The Effect of Privatization of Wage Differentials and Worker Composition. Evidence from Hungary

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This research intends to fill a gap in privatization research by studying the effects of the transfers of state assets to private hands on the wage structure and composition of workers. Studies of privatization on worker outcomes are not many, especially when compared with the vast number of papers dealing with productivity effects; nevertheless, there is a literature dealing with the average effects of privatization on firm level employment and wages. The internal structure of wages and employment, however, has been studied only to a small extent.[1] In this paper we use a Hungarian linked employer-employee data (LEED) which contain all firms inherited from socialism and follow them for a long period of time: the data start in 1986 and the last wave is from 2009. The data are a panel in firms, but workers unfortunately cannot be followed in time. We linked those who did not change their employer from one year to another but if a worker switches from one employer to another, we cannot construct a link.[2] Having information on both firms and their workers, we can study the effect of privatization not only on average employment and wages, but also on the wages and employment probabilities of different groups of employees.

The ownership information in the data is rich enough to study the three dominant methods of privatization employed in Hungary: sales to domestic and foreign investors and management-employee buyouts (MEBOs). Variations in the post-privatization behavior of firms by the type of the new private owner have been documented, e.g., by Frydman et al., (1999), Brown et al., (2006, 2010) and Earle and Telegdy (2002), and we also study the different outcomes on worker effects by the method of privatization. As the ownership data have information on the proportion of ownership stakes of different types of owners (not only on indicators of who the largest owner is, for example), we are also able to study differences

[1] An early study of the employment effects of privatization is Haskel and Szymanski (1993), which analyzes the level of employment and wages in British privatized firms. Brown, Earle, and Telegdy (2010) study the effects of privatization on average employment and wages in four Central and East-European countries. Bhaskar and Khan (1995) analyze the employment levels of jute firms in Bangladesh and provide results for white and blue collar workers separately.

[2] The database is described at the end of this abstract in detail.

by the degree of control given up by the state in the privatization process: total transfer of control when the state sell all the shares of the company and ceases to be an owner of the firm; partial privatization when the state gives up a majority of the firm's shares but not all of them; and revenue privatization when the state sells only a minority of the shares. We also study how the effect of privatization varies across the three large sectors of the economy (agriculture, industry and services) and whether output growth at the industrial level alters the new private owner's employment strategies.

As a starting point we analyze the effect of privatization on individual wages and the level of employment in the firm. For wages, we run Mincer-type regressions, were we control for gender, education, and experience, and for the level of employment we estimate simple regressions with the left hand side variable being the log number of employees at the firm level. To study wage differentials, we interact the privatization variables with different worker characteristics; for employment we run probit regressions where the dependent variables are worker characteristics.

A peculiar feature of the data is that is that they provide extensive information on the components of wages: the monthly base wage, overtime pay, regular payments other than the base wage (such as language and managerial allowances), and $1/12^{th}$ of the previous year's irregular payments (such as end-of-year bonuses). By using this information we can study how wage policies change around privatization: what is the proportion of regular payments to those which are given only irregularly and can be some form of incentive payment? In addition, we test how wages are correlated with firm level productivity.

Treatment of selection into privatization is one of the major problems of such studies. To account for this selection bias, we first add firm fixed effects to the regressions to control for all unobserved time-invariant effects at the firm level. As unobserved heterogeneity may vary not only at the firm level but also within groups of workers in the same firm, in another specification we interact the firm fixed effect with narrowly defined groups of workers. They are defined by gender, four education categories, and years of experience. We also distinguish workers by county (which is defined at the plant level) and the resulting grouping is interacted with firm identifiers. In this specification therefore we allow a different intercept for each education-gender-experience-county group within each firm. This procedure results in adding about 400,000 worker-firm fixed effects to the regressions. Finally, we add firm-worker effects to remove not only firm or worker group aspects which do not vary in time and may be correlated with privatization, but also individual worker characteristics. As we cannot follow workers who leave a firm and go to work for another, this exercise is useful not only to

control for unobserved employee effects but also to identify the effect of privatization for the group of those workers who had been employed by the firm during state ownership and remained thereafter.

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Database description

The LEED used in this paper come from two sources. The firm information come from the National Tax Authority in Hungary, which provides balance sheet data for all legal entities engaged in double-entry bookkeeping. Comparison with the total number of companies by legal form from the Statistical Yearbooks of Hungary 1992-2008) reveals that essentially every joint stock company is included in the data. The data are available annually from 1992 to 2009 for all firms and from 1986 to 1991 for a sample which is biased towards large enterprises. The firm-level data files include the balance sheet and income statement, the proportion of share capital held by different types of owners, and some basic variables, such as employment, location and industrial branch of the firm.

The second source is the Hungarian Wage Survey, hosted by the National Employment Office, which has information on workers' earnings and characteristics every three years between 1986 and 1992, and on an annual basis ever since. The survey requires firms to send information for a sample of their employees. In 1986 and 1989 the survey covered all firms. As at the start of the transition a vast number of small firms entered the economy, the sample design was changed to having only firms with more than 20 employees. This size threshold was kept until 1995; next year a random sample of smaller firms was added. For the period between 1996 and 1999 employers with 11-20 workers were included while for the last period the lower sampling threshold was reduced to 5 employees.

In 1986 and 1989, workers were selected from narrowly defined occupational and earnings groups within firms, using a systematic random design with a fixed interval of selection. High-rank managers were exempt from this rule and were surveyed comprehensively. In 1992 the sample design changed and was based on the day of birth of workers. Production workers were selected if born on the 5^{th} or 15^{th} of any month, while non-production workers were chosen if born on the 5^{th}, 15^{th}, or 25^{th} of any month. Therefore, even though the target group of the survey was the population of firms above 20 employees, if a firm did not have any employees born on the given days in a particular year, the firm-year is missing from the data. This design was maintained for the firms with at least 20 employees by 2001, and for firms with employment above 50 thereafter, but for the smaller firms all employees' information was required. This selection procedure results in a random sample of about 6.6 percent of production workers, and 10 percent of non-production workers. We use information on the numbers of production and non-production workers in the firm to weight the within-firm samples and adjust for the oversampling of non-production workers. With the help of the comprehensive firm level data described above we also construct a firm weight

which varies by firm size and adjusts the sample to the total number of employees in the relevant sectors of the Hungarian economy. The Wage Survey data provide extensive information on employees' earnings, their highest level of education, gender, age, occupation, whether the worker is a new hire and working hours in some years.

The two datasets can be linked the help of a unique identifier. The result is a linked employer-employee dataset (LEED) in which we are able to follow firms across years; however, workers are not organized in a panel and thus cannot be followed in time. Nonetheless, relying on the abundance of individual information and on the sampling scheme being based on birth date, we linked 44 percent of observed employees that do not change their workplace from one year to the next.[3]

[3] We cleaned both datasets extensively. In particular, we cleaned firm ownership data, checking for miscoding and dubious changes. We also cleaned the longitudinal linkages of the data with the help of a dataset which provides information on re-registration and boundary changes. As this dataset is not comprehensive, we also detected false entries and exits by looking for matches of exits among the entries on the basis of headquarter settlement, industry, sales, and employment. In the firm-level data we also cleaned unbelievable data entries for some continuous variable (employment, wage bill, and sales). If the value of the variable increased (decreased) at least 8 times and then decreased (increased) back, we set the middle year's value to missing. This procedure affected only a very small proportion of firms.