0.038	-	-0.063
Jobs	-0.151	-	-0.013	0.069	0.137	-
IV – Product						
Hours	-	-0.193	0.021	0.077	-	-0.076
Jobs	-0.173	-	0.000	0.076	0.163	-
IV - Product and wages						
Hours	-	-0.022	-0.012	0.058	**-**	**-0.065**
Jobs	-0.118	-	-0.022	0.068	**0.150**	**-**

* Include one lag

Source: IERAL of Fundación Mediterránea based on Table 7, 8 and Table A-6

Finally, table 12 provides the long run elasticities which can be benchmarked with those previously found with aggregate data.[42] We have found higher values for the long run elasticities. Our results show an output elasticity in the long run of 0.575 % and 0.03% for workers and hours respectively. The response to wages is also important in the long run with an estimated employment "elasticity" of -0.86%.

Table 12

Labor Demand Elasticities under different alternatives

	Long Run Elasticities			
	Wage		**Regs**	**Output**
	Total	**Hourly**		
OLS				
Hours	0.073	-0.226	0.042	-0.031
Jobs	-0.946	-0.208	-0.049	0.603
IV – Product				
Hours	0.115	-0.219	0.030	0.037
Jobs	-1.187	-0.274	-0.039	0.631
IV – Product and wages				
Hours	0.070	-0.025	-0.001	0.026
Median Lags	**9**	**1***	**1***	**1***
Jobs	-0.860	-0.030	-0.177	0.575
Median Lags	**7**	**10**	**7**	**6**

[42] See Pessino, 1995 and Montoya and Navarro, 1996.

** Less than 1 quarter.*
Source: IERAL of Fundación Mediterránea based on Table 7,8 and Table A-6

V. Concluding Remarks

Argentina's experience in the 1990s raises serious questions about the adjustment of the labor market. While output was growing strongly, employment was lagging behind. Many observers blame this behavior on an increasingly binding lack of market flexibility. One source of such stiffness could well be the important number of regulations governing labor market relations. As the economy demanded greater flexibility to adjust to a more competitive business environment, labor regulations were becoming ever more binding. The issue, however, is that there were no estimates of how important these increasingly tighter regulations were.

We have shown that Argentina's regulations do not quite do what they are intended to do. They reverse discriminate, providing protection to those workers with greater human capital. Regulations appeared regressive, limiting the opportunities of those worse off and protecting the jobs of those endowed with higher human capital. We also found that those who do have regulatory coverage earn, other things equal, lower incomes. That is, there is a trade-off between this fringe "benefit" and earnings. The cost, while relatively small, was still significant.

Regulations, and in particular severance payments, represent a cost for business. Firms rationally respond to them by lowering their demand for labor. Indeed, in the short run, but mostly in the long run, there is a strong negative effect of regulations on the level of labor demand. This downward shift of labor demand is at least partially (and we would argue mostly) responsible for the drop in earnings that is found to be associated with regulatory coverage. Similarly, any downward shift of a demand curve increases the potential for employment reduction.

To compound the problem, our estimates indicate that when regulations become stricter, firms rationally alter their labor allocations. They substitute workers for hours. Indeed, we find that individually worked hours go up with an increased regulatory burden at the same time that the number of workers is reduced. Regulations do not appear to be helpful in creating employment.

To conclude, an anecdote could help illustrate our findings. In May 1998, while the Ministry of Labor had sent to Congress proposed legislation that would further stiffen regulations, official statistics measured a very mild decrease in the unemployment rate relative to October 1997. Mr. Erman Gonzales, the Labor Minister, subsequently argued that unemployment was not going down because businessmen were not being "socially responsible." In spite of healthy GDP growth, they were not hiring more workers. He claimed they had, instead, increased the number of hours worked "exploiting" workers. Politician to the bone, he blamed others for his own mistakes.

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ANNEXES

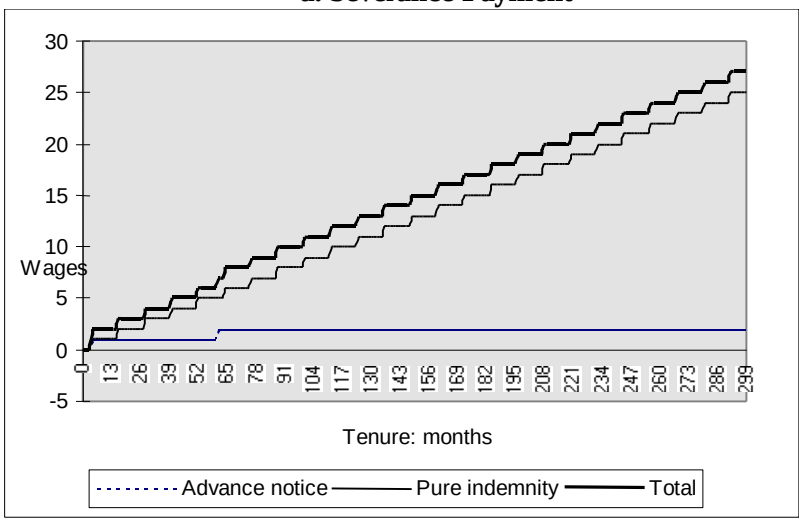
ANNEX 1- Labor Regulations

Graph A-1

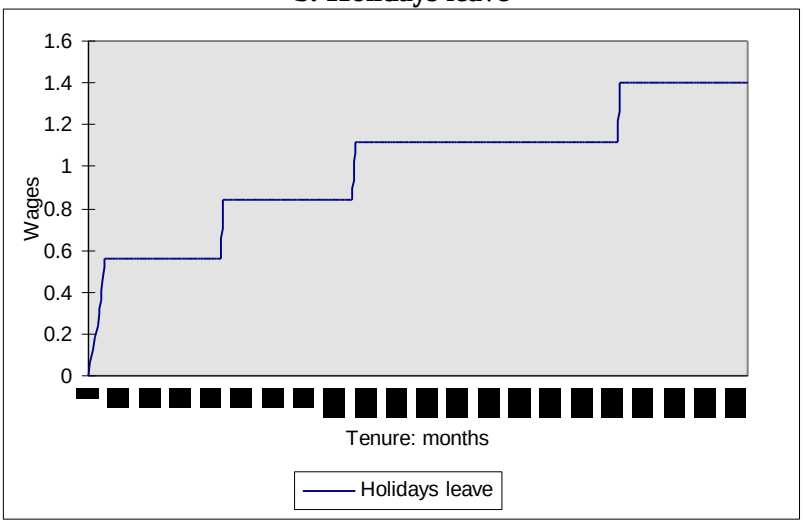
Cost of Labor Regulations

Regulatory Costs

a. Severance Payment



b. Holidays leave



Source: IERAL- Fundación Mediterránea, based on legislation enforced in each period.

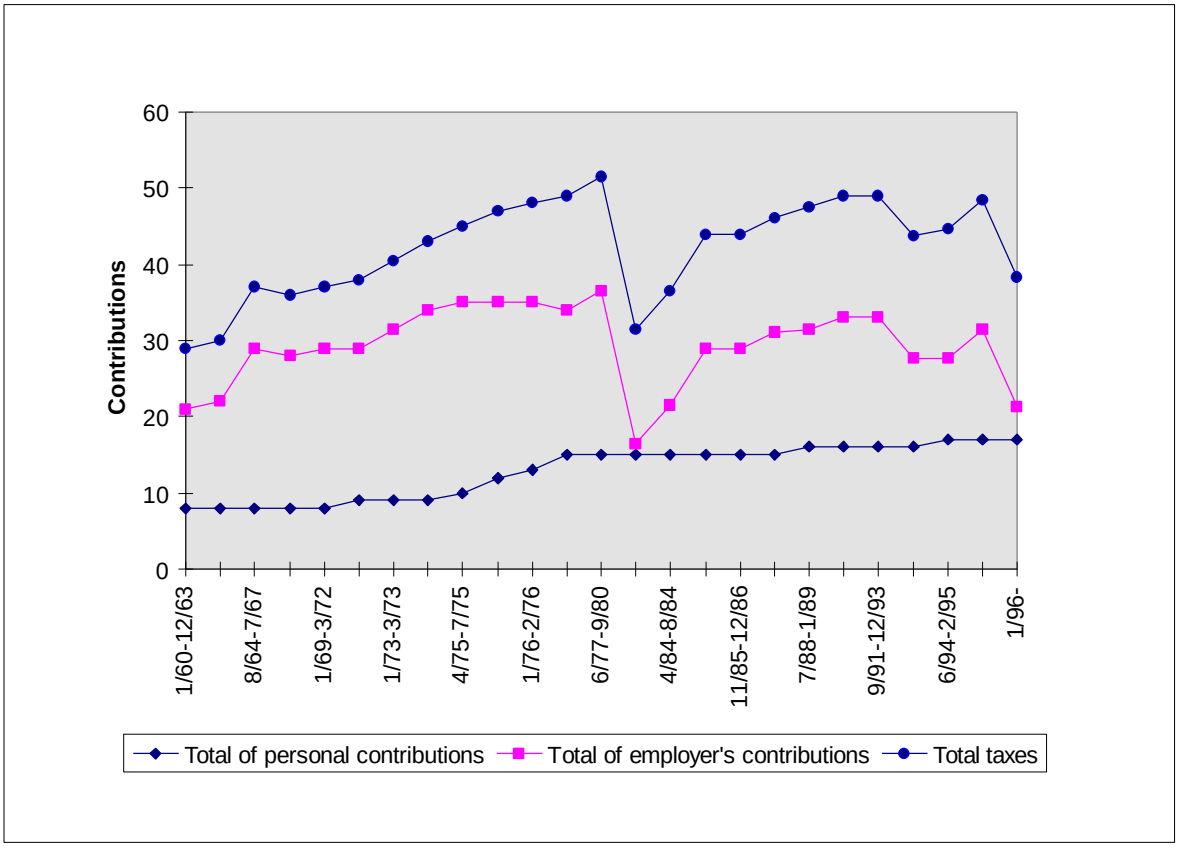
.

ANNEX 1

Graph A-2

Evolution of the Personal and Employer Contributions to Social Security

-as percentage of gross wage-



ANNEX 2
PHS

The microdata dataset available to track down the evolution of employment is the Permanent Household Survey (PHS) The PHS survey is a random sample of households that contains an array of personal, demographic and economic information on individual household members. They are conducted twice a year (in May and October) since 1974 in the main urban centers of Argentina43. The files record information on each respondent's labor market status and living arrangements during the survey week as well as the retrospective data on labor market activity during the previous month.

In terms of personal, demographic, and economic information on individual household members, the following information: labor market status (employed, unemployed or non labor force), relation to household head, age, sex, marital status, hours worked in the survey week, occupation, firm size and sector of activity, nonlabor income, schooling, number of children, hourly wage, number of hours worked. Wage earners declare there fringe benefits so it is possible to detect covered and uncovered people. It is not difficult to join personal and household files and to create from these joined database variables related to the household than can influence individual behavior towards the labor market.

The PHS has a rotating sample design, with households (addresses, strictly speaking) in the survey for four waves (two years) renewing the sample for each wave.

43 Considering the total sample is about 80% of Argentina's urban population. It must be remembered that about 15% of Argentina's population lives in rural areas (defined as villages of less than 5000 persons).

ANNEX 2

Table A- 1

Description of the Variables

Variable Definition	Name	Measurement Issues
Family Status		
Marital Status	Married	Dummy variable. 1 if the person is married.
Household Position	Household Head	Dummy variable. 1 if the person is the household head.
Number of Children	Children	Quantity of children.
	Child < 6	Quantity of children younger than 6 years old.
Non-Labor Income	Nonlabor	Log of the difference between household income and person's income divided by the quantity of household members but the referred person.
Activity Status		
	Partic	Dummy variable. 1 if a person is a labor force participant.
	Emplea	Dummy variable. 1 if the person is employed given the person is in the labor force. It is set to missing when the person is not in the labor force
	Wage	Hourly wage or earnings corresponding to the last month for reporting unit – Wage after social security deductions in wage-earners case-.
	Lnyh	Natural logarithm of hourly wages. It is set to missing if the person is not part of the labor force or if he/she is unemployed.
	Ptime	Dichotomous variable. 1 is the person work less than 35 hours per week.
Human Capital		
Schooling		Maximum educational attainment- Defined as Dichotomous in all cases.
	Illiterate	1 if the person has Incomplete (including illiterates) primary level
	Primary	1 if the person has Complete primary level or incomplete secondary level
	High-school	1 if the person has Complete secondary level or incomplete university level
	College	1 if the person has Complete university level
Experience	Exper	Mincerian Experience calculated as (Years of schooling - Age - 6).
	Exper**2	Describes the age-earnings profile
Tenure	Tenure	Continuous variable. Years of Tenure in the same job. It tries to measure specific on-the-job training.
Branch of activity		Sector of activity of the main occupation at the week of reference, classified under CIIU Rev. 3rd. Defined as Dichotomous in all cases
	Manufacturing	1 if the person works in manufacturing sector
	Construction	1 if the person works in construction sector
	Retail	1 if the person works in retailing sector
	Private Services	1 if the person works in restaurants, hotels
	Elect/Public Services	1 if the person works in utility companies.
	Finan	1 if the person works in financial services or insurance companies.
	Trans	1 if the person works in transportation services
	Public Administration	1 if the person works in public sector or defense
	Social Services	1 if the person works in health, education or other social services.
	Maids	1 if the person works as household maid

Firm size		Size of the employee's main occupation firm at the week of reference. Defined as Dichotomous in all cases
	Size5	1 if the person works in a firm with up to 5 employees.
	Size <25	1 if the person works in a firm with between 6 and 25 employees.
	Size <100	1 if the person works in a firm with between 26 and 100 employees.
	Largest	1 if the person works in a firm with more than 100 employees.
Job Status		Main occupation category of the person at the week of reference.
	Self	Dummy variable. 1 if the person is self-employed in his or her main occupation.
Labor regulations		
	Regs	1 if the person is registered in the social security system.
	Flia_reg	1 if any other member by the person has a job covered by labor regulations.

ANNEX 3

Table A- 2

Probit: Having or Not Severance Payment

Wage-earners		
	(1) Women	**(2) Men**
Primary	0.127	-0.002
	(2.14)*	(0.07)
High-School	0.609	0.330
	(9.24)**	(7.73)**
College	0.814	0.266
	(10.59)**	(4.43)**
Exper	0.056	0.052
	(11.82)**	(13.48)**
Exper**2	-0.001	-0.001
	(8.75)**	(11.85)**
Tenure	0.004	0.008
	(3.58)**	(7.07)**
Elect	0.734	0.461
	(2.15)*	(3.44)**
Retail	0.190	-0.134
	(4.16)**	(4.32)**
Trans	0.410	-0.205
	(4.28)**	(5.89)**
Finan	0.380	0.050
	(6.86)**	(1.12)
Serv	0.470	-0.018
	(11.25)**	(0.58)
Size25	0.516	0.433
	(13.54)**	(16.59)**
Size100	1.008	0.938
	(21.91)**	(28.37)**
Largest	1.011	1.113
	(21.26)**	(33.90)**
Flia_reg	1.448	1.364
	(39.67)**	(41.86)**
Household Head	0.022	0.432
	(0.49)	(14.80)**
Ptime	-0.539	-0.563
	(16.55)**	(17.31)**
Married	-0.137	
	(3.58)**	
Child <6	-0.015	
	(0.50)	
Constant	-1.388	-1.003
	(15.55)**	(15.74)**
Observations	**13202**	**21618**

Robust z-statistics in parentheses.
significant at 5% level; ** significant at 1% level
Source: IERAL of Fundación Mediterránea based on PHS.

ANNEX 3

Table A-3

Probit model with sample selection

Women

Censored obs = 34291
Uncensored obs = 24235
Wald chi2(7) = 208.54
Log likelihood = -3.61e+07 Prob > chi2 = .0000

	Coef.	Std. Err.	Z	P>z
EMPLEA				
Primary	-0.079102	0.0419559	-1.885	0.059
High-School	0.0753084	0.0486756	1.547	0.122
College	0.4914512	0.0753675	6.521	0
Exper	0.0177675	0.0051296	3.464	0.001
Exper**2	-0.0001513	0.0001033	-1.466	0.143
Children	0.0107576	0.0137898	0.78	0.435
Child <6	-0.035998	0.0240721	-1.495	0.135
Constant	1.063247	0.1024139	10.382	0
PARTIC				
Primary	-0.1724532	0.0177661	-9.707	0
High-School	0.1627323	0.0202538	8.035	0
College	0.9491935	0.0301072	31.527	0
Exper	0.059959	0.0017564	34.138	0
Exper**2	-0.0014007	0.0000328	-42.723	0
Children	-0.1488518	0.0050678	-29.372	0
Household Head	0.8155764	0.0198255	41.138	0
Nonlabor	-0.0000649	0.0019907	-0.033	0.974
Constant	-0.4423268	0.0261064	-16.943	0
/athrho	-0.0956706	0.0812272	-1.178	0.239
Rho	-0.0953798	0.0804883		

Source: IERAL of Fundación Mediterránea based on PHS.

ANNEX 3

Table A- 4

Probit model with sample selection

Males

			Number of obs	= 49152
			Censored obs	= 7994
			Uncensored obs	= 41158
			Wald chi2(7)	= 273.54
Log likelihood = -2.26e+07			Prob > chi2	= 0.0000

	Coef.	Std. Err.	z	P>z
EMPLEA				
Primary	0.1316827	0.0291969	4.51	0
High-School	0.3709243	0.0366284	10.127	0
College	0.6478144	0.0576389	11.239	0
Exper	0.0185666	0.0036929	5.028	0
Exper**2	-0.0001938	0.0000677	-2.861	0.004
Children	0.0075412	0.0094311	0.8	0.424
Child <6	0.0625686	0.019189	3.261	0.001
Constant	0.9992917	0.0478594	20.88	0
PARTIC				
Primary	-0.0951961	0.0286152	-3.327	0.001
High-School	0.1236844	0.0349269	3.541	0
College	0.3313181	0.0650153	5.096	0
Exper	0.1497022	0.0028334	52.836	0
Exper**2	-0.0030261	0.0000478	-63.361	0
Children	0.0727816	0.0098712	7.373	0
Household Head	0.717768	0.027059	26.526	0
Nonlabor	-0.005561	0.0027943	-1.99	0.047
Constant	-0.3758164	0.0383718	-9.794	0
/athrho	-0.5661471	0.067164	-8.429	0
Rho	-.5125241	.0495213	-0.6029607	-0.4090819

Source: IERAL of Fundación Mediterránea based on PHS.

ANNEX 4
INDEC Industrial Survey
METHODOLOGY

The main source of data for the preparation of the indexes of Physical Volume, Workers Employed, Hours Worked and Wages per Worker is the Monthly Industrial Survey carried out by INDEC on a total of 1,271 industrial establishments. It is a countrywide sample selected from the third stage of the 1985 National Economic Census (as referred to 1986). The reference universe consists of establishments employing more than 10 staff and covers all the activities of the manufacturing industry. Complementary data are also provided for public and private institutions.

The Survey consists of two questionnaires (A and F) which are answered by the same group of establishments. A registers data on jobs, timetables and wages, while F registers product information: physical amounts produced with own and third-party raw materials and dispatches in physical and monetary units with a specifically designed questionnaire per establishment. Both questionnaires are submitted monthly.

The bulk of the forms are collected by surveyors from INDEC or from the Provincial Statistics Departments according to agreements with INDEC.

Once the survey forms are collected, they are submitted to routine editing and registry in the data base; a team of analysts assesses their consistency, and after statistical control missing items are allocated and indicators are calculated.

Since the Monthly Industrial Survey began to be taken in January 1990, it was decided to publish the new series taking as a basis of comparison the average of the 1990 indexes and calling this year the base year for the sake of simplicity.

In the sampling design, a stratified method of optimal allocation was used, making the selection probability for any given establishment vary according to branch of activity and stratum.[44] The indicators for different aggregation levels up to division and general levels are obtained from the most disaggregated results, weighting them according to the percentage share in year 1986 of the variable chosen for each indicator:

Index	Weighting factor (*)
Physical Production	Volume Added Value
Workers employed	Workers employed
Hours worked	Hours worked
Wages per worker	Total wages

(*) The added value was calculated as the difference between the values of production and intermediate consumption, excluding VAT. Workers, hours worked and total wages correspond to paid staff employed in the production process of categories no higher than that of foreman or supervisor.

44 The denomination of activity branch is applied to a sub-group of CIIU 3rd. Rev. Or a body of sub-groups generally coinciding with the 4-digit sub-groups of CIIU 3rd. Rev., and in a few cases with the 3-digit sub-groups of CIIU 3rd. Rev. The strata are two:1.establishments with between 10 and 200 paid staff and 2.establishments with more than 200 paid staff.

The percentage share of each division during 1986 [45] in the above mentioned indicators is detailed in the table below:

Base Year Weights

General Level and Subdivision		Added value	Workers employed	Hours worked	Total wages
3	General level for industry	100.00	100.00	100.00	100.00
31	Foodstuffs, beverages and tobacco	22.76	24.03	24.60	21.26
32	Textiles and leather products	9.57	16.45	16.20	13.89
33	Wood, wooden products and furniture	1.65	4.97	4.71	2.20
34	Paper, printers and publishers	5.04	5.10	5.26	6.00
35	Chemicals and petroleum-based products	29.75	10.19	10.43	12.44
36	Cement, glass, ceramics and other non-metallic minerals	3.59	5.64	5.74	5.57
37	Basic metals industry	4.01	7.83	7.59	10.98
38	Metal products, machinery and equipment	22.81	25.11	24.82	27.19
39	Other manufacturing industries	0.82	0.66	0.64	0.47

The Index of Physical Volume of Production (IVF) provides, with quarterly frequency, an approximation to the development of added value at constant prices. It is worth noting that this last measurement cannot be carried out for each one of the years concerned, let alone the quarters, since in order to obtain it one would have to measure its components (production and intermediate consumption values) at current prices, and the corresponding deflators. This is why the Index of Physical Volume of Production is usually considered to be the best substitute.

However, it is necessary to caution that the relationship between added value and production is not constant. As an illustration it may be mentioned that, as from the census data, a drop in this relationship was noticed during the 1986-1993 period. This was basically due to the economy's externalization process stemming from the deep structural change taking place as from 1990.

Calculation procedure

The main source of data is Form F of the Monthly Industrial Survey. This contains data on the product basket for each establishment surveyed.

In each establishment, the index of physical volume is calculated monthly relating the value of its monthly production basket at 1986 figures to the value of the same for that year. For establishment *e* this would give:

$$IVF_e = \left(\sum_i p_i^0 \, q_i^t \; / \sum_i p_i^0 \, q_t^0 \right) * 100$$

in which sigma covers all products *i* selected for the establishment, and:

p° = the 1986 price vector

q_t° = the vector of monthly amounts for 1986

qt = the amounts in month t

It should be mentioned that vectors *p* for prices and *q* for amounts correspond to a product basket which represents at least 80% of the value of production in each establishment.

In other words, the basic expression of the calculation corresponds to a Laspeyres quantity index. When new products appear, they are incorporated into the calculation assigning them a zero

45 This corresponds to the third stage of the 1985 Economic Census and refers to the universe of establishments with paid staff.

amount in 1986, and establishing a *p°* emerging from the analysis of current prices based on the similar products of other establishments or, if this is not possible, respecting the relative current price relationship of that year. Quarterly indexes are obtained as simple averages of the monthly indexes.

Table A- 5
Description of the Variables Used in Manufacturing Survey Analysis
INDEC Industrial Survey – Variables

Variable Definition	Name	Measurement Issues
Employment and hours	Employemtn	Log of manufacturing employment index.
	Employmente_k	"Linem" lagged k periods.
	Hours per Worker	Log of hours per worker index
	Hours per Worker_k	"Linhe" lagged k periods
	Linhag	Log of agency hours personnel index
Wage and labor cost	Normal Wage	Log of normal wage index (without overtime hours)
	Overtime Wage	Log of overtime-hours wage index
	Hourly Wage	Log of hourly wage index
	Regulation	Log of labor regulations index. The index is based on severance payment (sector average Tenure * sector average lay-offs) plus payroll taxes
Product and production	Output	Log of production index
	Output_k	"Linpf" lagged k periods
Instrumental variables	Linpbi	Log of GDP index
	Unemployemnte Aggregate Index	Log of aggregate unemployment index
	Lni_gram	Log of economic openness index ((Import+Export) / GDP) by sector.
	Physical Capital Price Index	Log of physical capital price index
	Consumer Price Index	Log of consumer price index
	Wholesole Price Index	Log of wholesale price index
	Dcb	Dummy equal to 1 if output growth was less than 2.7% by quarter.
	Dce	Dummy equal to 1 if output growth was between 2.7% and 4% by quarter.
	Dca	Dummy equal to 1 if output growth was greater than 4% by quarter.

Source: IERAL-Fundaciòn Mediterránea based on Manufacturing Survey - INDEC

ANNEX 4
Table A-6
Manufacturing Survey
IV- Endogenous: Product

	Unbalanced Panel		Balanced Panel	
	Linem	**Linhe**	**Linem**	**Linhe**
	(1)	**(2)**	**(3)**	**(4)**
Linsat	-0.173	-0.193	-0.121	-0.173
	(21.79)**	(36.54)**	(13.51)**	(26.51)**
Prodh	0.119	0.129	0.064	0.136
	(10.59)**	(17.58)**	(4.85)**	(13.74)**
Linpf_1	-0.043	-0.052	-0.030	-0.066
	(6.86)**	(12.26)**	(3.67)**	(10.39)**
Linsae	0.018	0.054	0.026	0.053
	(7.01)**	(32.56)**	(8.09)**	(22.07)**
Linem_1	0.815	-0.079	0.888	-0.093
	(77.04)**	(11.07)**	(59.86)**	(8.24)**
Linem_2	-0.252	0.059	-0.297	0.080
	(18.90)**	(6.52)**	(15.36)**	(5.41)**
Linem_3	0.307	-0.056	0.288	-0.038
	(28.38)**	(7.60)**	(20.13)**	(3.45)**
Linhe_1	0.047	0.208	0.027	0.270
	(3.65)**	(23.56)**	(1.57)	(20.54)**
Linhe_2	0.078	-0.013	0.007	0.017
	(6.20)**	(1.48)	(0.44)	(1.39)
Linhe_3	0.038	0.017	0.055	0.025
	(3.18)**	(2.02)*	(3.68)**	(2.18)*
t2	-0.031	0.093	-0.036	0.092
	(6.70)**	(29.15)**	(6.90)**	(23.26)**
t3	-0.032	0.087	-0.026	0.081
	(6.53)**	(26.06)**	(4.83)**	(19.67)**
t4	-0.020	0.082	-0.013	0.071
	(4.24)**	(25.73)**	(2.47)**	(17.94)**
Lnreg	-0.010	0.021	-0.008	0.017
	(1.40)	(4.48)**	(1.04)	(2.83)**
Constant	0.279	4.051	0.479	3.512
	(2.81)**	(56.12)**	(4.06)**	(37.12)**
AR-Squared	.90	.72	.87	.71
Observations	**10532**			

Absolute value of z-statistics in parentheses; significant at 5% level; ** significant at 1% level

NOTE: NOTE: Instruments are Product: linsat_1; linpf_2; linpf_3; linpf_4, lipc, lipk, lipm, lni_uag, dce; dca; Wages: linsat_1; linpf_2; linpf_3; linpf_4, lipc, lipk, lipm, lni_uag, dce; dca

See Table A-5 for description of the variables

Source: IERAL-Fundaciòn Mediterránea based on Manufacturing Survey – INDEC