



Payroll taxes, wages and employment: Identification through policy changes

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ABSTRACT

This paper investigates the effect of changes in payroll taxes on wages and employment in Argentina. The analysis, based on administrative data, focuses on the impact of a series of major changes in payroll taxes which varied across geographical areas. This setup offers two main advantages over previous studies. First, using longitudinal data, the variation in tax rates across space and time provides a plausible source of identification of their effects on employment and wages. Second, the use of legal tax rates for each area at each point in time provides a remedy for the measurement error bias raised by the use of empirical rates constructed from observed tax and wage bills. Once this bias is accounted for, the results indicate that changes in payroll tax rates are only partially shifted onto wages, and they point to the absence of any significant effect on employment.

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1. Introduction

The appropriate level of payroll taxes and their influence on labor markets are hotly debated issues (see, among others, [Nickell and Layard, 1999](#)). While such taxes usually constitute an important source of government revenue, they drive a wedge between the cost of labor for a firm and the net wage of the worker, and may therefore have distortional effects on the functioning of the labor market. The introduction of a payroll tax implies a downward shift in the labor demand schedule equivalent to the amount of the tax, and standard partial equilibrium incidence analysis states that the extent of shifting from employers to workers depends on the elasticities of labor demand and supply.

However, taxes and social security contributions do not necessarily reduce workers' perceived income. Social security contributions may also be regarded as deferred consumption when they take the form, for example, of contributions to public pension programs ([Summers, 1989](#)). The introduction of a new payroll tax will presumably translate into an outward shift of the labor supply curve, thereby increasing the negative effect of the tax on wages but reducing its impact on employment ([Gruber and Krueger, 1990](#)). Such adjustments could be prevented, however, through the use of bargaining systems that preclude downward adjustments in wages ([Dolado et al., 1996](#)). In the case we study in this paper, however, it is unlikely that workers would perceive any significant change in their permanent income through future

payroll tax induced revenues. Thus, there would only be a downward shift in the demand schedule as a result of the changes in payroll taxes studied in this paper.

The relative levels of labor demand and supply elasticities, the presence of offsets, and the resulting incidence of the payroll tax are, ultimately, empirical questions, although there is a relatively small amount of definitive evidence on the subject. Earlier studies include [Brittain's \(1971\)](#) cross-country analysis, which finds full shifting of the tax to the worker's remuneration, and [Holmlund \(1983\)](#), which finds partial shifting based on time series evidence from the Swedish economy. Most of the shortcomings of cross-country and time series studies are overcome by [Gruber's \(1997\)](#) influential study of Chile's 1981 major social security reform and the resulting reduction of payroll taxes by around 25 percentage points. This study, based on a panel survey of manufacturing plants, compares wages and employment before and after the reform and finds evidence of a full shifting of taxes to wages, with no significant employment effects. [Gruber's \(1997\)](#) data, however, contain no information on the statutory tax rates applied to each company, which are conjectured to have changed across the board for the whole country at one point in time. His study relies on firm-specific empirical tax rates that are calculated by dividing total tax payments by wages. Despite the advantage of having information on the actual tax liability for every firm in the panel, any shock and/or measurement error in wages (the dependent variable) will be reflected as a spurious correlation in the regression results, since the tax rate is by definition a function of wages.

Our study exploits a series of major policy shifts in labor taxation which were introduced in Argentina during the period 1995–2001, following a social security reform and other market-oriented changes

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in the economy. The setting, a middle-income developing country in South America, is reminiscent of Gruber's (1997) Chilean study. However, the Argentine policy reform varied by region, while the Chilean study and later contributions to the literature (Kugler and Kugler, 2003) are based on uniform economy-wide changes or on firm-varying tax levels (Anderson and Meyer, 1997; Murphy, 2007). Starting from an almost uniform national payroll tax level, the Argentine reform introduced a wide range of rates that varied by geographical area. Moreover, the full set of region-specific legal tax rates were reconstructed from the relevant laws, executive orders ("decretos") and the software created by the tax authorities which is used by firms to compute tax liabilities.¹ Full information is available on the exact legal tax rates applying to firms in each of the regions of the country, which eliminates the problems of spurious regression that might arise from purely observational tax rates.²

These three characteristics (geographical variation, time variation and the availability of exact legal tax rates) constitute the backbone of the identification strategy pursued below. In the spirit of Gruber and Krueger (1990) and of Besley and Burgess (2004), the unit of analysis is a geographical area, and the study is based on an administrative panel dataset containing monthly aggregates of payroll, tax and employment figures.

The following section presents a brief account of the institutional setting for the Argentine labor market and its reform during the period under study. Section 3 describes the data and the construction of the variables used in the analysis. Section 4 presents the main empirical results, and Section 5 describes a series of robustness checks. Conclusions follow.

2. Payroll taxes in Argentina during the 1990s

When a new administration took office in 1989, a series of market-oriented structural reforms were introduced in the Argentine economy. In 1991, the Federal Government consolidated the level of payroll taxes³ at 33% of the wage for employers and at 16% for employees, resulting in a total non-wage labor cost of 49 percent of the wage.⁴ A major social security reform was established by Act 24.241 of September 1993. This statute mandated a new, fully funded pension system, which both new workers and those in the existing pay-as-you-go regime could join. It also provided a unified framework for the collection and distribution of employer and employee contributions to the social security system. The data used in this paper is taken from this administrative source, which went online in July 1994.

¹ The working paper version of this article reports the relevant decrees and presents examples of the tax software used by firms to compute payroll tax liabilities (Cruces et al., 2010).

² While this is also true in Anderson and Meyer's (1997) and Murphy's (2007) studies of unemployment insurance tax rates in the United States, the presence of experience rating effectively introduces a firm-specific component into the tax rate, and there is, consequently, no single uniform tax rate by geographical area in these studies.

³ Firms were required to make just one total payment to the tax bureau. The payroll tax rate was in fact the sum of a series of different components that were subsumed into this payment. Some areas in the sparsely populated provinces of the Patagonia region in the south of the country had traditionally benefited from a rebate in one of these components (family allowances), which is why the rates were not completely uniform across the country. MTSS (1998) and Neffa (2005) provide an in-depth account of labor and social security regulations during this period.

⁴ While payroll tax rates were modified, the definition of taxable income and the tax ceiling (the upper limit on the wage sum to which the tax rate was applied) for individual wages were constant and uniform across the country, which reduces the variation to only one dimension (Murphy, 2007). The ceiling refers to the computation of the payroll tax and was not affected by the tax changes – full payroll taxes t or reduced rates $t(1 - c)$ were applied throughout the period to wages in the zero-ceiling interval. Moreover, employee contributions were unaffected over the period under study.

Table 1
Payroll tax rates and area characteristics.

	Areas	Simple average	Std. dev.	Min.	Max.	5th perc.	95th perc.
Reduction coefficient (Executive order 2609/93)	85	0.59	0.11	0.30	0.80	0.40	0.75
Percentage of population with basic needs deficit	85	0.22	0.07	0.08	0.38	0.12	0.33
Distance to Buenos Aires in 1000s of km	85	1.07	0.57	0.00	3.15	0.41	1.89
Legal rate							
March 1995	85	0.233	0.037	0.165	0.330	0.171	0.297
January 1996	85	0.163	0.028	0.104	0.239	0.118	0.212
January 1999	85	0.163	0.028	0.104	0.239	0.118	0.212
August 1999	85	0.138	0.022	0.092	0.197	0.102	0.176
June 2001	85	0.138	0.022	0.092	0.197	0.102	0.176
September 2001	85	0.210	0.000	0.210	0.210	0.210	0.210
Empirical rate							
March 1995	85	0.226	0.037	0.139	0.302	0.169	0.287
January 1996	85	0.163	0.030	0.106	0.226	0.114	0.208
January 1999	85	0.155	0.028	0.107	0.221	0.113	0.198
August 1999	85	0.133	0.022	0.093	0.231	0.098	0.167
June 2001	85	0.147	0.029	0.105	0.291	0.111	0.183
September 2001	85	0.194	0.011	0.161	0.250	0.180	0.207

Based on the belief that lower taxes would reduce unemployment and promote the formalization of the labor market, the social security reform law also gave the Executive the power to diminish the "tax incidence on labor costs". The main policy instrument was the determination of payroll tax "reduction coefficients" by geographical area and the subsequent modification of these coefficients. In terms of tax administration, Argentina is divided into 85 areas.⁵ In December 1993, an executive order was issued that assigned a "reduction coefficient" c ranging from 30 to 80% (11 coefficients in 5 percentage-point steps) to each of these areas. Each area's payroll tax thus corresponded to the national rate, t , reduced proportionally by this coefficient: $t(1 - c)$. Taxes were thus reduced from an almost uniform rate of 33% to a range of values between 6.6 and 23.1% (corresponding to the extreme cases of 80% and 30% reductions, respectively). The first panel in Table 1 presents the summary statistics on the reduction coefficients for the 85 administrative areas.

The consolidated payroll tax rate of 1991 and the reduction coefficients established in 1993 were the basis of Government interventions on payroll taxes during the 1990s, and provide the source of identification for this study. The coefficients for each of the 85 areas were, by executive order, set on the basis of poverty levels and the distance to the country's capital, Buenos Aires. These criteria were chosen in order to compensate for differential development levels and for location costs, respectively. The regression results shown in the first column of Table 2 indicate that these reduction coefficients are well explained by the criteria mentioned above: distance to Buenos Aires and the percentage of population with basic needs deficits gathered from the 1991 census. Moreover, the reductions were differential within regions, with poorer areas receiving higher reduction coefficients than their richer neighbors, as attested to by the regression shown in the second column of Table 2, where the distance and poverty variables remain significant even after including regional controls. These results are consistent with the assignment of tax reduction coefficients based on pre-established rules, rules that could not be manipulated by the local

⁵ Argentina is a Federal State, which is divided into 23 provinces and one autonomous city. The "areas" defined by the tax bureau do not cross provincial boundaries. These areas usually correspond either to the capital of the province, to one or two major urban areas, or to the rest of the province.

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