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Shifting the Burden of Corporate Taxes – Heterogeneity in Direct Wage Incidence

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Nils aus dem Moore[1]

Shifting the Burden of Corporate Taxes – Heterogeneity in Direct Wage Incidence

Abstract

We contribute to the empirical literature on the effective incidence of corporate income taxation. We focus on the so-called direct incidence via the wage bargaining process. Building on the innovative framework of Arulampalam, Devereux and Maffini (2012), we analyze the importance of various dimensions of heterogeneity at the firm-level. In particular, we investigate the distinct effects of (i) firm size, (ii) level of profitability, and (iii) competition intensity across (iv) different economic sectors. Furthermore, we investigate the relative importance of the surrounding institutional setting. To this end, a firm-level within-country approach is pursued separately for two different economies, namely France and the United Kingdom, which can be regarded as polar cases with respect to the relevant features of the wage-setting process. However, in many respects, we find surprisingly similar results for both countries. Thereby, this paper also adds to the literature by providing new insights on the degree to which results from previous single-country studies can possibly be generalized.

JEL Classification: H22, H25, J31, J38

Keywords: Corporate income taxation; profit taxation; tax incidence; wages; difference-in-differences

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1 Nils aus dem Moore, RWI - Berlin Office. *– The author is grateful to Thomas K. Bauer, Daniel Baumgarten, Nadja Dwenger, Frank Fossen, Jochen Kluve and Michael Kvasnicka for helpful comments and suggestions. The usual disclaimer applies. – This paper corresponds to chapter 1 of the dissertation „Myths and Measurement – Firm-level Effects of Corporate Income Taxation" at the Faculty of Management and Economics at Ruhr-Universität Bochum, available online at http://www-brs.ub.ruhr-uni-bochum.de/netahtml/HSS/Diss/MooreNilsausdem/.* *– All correspondence to Nils aus dem Moore, RWI - Berlin Office, Invalidenstr. 112, 10115 Berlin, Germany, e-mail: Nils.ausdemMoore@rwi-essen.de*

1 Introduction

Tax competition and the global downward trend in the rates of the corporation tax since the 1980's are hotly debated issues in the realm of public finance. Proponents of corporate tax reform justify their persistent call for ever lower corporate tax rates with international tax competition and the international mobility of firms, whereas their opponents view lower corporate tax rates as one cause of growing inequalities, favoring already wealthy capital owners at the expense of workers. In this debate, the effective incidence of the corporate income tax is of central importance: If it falls to a large extent on workers, lower corporate tax rates might actually benefit workers. Therefore, the question of how the presumptive benefits from corporate tax reforms are shared among the share- and stakeholders of corporations is of high relevance for policy makers.

Despite its policy relevance, the empirical evidence on the effective incidence of the corporate income tax has been extremely sparse until recently. For practical purposes it did not help much either, that the central results of the well-established theoretical literature point to two starkly contradicting conclusions that depend on whether one assumes a closed economy or an open economy setting: in the first setting, the entire tax burden falls on capital, in the latter on labor. As a result, the corporation tax is often simply ignored in analyses of the distributional effects of national tax systems (Arulampalam et al., 2012, 1038) or attributed rather tentatively to the factors capital and labor on the basis of results from computable general equilibrium or simplified microsimulation models (see e.g., Fullerton and Metcalf 2002, Gravelle 2011, 29, Harris 2009, 5). [1]

[1] Harris (2009, 3) sheds some light on the respective practice in the two relevant U.S. government agencies: Whereas the Joint Committee on Taxation does not assign corporate tax incidence to individuals, the Congressional Budget Office and the Treasury assign the entire burden of the corporate tax to capital owners in proportion to their share of aggregate capital income. The rather pragmatic character of this approach is revealed by the fact that, for several years prior to settling on its current practice, the CBO prepared two sets of distributional estimates: one assuming the entire incidence was borne by labor and another assuming the entire incidence was borne by capital. Against this backdrop, Harris (2009) uses three different scenarios concerning the incidence of the corporate income tax for his own assessment of the overall progressivity of the U.S. tax system, assuming respectively that capital bears 20 percent, 50 percent, or 80 percent of the corporate tax burden.

In their survey on the opinions of labor and public economists at 40 leading research universities in the U.S., Fuchs et al. (1998) found that the median belief with respect to the incidence of the corporate income tax was that 40% of the burden is borne by capital. A decade ago, Fullerton and Metcalf (2002, 1823) pointedly summarized the unsatisfactory state of affairs as follows: "The standard assumption about the corporate income tax that the burden falls 100% on capital remains the standard assumption even though it is commonly believed to be false (because of international capital mobility and endogenous saving)."

Against this backdrop, a series of recent papers has considerably enriched the empirical evidence concerning the effective incidence of the corporate income tax, using newly available data sources, original identification strategies and econometrically advanced estimation techniques. Yet, the results still vary considerably so that the issue is far from settled.[2] We contribute to the ongoing research effort by an investigation of the firm-level heterogeneity in the so-called "direct" incidence on wages that results from the wage bargain. Recent research suggests that this channel not only contributes a certain portion to the overall incidence on wages, as first proposed by Arulampalam, Devereux and Maffini (2012), but might indeed be responsible for the major part of the overall effect (Fuest, Peichl and Siegloch, 2013).

We add to the growing body of empirical insights in two ways: firstly, while the vast majority of the existing studies focus on estimating a single homogenous parameter value, mostly for manufacturing, we take a closer look at the various sources of heterogeneity at the firm-level and shed additional light on the distinctive impact of the factors (i) firm size, (ii) level of profitability, and (iii) competition intensity across (iv) different economic sectors. In our benchmark analysis for the manufacturing sector in France, we obtain an estimate of 2.8 percent for the short-run, and 4.7 percent for the long-run elasticity of wages with respect to corporate income tax changes. For a one Euro rise in tax liability, these estimates translate to incidence effects of 39 Eurocent in the short-run and of 66 Eurocent in the long-run. The estimated elasticities vary systematically with firm size

[2] A detailed review of both the theoretical and empirical literature is provided in section 2.

and level of profitability, as they are larger for small and medium sized enterprises and concentrated in the upper half of the firm profitability distribution. While the analysis by competition intensity offers no simple clear-cut relationship, we show that corporate tax shifts via wage bargaining occur not just in manufacturing, but also in several other industries.

Secondly, we investigate the relative importance of the surrounding institutional setting by pursuing a firm-level within-country approach separately for two different economies, namely France and the United Kingdom, that can be regarded as polar cases with respect to the relevant features of the wage-setting process (cf. Du Caju, Gautier, Momferatou and Ward-Warmedinger 2008). In contrast, the existing studies either use data from several countries without exploring the effect of country-specific conditions in detail (Arulampalam et al., 2012), or focus on a single country (which is Germany in the case of Fuest et al. 2013, Dwenger, Rattenhuber and Steiner 2011, and Bauer, Kasten and Siemers 2012; and the U.S. in the analysis of Liu and Altshuler 2013). The benchmark results for UK manufacturing firms are surprisingly similar to those for France, with an estimated short-run elasticity of 2.7 percent and a long-run elasticity of 4.9 percent, respectively. The results on the relevant dimension of heterogeneity are also reconfirmed, with significant effects for all size categories and the upper three quartiles of the firm profitability distribution. Thereby, our analysis adds to the literature by providing new insights on the degree to which the results from previous single-country studies can be generalized.[3]

The remainder of this paper proceeds as follows: Section 2 gives an overview of the previous literature with an emphasis on recent empirical contributions. Section 3 describes our research design. Section 4 presents the results of our empirical analysis and section 5 concludes.

[3]We confined our analysis to France and the UK because, first, these countries differ substantially with respect to wage-setting institutions, and second, both also feature among those countries with the best coverage in the utilized Amadeus database of firm-level accounts, for details see 3.3.

2 Previous Literature

2.1 Theory

The essence of theoretical reasoning on the incidence of the corporate income tax could be summed up for almost 50 years by citing only one name: Arnold C. Harberger. His seminal contribution from 1962 presents a model of a closed economy with a corporate and a non-corporate sector that allows the general equilibrium analysis of introducing a tax in the corporate sector. Harberger (1962) shows that the incidence of the tax depends on a number of factors, including the elasticities of substitution between labor and capital used in each sector and between the goods produced in each sector. His main conclusion is that under reasonable assumptions, the tax is borne by all owners of capital, across both sectors, as it drives down the post-tax return to capital. Similar results have been generated by a number of more complex Computable General Equilibrium (CGE) models with a larger number of sectors (see Shoven 1976 and a short review of this strand of the literature in Gentry 2007).

Whereas the original Harberger model was clearly set up with the economic structure of the United States at that time in mind, i.e., a large diversified multi-sectoral domestic economy that could reasonably be analysed with the characteristic assumptions of a closed-economy scenario, the basic insights of his approach have subsequently been transferred to an international setting of numerous small open economies. The central assumption here is that capital is perfectly mobile between countries, but labor is not. Bradford (1978) and Kotlikoff and Summers (1987) were the first to demonstrate that the introduction of a tax on corporate income in a home country tends to reduce the world rate of return to capital while shifting capital from the home country to the rest of the world. Harberger himself shows that these open economy assumptions reverse his original incidence result (Harberger, 1995): As a consequence of the tax-induced shift in capital, the return to labor in the home country is reduced whereas the return to labor increases abroad. Assuming that the home country is small relative to the rest of the world, the effect on the world rate of return diminishes towards zero. However, there remains an

exodus of capital. Consequently, the home country labor force effectively bears the entire burden of the tax. Indeed, given that a deadweight loss is induced by the outward shift of capital, the cost to the home country labor force can even exceed the tax revenue generated.[4]

In the vein of Harberger's approach, a number of contributions have developed more sophisticated general equilibrium models of the long-run incidence of taxes on corporate income in an open economy. In her review, Gravelle (2010) distinguishes four variations of the general equilibrium approach (Grubert and Mutti 1985; Gravelle and Smetters 2006; Randolph 2006; Harberger 2008.) Incorporating more detailed features of the real-world economy, such as the extent of factor mobility, supply elasticities, the relative capital intensities of different sectors, and differentiating between perfect versus imperfect competition scenarios, these models make intermediate predictions concerning the distribution of the corporate tax burden among the factors of production. Thus, the question of the effective incidence of the corporate income tax in a given real-world setting is essentially an empirical one.

2.2 Empirical Studies

For several decades, the pioneering work of Krzyzaniak and Musgrave (1963) seemed to be the only noteworthy effort to validate Harberger's predictions empirically (cf. Fullerton and Metcalf 2002, 1817). By regressing the corporate output price on the corporate tax rate and other control variables in the two time periods from 1935 to 1942 and from 1948 to 1959, Krzyzaniak and Musgrave (1963) obtains the result that the corporate tax was "overshifted", i.e. the corporate sector was seemingly able to raise prices by more than the amount of taxes levied and thereby increase its profits. Even though this implausible result raised a lot of questions and criticism (e.g., Cragg et al. 1967), pointing mainly to the problem of reverse causality, almost no attempts to econometrically estimate the

[4] Harberger (2008, 305) puts this bluntly: "The bottom line of a simple open-economy model is that country A's tax change cannot affect the net rate of return to capital, nor can it affect the world prices of tradable goods and services. Thus, it can only be reflected in the wages of labor and in the prices of non-tradable goods."

incidence of the corporate income tax were undertaken subsequently. Obviously, the daunting challenges with respect to identification and the lack of suitable data inhibited the emergence of an empirical incidence research program.[5]

In the recent renaissance of empirical research on corporate tax incidence, two broad strands of the literature can be distinguished, namely those studies that try to engage directly with the open-economy general equilibrium corporate tax incidence models and those that use various strategies to identify at least a substantial part of the overall corporate tax incidence (cf. Clausing 2013, 154). By and large, the first group consists of cross-country analyses, typically at rather high levels of aggregation, whereas the studies of the second group focus on regional, industry-specific and/or even individual variations within a single country to identify the (wage) incidence.

Both approaches have specific advantages and drawbacks with respect to the challenge of identification (see Fuest et al., 2013, 1): To capture the general equilibrium incidence effects of corporate taxation for a given country, *a priori* a cross-country analysis seems to be the only adequate empirical approach, since all relevant factor and output prices within the respective country under scrutiny are likely to be impacted through the workings of the general incidence mechanisms. However, the common trend assumption which is crucial for identification seems often hard to defend in cross-country analyses of corporation tax incidence. Focusing the analysis on a single country by exploiting regional and/or industry-specific variation renders the common trend assumption arguably much more credible, but conversely the source and size of variation in tax rates often gets blurred and/or, diminished, respectively. Although by now, this identification dilemma of corporate tax incidence research seemingly has been overcome in the most advanced studies that are based on firm-level information, we stick to the dichotomy of cross-country versus within-country as the structuring principle of the following overview.

Cross-country studies Among the cross-country studies, the trio of contributions by Hassett and Mathur (2010), Felix (2007), Desai, Foley and Hines (2007) have drawn most

[5]However, the impression of "no other subsequent attempt" in Fullerton and Metcalf (2002, 1817) is not entirely correct, as the time series estimation of the incidence of the corporation income tax in U.S. manufacturing by Gordon (1967) documents; see also Whalley (1997) for an overview of further theoretical contributions and empirical studies in the second half of the twentieth century.

attention, but attracted also a lot of criticism. Concordantly, these papers find that corporate taxes exert a large negative effects on wages. But, as has been pointed out in detail by Gravelle and Hungerfort (2011), and Clausing (2012, 2013), these incidence studies have key limitations and are sensitive to idiosyncratic specification and data choices.

Hassett and Mathur (2010) regress five-year average wages (as natural logs) from the manufacturing sector of 65 countries over the period 1981 to 2005 on the corporate tax rate and several control variables using a fixed effects model. Their baseline result is that a 1 percent increase in the corporate tax rate is associated with a nearly 0.7 percent decrease in hourly wages (Hassett and Mathur, 2010, 14). In their critical review and replication, Gravelle and Hungerfort (2011) point out that this elasticity between wages and corporate tax rates is implausible large, implying a decrease of 13$ in wages for each dollar fall in corporate taxes (Gravelle and Hungerfort, 2011, 22). They also point out that the results of Hassett and Mathur (2010) are not robust with respect to several critical specification choices (e.g., use of five-year averages, neglect of adjustments for between-country differences in inflation dynamics and exchange rates; cf. Clausing 2013, 154).

Felix (2007) follows a similar approach to Hassett and Mathur, but uses a different data source. Aggregating household data from the Luxembourg Income Survey for thirty countries over the period 1979 to 2002, she uses a random effects specification to regress wages on corporate taxes. Among many insignificant results, her favourite specification predicts that a one percentage point increase in the corporate tax rate results in a decrease of 0.7 to 1.2 percent in annual gross wages (Felix, 2007, 17). As Gravelle and Hungerfort (2011, 22) and Clausing (2012, 440) point out, substantial concerns are raised by several oddities with respect to specifications and data set construction as well as by obvious contradictions between the results in the text and the conclusions of the paper.

Desai et al. (2007) try to measure the relative importance of the corporate tax incidence on wages and capital by estimating the wage and interest rate sensitivity to corporate taxes for a four-year sample of U.S. multinational firm affiliates in OECD countries. By imposing the cross-equation restriction that labor and capital shares sum to one (and

thereby excluding the theoretically well-established possibility of over-shifting phenomena and the existence of an excess burden from taxing corporate income that is generally believed to be rather important[6]), they attain as their central result that labor bears between 45 percent and 75 percent of the total burden. But theoretical ambiguities and empirical challenges cast serious doubt on the validity of this finding. For instance, the significance of their results obviously vanishes if the cross-equation restriction is lifted (for details, see Gravelle and Hungerfort 2011, 22 and Clausing 2012, 440-441).

In her work on corporate tax incidence, Clausing (2012, 2013) first provides detailed reviews of the recent empirical literature and then proceeds with a battery of regression analyses of her own.[7] By combining three different empirical approaches (i.e., firstly a replication study of Hassett and Mathur 2010, secondly a two-step investigation of the general equilibrium tax incidence mechanism, and thirdly a series of vector autoregressions) with alternative sources for the key data on taxes and wages, Clausing (2012) is at present the most comprehensive cross-country incidence investigation. Although she finds some evidence suggesting that corporate taxation may lower wages, the preponderance of her analyses does not suggest any wage effects from corporate taxation. Clausing rationalizes this result by pointing to the extreme identification problems at the aggregate level of cross-country studies (2012, 468-469).

Within-country studies The branch of within-country studies on corporate tax incidence started in 2009 with the cross-state analyses for the U.S. of Felix (2009), Felix and Hines Jr. (2009) and Carroll (2009). Felix uses individual level data for the year 2000 across fifty U.S. states, finding that workers capture just over half of the benefits of lower tax rates, but only in states without right to work laws. As Clausing (2012, 443) points out, the results are likely to be driven by state-specific effects, such as industrial composition, which the authors cannot adequately address with a dataset that comprises

[6]See for example Gordon (1986) and Harberger (2006) as well as the expositions in Salanié (2002), chap. 6, Dahlby (2008), chap. 7, and Kaplow (2008), chap. 9.

[7]Note that both publications are based on the same empirical analyses, but differ in purpose and breadth of the exposition. Whereas Clausing (2012) is an academic survey of recent tax incidence research enriched by a multi-step replication and estimation effort, Clausing (2013) describes the research of other authors and her own contributions in a very concise way, putting more emphasis on policy implications and concrete options for international tax reforms. Here, we focus on Clausing (2012).

only one year of information. The same caveat applies to the similar analysis of Felix and Hines Jr. (2009) that relates wages to tax rates, individual and state characteristics.

In a similar study, Carroll (2009) improves on some of the shortcomings of the two previous papers. Regressing average hourly earnings on corporate taxes, worker productivity, and other factors on the basis of state level data from 1970 to 2007, he accounted for time and state fixed effects. The paper finds some evidence that corporate taxes affected wages negatively during the period 1970-2007, albeit universally only at the confidence levels of 90 percent and 95 percent. More problematic than this weakness with respect to significance is a central measurement issue exposed by Gravelle and Hungerfort (2011, 24): Carroll (2009) finds a significant wage effect only for the average tax rate that he calculates not in the usual way as taxes divided by profits but as the ratio of taxes to personal income. Given the tight relationship between personal income and wages, this measurement seems inappropriate to identify the incidence effect of corporate taxes on wages.

Vasquez-Ruiz (2012) builds upon the identification of exogenous tax changes via the narrative analysis of federal tax legislation in the United States over the period 1945-2007 by Romer and Romer (2009, 2010). He analyzes the effect of the corporate tax changes that were identified as exogenous on the rate of return to capital, consumer good prices, and wages at the industry-level by means of a vector autoregression model (VAR). Concerning wage rates, Vasquez-Ruiz finds that, in response to an exogenous rise of the corporate income tax, wages decline significantly across all non-tradable sectors (i.e., services, transportation & utilities, construction, wholesail & retail trade) as well as in the mining sector that produces a homogeneous and tradable good (e.g., fuel and nonfuel minerals). However, in manufacturing and agriculture, both sectors that produce tradable and imperfectly homogeneous goods, wages significantly increase with the imposition (or the rise) of the corporate income tax (cf. Vasquez-Ruiz 2012, 25). Vasquez-Ruiz interprets his results as an empirical validation of the predictions from Harberger (1995, 2008) on the incidence effects of an exogenous increase of the corporate income tax in a multi-sector open economy. The current frontier of micro-econometric research on the effective incidence of the corporate income tax is essentially embodied by the quintet of

contributions from Arulampalam, Devereux and Maffini (2012), Dwenger, Rattenhuber and Steiner (2011), Liu and Altshuler (2013), Bauer, Kasten and Siemers (2012), and Fuest, Peichl and Siegloch (2013). This strand of the empirical literature originated in 2006 with the first working paper version of Arulampalam et al. that challenged the exclusive authority of the Harberger approach, positing wage bargaining as a second incidence channel in addition to the workings of the general equilibrium effects.

The intuition behind this wage bargaining channel and the resulting effect, labeled the "direct incidence" on wages in Arulampalam et al. (2012), is straight-forward: Assuming that a firm and its labor force bargain over both wages and employment along the lines of the efficient bargaining framework of McDonald and Solow (1981), the government reduces (enlarges) the size of firm-specific quasi-rents that can be bargained over by increasing (reducing) the respective corporate tax burden. Assuming that a proportion of the remaining after-tax quasi-rents is paid out in wages, a direct link between the wage rate and the tax burden is established at the firm-level. In contrast, the general equilibrium effects that might lead to changes in the output price and could produce, via adjustments of the capital stock, also a wage effect, solely affect the pre-tax level of value added. By regressing the wage rate on the firm-specific tax burden, conditional on value added, and on a number of firm- and country-specific covariates, Arulampalam et al. (2012) claim to isolate the direct effect. Using data for more than 50,000 companies from nine European countries over the period 1996-2003, their central estimate suggests that an exogenous rise of $1 in taxes reduces the wage bill by 49 cent.

Despite early criticism concerning the identification strategy and its econometric implementation, most notably in the yearly updates of the review by Gravelle and Hungerfort, and notwithstanding the substantial variation in the size of the estimated effects in the course of subsequent updates of their working paper, the approach of Arulampalam et al. (2012) has been highly influential. Proposing the wage bargaining process as an additional channel of corporate tax incidence over and above the general equilibrium effects, their study laid the groundwork for subsequent attempts to identify and measure corpo-

rate tax incidence on a disaggregated level.[8] The studies of Dwenger et al. (2011) and Liu and Altshuler (2013) avoid one weakness of Arulampalam et al. (2012), namely the non-transparent mixture of different sources and levels of variation both from the country and from the firm-level, by focusing on a single country, respectively Germany and the United States.

Dwenger et al. (2011) merge comprehensive corporate tax return and individual labor market data for Germany during the period 1998-2006 and use variations in the firm-specific average corporate tax rate that resulted from two substantial corporate tax reforms (the Tax Relief Act of 1998 to 2001 and the Tax Preference Reduction Act of 2004) for identification. They employ an estimation strategy along the lines of Gruber and Saez (2002) to control for potential endogeneity. Specifically, they do not use the observed firm-specific effective tax burden (ETR) directly as it is included in the corporate tax records since it presumably reflects adjustments by the firms in anticipation or reaction to the two tax reforms. Instead, they calculate counterfactual ETRs with the help of a corporate tax microsimulation model for Germany. The resulting counterfactual ETRs are then used as instruments in their wage regressions. Controlling for adjustments in employment, their estimation reveals that a one percentage point increase in the effective tax rate reduces wages by 2.12 percent. This semi-elasticity implies that an increase of corporate tax revenue by 1 Euro would reduce the wage bill by 0.44 Euro.

Like Arulampalam et al., Liu and Altshuler (2013) focus their analysis explicitly on the rent-sharing channel of corporate tax incidence, building upon and extending the theoretical incidence analysis under imperfect competition of Davidson and Martin (1985). They use variation in effective marginal tax rates across industries and across time in the United States, exploiting the fact that due to asset-specific rules, e.g. for depreciation allowances and investment tax credits, the tax burden on a marginal investment project depends on its asset mix. Hence, given that characteristic asset mixes vary from industry to industry, they face different effective marginal tax rates (Liu and Altshuler, 2013, 216; 222-223). Over all industries, the central estimate of Liu and Altshuler suggests that a $1

[8]The theoretical plausibility of a wage bargaining channel of corporate tax incidence has recently been backed up by Riedel (2011) and Krautheim and Schmidt-Eisenlohr (2012).

increase in corporate tax revenue decreases wages by approximately $0.60. In addition, they find that the size of the effect increases with the degree of industry concentration.

The contributions of Bauer, Kasten and Siemers (2012) and Fuest, Peichl and Siegloch (2013) not only evolved in parallel but also pursue a similar approach, albeit with noteworthy differences in the details, to identify the wage effect of the corporate tax at the level of the individual employee.

Using a large panal data set on wages and employee charateristics from the Federal Employment Agency in Germany, Bauer et al. (2012) exploit the regional variation of the local German business tax ("Gewerbesteuer") in a Mincer-type wage regression for male workers, to investigate (i) the extent of burden shifting to employees via the individual wage rate, (ii) a potential effect asymmetry between tax increases and decreases, and (iii) a potential effect heterogeneity between different groups of workers. They find, first, that labor shares a significant part of the burden of corporate income taxes, with the business-tax-elasticity of real wages ranging from -0.28 to -0.46. Second, they provide first-time evidence for effect asymmetry with a higher degree of tax shifting for tax reliefs (i.e. wage increases) than for tax increases (wage cuts); a finding that they attribute mainly to the established fact of downward wage rigidity. Third, they show that the tax-induced wage effects differ among skill and age groups in such a manner that employees with low bargaining power have to bear the brunt of the shifted business tax burden.

Like Bauer et al., Fuest et al. (2013) identify the wage incidence by a combination of administrative data from Germany and the spatial variation in tax burdens. However, their research design features two relevant advantages: First, they use a linked employer-employee dataset (LIAB) provided by the Institute of Employment Research (IAB) in Nuremberg that contains not only a representative 2 percent sample of the administrative employment statistics of the German Federal Employment Agency, but also the corresponding employer information from the firm component of the LIAB. Therefore, Fuest et al. (2013) are able to control simultaneously for firm-specific as well as for indivual-specific covariates. Second, Fuest et al. (2013) realize a higher level of spatial disaggregation by using data on the lowermost regional level, i.e. the municipality ("Gemeinde"). Since the

local business tax ("Gewerbesteuer") is indeed set at the municipal level, this seems to be the adequate choice.[9]

The comprehensive research design that takes the characteristics of employers, employees and the respective municipalities into account allows Fuest et al. (2013) to identify separately the direct wage effect that arises from a collective bargaining context as well as the conventional indirect wage effect through reduced investment. They find that the wage bill declines by 44 to 77 Eurocent for every additional tax Euro a firm has to pay and that the overall effect stems almost completely from the direct incidence that arises through wage bargaining. Furthermore and in clear contrast to the distributional result of Bauer et al. (2012), high and medium-skilled workers bear the bulk of the corporate tax burden in the the analogous estimation setup of Fuest et al..

[9]In contrast, Bauer et al. (2012) use average tax rates on the next higher regional level, the county ("Kreis"), which leads of course to a loss of regional variation (there are roughly 11,400 municipalities versus 400 counties) but, more importantly, renders the variation in tax rates somewhat imprecise: Annual tax changes in only 8 percent of the municipalities lead to a variation of the average tax rate in 65-75 percent of the counties (cf. Fuest et al. 2013, 3, footnote 5). On the other hand, one could argue that it is not decisive where the local business tax rates are set, but on which level the wage bargaining process usually occurs. In light of this consideration, the more aggregate approach of Bauer et al. looks less disadvantageous with respect to the proper identification of the tax incidence on wages.

3 Research Design

3.1 Conceptual Framework

This paper is based on the approach of Arulampalam et al. (2012) to identify the effective incidence of corporate income tax on wages. They start from the observation that wages are typically a result of a bargaining process between capital owners and workers or between their respective representations.[10] Corporate taxation alters the conditions under which this bargaining process is operating. To account for the resulting ramifications, Arulampalam et al. introduce a tax on corporate income into the basic efficient bargaining framework of McDonald and Solow (1981). In this framework, the simple assumption that the aggregate stock of labor is fixed and that labor is paid its marginal product is skipped. Instead, the firm and the workers bargain over both wages and employment. This bargaining is motivated by the existence of firm-specific rents arising from imperfect competition.[11]

The starting point of the model derived by Arulampalam et al. is a single firm in which the wage rate w and the size of the labor force N result from a bargaining process between the firm and a single union representing all workers in the company. Simultaneously, the firm chooses its capital, K. Employees face an outside wage $\overline{w}$, unaffected by the bargaining process in the firm, and which may reflect wages in alternative jobs or the guaranteed unemployment benefit. The union aims to maximise $(u(w)-u(\overline{w}))N$ with $u(\cdot)$ representing the utility of a single worker and N being the number of workers employed by the firm. The firm may have the option of shifting its activities to another location, or another activity, where, net of the costs of shifting, it can earn an outside post-tax profit

[10] This is by no means trivial, since rent-sharing theories contradict many assumptions and implications of the standard competitive model. But an ever growing body of empirical research clearly points to the conclusion that the rent-sharing approach is a better description of real labor markets, among the early contributions are Christofides and Oswald (1992), Blanchflower, Oswald and Sanfey (1996), Van Reenen (1996) and Hildreth and Oswald (1997).

[11] As Du Caju et al. (2011) points out (p. 704, footnote 12), it does not matter in this context whether one chooses the efficient bargaining model of McDonald and Solow (1981), the right-to-manage model of Nickell and Andrews (1983), or the general barganing model of Manning (1987) as theoretical point of departure. Although these models have different implications for unemployment and economic welfare, they lead to identical wage equations and thereby provide a common basis for empirical studies.

of $\pi*$. The firm is prepared to bargain over location-specific profit (before wages), i.e., the additional profit available by producing locally.

Domestic post-tax profit is

$$\pi = F(K, N) - wN - rK - T, \tag{1}$$

where $F(K, N)$ is a standard revenue function, depending on capital and labor. The cost of capital is rK. The corporate income tax, levied at rate τ, is denoted T and defined as

$$T = \tau[F(K, N) - wN - \alpha rK + \phi]. \tag{2}$$

Thus, the tax is levied on revenue net of wage payments and an allowance for the cost of capital, where α is a measure of the generosity of depreciation allowances.

Of course, there are many other factors which can affect the firm's tax liability: interest payments, the extent to which taxable profit can be shifted abroad to a lower-tax country through manipulating transfer prices, stock relief, losses brought forward from an earlier period, or the contribution to an investment pension fund. These factors are not explicitly modelled, Arulampalam et al. (2012) include them all in the term ϕ. The existence of this term implies that tax liabilities may vary across firms which have the same revenue, labor costs and investment.

Hence, it is the existence of these firm-specific factors incorporated in ϕ and the resulting firm-specific variation of the tax burden which allow for the identification of the direct incidence of the corporate income tax that arises from the wage bargain. In the empirical implementation, this direct incidence effect is insulated from possible general equilibrium effects that may work through adjustments of the output price and/or the firm-specific capital stock by controlling for the pre-tax level of value added.

To close the model, Arulampalam et al. introduce the bargaining power of the firm, μ, which depends on the cost of the firm of a temporary dispute with the workforce, and the bargaining power of the union $(1 - \mu)$, which may depend on the availability of

alternative income to the workers in the event of a dispute. Assuming (i) that wages and employment are determined by a Nash bargain and (ii) that the firm chooses its capital stock by maximising the net of tax profit, π, they arrive at three equations that jointly determine the values of the wage rate, w, the capital stock, K, and the number of workers employed, N. On this basis, they derive the following central equation of their theoretical model:

$$(3) \qquad w \equiv \mu\overline{w} + (1-\mu)\left\{\frac{F(K,N)-(1+m)K}{N} - \frac{\tau\phi}{(1-\tau)N} - \frac{\pi*}{(1-\tau)N}\right\}$$

In equation 3, the wage is approximately equal to a weighted average of the outside wage and a share of the per-employee location-specific profit gross of wages. The deductibility of labor costs from taxable income implies that there are only three elements that relate to the home country tax system in the expression, as detailed below.

The capital expenditure effect captured in the term $\frac{F(K,N)-(1+m)K}{N}$ is the effect of less than full deductibility of capital expenditure, with m being the effective marginal tax rate (EMTR), defined as $m = \tau(1-\alpha)/(1-\tau)$. For a cash flow tax, the effective marginal tax rate (EMTR) is approximately equal to zero, $m = 0$, because in this case, the parameter for the generosity of depreciation allowances is equal to one, $\alpha = 1$. In the more realistic case of $\alpha < 1$, the additional tax liability reduces the profit over which the firm and the union can bargain, which leads to a reduction of the wage rate. The parameter α varies across firms depending on the asset mix invested in by the firm.

The wage bargain effect $\frac{\tau\phi}{(1-\tau)N}$ captures in ϕ all other factors that determine the tax liability and thereby also influence the size of the post-tax profit over which the firm is prepared to bargain. Conditional on other factors, a rise in ϕ induces a rise in tax and should lead to a reduction of the wage rate, since $\frac{\partial \mathrm{w}}{\partial \phi} = -\frac{(1-\mu)}{N}\frac{\tau}{(1-\tau)} < 0$.

Arulampalam et al. (2012) describe this effect as the direct impact of taxation through the wage bargain: a rise in the firm-specific tax burden, caused by the factors contained in ϕ, reduces the wage conditional on the levels of capital, employment and pre-tax profit.

This effect is identified in the empirical estimation by regressing the wage rate on the tax liability per employee conditional on F/N, proxied by the value added per employee.

3.2 Econometric Model

To translate the theoretical framework as represented by equation 3 into an empirical specification that can be estimated on the basis of firm-level accounting data, we include the value added per employee to control for indirect general equilibrium effects of the corporation tax on the wage rate. As Askenazy, Cette and Maarek (2012, 9) state, the empirical counterpart for the theoretical concept of bargaining power workers and firms is difficult to capture. To account for proven determinants of the balance of power between the two negotiating parties in the wage-setting process, we add the firm size, the growth rate of the gross domestic product and the (national) unemployment rate.[12]

We hypothesize that with growing size, firms might be able to use different outside options like out-sourcing or off-shoring more easily as a threat point during wage negotiations to avoid a high degree of rent-sharing (cf. Krautheim and Schmidt-Eisenlohr, 2012). GDP growth and the unemployment rate reflect the general conditions of the economy as a whole and of the labor market in particular, thereby capturing important factors for the bargaining strength of employers and employees to some extent (cf. Askenazy et al., 2012). We assume that higher GDP growth comes along with more leeway for wage gains whereas a higher unemployment rate should weaken the assertiveness of the union.

We derived the dynamic specification with two lagged values of wage rate, value added, and tax liability after studying their time series properties in a series of simple univariate autoregressive (AR) model estimations by means of pooled OLS and Fixed Effects. The high persistence of these central firm-level variables, especially in the time series of wage

[12] For lack of respective informations in the accounting data used, we cannot include variables to capture the bargaining level or other institutional aspects like the existence of a works council or the extent of union coverage. However, we regard this void as a minor nuisance against the backdrop that the precise impact of these factors on the extent of rent-sharing is not settled yet, documented by recent empirical contributions: while Du Caju et al. (2010, 485) report that "Rent-sharing is enhanced by collective bargaining coverage in general and by firm-level agreements in particular", Rusinek and Rycx (2013, 49) find evidence that "pay-setting does not need to be collective to generate rent-sharing".

rate and value added, called for the inclusion of at least two lags in the econometric implementation of the bargaining model.[13]

All in all, our economic considerations and the preparatory time series analyses yield the following dynamic specification as our baseline model:

$$
\begin{aligned}
ln\, w_{it} = \alpha &+ \beta_{01}\, ln\, w_{i,t-1} + \beta_{02}\, ln\, w_{i,t-2} \\
&+ \beta_{10}\, ln\, T_{i,t} + \beta_{11}\, ln\, T_{i,t-1} + \beta_{12}\, ln\, T_{i,t-2} \\
&+ \beta_{20}\, ln\, \Pi_{i,t} + \beta_{21}\, ln\, \Pi_{i,t-1} + \beta_{22}\, ln\, \Pi_{i,t-2} \\
&+ \gamma_{01}\, size_{i,t} + \gamma_{02}\, gdp_t + \gamma_{03}\, alo_t \\
&+ \lambda_{01}\, year_t + \lambda_{02}\, \mu_i + \epsilon_{i,t}
\end{aligned}
\tag{4}
$$

In equation 4, i and t index companies and years respectively. w_{it} denotes the wage rate and T_{it} is the tax bill per employee. $\Pi_{i,t}$ indicates the value added per employee. With respect to influences on the bargaining process, γ_{01} represents the coefficient of $size_{i,t}$, γ_{02} measures the impact of gdp_t, and likewise γ_{03} that of the unemployment rate alo_t. The importance of year effects $year_t$ is captured by λ_{01}, the impact of company-specific time-invariant effects μ_i is measured by λ_{02}, and ϵ_{it} is the usual error term.

In a slightly extended specification, we include two supplementary firm-level variables. The inclusion of the year-on-year rate of employment change at the firm level, $empl_{i,t}$, addresses a concern that has been voiced most notably by Dwenger et al. (2011, 2), namely that most existing incidence studies neglect the possibility that the burden of the corporate income tax might not only influence the wage rate of the employees, but also their number, i.e. the employment level.

[13] The results of the univariate time series analyses for wage rate, value added per capita and tax liability per capita are documented in the appendix, see tables 18, 19, and 20 for France and tables 21, 22, and 23 for the UK. In the course of our study, the appropriateness of the lag structure was validated further by analyzing the effects of alterations in the number of lags as part of our robustness checks, see sub-section 4.4.

To account for the fact that, in France just as in the UK, the wage-setting process faces a lower bound in the form of legal minimum wages[14], we include the time-variant firm-level dummy variable $minwage_{i,t}$. It takes the value of one if a company does not pay a wage rate that is at least 5 percent above the lowest observed wage rate in its respective industry (two-digit level). In this case, and in accordance with Arulampalam et al. (2012, 1048-1049), we interpret the respective firm as a "minimum wage company" where deviations from commonly practiced rent-sharing routines are likely.

With the two amendments, our extended specification reads as follows:

$$
\begin{aligned}
ln\, w_{it} = \alpha &+ \beta_{01}\, ln\, w_{i,t-1} + \beta_{02}\, ln\, w_{i,t-2} \\
&+ \beta_{10}\, ln\, T_{i,t} + \beta_{11}\, ln\, T_{i,t-1} + \beta_{12}\, ln\, T_{i,t-2} \\
&+ \beta_{20}\, ln\, \Pi_{i,t} + \beta_{21}\, ln\, \Pi_{i,t-1} + \beta_{22}\, ln\, \Pi_{i,t-2} \\
&+ \gamma_{01}\, size_{i,t} + \gamma_{02}\, gdp_t + \gamma_{03}\, alo_t + \gamma_{04}\, empl_{i,t} + \gamma_{05}\, minwage_{i,t} \\
&+ \lambda_{01}\, year_t + \lambda_{02}\, \mu_i + \epsilon_{i,t}
\end{aligned} \tag{5}
$$

[14] While in France, a legal minimum wage was already introduced in 1950, the UK only adopted a national minimum wage in 1999.

3.3 Data and Variables

Our empirical analysis is mainly based on the pan-European database Amadeus compiled by the Bureau van Dijk (BvD).[15] It contains detailed accounting information of more than 10 million companies from 41 countries, including the EU countries and Eastern Europe. A standard company report includes 24 balance sheet items, 25 profit and loss items, 26 ratios, and descriptive information including trade description and activity codes. Additional ownership information is collected by the BvD.

Overall, however, data quality varies considerably between different countries in the Amadeus database, due to different legal requirements with respect to the public registration and publication of company accounts. Fortunately, our chosen economies of France and the UK not only differ with respect to their wage-setting institutions, but both also feature among those countries with the best coverage in the Amadeus database. To take account of changing conditions in the economy at general and the labor market in particular, we additionally use macroeconomic and labor market information provided by the Organization for Economic Cooperation and Development (OECD).

More precisely, the accounting data used in the present analysis stem from the BvD Amadeus updates #124 (January 2005) and #202 (January 2011). Since every update spans about ten years backwards, there is a considerable overlap of the two sources. Given that, for every update, quality inspections and data revisions by BvD usually focus on the most recent 3 to 5 years, we do not construct our final dataset by simply assembling the two updates at a single date. Instead, we use a merging procedure that exploits the existing overlap to fill gaps in the newer update with information from the older one wherever this enhancement of overall data quality is feasible.

Several additional steps of data selection and processing are undertaken: First, since we focus on the direct incidence of the corporate income tax, we restrict the sample to companies of the corporate sector. Second, to identify the pure firm-level incidence without confounding influences from (multi- or international) group or holding structures and the

[15] See http://www.bvdinfo.com for a general description of BvD and http://www.bvdinfo.com/en-gb/products/company-information/international/amadeus for details on the Amadeus database.

attached profit-shifting opportunities, we only keep companies for which unconsolidated accounting data are available. Third, we follow Arulampalam et al. (2012) in including only companies that were not defined as "micro" by the European Commission (2003). That is, we only use companies with at least two subsequent years of recorded total assets bigger than two million Euros and at least one employee. Fourth, observations with clear errors were dropped,[16] likewise obsevations that appeared in the first and one hundreth percentiles of the respective distribution with respect to at least one of the main variables.[17]

To investigate potential sector-specific features and contribute to the rather thin empirical evidence beyond the manufacturing sector, we compiled two separate country datasets that each span the time period from 1994 to 2010 and encompass comparable information for the four sectors of (i) manufacturing, (ii) construction, (iii) trade and retail, and (iv) hotels and restaurants.[18] Table 1 and Table 2 present the observations per year across sectors. Obviously, each of the eight sectoral panel datasets is non-balanced, but, for each sector, every year is sufficiently well represented.

However, given the dynamic nature of our empirical model and the data requirements of the adequate panel estimation techniques, what matters most is the number of subsequent observations without gaps at the level of the individual firm. Specifically, the employed General Method of Moments estimator (GMM) requires at least four continuous years of data. Table 3 and Table 4 therefore depict the number of available years with subsequent information at the individual firm for France and the UK respectively.[19]

[16]For example, we dropped observations with negative values for fixed assets, turnover or total costs of employees.

[17]The three central variables that were included in this clearing up of extreme values are wage rate, value added per capita and tax liability per capita.

[18]The sectoral classification is based on the NACE Rev. 2 Section Codes, with "Manufacturing" (C), "Construction" (F), "Wholesail and retail trade; repair of motor vehicles and motorcycles" (G, here demoninated "Trade and Retail" for sake of brevity) and "Accomodation and food service activities" (I, abbreviated here as "Hotels and Restaurants").

[19]The characteristic frequency distribution across all four sectors with a first, local peak for a number of 9 subsequent years of information and a second, global peak for a number of 17 subsequent years of observations results from the aforementioned merging of the two Amadeus updates from the years 2005 and 2011. For those firms that are only contained in one of the two updates, ten subsequent years of information is the best possible case and nine years is the most common case in our processed dataset. For firms that are contained in both updates, given the overlap in the years 2001 to 2004, the best case

Table 1: France - Observations per Year, by Economic Sector

Sector	Manufacturing		Construction		Trade and Retail		Hotels and Restaurants	
Year	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
1994	6,851	3.77	2,624	3.03	9,725	3.69	973	3.80
1995	6,753	3.72	2,576	2.98	9,770	3.71	975	3.81
1996	6,719	3.70	2,571	2.97	9,753	3.70	971	3.80
1997	6,701	3.69	2,569	2.97	9,723	3.69	973	3.80
1998	6,704	3.69	2,572	2.97	9,772	3.71	973	3.80
1999	6,662	3.67	2,553	2.95	9,922	3.77	985	3.85
2000	6,621	3.65	2,555	2.95	9,681	3.67	964	3.77
2001	6,583	3.62	2,552	2.95	9,668	3.67	967	3.78
2002	16,082	8.85	8,011	9.25	23,134	8.78	2,249	8.79
2003	15,007	8.26	7,587	8.76	21,431	8.13	2,047	8.00
2004	13,824	7.61	7,209	8.33	20,152	7.65	1,932	7.55
2005	13,794	7.59	7,188	8.30	20,053	7.61	1,925	7.53
2006	13,738	7.56	7,164	8.28	19,964	7.58	1,880	7.35
2007	13,715	7.55	7,156	8.27	19,927	7.56	1,893	7.40
2008	13,762	7.58	7,127	8.23	19,973	7.58	1,905	7.45
2009	13,667	7.52	7,077	8.18	19,819	7.52	1,900	7.43
2010	14,454	7.96	7,477	8.64	21,039	7.98	2,067	8.08
Total	181,637	100.00	86,568	100.00	263,506	100.00	25,579	100.00

Note: Data from Amadeus (BvD), Updates #124 and #202.

Turning to the variables used in our basic and extended econometric specifications as depicted in equations 4 and 5, we proxy the wage rate w_{it} by the annual average company wage, calculated by dividing the Amadeus variable "Costs of Employees" by the "Number of Employees".[20] To proxy the tax variable T, we use the tax item recorded in the profit and loss statement that should, in the case of corporations, consist almost exclusively of tax payments due to the corporate income tax. We normalize the total tax liability through division by the number of employees. The value added per worker, Π_{it}, is likewise calculated by dividing the Amadeus variable "Value added" by the total number of employees. The variable *Size* is the natural log of the balance sheet item "Total Assets". The macroeconomic variables *gdp* and *alo* are taken from the OECD database, likewise

is 17 years of subsequent information, thereby spanning the whole period of our processed dataset, i.e. from 1994 to 2010.

[20] An inevitable drawback of using accounting data in our context is that they provide no information on hours worked (Neither the number of employees in full time equivalents). We try to attenuate this handicap by estimating comparatively long time periods with a length of 14 to 20 years. The short-run variation in intensity of work should therefore not account for our long-run results (cf. Hildreth and Oswald (1997, 330)).

Table 2: UK - Observations per Year, by Economic Sector

Sector	Manufacturing		Construction		Trade and Retail		Hotels and Restaurants	
Year	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
1994	11,635	5.21	5,783	2.42	11,385	5.28	0†	0.00
1995	12,208	5.46	6,211	2.60	12,060	5.59	2,512	5.13
1996	12,157	5.44	6,203	2.60	12,031	5.58	2,510	5.12
1997	12,150	5.44	6,203	2.60	12,033	5.58	2,503	5.11
1998	12,098	5.41	6,185	2.59	11,950	5.54	2,523	5.15
1999	12,039	5.39	6,146	2.57	11,927	5.53	2,510	5.12
2000	11,927	5.34	6,124	2.57	11,846	5.49	2,497	5.10
2001	11,861	5.31	6,125	2.57	11,787	5.46	2,482	5.06
2002	11,717	5.24	6,084	2.55	11,751	5.45	2,454	5.01
2003	15,357	6.87	23,736	9.94	14,369	6.66	3,797	7.75
2004	14,298	6.40	22,949	9.61	13,503	6.26	3,637	7.42
2005	14,188	6.35	22,873	9.58	13,463	6.24	3,599	7.34
2006	14,220	6.36	22,853	9.57	13,442	6.23	3,602	7.35
2007	14,264	6.38	22,794	9.55	13,425	6.22	3,557	7.26
2008	14,257	6.38	22,483	9.42	13,408	6.22	3,541	7.23
2009	14,285	6.39	22,611	9.47	13,455	6.24	3,569	7.28
2010	14,815	6.63	23,378	9.79	13,858	6.42	3,715	7.58
Total	223,476	100.00	238,741	100.00	215,693	100.00	49,008	100.00

Notes: Data from Amadeus (BvD), Updates #124 and #202. Monetary values are in Euros (in thousands), deflated with the harmonised consumer price index of the OECD, base year 2005. † The Amadeus database indeed contained no observations for the sector "Hotels and Restaurants" in 1994.

the harmonised consumer price index that was used to deflate all monetary variables with 2005 being the base year.

Tables 5 and 6 display the descriptive statistics of the main variables described above, separately by economic sector, and including the two supplementary firm-level variables *empl* and *minwage* for our extended specification. Note that monetary values for France are given in Euro (thousands) and for the UK in pound sterling (thousands).[21]

The difference in the wage level between France and the UK that remains even after a currency conversion reflect the fact that social insurance contributions from both sides, employers and employees, are included in our wage rate. In both countries, the highest

[21] At the end of the year 2010, the rounded Euro value of the UK pound sterling was 0.86 EUR. For a rough comparison of the monetary values in Table 6 for the UK to the respective values for France in Table 5, the values for the UK have to be multiplied by 1.16. Since currency rates fluctuated significantly during the period of 1994 to 2010, we decided to present the descriptive statistics for the UK in original currency.

Table 3: France - Number of Consecutive Observations per Firm

Sector	Manufacturing		Construction		Trade and Retail		Hotels and Restaurants	
No. of obs.	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
4	7	0.02	1	0.01	0	0.00	0	0.00
5	28	0.08	1	0.01	6	0.01	2	0.08
6	60	0.17	13	0.09	36	0.08	2	0.08
7	226	0.65	95	0.64	146	0.34	7	0.28
8	1,069	3.05	461	3.11	964	2.23	55	2.20
9	12,104	34.57	5,178	34.90	15,727	36.40	729	29.13
10	1,944	5.55	799	5.39	1,541	3.57	92	3.68
11	66	0.19	12	0.08	53	0.12	2	0.08
12	58	0.17	39	0.26	64	0.15	4	0.16
13	191	0.55	42	0.28	115	0.27	21	0.84
14	461	1.32	146	0.98	329	0.76	26	1.04
15	710	2.03	241	1.62	695	1.61	60	2.40
16	2,203	6.29	958	6.46	2,546	5.89	181	7.23
17	15,887	45.37	6,850	46.17	20,982	48.56	1,322	52.82

Note: Data from Amadeus (BvD), Updates #124 and #202.

Table 4: UK - Number of Consecutive Observations per Firm

Sector	Manufacturing		Construction		Trade and Retail		Hotels and Restaurants	
No. of obs.	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
4	6	0.02	4	0.02	1	0.00	2	0.06
5	17	0.06	7	0.06	6	0.02	0	0.00
6	43	0.14	31	0.25	28	0.08	2	0.07
7	113	0.37	95	0.76	131	0.36	9	0.31
8	2,025	6.61	1,046	8.40	1,310	3.59	180	6.13
9	942	3.08	323	2.59	1,135	3.11	89	3.03
10	1,275	4.16	915	7.34	1,386	3.80	5	0.17
11	80	0.26	17	0.14	82	0.22	6	0.20
12	186	0.61	35	0.28	160	0.44	21	0.72
13	294	0.96	99	0.79	242	0.66	34	1.16
14	520	1.70	89	0.71	680	1.86	56	1.91
15	1,043	3.41	364	2.92	1,222	3.35	120	4.09
16	3,567	11.65	1,570	12.60	4,579	12.55	2,411	82.15
17	20,517	66.99	7,863	63.12	25,523	69.95	0	0.00

Note: Data from Amadeus (BvD), Updates #124 and #202.

wage rates are paid, on average, in the sector "Construction" and the lowest wages in the sector "Hotels and Restaurants".

Across all sectors, the average number of employees is higher in the UK than in France, most notably in the sector "Hotels and Restaurants". The considerable differences between mean and median values for the tax bill per employee, in both countries, point to the fact that a huge share of corporate tax revenues is paid by a rather small portion of the taxable corporations. Nonetheless, the percentage of company-year observations with a positive tax liability ranges within the four sectors from 73 to 87 in France and from 68 to 82 in the UK.

For illustrative purposes with respect to the extent of structural differences between the four sectors, we included a measure of average subsector capital intensity, calculated as the ratio of tangible fixed assets to total assets, in the summary statistics. [22]

[22]The calculation of the ratio "Average Subsector Concentration" is explained in sub-section 4.3.

Table 5: France - Descriptive statistics of Main Variables, by Economic Sector

Sector	Manufacturing			Construction			Trade and Retail			Hotels and Restaurants		
Variable	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.
Annual Wage	38.38	36.13	13.30	43.13	39.54	18.16	42.90	37.60	21.13	34.64	30.46	22.09
Number of Employees	155.97	49.00	1019.43	84.59	41.00	251.97	74.02	28.00	680.25	109.98	28.00	577.46
Value Added per Employee	54.88	47.74	29.39	66.07	49.19	69.53	65.83	51.56	48.77	61.93	48.35	58.37
Tax Bill per Employee	3.18	1.12	5.78	5.53	1.74	15.03	5.68	2.26	10.41	3.51	0.60	7.54
Positive Tax Liability *(Dummy)*	0.77	1.00	0.42	0.87	1.00	0.34	0.84	1.00	0.37	0.73	1.00	0.45
Minimum Wage Company *(Dummy)*	0.01	0.00	0.09	0.00	0.00	0.06	0.00	0.00	0.05	0.00	0.00	0.07
Percent Change of Company Employment	0.04	0.00	2.12	0.05	0.00	0.41	0.06	0.00	2.37	0.09	0.00	0.96
Small Company *(Dummy)*	0.73	1.00	0.45	0.83	1.00	0.37	0.84	1.00	0.37	0.87	1.00	0.33
Medium Company *(Dummy)*	0.19	0.00	0.39	0.13	0.00	0.33	0.13	0.00	0.34	0.10	0.00	0.30
Big Company *(Dummy)*	0.08	0.00	0.27	0.04	0.00	0.19	0.04	0.00	0.18	0.02	0.00	0.15
Average Subsector Concentration	0.45	0.34	0.21	0.29	0.37	0.09	0.39	0.22	0.21	0.52	0.51	0.02
Average Subsector Profitability	0.10	0.10	0.09	0.10	0.09	0.08	0.18	0.08	9.83	0.19	0.10	2.01
Average Subsector Capital Intensity	0.17	0.13	0.15	0.10	0.05	0.15	0.10	0.05	0.13	0.38	0.32	0.31
National Rate of Unemployment	8.92	8.87	0.96	8.84	8.87	0.92	8.92	8.87	0.96	8.93	8.87	0.97
National Rate of GDP Growth	1.47	1.87	1.58	1.39	1.87	1.60	1.47	1.87	1.58	1.48	1.87	1.58

Notes: Data from Amadeus (BvD), Updates #124 and #202. Monetary values are in Euros (in thousands), deflated with the harmonised consumer price index of the OECD, base year 2005.

Table 6: UK - Descriptive Statistics of Main Variables, by Economic Sector

Sector	Manufacturing			Construction			Trade and Retail			Hotels and Restaurants		
Variable	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.
Annual Wage	28.45	23.54	17.78	36.76	28.26	31.85	27.63	21.12	21.28	16.93	13.61	23.24
Number of Employees	227.99	89.00	713.80	131.95	57.00	431.90	252.89	47.00	2803.55	508.06	101.00	2813.02
Value Added per Employee	41.98	31.89	36.11	65.37	39.75	111.91	45.77	31.84	48.93	34.85	19.32	214.20
Tax Bill per Employee	2.45	0.88	6.38	6.82	1.22	27.50	4.25	1.29	9.94	0.82	0.35	58.09
Positive Tax Liability *(Dummy)*	0.74	1.00	0.44	0.81	1.00	0.39	0.82	1.00	0.38	0.68	1.00	0.47
Minimum Wage Company *(Dummy)*	0.01	0.00	0.08	0.00	0.00	0.04	0.00	0.00	0.04	0.00	0.00	0.05
Percent Change of Company Employment	0.04	0.00	2.03	0.11	0.00	1.84	0.07	0.01	1.70	0.46	0.01	37.16
Small Company *(Dummy)*	0.70	1.00	0.46	0.77	1.00	0.42	0.79	1.00	0.41	0.71	1.00	0.46
Medium Company *(Dummy)*	0.20	0.00	0.40	0.17	0.00	0.38	0.15	0.00	0.36	0.19	0.00	0.39
Big Company *(Dummy)*	0.10	0.00	0.30	0.06	0.00	0.23	0.06	0.00	0.24	0.10	0.00	0.30
Average Subsector Concentration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Subsector Profitability	0.22	0.10	6.12	0.10	0.07	1.03	0.14	0.08	3.84	-0.06	0.07	5.64
Average Subsector Capital Intensity	0.28	0.24	0.22	0.33	0.14	0.37	0.21	0.13	0.22	0.68	0.82	0.56
National Rate of Unemployment	6.30	5.71	1.42	6.05	5.45	1.30	6.31	5.71	1.42	6.09	5.46	1.23
National Rate of GDP Growth	2.42	3.05	2.15	1.91	2.66	2.43	2.45	3.05	2.14	2.23	2.96	2.22

Notes: Data from Amadeus (BvD), Updates #124 and #202. Monetary values are in UK pound sterling (in thousands), deflated with the harmonised consumer price index of the OECD, base year 2005.

4 Results

Our analysis of the direct incidence of corporate income taxation on wages proceeds in three steps: First, we estimate the basic and extended specification according to equations 4 and 5 for manufacturing in France, being the sector with the highest data quantity and quality we had access to. Furthermore, it also provides a good basis for a comparison of our estimates with the literature since most empirical studies focus on the manufacturing sector. Second, we analyse the importance of three different sources of potential impact heterogeneity through a series of split-sample analyses, namely by company size, by average profitability, and by competition intensity. Finally, we extend the scope of our investigation to three additional sectors in France and perform most of the previous analyses also for the respective sectors in the UK. To further ensure the validity of our results, we carry out various robustness checks.

The baseline results for our basic and extended specification are presented in subsections 4.1 and 4.2, the findings of our investigation into various sources of potential heterogeneity are described in subsection 4.3. The outcomes of various robustness checks are discussed in subsection 4.4.

4.1 Basic Specification

We estimated the wage bargaining model for corporate tax incidence using four different estimation techniques: We ran pooled Ordinary Least Squares (OLS) as well as Fixed Effects (FE) regressions and we applied two versions of the Generalized Method of Moments (GMM) estimator. Given the presence of lagged values of the dependent variable, i.e. the wage rate, on the right-hand side of our dynamic specification from equation 4, the pooled OLS estimate of the coefficient for the lagged dependent variable, i.e. β_{01}, is upward-biased, whereas the same coefficient will be downward-biased in the FE estimation.

Since they are biased into different directions, the coefficient estimates for the lagged dependent variable from OLS and FE provide a useful tool to assess the validity of results

from GMM estimations for the same specification: One condition the GMM estimations have to fulfill is that the estimate for the coefficient of the lagged dependent variable lies within the bounds defined by prior OLS and FE estimations (cf. Bond 2002, 3-5). We therefore include OLS and FE results in the presentation and evaluation of our basic and extended specification, but focus on GMM results in the subsequent analyses directed towards different sources of effect heterogeneity in the direct incidence of the corporate income tax on wages.

Turning to the results for our basic specification presented in table 7, we see the typical pattern of upward and downward bias with respect to the coefficient of the lagged dependent variable: While the OLS estimation yields a highly significant estimate of 0.591, the corresponding and equally significant value of the FE estimation is 0.160. With a coefficient estimate of 0.0938, the so called "Difference" version of the GMM estimator fails to meet the boundary condition described above, but the "System" version yields a result of 0.313 that lies safely within the bounds from OLS and FE, even if one takes into account the corresponding confidence interval.[23]

Further inspection of the coefficient estimates corroborates that the "System" GMM results are the most trustworthy basis for an economic interpretation: not only does the "System" column contain significant estimates with the expected sign for the current values of Value added and Tax, but contrary to the other columns it also displays no dubious changes of sign between current and lagged values.

The coefficient estimates for *Size*, *GDP Growth* and *Unemployment* are insignifant or, in the case of *GDP Growth* of economically negligible size. However, this is no cause of concern: it is a priori not clear that *Size* should have an impact on the wage rate in an

[23]The labeling of the two variants of the GMM estimator as "Difference" and "System" points to the two different but closely related dynamic panel estimators that were developed by Arellano and Bond (1991) in the case of "Difference" GMM and by Arellano and Bover (1995) and Blundell and Bond (1998) in the case of "System" GMM. While the "Difference" version of the estimator transforms all regressors, usually by differencing, and than applies the Generalized Methods of Moments estimation procedure developed by Hansen (1982), the "System" estimator uses an additional assumption, namely that the first differences of the instrumenting variables are uncorrelated with the fixed effects. Hence, the introduction of more instruments is possible . Concretely, the "System" owes its designation to the fact that it uses a system of two equations, the original equation as well as the transformed one. See Wooldridge (2001) and Bond (2002) for an introduction to GMM estimation and Roodman (2009a) for details of the "Difference" and "System" versions and their respective implementation in the Stata command *xtabond2*.

Table 7: France - Manufacturing, Basic Specification

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage (*first lag)*	0.591***	0.160***	0.0938*	0.313***
	(0.00901)	(0.00657)	(0.0532)	(0.0426)
(*second lag)*	0.258***	0.0355***	-0.0156	0.0736***
	(0.00845)	(0.00629)	(0.0211)	(0.0241)
Value added	0.354***	0.359***	0.242***	0.280***
	(0.0138)	(0.00346)	(0.0413)	(0.0534)
(*first lag)*	-0.196***	-0.0601***	-0.0519*	-0.0359
	(0.0119)	(0.00444)	(0.0288)	(0.0415)
(*second lag)*	-0.0630***	0.000887	0.0176	-0.0161
	(0.00689)	(0.00432)	(0.0192)	(0.0285)
Tax	-0.0214***	-0.0206***	-0.0252***	-0.0300**
	(0.00138)	(0.000672)	(0.00847)	(0.0124)
(*first lag)*	0.00790***	0.00107	-0.00482	-0.00804
	(0.00110)	(0.000718)	(0.00753)	(0.00947)
(*second lag)*	0.00344***	0.000993	-0.00765	0.00810
	(0.000772)	(0.000676)	(0.00608)	(0.00919)
Size	0.00117**	-0.0172***	0.0650*	0.0311
	(0.000495)	(0.00261)	(0.0367)	(0.0320)
GDP Growth Rate	-0.00546***	-0.0403***	0.00458***	0.00331**
	(0.000462)	(0.000686)	(0.00132)	(0.00150)
Unemployment Rate	-0.00207	-0.0494***	0.0181***	0.00440
	(0.00136)	(0.00156)	(0.00358)	(0.00366)
R^2	0.906	0.728		
Observations	35014	35014	24361	35014
Groups	9340	9340	6997	9340
Instruments			241	272
AR(1) p-value			0.001	0.000
AR(2) p-value			0.548	0.327
Hansen p-value			0.191	0.758

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

estimation where the dependent variable is estimated on a per capita basis and all other firm-level variables equally enter in a normalized way, i.e., per capita. The very small or non-existing effects of *GDP Growth* and *Unemployment* are likely due to the simple fact that these national variables explain only a very small part of the variation in a firm-level estimation based on a single-country dataset.

The diagnostic tests for the "System" GMM estimation are throughout satisfactory: The Arellano-Bond test for autocorrelation of the differenced residuals reports first-order serial correlation by the significant p-value for AR(1), which is to be expected in the case of a dynamic panel estimation with a lagged dependent variable. A critical condition for the soundness of the GMM application is a non-significant result for AR(2), confirming in our application that lags of the dependent variable of order two and higher are not endogenous and could therefore serve as suitable instruments. The Hansen overidentification test for instrument validity is equally encouraging since the null hypothesis that the overidentification restrictions are fulfilled is clearly not rejected.[24] Given the risks of instrument proliferation in applying system GMM it is important to note that the number of 272 instruments is quite low in comparison to the number of 9340 groups and, thus, far away from a critical threshold (cf. Roodman 2009a,b).[25]

Turning to the economic interpretation of the results, the estimated short-run elasticity of -3 percent translates to a monetary value of minus 42 Eurocent as the short-run incidence of an additional Euro in tax liability, evaluated at the median value of 13.98 of the wage to tax ratio. Taking into account the lagged values of the wage rate and the tax liability, the resulting long-run elasticity of -4.89 percent leads to a long-run incidence, i.e. after two years, of minus 68 Eurocent. These values seem to be compatible with the idea of a staggered burden shifting through the wage bargaining process that occurs in a regular interval every one to two years.[26]

[24]Since we estimate by using the 'robust' option of the command xtabond2 for difference and system GMM in Stata (Release 13.0), only the Hansen overidentification test is of importance since the alternative Sargan test depends on the two assumptions of homoscedasticity and absence of autocorrelation which are not fulfilled in our analysis.

[25]As a rule of thumb, the number of instruments used should stay in safe distance below the number of groups included in the estimation, see Roodman (2009a, 98-99), but note also the extensive discussion of the limits and risks of this heuristic in Roodman (2009b).

[26]Du Caju et al. (2008), 25, reports that the average time interval for wage adjustments is 1 year in the UK and 1.5 years in France.

4.2 Extended Specification

The results for our extended specification from equation 5, displayed in table 8, are very similar to those of the basic specification, although the coefficients for the two added variables are both significant in the "System" GMM estimation. The dummy for minimum wage companies simply indicates that these companies pay wages that are on average 21 percent lower than the mean of the rest of the sample, whereas the negative wage impact of the employment change variable points to the somewhat mechanical relationship between the wage rate and the number of employees in our accounting data: A rise in the number of employees leads, ceteris paribus, to a decline of the wage rate, since the latter is calculated by dividing the total cost of employees by the number of employees. The consequences for the estimates of interest are very small: The short-run elasticity drops slightly to -2.80 percent which equals a short-run incidence of minus 39 Eurocent. The corresponding long-run values are -4.74 percent for the elasticity and minus 66 Eurocent for the incidence.

4.3 Dimensions of Heterogeneity

To shed some light on the inner workings of the wage bargaining channel of corporate tax incidence and possibly identify the driving factors behind the extent of burden shifting, we carried out several analyses that focus on different dimensions of potential effect heterogeneity. To allow for a straightforward interpretation of results, we decided not to use a battery of alternative interaction effects, but to run a series of split-sample analyses, focusing one by one on possible sources of heterogeneity. The results of this exercise are presented in the following subsections.

Heterogeneity by Size Table 9 shows that the incidence effect for the whole sample in column one is driven by the significant results for small and medium enterprises, whereas no signficant wage effect of the tax liability can be observed for big companies. In general, the estimation for big companies is somewhat less precise than for small and medium companies, due to the smaller sample size. But in view of the significant and

Table 8: France - Manufacturing, Extended Specification

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage (*first lag)*	0.596***	0.182***	0.138**	0.336***
	(0.00883)	(0.00643)	(0.0553)	(0.0422)
(*second lag)*	0.250***	0.0385***	0.00176	0.0736***
	(0.00821)	(0.00612)	(0.0242)	(0.0252)
Value added	0.326***	0.333***	0.227***	0.275***
	(0.0138)	(0.00344)	(0.0400)	(0.0518)
(*first lag)*	-0.173***	-0.0463***	-0.0273	-0.0156
	(0.0119)	(0.00434)	(0.0295)	(0.0404)
(*second lag)*	-0.0590***	0.00158	-0.00102	-0.0186
	(0.00665)	(0.00421)	(0.0258)	(0.0309)
Tax	-0.0198***	-0.0192***	-0.0238***	-0.0280**
	(0.00135)	(0.000655)	(0.00824)	(0.0120)
(*first lag)*	0.00752***	0.000930	-0.00552	-0.0121
	(0.00105)	(0.000698)	(0.00780)	(0.00918)
(*second lag)*	0.00302***	0.000667	-0.00205	0.00705
	(0.000736)	(0.000657)	(0.00752)	(0.00952)
Size	0.000991**	-0.00815***	0.0797**	0.0289
	(0.000487)	(0.00255)	(0.0395)	(0.0305)
Minimum Wage (Dummy)	-0.137***	-0.153***	-0.0912	-0.206*
	(0.0128)	(0.00731)	(0.0993)	(0.117)
Employment Change	-0.0809***	-0.0673***	-0.134***	-0.146***
	(0.0152)	(0.00214)	(0.0360)	(0.0436)
GDP Growth Rate	-0.00457***	-0.0373***	0.00491***	0.00394***
	(0.000487)	(0.000675)	(0.00126)	(0.00141)
Unemployment Rate	-0.00222*	-0.0459***	0.0137***	0.00139
	(0.00131)	(0.00152)	(0.00373)	(0.00365)
R^2	0.912	0.743		
Observations	35014	35014	24361	35014
Groups		9340	6997	9340
Instruments			241	272
AR(1) p-value			0.000	0.000
AR(2) p-value			0.617	0.561
Hansen p-value			0.366	0.915

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

plausible coefficient estimates for the wage rate and value added, the non-significance for the tax variable in the category of big companies suggests that an economic interpretation might be warranted. One possible explanation could be that big corporations have more opportunities for tax-smoothing so that no clear-cut relationship exists between the tax

Table 9: France - Manufacturing, Extended Specification, by Size

by Size Group:	ALL	SMALL	MEDIUM	BIG
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage (*first lag)*	0.336***	0.334***	0.253***	0.391***
	(0.0422)	(0.0601)	(0.0827)	(0.0946)
(*second lag)*	0.0736***	0.0771**	0.0269	0.115**
	(0.0252)	(0.0320)	(0.0381)	(0.0548)
Value added	0.275***	0.352***	0.217***	0.109***
	(0.0518)	(0.0540)	(0.0648)	(0.0405)
(*first lag)*	-0.0156	-0.0789	-0.0313	0.00294
	(0.0404)	(0.0557)	(0.0285)	(0.0347)
(*second lag)*	-0.0186	-0.0323	0.00133	0.0108
	(0.0309)	(0.0415)	(0.0212)	(0.0320)
Tax	-0.0280**	-0.0349***	-0.0229**	-0.0119
	(0.0120)	(0.0113)	(0.0116)	(0.00837)
(*first lag)*	-0.0121	0.000464	-0.00811	-0.00460
	(0.00918)	(0.0112)	(0.00943)	(0.00747)
(*second lag)*	0.00705	0.00910	0.00269	0.00201
	(0.00952)	(0.0110)	(0.00783)	(0.00709)
Size	0.0289	0.0179	0.0389	0.0512
	(0.0305)	(0.0472)	(0.0558)	(0.0327)
Minimum Wage (Dummy)	-0.206*	-0.160	-0.430***	0.0438
	(0.117)	(0.115)	(0.139)	(0.0829)
Employment Change	-0.146***	-0.0946**	-0.0759*	-0.0206
	(0.0436)	(0.0379)	(0.0459)	(0.0300)
GDP Growth Rate	0.00394***	0.00389**	0.00606**	0.00261
	(0.00141)	(0.00165)	(0.00305)	(0.00343)
Unemployment Rate	0.00139	0.00399	0.0122	-0.00229
	(0.00365)	(0.00377)	(0.00773)	(0.00966)
Observations	35014	24566	7439	3009
Groups	9340	6508	2009	823
Instruments	272	272	269	259
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.561	0.666	0.785	0.785
Hansen p-value	0.915	0.718	0.774	0.443

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%. (iv) Column ALL is replicated from table 8

liabilities paid in a given year and the economic situation of the company respectively the evolution of the average wage rate. Alternatively, it might be of relevance that in France, the wage bargaining for bigger companies occurs mostly at a sectoral level, and that a

possibly existing additional wage-setting stage at the company level might be of minor importance (cf. Du Caju, Gautier, Momferatou and Ward-Warmedinger 2008, 8-11).

Heterogeneity by Profitability Table 10 displays the result of our split-sample analysis by quartiles of average profitability, i.e., the position of an individual company in the distribution of average profit for the whole period from 1994 to 2010. The overall benchmark result, reproduced in column one, is obviously driven by the companies in the 3rd and 4th quartil of the average profitability distribution. This result supports the reasoning, as provided by Arulampalam et al. (2012), that firm-specific rents are the basis for the wage bargaining channel of corporate tax incidence. After all, only companies that regularly exhibit positive and above average profits have something to share with their employees in the first place. Of course, in the symmetric setup of our model, the same companies are in the position to share the burden of corporate taxation with their employees.

Heterogeneity by Competition Intensity Prior empirical research on corporate tax incidence under imperfect competition, notably by Liu and Altshuler (2013), motivates the hypothesis that competition intensity should play a role for the extent of burden shifting via the wage bargaining channel. Following the reasoning that firm-specific rents are the basis for a wage bargaining channel, the resulting incidence effect of corporate taxation is expected to be larger in less competitive industries whith bigger rents. In a first attempt to investigate this relationship, we followed the approach of Liu and Altshuler (2013) to measure competition intensity via the so-called CR4 ratio. It relates the sum of the market share of the four companies with the highest individual market share to the total market size at the industry level.

We used the "turnover" variable from Amadeus to calculate permanent ratios, i.e. averaged over the years 1994 to 2010, at the two-digit industry level of the classification of economic activities in the European Union (NACE Rev. 2). Subsequently, we employed the CR4 ratio to split the sample into four quartiles of declining competition intensity, from quartil 1 with the lowest CR4 value and accordingly the highest competition intensity to

Table 10: France - Manufacturing, Extended Specification, by Profitability

by Average Level of Profitability:	ALL	LOWEST Quartil 1	Quartil 2	Quartil 3	HIGHEST Quartil 4
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage (*first lag)*	0.336***	0.276***	0.339***	0.393***	0.359***
	(0.0422)	(0.0809)	(0.0713)	(0.0606)	(0.0638)
(*second lag)*	0.0736***	0.0204	0.0572	0.113***	0.0637
	(0.0252)	(0.0400)	(0.0409)	(0.0400)	(0.0412)
Value added	0.275***	0.149***	0.180***	0.364***	0.448***
	(0.0518)	(0.0436)	(0.0655)	(0.0636)	(0.0616)
(*first lag)*	-0.0156	0.00386	-0.0427	-0.0993*	-0.0703
	(0.0404)	(0.0324)	(0.0290)	(0.0593)	(0.0620)
(*second lag)*	-0.0186	-0.00209	0.00765	-0.0520	-0.0217
	(0.0309)	(0.0200)	(0.0289)	(0.0467)	(0.0551)
Tax	-0.0280**	-0.00648	-0.00124	-0.0266***	-0.0586***
	(0.0120)	(0.00914)	(0.00930)	(0.00915)	(0.0132)
(*first lag)*	-0.0121	-0.00110	-0.00362	-0.00562	-0.0181
	(0.00918)	(0.0103)	(0.00706)	(0.0103)	(0.0156)
(*second lag)*	0.00705	0.00544	1.43e-05	0.0145	0.00282
	(0.00952)	(0.00852)	(0.00826)	(0.0102)	(0.0155)
Size	0.0289	0.0598	0.00672	0.0374	-0.00494
	(0.0305)	(0.0525)	(0.0360)	(0.0307)	(0.0295)
Mininum Wage (Dummy)	-0.206*	-0.0474	-0.532***	-0.222**	-0.170
	(0.117)	(0.141)	(0.191)	(0.112)	(0.115)
Employment Change	-0.146***	-0.0472**	-0.105*	-0.121**	-0.0986**
	(0.0436)	(0.0226)	(0.0539)	(0.0611)	(0.0443)
GDP Growth Rate	0.00394***	0.00964*	0.00547**	0.00326	0.00320
	(0.00141)	(0.00577)	(0.00260)	(0.00206)	(0.00201)
Unemployment Rate	0.00139	0.0126	-0.000227	-0.00152	0.00771
	(0.00365)	(0.0121)	(0.00670)	(0.00500)	(0.00506)
Observations	35014	4220	8521	10645	11628
Groups	9340	1568	2354	2672	2746
Instruments	272	260	272	272	272
AR(1) p-value	0.000	0.000	0.000	0.000	0.000
AR(2) p-value	0.561	0.657	0.106	0.030	0.560
Hansen p-value	0.915	0.724	0.504	0.758	0.218

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

quartil 4 with the opposite characteristis, i.e. the highest CR4 value and correspondingly the lowest level of competition intensity.

Following the same theoretical reasoning as above with respect to differences in average profitability, one would expect larger incidence effects in quartiles with higher concentration ratios and lower competition intensities: only corporations that have sizeable profits and some leeway to bargain over the distribution with their employees or their respective union can engage in rent-sharing and, consequently, possibly also shift the burden of corporate income taxation at least partly upon their employees. On the other hand, one could also argue like Martins (2010, 171-172) that higher competition intensity might lead to a greater demand for wage flexibility, which could increase the performance-pay sensitivity of compensation schemes and transform rent-sharing into a more general risk-sharing.[27]

The results of our respective split-sample analysis on the basis of the CR4 ratio, documented in table 11, reveal no clear-cut relationship between the intensity of competition and the size of corporate tax incidence via the wage bargaining channel: in the first quartile, a significant tax elasticity is detected, likewise in the third and fourth quartile. Taking the size of the different coeffient estimates into account, one could assume that a hump-shaped relationship might exist. But it seems difficult to rationalize with recourse to economic theory why the shifting of the corporate tax on wages should be more pronounced in the middle of the distribution of market concentration and competition intensity and less concentrated at the tails.

Instead, we believe that the result has to be seen in light of the restrictions that apply to our calculation of the concentration ratio CR4: We calculated the ratio by relating the sum of the market shares of the four companies with the highest individual market shares to the overall market size, but only to the extent that it was reflected in our data. Given that we used a dataset that included only French corporations, the market share of foreign corporations simply had to be ignored.

Therefore, we followed the alternative approach of Du Caju et al. (2010, 483) who proxied the intensity of product market competition at the industry level by the respective share of companies with less than 20 employees. The reason is that a relatively large share of small companies might signal a higher degree of competition intensity. Applied to our

[27] Using UK data, this effect has been documented by Cunat and Guadalupe (2005), albeit in particular for executives.

Table 11: France - Manufacturing, Ext. Spec., by Competition Intensity I

by Sub-Industry Level of Competition Intensity:	ALL	HIGHEST Quartil 1	Quartil 2	Quartil 3	LOWEST Quartil 4
Dependent Variable: ln_w	GMM (System)	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage (*first lag)*	0.336***	0.420***	0.354***	0.343***	0.344***
	(0.0422)	(0.0411)	(0.0421)	(0.0375)	(0.0653)
(*second lag)*	0.0736***	0.106***	0.0500*	0.0920***	0.0964**
	(0.0252)	(0.0305)	(0.0286)	(0.0277)	(0.0432)
Value added	0.275***	0.246***	0.256***	0.407***	0.246***
	(0.0518)	(0.0542)	(0.0620)	(0.0552)	(0.0483)
(*first lag)*	-0.0156	-0.0728*	-0.0551**	-0.0258	-0.0313
	(0.0404)	(0.0400)	(0.0269)	(0.0374)	(0.0422)
(*second lag)*	-0.0186	-0.0136	0.00376	-0.00775	-0.00815
	(0.0309)	(0.0339)	(0.0313)	(0.0313)	(0.0358)
Tax	-0.0280**	-0.0223**	-0.0116	-0.0410***	-0.0195**
	(0.0120)	(0.00910)	(0.00868)	(0.00991)	(0.00954)
(*first lag)*	-0.0121	0.00266	-0.0130*	-0.0153*	-0.00729
	(0.00918)	(0.00759)	(0.00692)	(0.00903)	(0.0117)
(*second lag)*	0.00705	0.00603	0.00491	0.00202	-0.00402
	(0.00952)	(0.00794)	(0.00882)	(0.00964)	(0.0103)
Size	0.0289	0.0347**	-0.00360	0.0188	0.0364*
	(0.0305)	(0.0162)	(0.0219)	(0.0221)	(0.0215)
Minimum Wage (Dummy)	-0.206*	-0.388***	-0.113	-0.218*	-0.293**
	(0.117)	(0.0997)	(0.171)	(0.113)	(0.117)
Employment Change	-0.146***	-0.112***	-0.0997*	-0.0576*	-0.0979***
	(0.0436)	(0.0414)	(0.0548)	(0.0338)	(0.0376)
GDP Growth Rate	0.00394***	0.00347*	0.00156	0.00487*	-0.00129
	(0.00141)	(0.00207)	(0.00296)	(0.00262)	(0.00271)
Unemployment Rate	0.00139	-0.00342	0.00241	0.00112	0.00456
	(0.00365)	(0.00435)	(0.00601)	(0.00515)	(0.00652)
Observations	35014	11352	7504	9489	6669
Groups	9340	3046	2085	2592	1854
Instruments	272	272	272	272	272
AR(1) p-value	0.000	0.000	0.000	0.000	0.000
AR(2) p-value	0.561	0.872	0.246	0.242	0.202
Hansen p-value	0.915	0.828	0.815	0.775	0.155

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

sample of the French manufacturing sector, we found that across sub-sectors an average of 10.9 percent of the companies had less than 20 employees, with a median value of 14.2 percent. Against this backdrop, we splitted the sample in half with the value of

12.5 percent serving as the threshold to sort companies into the categories of "low" and "high" competition intensity. However, split-sample estimations based on this more robust approach to proxy competition intensity at the industry level did not yield consistent results, as documented by table 12. In columns 1 and 2 of table 12, the subsample with a higher (lower) degree of competition correlates with a (non-) significant tax effect, whereas in columns 3 and 4, estimated on a dataset restricted to the pre-crisis period from 1994 to 2007, the opposite is true: Here, the subsample with low competition intensity exhibits a significant tax effect, albeit only at the 10 percent level of significance, whereas no significant tax effect is observed for the subsample with high competition intensity.

Taken together with the results based on the CR4 ratio, we conclude that the degree of competition intensity seems to have no clear-cut effect on the extent of tax shifting via the wage bargaining channel, at least in our empirical framework that controls for the pre-tax level of added value per worker. The restrictions attached to the dataset used preclude an in-depth analysis of the question how exactly the competitive environment in a given economic sub-sector might affect the direct incidence of the corporate income tax.

Table 12: France - Manuf., Ext. Spec., by Competition Intensity, II

Time period	1994-2010		1994-2007	
Competition Intensity	LOW	HIGH	LOW	HIGH
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage *(first lag)*	0.351***	0.331***	0.357***	0.313***
	(0.0410)	(0.0445)	(0.0451)	(0.0546)
(second lag)	0.0667***	0.0672**	0.0680***	0.0746**
	(0.0222)	(0.0290)	(0.0241)	(0.0348)
Value added	0.288***	0.238***	0.277***	0.219***
	(0.0587)	(0.0498)	(0.0650)	(0.0657)
(first lag)	-0.0617**	-0.00202	-0.0491	-0.00326
	(0.0281)	(0.0416)	(0.0321)	(0.0489)
(second lag)	-0.00672	-0.000697	-0.00222	-0.0131
	(0.0228)	(0.0351)	(0.0288)	(0.0418)
Tax	-0.0148	-0.0215**	-0.0179*	-0.0197
	(0.00953)	(0.0107)	(0.0102)	(0.0162)
(first lag)	-0.00604	-0.00934	-0.00728	-0.00412
	(0.00720)	(0.0101)	(0.00845)	(0.0121)
(second lag)	0.00234	0.00251	0.00147	0.00680
	(0.00729)	(0.0109)	(0.0105)	(0.0138)
Size	0.0214	0.0323	0.0287	0.0206
	(0.0229)	(0.0256)	(0.0259)	(0.0309)
Minimum Wage *(Dummy)*	-0.207*	-0.526***	-0.154	-0.580***
	(0.108)	(0.165)	(0.159)	(0.215)
Employment Change	-0.115***	-0.140**	-0.0979**	-0.140*
	(0.0447)	(0.0577)	(0.0488)	(0.0740)
GDP Growth Rate	0.00455***	0.00243	0.0164***	0.0175**
	(0.00163)	(0.00222)	(0.00574)	(0.00683)
Unemployment Rate	0.00535	0.00117	-0.0236***	-0.0250***
	(0.00371)	(0.00475)	(0.00801)	(0.00797)
Observations	20866	14148	17404	12181
Groups	5745	3689	5309	3468
Instruments	272	272	182	182
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.188	0.211	0.106	0.202
Hansen p-value	0.745	0.520	0.769	0.559

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Heterogeneity by Economic Sector Naturally, sectoral differences are one source of potential heterogeneity with respect to the wage bargaining channel of corporate tax incidence, given that sectoral idiosyncrasies are of high importance for the level and evolution of wages and should therefore also matter in the context of a wage bargaining model.[28] To broaden the picture beyond the manufacturing sector, we conducted incidence analyses along the lines of our basic and extended model for the three additional sectors of "Construction" (Nace Code, Revision 2: F), "Trade and Retail" (G) and "Hotels and Restaurants" (I). The choice of these sectors was motivated by the aim to cover a range of economic activity that is as broad as possible, but also dictated by considerations of data quantity and quality.[29]

Turning to the results displayed in table 13, a significant and negative impact of the tax liability is observed for "Trade and Retail" and "Hotels and Restaurants", here with a lag of one year, but not for "Construction". The effect size in the two former sectors is very close to our benchmark result from the manufacturing sector. The short-run elasticities translate to short-run incidences of minus 28 Eurocent (Trade and Retail) and, after one year, of minus 34 Eurocent (Hotels and Restaurants). The corresponding long-run elasticities are minus 57 Eurocent (Trade and Retail) and minus 78 Eurocent (Hotels and Restaurants). These are calculated taking into account current and lagged coefficients of the tax variable, and of the lagged coefficients of the wage rate.

The non-existence of a significant tax effect in the construction sector could be due to several factors: First, in France this sector is highly regulated, like it is the case in many countries, e.g., Germany, by special provisions that also cover the wage-setting process. Second, given that construction obviously is a non-tradable business where domestic companies usually capture a very large market share, it is also plausible that the corporate

[28]The recent empirical literature attributes the existence and persistence of inter-industry wage differentials in large part to the importance of inter-industry differences in the extent of rent-sharing, see Du Caju, Lamo, Poelhekke, Kátay and Nicolitsas (2010); Du Caju, Rycx and Tojerow (2011); Card, Devicienti and Maida (2011); and Rusinek and Rycx (2013).

[29]At the outset of our data preparation process, we started with a total of seven sectors that also included "Real estate activities" (NACE Rev. 2 Section Code: L), "Electricity, gas, steam and air conditioning supply" (D) and "Water supply; sewerage, waste management and remediation activities" (E). However, it became apparent that the requirements of our estimations with respect to sample size and data quality are only fulfilled by the four sectors detailed above.

Table 13: France - Extended Specification, by Economic Sector

by Economic Sector: (Nace Rev. 2 Code)	Manufacturing (C)	Construction (F)	Trade and Retail (G)	Hotels and Restaurants (I)
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage (*first lag*)	0.336***	0.434***	0.439***	0.467***
	(0.0422)	(0.0375)	(0.0317)	(0.120)
(*second lag*)	0.0736***	0.133***	0.0690***	0.0954**
	(0.0252)	(0.0352)	(0.0191)	(0.0457)
Value added	0.275***	0.376***	0.253***	0.256**
	(0.0518)	(0.0578)	(0.0707)	(0.110)
(*first lag*)	-0.0156	-0.167***	-0.0557	0.0297
	(0.0404)	(0.0503)	(0.0362)	(0.0651)
(*second lag*)	-0.0186	-0.0701**	0.0257	0.0178
	(0.0309)	(0.0355)	(0.0245)	(0.0293)
Tax	-0.0280**	-0.0175	-0.0260**	-0.0121
	(0.0120)	(0.0110)	(0.0127)	(0.0137)
(*first lag*)	-0.0121	-0.000120	-0.00215	-0.0271*
	(0.00918)	(0.00943)	(0.0112)	(0.0162)
(*second lag*)	0.00705	0.0103	-0.0135	0.00995
	(0.00952)	(0.00778)	(0.00964)	(0.0128)
Size	0.0289	-0.00290	0.00623	0.0828*
	(0.0305)	(0.0176)	(0.0248)	(0.0445)
Minimum Wage (Dummy)	-0.206*	-0.0334	0.121	-1.376
	(0.117)	(0.268)	(0.371)	(1.069)
Employment Change	-0.146***	-0.0522*	-0.145***	-0.326***
	(0.0436)	(0.0286)	(0.0548)	(0.119)
GDP Growth Rate	0.00394***	0.00290	0.00479***	-0.00107
	(0.00141)	(0.00188)	(0.00136)	(0.00621)
Unemployment Rate	0.00139	0.00335	0.00679**	-0.00499
	(0.00365)	(0.00384)	(0.00281)	(0.0104)
Observations	35014	14836	43204	2503
Groups	9340	3767	12326	782
Instruments	272	272	253	228
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.561	0.095	0.029	0.211
Hansen p-value	0.915	0.590	0.747	0.462

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

tax burden in this sector is rather shifted forward to the output price and not backwards to the factor labor.

Finally, the change of sign with respect to the coefficients of value added and its lags, as well as the dissatisfactory statistic of the AR(2) test for serial correlation, rise some doubts concerning the validity of the "System" GMM estimation for this sector. Against this backdrop, the non-significant result for "Construction" should not be given too much weight. On all accounts, the results of our sectoral analyses presented in table 13 clearly show that the phenomenon of a direct incidence of corporate taxation on wages via the barganing channel is, at least in France, not restricted to the manufacturing sector.

Heterogeneity by Country Based on the consideration that the same sectors in different countries might be more similar than different sectors in the same country, we ran the same analyses as described above also for company samples from the UK to test how country specific the results for France are or whether they could lend themselves to a cautious generalization. Here, we focus on the split-sample analyses for the manufacturing sector by size and by profitability, as well as on the sectoral comparison with "Construction", "Trade and Retail" and "Hotels and Restaurants". [30]

As table 14 documents, a significant and negative tax effect is obtained for all size categories in the UK manufacturing sector. The benchmark result for all companies displays a short-run elasticity of -2.7 percent that translates to a short-run incidence of minus 40 pence. The calculated long-run elasticity of -4.9 percent leads to a long-run incidence of minus 73 pence. In contrast to the respective results for France in table 9, where no significant tax effect was detected for big companies, in the UK the big corporations show the largest coefficient for the short-run tax elasticity, with a value of -3.8 percent. [31]

[30] Due to some implausible estimates and irregularities signaled by the test statistics for the "Difference" and "System" GMM estimations, we present in the following the results obtained from a dataset where the extreme value selection was tightened so that the 5th and 95th percentiles in the respective distributions of wage rate, value added and tax liability were excluded from the analyses. The results for the respective estimations based on a UK dataset with the original selection routine that discarded only the 1st and 100th percentile are documented by tables 24 and 25 in the appendix.

[31] Note that a higher elasticity does not automatically imply a higher incidence effect in monetary terms, since the median values of the wage to tax ratio might differ considerably for different subsamples. Here, the ratio for all companies has a median of 14.88, whereas the ratio for the subsample of big companies has a median of only 9.62. Hence, the resulting short-run incidence for the big companies is minus 36 pence. In the long-run, the calculated elasticity of -4.9 percent translates to an incidence of minus 47 pence.

At first sight, this divergence seems contradictory to our results for France, but it can be explained and reconciled with the same underlying bargaining model, if one takes well-known institutional differences between the labor markets in France and the UK into account: While the dominant level of wage-setting in France, at least for big companies, is the sector, in the UK the wage bargaining at the firm-level is of much bigger importance, even for big companies (cf. Du Caju et al. 2008, 11).

On the one hand, the validity of the split-sample analysis by size for the UK is somewhat called into question by the significantly positive and sizeable effect of the national unemployment rate across all size groups. On the other hand, the well-behaved test statistics for the "System" GMM estimations exhibit no cause for concern.

In the UK, the results for the split-sample analysis by quartiles of average sub-sector profitability, displayed in table 15, confirm the conclusion drawn above on the basis of the respective analysis for France: As the bargaining framework rests on the existence of firm-specific rents that can be shared between companies and their respective workforce, a negative wage effect from corporate taxation should only materialize for companies that exhibit positive and above average profits over time.

It seems logically mandatory that no effect can be observed for UK corporations in the first quartile of the average profit distribution: Given that the corporate tax is a tax on positive profits, those companies that typically have only small or no profits at all do not bear a tax burden to begin with and therefore we should not expect to observe a significant burden-sharing with their workforce.

Finally, the sectoral comparison in the UK between "Manufacturing", "Construction", "Trade and Retail" and "Hotels and Restaurants" seems to underline, at first sight, the finding from the corresponding analysis for France that sectoral heterogeneity strongly matters for the extent of corporate tax incidence via the wage bargain. In contrast to the previous results for French companies, where a significant tax effect was observed only in the sectors "Manufacturing" and "Trade and Retail", all sectors in the UK exhibit a significant and sizeable negative effect of the tax liability on the wage rate in table 16. However, evaluating the short-run elasticities at the median of the respective wage-tax-

Table 14: UK - Manufacturing, Extended Specification, by Size

by Size Group:	ALL	SMALL	MEDIUM	BIG
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage *(first lag)*	0.394***	0.348***	0.305***	0.230**
	(0.0492)	(0.0469)	(0.0933)	(0.104)
(second lag)	0.0582*	0.0970***	0.0179	-0.0829
	(0.0350)	(0.0343)	(0.0480)	(0.0518)
Value added	0.541***	0.563***	0.369***	0.396***
	(0.0609)	(0.0564)	(0.0608)	(0.0537)
(first lag)	-0.154***	-0.165***	-0.0585	-0.0971
	(0.0518)	(0.0541)	(0.0651)	(0.0693)
(second lag)	0.00338	-0.0677	0.0167	0.0527
	(0.0465)	(0.0462)	(0.0483)	(0.0461)
Tax	-0.0267**	-0.0253**	-0.0251**	-0.0376***
	(0.0124)	(0.0112)	(0.0112)	(0.0121)
(first lag)	-0.0105	-0.00646	-0.0119	-0.000209
	(0.0123)	(0.0116)	(0.0138)	(0.0148)
(second lag)	-0.00757	0.0106	-0.00850	-0.00846
	(0.0120)	(0.0113)	(0.0124)	(0.0128)
Size	0.0462	0.0592**	0.0248	0.0780**
	(0.0296)	(0.0300)	(0.0479)	(0.0381)
Minimum Wage *(Dummy)*	-0.176**	-0.217***	-0.292**	-0.380***
	(0.0818)	(0.0665)	(0.121)	(0.113)
Employment Change	0.0351	0.0209	-0.0304	-0.0485
	(0.0571)	(0.0533)	(0.0610)	(0.0361)
GDP Growth Rate	0.00288*	0.00240	0.00533**	0.00203
	(0.00152)	(0.00156)	(0.00266)	(0.00320)
Unemployment Rate	0.0387***	0.0293***	0.0481***	0.0324***
	(0.00535)	(0.00493)	(0.00973)	(0.00880)
Observations	25346	16962	6099	2285
Groups	6306	4268	1474	564
Instruments	272	272	272	272
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.470	0.798	0.754	0.196
Hansen p-value	0.144	0.302	0.924	0.843

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

ratio one obtains short-run incidences of minus 40 pence in manufacturing, minus 1 pound and 15 pence in construction, minus 1 pound and 1 pence in trade and retail, and minus 73 pence in hotels and restaurants for a one UK pound stirling rise in tax liabilities.

Table 15: UK - Manufacturing, Extended Specification, by Profitability

by Average Level of Profitability:	ALL	LOWEST Quartil 1	Quartil 2	Quartil 3	HIGHEST Quartil 4
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage (*first lag)*	0.394***	0.375***	0.228**	0.263***	0.442***
	(0.0492)	(0.0799)	(0.0927)	(0.0684)	(0.0538)
(*second lag)*	0.0582*	0.0712	0.0646	0.0427	0.0745*
	(0.0350)	(0.0537)	(0.0495)	(0.0427)	(0.0393)
Value added	0.541***	0.333***	0.534***	0.471***	0.534***
	(0.0609)	(0.0622)	(0.0624)	(0.0699)	(0.0528)
(*first lag)*	-0.154***	-0.119**	-0.0859	0.0465	-0.216***
	(0.0518)	(0.0574)	(0.0664)	(0.0568)	(0.0614)
(*second lag)*	0.00338	-0.0473	-0.0765	0.0195	-0.0220
	(0.0465)	(0.0589)	(0.0567)	(0.0546)	(0.0481)
Tax	-0.0267**	-0.0124	-0.0362***	-0.0447***	-0.0423***
	(0.0124)	(0.00951)	(0.0105)	(0.0129)	(0.0127)
(*first lag)*	-0.0105	0.00245	-0.00191	-0.0365***	0.00449
	(0.0123)	(0.0108)	(0.0124)	(0.0126)	(0.0137)
(*second lag)*	-0.00757	0.0130	0.0181	-0.00339	-0.00709
	(0.0120)	(0.0118)	(0.0121)	(0.0133)	(0.0126)
Size	0.0462	-0.000330	0.0489	0.0472	0.0259
	(0.0296)	(0.0336)	(0.0398)	(0.0416)	(0.0255)
Minimum Wage *(Dummy)*	-0.176**	-0.124**	-0.248***	-0.216***	-0.180**
	(0.0818)	(0.0625)	(0.0848)	(0.0816)	(0.0765)
Employment Change	0.0351	-0.0713	-0.0729	0.0309	-0.0173
	(0.0571)	(0.0638)	(0.0611)	(0.0549)	(0.0455)
GDP Growth Rate	0.00288*	0.00552*	0.00395	0.00536**	0.00374**
	(0.00152)	(0.00333)	(0.00243)	(0.00214)	(0.00175)
Unemployment Rate	0.0387***	0.0545***	0.0279***	0.0429***	0.0402***
	(0.00535)	(0.0112)	(0.00796)	(0.00761)	(0.00541)
Observations	25346	2112	6151	8850	8233
Groups	6306	798	1700	1999	1809
Instruments	272	270	272	272	272
AR(1) p-value	0.000	0.000	0.000	0.000	0.000
AR(2) p-value	0.470	0.209	0.382	0.104	0.274
Hansen p-value	0.144	0.550	0.159	0.583	0.297

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Obviously, the extreme size of the effects for "Construction" and "Trade and Retail" would imply an immediate over-shifting that exceeds the original tax burden and therefore raise

concerns with respect to the validity of the estimates.[32] These doubts are reinforced by the unsatisfactory test statistics for all sectors except manufacturing.

To inspect whether the manifold and far-reaching economic disturbances caused by the recent global financial and economic crisis might perhaps explain the dubious coefficient results and problematic test statistics in the other three sectors, we ran the same analyses restricted to the time span from 1994 to 2007. The results are documented in table 26 in the appendix. For manufacturing and the sector "Hotels and Restaurants", the size of the respective tax coefficient is plausible and the test statistics are satisfactory. Furthermore, no anomalies like a change of sign between current and lagged variables are observed among the decisive firm-level variables.

The short-run elasticities in these sectors translate to monetary short-run incidences of minus 57 pence (Manufacturing) and minus 89 pence (Hotels and Restaurants). The corresponding long-run elasticities, calculated by taking into account significant values of current and lagged coefficients of the tax variable and of the lagged coefficients of the wage rate, yield monetary long-run incidences of minus 88 pence in the manufacturing sector and minus one pound and 91 pence for "Hotels and Restaurants". For the sectors "Construction" and "Trade and Retail", the test statistics improve somewhat but the implausible results barely change.

Taken as a whole, the sectoral analyses for the UK produced no entirely credible results beyond the manufacturing sector. In the other three sectors, not only the coefficients of the tax liability, but also those of other firm-level variables show anomalies like a dubious size and a "wrong" or changing sign that point to more severe data problems that are not restricted to the crisis period from 2007 to 2010.

[32] However, the point estimates that provide the basis for the calculation of the incidence effects are of course surrounded by confidence intervals that also cover a broad range of supposedly more realistic values for the estimated elasticity.

Table 16: UK - Extended Specification, by Economic Sector

by Economic Sector: (Nace Rev. 2 Code)	Manufacturing (C)	Construction (F)	Trade and Retail (G)	Hotels and Restaurants (I)
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage *(first lag)*	0.394***	0.521***	0.406***	0.414***
	(0.0492)	(0.0452)	(0.0334)	(0.107)
(second lag)	0.0582*	0.130***	0.117***	0.111***
	(0.0350)	(0.0376)	(0.0253)	(0.0325)
Value added	0.541***	0.747***	0.810***	0.384***
	(0.0609)	(0.0552)	(0.0503)	(0.0749)
(first lag)	-0.154***	-0.361***	-0.203***	-0.0309
	(0.0518)	(0.0581)	(0.0516)	(0.0597)
(second lag)	0.00338	-0.109**	-0.107***	-0.0490*
	(0.0465)	(0.0477)	(0.0371)	(0.0291)
Tax	-0.0267**	-0.0656***	-0.0886***	-0.0505**
	(0.0124)	(0.0146)	(0.0138)	(0.0223)
(first lag)	-0.0105	0.0361***	-0.0141	-0.0142
	(0.0123)	(0.0133)	(0.0159)	(0.0203)
(second lag)	-0.00757	-0.00376	0.0141	0.00542
	(0.0120)	(0.0135)	(0.0115)	(0.0199)
Size	0.0462	-0.0555***	0.00930	-0.0618**
	(0.0296)	(0.0165)	(0.0159)	(0.0304)
Minimum Wage *(Dummy)*	-0.176**	-0.580**	-0.141	-2.683***
	(0.0818)	(0.277)	(0.186)	(0.456)
Employment Change	0.0351	0.0166	-0.164***	-0.0830**
	(0.0571)	(0.0199)	(0.0605)	(0.0419)
GDP Growth Rate	0.00288*	0.00343**	0.00227**	0.0120***
	(0.00152)	(0.00171)	(0.00108)	(0.00396)
Unemployment Rate	0.0387***	0.0210***	0.0204***	0.0565***
	(0.00535)	(0.00415)	(0.00426)	(0.00999)
Observations	25346	10808	31153	2935
Groups	6306	2604	6591	782
Instruments	272	272	272	240
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.470	0.547	0.000	0.034
Hansen p-value	0.144	0.047	0.000	0.599

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

4.4 Robustness

To assess the robustness of our results, we carried out an extensive battery of additional analyses, predominantly the manufacturing sector in France, that comprised, inter alia, (i) various minor specification changes, especially concerning the lag structure; (ii) different choices concerning the selection of the internal instruments in the "Difference" and "System" GMM estimations and the use of alternative variants of the GMM estimator; (iii) different time spans within the boundaries from the year 1994 to the year 2010; and (iv) alternative thresholds for the elimination of extreme values and outliers. Last but not least, we (v) also investigated whether our analyses that combine individual firm-level data and national covariates are subject to a problem that results from a special wihtin-group correlation, commonly referred to as clustering or Moulton problem.

First, concerning the empirical model of our basic and extended specifications, we experimented with the number of lags for the decisive firm-level variables. For purpose of comparison, we started out with a static version of our model that is estimated using pooled OLS and Fixed Effects regressions. The qualitative result of a significant and negative tax effect on wages appeared in all specifications, documented by tables 30, 31 and 32 in the appendix. Overall, our favourite specification that includes two lags of wage rate, value added and tax liability, seemed to strike the ideal balance between the aim of representing the underlying dynamic structure as precisely as possible, documented by the significance of the respective coefficients, and the limitations imposed by the available data. The associated trade-off is evident: The inclusion of any additional lag raises the demands of the resulting specification with respect to the necessary length of firm-level spells without gaps in all relevant variables. This inevitably reduces the number of included firms and observations, thereby rendering the estimations less precise and, to a certain extent, also less representative with respect to the starting basis of the company sample.

Second, concerning the choice of the instruments in the "Difference" and "System" GMM estimations, we tested the applicability of alternative firm-level variables, for instance the debt ratio, and the impact of variegated lag structures in the instrument sets. Using

the boundary condition for the coefficient of the lagged dependent variable with respect to prior OLS and FE estimates and the usual tests to detect problems of second order serial correlation or over-identification, we found no suitable instruments that solve the endogeneity issue except first and second lag of the wage rate, value added and tax liability. Variations of the lag lengths used in the GMM instrument set exposed the same tradeoff as explained above with respect to the lag lengths used in the regression estimation itself, but the overall result was hardly affected.[33] In this context, we also employed alternative versions of the "Difference" and "System" GMM estimators, as recommended by Roodman (2009b, 156). In addition to standard routines that accomodate for heteroscedasticity or autocorrelation, we also ran estimations with finite sample-correction developed by Windmeijer (2005), as well as estimations based on forward orthogonal deviations instead of first differences as proposed by Arellano and Bover (1995).[34] Table 33 in the appendix demonstrates that these variations in the technical parameters of the estimation technique did not affect the qualitative nature of our results.[35]

Third, we explored the impact of choosing different time spans within the boundaries from the year 1994 to the year 2010. We already discussed above that perturbations stemming from the recent financial and economic crisis obviously blurred the incidence effect in the UK. This also seems to be the case for France, as suggested by table 17. Compared to the results for the time span from 1994 to 2010, documented in table 8, the shorter period that excludes the years 2008-2010 because they are likely impacted by the crisis yields estimation results that are, all in all, perhaps even a little bit more

[33]Results that illustrate the ramifications of alternative lag structures in the instrument set of the "Difference" and "System" GMM estimations are available from the author upon request.

[34]See Roodman (2009a) for a detailed explanation of the multiple implementation options for GMM estimation by the Stata command *xtabond2* and the econometric reasoning behind each of them. As standard, we used the "robust" option for the "onestep" GMM estimator, thereby specifying that the robust estimator of the covariance matrix of the parameter estimates be calculated and, as a result, obtaining standard errors that are consistent in the presence of any pattern of heteroskedasticity or autocorrelation. The Windmeijer finite sample correction for the covariance matrix in twostep GMM estimation is called by the "twostep robust" option, the use of forward orthogonal deviations instead of differencing is induced by activation of the "orthogonal" option.

[35]We also tried to further reduce the number of instruments used, although the instrument count of our benchmark approach already seems to be very low. Indeed, a further reduction by way of collapsing the instrument set was not possible: upon invoking the option "collapse" of the *xtabond2* command, the number of regressors outnumbered the number of available instruments and, consequently, the estimation process failed.

convincing. This appraisal is based on the observation that in the preferred "System" GMM estimation now the coefficient of the national unemployment rate is also estimated with the expected negative sign at the 5 percent level of significance. The short-run tax elasticity of -4.21 percent translates to a short-run incidence of minus 60 Eurocents for an additional Euro of tax liability; the calculated long-run tax elasticity of -6.86 percent implies a long-run incidence of minus 98 Eurocents.

The robustness of our analyses is further corroborated by an alternative estimation that covers only the years from 2000 to 2010, i.e. a time span that is both relatively short for an application of GMM techniques in a specification with two lags and includes the supposedly problematic years of the financial and economic crisis. Nevertheless, as documented by table 27 in the appendix, the results are remarkably similar to our previous findigs. The short-run elasticity from the "System" GMM estimation of -2.73 percent corresponds to a short-run incidence of minus 37 Eurocents; the calculated long-run elasticity of -4.32 percent translates to a long-run incidence of minus 60 Eurocents.

Fourth, we also investigated the sensitivity of our results with respect to the selection routine that eliminated extreme values of the central variables wage rate, tax liability and value added. As described in subsection 3.3, we used a default routine that eliminated those observations with values in the 1st and 100th percentiles of the respective distributions for at least one of the three variables. Our comparatively cautious approach was guided by the intention to keep the sample size as large as possible and, thereby, to preserve its representative character as much as possible.

On the other hand, given the somewhat inaccurate constitution that plagues large accounting datasets like Amadeus, one could also argue that tighter selection thresholds are necessary to obtain a trustworthy data basis.[36] On this account, we repeated all analyses for France also with datasets that resulted from a stricter data cleaning procedure, using the 5th and the 95th percentiles as respective cut-off thresholds. The quality of our central results was hardly affected.

[36] Arulampalam et al. 2012 use the 5th and 95th percentiles as selection thresholds from the outset in their incidence study that is based on the Orbis dataset, also provided by Bureau van Dijk Electronic Publishing and identical to Amadeus with respect to the information for European countries (cf. Arulampalam et al. 2012, 1043.)

Table 17: France - Manufacturing, Extended Specification, 1994-2007

Dependent Variable: ln_w	OLS	FE	GMM (Difference)	GMM (System)
Wage (*first lag)*	0.592***	0.156***	0.218***	0.326***
	(0.00952)	(0.00700)	(0.0503)	(0.0575)
(*second lag)*	0.254***	0.0382***	0.0301	0.0605**
	(0.00890)	(0.00668)	(0.0258)	(0.0269)
Value added	0.311***	0.316***	0.251***	0.293***
	(0.0147)	(0.00375)	(0.0530)	(0.0766)
(*first lag)*	-0.160***	-0.0322***	-0.0196	-0.00351
	(0.0124)	(0.00467)	(0.0345)	(0.0481)
(*second lag)*	-0.0596***	-4.21e-05	-0.00292	0.00361
	(0.00721)	(0.00455)	(0.0309)	(0.0354)
Tax	-0.0180***	-0.0168***	-0.0341***	-0.0421***
	(0.00143)	(0.000724)	(0.0100)	(0.0152)
(*first lag)*	0.00590***	-0.000104	-0.00119	-0.00677
	(0.00110)	(0.000763)	(0.0100)	(0.0111)
(*second lag)*	0.00309***	0.00135*	0.000243	0.000793
	(0.000791)	(0.000711)	(0.0103)	(0.0129)
Size	0.000432	-0.0156***	0.0574	0.0185
	(0.000526)	(0.00290)	(0.0499)	(0.0452)
Minimum Wage *(Dummy)*	-0.129***	-0.144***	-0.0261	-0.0910
	(0.0125)	(0.00795)	(0.144)	(0.166)
Employment Change	-0.0753***	-0.0620***	-0.124***	-0.106**
	(0.0146)	(0.00225)	(0.0426)	(0.0513)
GDP Growth Rate	-0.00618***	-0.00900***	0.0248***	0.0176**
	(0.000901)	(0.000800)	(0.00767)	(0.00742)
Unemployment Rate	-0.00917***	-0.0442***	-0.0372***	-0.0255**
	(0.00142)	(0.00152)	(0.0110)	(0.0104)
R^2	0.907	0.708		
Observations	29585	29585	19931	29585
Groups		8684	6344	8684
Instruments			157	182
AR(1) p-value			0.000	0.000
AR(2) p-value			0.508	0.681
Hansen p-value			0.647	0.959

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

As an illustration, the respective results from the basic and extended specification for the manufacturing sector in France are documented in tables 28 and 29 in the appendix.[37]

[37]Given that the prior robustness check concerning alternative time spans pointed to perturbations in the years 2008 to 2010 that are likely due to the financial and economic crisis, we choose to use the pre-crisis period from 1994 to 2007 for the robustness check concerning the selectivity of the data cleaning

They produce an identical estimate for the short-run elasticity of -2.69 percent that translates to a short-run incidence of minus 42 Eurocents; the corresponding long-run elasticities are -3.80 percent (basic specification) and -3.86 percent (extended specification), implying a long-run incidence of minus 60 Eurocents.[38]

Finally, we analyzed whether our estimations are subject to a clustering problem, also known as "Moulton problem", that may result from a special wihtin-group correlation when regressors vary at different levels. In our benchmark and extended specifications, all variables vary at the level of the individual firm, except for the macroeconomic covariates of the GDP growth rate and the unemployment rate that take the same value for all observations of a given year in either country. Moulton (1990) shows that ignorance with respect to the issue of possible intra-group correlation can lead to severely downward biased standard errors. However, especially for panel data, there is no mainstream procedure for dealing with this problem. Moreover, the existing correction routines do not lend themselves to an application where the number of groups at the higher level is as small as in our case of national macroeconomic covariates (see Angrist and Pischke (2008, 308-323) for an overview and Liang and Zeger (1986) and Combes, Duranton and Gobillon (2008) for two alternative correction techniques). Therefore, we resorted to a somewhat shirt-sleeved approach and simply dropped the macro covariates in a series of "Moulton" regressions. In comparison to our original results, there were no statistically or economically relevant effects to be observed.[39] Hence, we conclude that our results are not driven by an unattended problem of underestimated within-group correlation.

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procedure. Alternative versions are available from the author upon request.

[38] Finally, the breadth of our analyses in the preceding subsections, that comprise reliable results for different economic sectors within France and include the UK as a second country with trustworthy estimates for the manufacturing sector, can, in a sense, be seen as a series of robustness checks with respect to our central results for the manufacturing sector in France.

[39] For illustrative purposes, the "Moulton" results for the basic and extended specification with respect to both countries are documented in tables 34, 35, 36 and 37 in the appendix. Further results are available from the author upon request.

5 Conclusion

The empirical "Search of Corporate Tax Incidence" (Clausing, 2012), untended for decades, has experienced a fascinating renaissance in recent years, based on newly available datasets and ever refined strategies of identification and estimation. However, Clausing's statement with respect to her own results that "the preponderance of evidence presents a decidedly ambiguous picture", also holds with respect to the research program as a whole. It largely is, still, an elusive quest. The present study contributes mainly in two ways to this challenging endeavor:

Firstly, it takes a closer look at various dimensions of firm-level heterogeneity that are likely to influence the extent of tax shifting via the wage bargaining channel. Concretely, we investigate the distinctive impacts of (i) firm size, (ii) average level of profitability, (iii) competition intensity, and (iv) different economic sectors.

Secondly, against the backdrop that most existing studies either use data from several countries without exploring the effect of country-specific conditions in detail or focus from the outset on a single country, we investigate the relative importance of the surrounding institutional setting by pursuing our firm-level within-country approach separately for France and the UK. In many institutional aspects, these countries can be seen as polar cases within Europe, notably with respect to relevant features of the wage-setting process.

Our benchmark results for the manufacturing sector in France exhibit a short-run elasticity of 2,8 percent and a corresponding short-run incidence of 39 Eurocent for a one Euro increase in tax liability. The respective long-run elasticity of 4.7 percent translates to a long-run incidence of 66 Eurocent. For manufacturing in the UK, we obtain similar benchmark results: In the short-run, an elasticity of 2.7 percent that translates into an incidence of 40 pence. In the long run, the elasticity of 4.9 percent implies an incidence of 73 pence.

Concerning firm size as the first dimension of potential impact heterogeneity, we observe a significant incidence effect for small and medium enterprises in France and for all company size categories in the UK. This finding is in line with the underlying wage bargaining

approach since for big companies in France, the dominant level of wage-setting are sectoral negotiations, whereas in the UK, firm-level bargaining is the dominant wage-setting arena also for big companies.

We also find consistent results for France and the UK with respect to the second dimension of heterogeneity, since the average level of firm profitability is obviously the main factor behind corporate incidence via the wage bargaining channel in both countries. In France, we observe no significant effect in the first two quartiles of the firm distribution by average profitability, but a growing size of the significant effect from quartile three to quartile four. In the UK, only the first quartile exhibits no significant tax effect, but like in France, the size of the significant elasticity grows with rising average profitability from quartile two to quartile four. That corporate tax incidence via the bargaining channel sets in at lower levels of average profitability in the UK compared to France seems to be in line with the institutional fact that firm-level bargaining is of higher importance in the UK. Therefore, a higher sensitivity of wages to after tax profits is to be expected.

We followed two complementary approaches to analyse the impact of differences in product market competition intensity at the industry level: Firstly, we used the added market share of the four companies with the highest individual turnover in relation to the total industry market size as a proxy for the degree of product market competition. Secondly, we proxied competition intensity by the industry share of companies with less than 20 employees. However, the respective split-sample analyses of both approaches reveal no clear-cut relationship between the intensity of competition and the extent of corporate tax incidence via the wage bargaining channel.

Finally, our sectoral analyses show that the phenomenon of corporate tax shifting via the wage bargain is by no means restricted to manufacturing. For France, we provide clear evidence of similar effects in the sectors "Trade and Retail" and "Hotels and Restaurants", but find no significant effect in the construction sector. For the UK, we do find a significant tax effect for all sectors, but unlikely big magnitudes of the tax coefficient as well as unsatisfactory diagnostic tests cast doubt on the results beyond the manufacturing sector.

A large battery of checks in various dimensions, encompassing reasonable alternatives (i) in the selectivity of the initial data processing, (ii) in the specification of our econometric model, (iii) in the use of different GMM routines, (iv) in the time period considered, and (v) with respect to the existence of a Moulton problem proves the robustness of our central results.

Putting our results into perspective, we obviously corroborate similar findings from other recent studies like Arulampalam et al. (2012), Bauer et al. (2012), Dwenger et al. (2011), Fuest et al. (2013) and Liu and Altshuler (2013). The common features of these analyses are their foundation in a rent-sharing perspective on (firm-level) wage setting, i.e. the well-founded perception that labor markets are not perfectly competitive at all times and in all places (cf. Manning 2003, Martins 2010), and the use of disaggregated data, mostly at the level of individuals or single firms. On the other hand, empirical studies that try to match the general equilibrium approach of Harberger (1962) and its later enhancements very closely, and consequently search for wage effects not only in the corporate sector itself but across the entire economy, mostly via multiple-country analyses with aggregated data, find no conclusive evidence. Against this backdrop, Harberger's assertion that the mechanism that determines the incidence of the corporate tax in a context with non-perfect competition "differs only in minute detail" (Harberger 1962, 240) from the mechanism at work in the competitive case, looks obsolete. In contrast, the arguments of Lockwood (1990) that, especially in the labor market, (i) imperfect competition can make a big difference to the theory of corporate tax incidence and that (ii) theoretical studies like Atkinson and Stiglitz (1980) missed the point on grounds of a too special modelling of unionized labor markets (cf. Lockwood 1990, 188), seem to be reinforced by our results and the above-mentioned empirical studies.

Hence, we tentatively draw two main conclusions:

First, the "direct" incidence of the corporate income tax on wages via the wage bargaining channel is obviously not a negligible side-effect to a dominant general equilibrium effect. Actually, the opposite seems to be true, as suggested most notably by the analysis of Fuest et al. (2013). From a business perspective, this makes perfect sense: Whereas the general

equilibrium effect needs to work through time-consuming re-allocations of capital between economic sectors, thereby ultimately implying the shut-down of existing establishments, the wage bargaining channel provides firms and their workforces with a rapid cushioning tool that enables a smooth adjustment to changes of the corporate tax burden.

Second, the aim, visible most notably in empirical studies that are inspired by the general equilibrium perspective, to uncover one "true" value for the effective incidence of the corporate income tax that depicts the repartition of the tax burden to the different stakeholders once and for all, seems to be an "excessive ambition" (see Elster 2009) and largely misplaced. Measured against the eternal character of physical constants, the time variant and context sensitive nature of the effective incidence of the corporate income tax might be somewhat frustrating. But our result from the manufacturing sector analyses for France and the UK, being two quite different countries with respect to relevant labor market institutions, that approximately 40 percent of the corporate tax burden are shifted on the workforce within a year and up to 70 percent after three years, seems to be sufficiently generalisable to serve as a useful reference point for the realm of economic policy.

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Appendix

Table 18: France - Manufacturing - AR-Analyses: Wage

Dependent Variable: Wage	OLS	FE	OLS	FE	OLS	FE
Wage *(first lag)*	0.651***	0.499***	0.544***	0.337***	0.508***	0.209***
	(0.00647)	(0.00461)	(0.0116)	(0.00795)	(0.0230)	(0.0160)
(second lag)	0.301***	0.300***	0.225***	0.207***	0.193***	0.101***
	(0.00634)	(0.00461)	(0.0105)	(0.00840)	(0.0203)	(0.0169)
(third lag)			0.105***	0.148***	0.104***	0.0896***
			(0.00975)	(0.00854)	(0.0213)	(0.0167)
(fourth lag)			0.0691***	0.130***	0.0874***	0.132***
			(0.00988)	(0.00850)	(0.0207)	(0.0163)
(fifth lag)			0.0312***	0.105***	0.0198	0.0881***
			(0.00760)	(0.00777)	(0.0166)	(0.0159)
(sixth lag)					0.0463***	0.118***
					(0.0179)	(0.0160)
(seventh lag)					-0.0111	0.0732***
					(0.0173)	(0.0159)
(eigth lag)					0.00794	0.0836***
					(0.0173)	(0.0152)
(ninth lag)					0.00409	0.0660***
					(0.0131)	(0.0140)
R^2	0.847	0.493	0.853	0.478	0.848	0.374
Observations	57505	57505	24083	24083	6753	6753
Groups		12244		6464		1875

Notes: (i) Robust standard errors are reported in parentheses. (ii) * Significant at 10%, ** at 5%, *** at 1%.

Table 19: France - Manufacturing - AR-Analyses: Value added

Dependent Variable: Value added	OLS	FE	OLS	FE	OLS	FE
Value added *(first lag)*	0.621***	0.322***	0.544***	0.241***	0.546***	0.179***
	(0.00848)	(0.00518)	(0.0173)	(0.00851)	(0.0380)	(0.0166)
(second lag)	0.268***	0.130***	0.154***	0.0882***	0.134***	0.0261
	(0.00796)	(0.00516)	(0.0173)	(0.00919)	(0.0291)	(0.0168)
(third lag)			0.112***	0.0649***	0.105***	0.0360**
			(0.0149)	(0.00933)	(0.0232)	(0.0169)
(fourth lag)			0.0703***	0.0519***	0.0776***	0.0267
			(0.0123)	(0.00943)	(0.0194)	(0.0172)
(fifth lag)			0.0481***	0.0442***	-0.000329	0.00450
			(0.00955)	(0.00907)	(0.0185)	(0.0161)
(sixth lag)					0.0442**	0.0572***
					(0.0202)	(0.0165)
(seventh lag)					0.0260	0.0702***
					(0.0246)	(0.0180)
(eighth lag)					0.00685	0.0483***
					(0.0255)	(0.0183)
(ninth lag)					-0.00815	0.0147
					(0.0180)	(0.0180)
R^2	0.689	0.138	0.690	0.095	0.705	0.057
Observations	53885	53885	22111	22111	6119	6119
Groups		11744		6009		1724

Notes: (i) Robust standard errors are reported in parentheses. (ii) * Significant at 10%, ** at 5%, *** at 1%.

Table 20: France - Manufacturing - AR-Analyses: Tax

Dependent Variable: Tax	OLS	FE	OLS	FE	OLS	FE
Tax *(first lag)*	0.608***	0.260***	0.562***	0.146***	0.523***	0.0193
	(0.00662)	(0.00617)	(0.0131)	(0.0113)	(0.0252)	(0.0248)
(second lag)	0.206***	0.0333***	0.139***	-0.0183	0.159***	-0.0652***
	(0.00638)	(0.00595)	(0.0144)	(0.0118)	(0.0274)	(0.0251)
(third lag)			0.0764***	-0.0125	0.0908***	-0.0651**
			(0.0144)	(0.0117)	(0.0283)	(0.0255)
(fourth lag)			0.00496	-0.0656***	0.0410*	-0.0707***
			(0.0121)	(0.0117)	(0.0239)	(0.0262)
(fifth lag)			0.0616***	-0.0241**	0.0259	-0.0570**
			(0.00998)	(0.0108)	(0.0278)	(0.0258)
(sixth lag)					0.00409	-0.0337
					(0.0249)	(0.0257)
(seventh lag)					0.0430	0.0179
					(0.0281)	(0.0246)
(eighth lag)					0.000291	0.00127
					(0.0239)	(0.0247)
(ninth lag)					-0.0128	0.0155
					(0.0192)	(0.0237)
R^2	0.623	0.070	0.598	0.025	0.598	0.015
Observations	37623	37623	12718	12718	2858	2858
Groups		9707		4005		905

Notes:(i) Robust standard errors are reported in parentheses. (ii) * Significant at 10%, ** at 5%, *** at 1%.

Table 21: UK - Manufacturing - AR-Analyses: Wage

Dependent Variable: Wage	OLS	FE	OLS	FE	OLS	FE
Wage *(first lag)*	0.808***	0.723***	0.791***	0.673***	0.448***	0.132***
	(0.00414)	(0.00452)	(0.00525)	(0.00638)	(0.00957)	(0.00630)
(second lag)	0.0974***	0.125***	0.0620***	0.0789***	0.0417***	0.0585***
	(0.00402)	(0.00438)	(0.00735)	(0.00798)	(0.00838)	(0.00646)
(third lag)			0.0417***	0.0650***	0.0362***	0.0934***
			(0.00753)	(0.00809)	(0.00722)	(0.00652)
(fourth lag)			-0.0755***	-0.0672***	-0.0894***	-0.0474***
			(0.00684)	(0.00810)	(0.00763)	(0.00638)
(fifth lag)			0.0372***	0.0131*	-0.209***	-0.214***
			(0.00564)	(0.00704)	(0.00777)	(0.00633)
(sixth lag)					0.131***	0.0687***
					(0.00851)	(0.00658)
(seventh lag)					0.173***	0.123***
					(0.00992)	(0.00807)
(eighth lag)					0.132***	-0.000242
					(0.0142)	(0.0124)
(ninth lag)					0.0195	-0.00812
					(0.0139)	(0.0117)
R^2	0.861	0.732	0.809	0.627	0.599	0.277
Observations	60802	60802	31958	31958	11921	11921
Groups		9830		6356		2859

Notes: (i) Robust standard errors are reported in parentheses. (ii) * Significant at 10%, ** at 5%, *** at 1%.

Table 22: UK - Manufacturing - AR-Analyses: Value added

Dependent Variable: Value added	OLS	FE	OLS	FE	OLS	FE
Value added *(first lag)*	0.723***	0.581***	0.733***	0.544***	0.545***	0.163***
	(0.00581)	(0.00557)	(0.00838)	(0.00851)	(0.0157)	(0.0122)
(second lag)	0.166***	0.166***	0.0859***	0.0862***	0.0289*	0.00826
	(0.00570)	(0.00542)	(0.0110)	(0.0101)	(0.0164)	(0.0126)
(third lag)			0.0441***	0.0624***	0.0524***	0.0774***
			(0.0110)	(0.0103)	(0.0144)	(0.0128)
(fourth lag)			-0.0336***	-0.0249**	-0.0363**	0.00579
			(0.0104)	(0.0104)	(0.0147)	(0.0128)
(fifth lag)			0.0463***	0.00933	-0.170***	-0.182***
			(0.00889)	(0.00942)	(0.0149)	(0.0128)
(sixth lag)					0.101***	0.00266
					(0.0162)	(0.0132)
(seventh lag)					0.173***	0.100***
					(0.0184)	(0.0152)
(eighth lag)					0.0403*	-0.0239
					(0.0207)	(0.0178)
(ninth lag)					0.0166	-0.0179
					(0.0172)	(0.0170)
R^2	0.785	0.521	0.750	0.418	0.590	0.123
Observations	42129	42129	19457	19457	6201	6201
Groups		8057		4423		1706

Notes: (i) Robust standard errors are reported in parentheses. (ii) * Significant at 10%, ** at 5%, *** at 1%.

Table 23: UK - Manufacturing - AR-Analyses: Tax

Dependent Variable: Tax	OLS	FE	OLS	FE	OLS	FE
Tax *(first lag)*	0.536***	0.232***	0.520***	0.150***	0.492***	0.0333*
	(0.00673)	(0.00620)	(0.0116)	(0.0102)	(0.0201)	(0.0196)
(second lag)	0.222***	0.0386***	0.145***	0.000910	0.119***	-0.0976***
	(0.00638)	(0.00611)	(0.0120)	(0.0107)	(0.0207)	(0.0195)
(third lag)			0.0992***	0.000567	0.0623***	-0.0832***
			(0.0123)	(0.0109)	(0.0222)	(0.0198)
(fourth lag)			0.0401***	-0.0126	0.0432**	-0.0788***
			(0.0122)	(0.0108)	(0.0210)	(0.0196)
(fifth lag)			0.0373***	-0.0431***	0.00708	-0.0805***
			(0.00996)	(0.0103)	(0.0206)	(0.0207)
(sixth lag)					0.0380*	-0.0391*
					(0.0210)	(0.0210)
(seventh lag)					0.0531**	-0.0136
					(0.0232)	(0.0215)
(eighth lag)					0.0118	-0.0326
					(0.0220)	(0.0209)
(ninth lag)					0.0159	-0.0257
					(0.0176)	(0.0207)
R^2	0.464	0.056	0.483	0.022	0.478	0.037
Observations	35901	35901	14526	14526	4093	4093
Groups		7673		3728		1138

Notes: (i) Robust standard errors are reported in parentheses. (ii) * Significant at 10%, ** at 5%, *** at 1%.

Table 24: UK - Manuf., Sample 1-100, Ext. Spec., by Size (1994-2010)

by Size Group:	ALL	SMALL	MEDIUM	BIG
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage *(first lag)*	0.374***	0.332***	0.321***	0.217**
	(0.0486)	(0.0467)	(0.0863)	(0.0891)
(second lag)	0.0625**	0.0858***	0.0221	-0.0799**
	(0.0304)	(0.0311)	(0.0409)	(0.0405)
Value added	0.434***	0.547***	0.340***	0.294***
	(0.0760)	(0.0713)	(0.0665)	(0.0745)
(first lag)	-0.117*	-0.0539	-0.0634	-0.00315
	(0.0667)	(0.0557)	(0.0654)	(0.0410)
(second lag)	-0.0291	-0.0453	0.00220	0.0708**
	(0.0426)	(0.0424)	(0.0428)	(0.0354)
Tax	-0.00107	-0.0319**	-0.0385**	-0.0484**
	(0.0216)	(0.0156)	(0.0163)	(0.0224)
(first lag)	-0.0148	-0.0355**	-0.0197	-0.0326**
	(0.0190)	(0.0149)	(0.0183)	(0.0138)
(second lag)	0.00654	0.00767	-0.00953	-0.0128
	(0.0140)	(0.0122)	(0.0139)	(0.0150)
Size	-0.0282	0.0228	-0.00922	0.0159
	(0.0498)	(0.0383)	(0.0573)	(0.0444)
Minimum Wage *(Dummy)*	-0.161	-0.475**	-0.668*	-0.262
	(0.251)	(0.185)	(0.344)	(0.213)
Employment Change	-0.0753	-0.0321	-0.0229	-0.0838**
	(0.0598)	(0.0658)	(0.0662)	(0.0337)
GDP Growth Rate	0.00440**	0.00451***	0.00420	0.00263
	(0.00218)	(0.00173)	(0.00275)	(0.00440)
Unemployment Rate	0.0422***	0.0351***	0.0519***	0.0443***
	(0.00753)	(0.00574)	(0.00969)	(0.0111)
Observations	30628	19925	7282	3421
Groups	7164	4764	1658	742
Instruments	272	272	272	272
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.603	0.083	0.515	0.638
Hansen p-value	0.739	0.646	0.790	0.954

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 25: UK - Sample 1-100, Ext. Spec., by Sector (1994-2010)

by Economic Sector: (Nace Rev. 2 Code)	Manufacturing (C)	Construction (F)	Trade and Retail (G)	Hotels and Restaurants (I)
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage *(first lag)*	0.374***	0.516***	0.342***	0.414***
	(0.0486)	(0.0491)	(0.0331)	(0.107)
(second lag)	0.0625**	0.129***	0.0690***	0.111***
	(0.0304)	(0.0361)	(0.0244)	(0.0325)
Value added	0.434***	0.631***	0.836***	0.384***
	(0.0760)	(0.0687)	(0.0599)	(0.0749)
(first lag)	-0.117*	-0.285***	-0.107**	-0.0309
	(0.0667)	(0.0769)	(0.0543)	(0.0597)
(second lag)	-0.0291	-0.138**	-0.0449	-0.0490*
	(0.0426)	(0.0544)	(0.0397)	(0.0291)
Tax	-0.00107	-0.0788***	-0.124***	-0.0505**
	(0.0216)	(0.0230)	(0.0178)	(0.0223)
(first lag)	-0.0148	0.0359	-0.0466**	-0.0142
	(0.0190)	(0.0256)	(0.0204)	(0.0203)
(second lag)	0.00654	0.0130	-0.00213	0.00542
	(0.0140)	(0.0208)	(0.0161)	(0.0199)
Size	-0.0282	-0.0599**	0.00938	-0.0618**
	(0.0498)	(0.0291)	(0.0219)	(0.0304)
Minimum Wage *(Dummy)*	-0.161	-0.233	-0.991*	-2.683***
	(0.251)	(0.893)	(0.511)	(0.456)
Employment Change	-0.0753	0.0213	-0.0720	-0.0830**
	(0.0598)	(0.0286)	(0.0480)	(0.0419)
GDP Growth Rate	0.00440**	0.00405*	0.00277**	0.0120***
	(0.00218)	(0.00226)	(0.00128)	(0.00396)
Unemployment Rate	0.0422***	0.0311***	0.0245***	0.0565***
	(0.00753)	(0.00650)	(0.00519)	(0.00999)
Observations	30628	12458	36485	2935
Groups	7164	2924	7382	782
Instruments	272	272	272	240
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.603	0.726	0.065	0.034
Hansen p-value	0.739	0.003	0.000	0.599

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 26: UK - Sample 5-95, Ext. Spec., by Sector (1994-2007)

by Economic Sector: (Nace Rev. 2 Code)	Manufacturing (C)	Construction (F)	Trade and Retail (G)	Hotels and Restaurants (I)
Dependent Variable: Wage	GMM (System)	GMM (System)	GMM (System)	GMM (System)
Wage *(first lag)*	0.350***	0.465***	0.426***	0.420***
	(0.0705)	(0.0758)	(0.0417)	(0.113)
(second lag)	0.0118	0.130***	0.127***	0.114***
	(0.0438)	(0.0500)	(0.0310)	(0.0344)
Value added	0.601***	0.885***	0.926***	0.397***
	(0.0976)	(0.0729)	(0.0611)	(0.0940)
(first lag)	-0.161**	-0.349***	-0.310***	-0.0181
	(0.0726)	(0.0990)	(0.0678)	(0.0699)
(second lag)	0.0482	-0.124*	-0.129***	-0.0415
	(0.0609)	(0.0669)	(0.0485)	(0.0351)
Tax	-0.0386**	-0.0916***	-0.107***	-0.0634**
	(0.0166)	(0.0231)	(0.0166)	(0.0278)
(first lag)	-0.0162	0.0155	0.0103	-0.0105
	(0.0159)	(0.0215)	(0.0217)	(0.0278)
(second lag)	-0.0217	-0.00383	0.0209	-0.00464
	(0.0157)	(0.0195)	(0.0152)	(0.0253)
Size	0.0839*	-0.0316	0.0190	-0.0719**
	(0.0463)	(0.0221)	(0.0157)	(0.0329)
Minimum Wage *(Dummy)*	-0.0717	-1.054**	-0.240	-2.686***
	(0.127)	(0.412)	(0.244)	(0.682)
Employment Change	0.00468	0.0264	-0.158**	-0.0861**
	(0.0655)	(0.0259)	(0.0732)	(0.0431)
GDP Growth Rate	-0.0358***	0.000518	-0.0224***	-0.0530***
	(0.00914)	(0.00887)	(0.00634)	(0.0203)
Unemployment Rate	0.0448***	0.0230	0.0237*	0.0857***
	(0.0130)	(0.0148)	(0.0128)	(0.0242)
Observations	21597	8950	26700	2434
Groups	5770	2321	6093	685
Instruments	182	182	182	156
AR(1) p-value	0.000	0.000	0.000	0.000
AR(2) p-value	0.249	0.746	0.021	0.159
Hansen p-value	0.407	0.314	0.000	0.564

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 27: France - Manuf., Sample 1-100, Ext. Spec. (2000-2010)

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.592***	0.110***	0.104*	0.315***
	(0.00983)	(0.00734)	(0.0626)	(0.0535)
(second lag)	0.252***	-0.0128*	-0.00641	0.0527**
	(0.00909)	(0.00706)	(0.0269)	(0.0258)
Value added	0.325***	0.333***	0.225***	0.265***
	(0.0156)	(0.00393)	(0.0421)	(0.0519)
(first lag)	-0.175***	-0.0330***	-0.0435	-0.0407
	(0.0134)	(0.00491)	(0.0315)	(0.0484)
(second lag)	-0.0541***	0.0182***	-0.0112	-0.00504
	(0.00748)	(0.00481)	(0.0277)	(0.0306)
Tax	-0.0201***	-0.0199***	-0.0251***	-0.0273**
	(0.00154)	(0.000749)	(0.00863)	(0.0119)
(first lag)	0.00696***	-0.000870	-0.00298	-0.00497
	(0.00121)	(0.000793)	(0.00794)	(0.0102)
(second lag)	0.00296***	-0.000430	0.00182	0.00211
	(0.000829)	(0.000765)	(0.00792)	(0.00942)
Size	0.00113**	-0.00660**	0.0818**	0.0417
	(0.000541)	(0.00317)	(0.0406)	(0.0491)
Minimum Wage *(Dummy)*	-0.146***	-0.163***	-0.162	-0.203
	(0.0151)	(0.00880)	(0.107)	(0.125)
Employment Change	-0.0770***	-0.0583***	-0.134***	-0.136***
	(0.0160)	(0.00229)	(0.0397)	(0.0453)
GDP Growth Rate	-0.00635***	-0.0449***	0.00530***	0.00441***
	(0.000489)	(0.000778)	(0.00127)	(0.00133)
Unemployment Rate	-0.0203***	-0.0636***	0.0161***	0.00470
	(0.00154)	(0.00162)	(0.00414)	(0.00419)
R^2	0.901	0.697		
Observations	29181	29181	21107	29181
Groups		8934	6719	8934
Instruments			223	246
AR(1) p-value			0.002	0.000
AR(2) p-value			0.528	0.969
Hansen p-value			0.473	0.908

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 28: France - Manuf., Sample 5-95, Basic Spec. (1994-2007)

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.594***	0.141***	0.151***	0.293***
	(0.00913)	(0.00787)	(0.0497)	(0.0809)
(second lag)	0.252***	0.0318***	0.00537	0.0620
	(0.00886)	(0.00760)	(0.0265)	(0.0465)
Value added	0.435***	0.445***	0.304***	0.314***
	(0.00972)	(0.00443)	(0.0556)	(0.0797)
(first lag)	-0.251***	-0.0697***	-0.0725*	-0.0794
	(0.0105)	(0.00581)	(0.0440)	(0.0605)
(second lag)	-0.0743***	0.000547	0.0112	-0.00460
	(0.00678)	(0.00554)	(0.0309)	(0.0572)
Tax	-0.0249***	-0.0241***	-0.0241***	-0.0269**
	(0.000941)	(0.000675)	(0.00797)	(0.0129)
(first lag)	0.0114***	0.00253***	0.00312	0.00324
	(0.000868)	(0.000715)	(0.00844)	(0.0117)
(second lag)	0.00354***	0.00144**	-0.00345	0.00189
	(0.000642)	(0.000664)	(0.00692)	(0.0137)
Size	-0.000948**	-0.0289***	0.0536	0.0216
	(0.000456)	(0.00282)	(0.0440)	(0.0527)
GDP Growth Rate	-0.00602***	-0.00825***	0.0312***	0.0224**
	(0.000794)	(0.000718)	(0.00594)	(0.00957)
Unemployment Rate	-0.00647***	-0.0403***	-0.0408***	-0.0271*
	(0.00131)	(0.00143)	(0.00853)	(0.0140)
R^2	0.915	0.778		
Observations	23888	23888	15625	23888
Groups		7447	5226	7447
Instruments			157	182
AR(1)-test p-value			0.000	0.000
AR(2)-test p-value			0.821	0.651
Hansen p-value			0.787	0.985

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 29: France - Manuf., Sample 5-95, Ext. Spec. (1994-2007)

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.593***	0.158***	0.163***	0.303***
	(0.00933)	(0.00773)	(0.0490)	(0.0759)
(second lag)	0.245***	0.0379***	0.0177	0.0692
	(0.00891)	(0.00740)	(0.0272)	(0.0481)
Value added	0.406***	0.413***	0.294***	0.305***
	(0.0120)	(0.00445)	(0.0558)	(0.0778)
(first lag)	-0.228***	-0.0589***	-0.0611	-0.0686
	(0.0118)	(0.00567)	(0.0437)	(0.0594)
(second lag)	-0.0719***	-0.00374	-0.00345	-0.0121
	(0.00671)	(0.00540)	(0.0315)	(0.0595)
Tax	-0.0235***	-0.0227***	-0.0235***	-0.0269**
	(0.00107)	(0.000659)	(0.00797)	(0.0125)
(first lag)	0.0113***	0.00280***	0.00224	0.00241
	(0.000841)	(0.000696)	(0.00828)	(0.0114)
(second lag)	0.00335***	0.00133**	-0.000790	0.00284
	(0.000644)	(0.000646)	(0.00693)	(0.0137)
Size	-0.000945**	-0.0184***	0.0686	0.0196
	(0.000460)	(0.00277)	(0.0440)	(0.0497)
Minimum Wage *(Dummy)*	-0.0662***	-0.0760***	0.00198	-0.0300
	(0.00364)	(0.00401)	(0.0585)	(0.0709)
Employment Change	-0.0724***	-0.0614***	-0.0477	-0.0475
	(0.0237)	(0.00270)	(0.0347)	(0.0535)
GDP Growth Rate	-0.00504***	-0.00741***	0.0287***	0.0221**
	(0.000820)	(0.000700)	(0.00607)	(0.00924)
Unemployment Rate	-0.00667***	-0.0382***	-0.0373***	-0.0272**
	(0.00128)	(0.00140)	(0.00854)	(0.0135)
R^2	0.920	0.790		
Observations	23888	23888	15625	23888
Groups		7447	5226	7447
Instruments			157	182
AR(1) p-value			0.000	0.000
AR(2) p-value			0.816	0.660
Hansen p-value			0.752	0.962

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 30: France - Static (1994-2007)
Manuf., S. 1-100, Ext. Spec.

Dependent Variable: Wage	OLS	FE
Value added	0.547***	0.310***
	(0.00774)	(0.00276)
Tax	-0.0459***	-0.0146***
	(0.00117)	(0.000520)
Size	0.00988***	-0.0208***
	(0.00146)	(0.00201)
Minimum Wage *(Dummy)*	-0.284***	-0.169***
	(0.0121)	(0.00660)
Employment Change	-0.000456	-0.000498***
	(0.000543)	(0.000182)
GDP Growth Rate	-0.00764***	-0.0114***
	(0.00104)	(0.000706)
Unemployment Rate	-0.0347***	-0.0565***
	(0.00159)	(0.00101)
R^2	0.694	0.684
Observations	49443	49443
Groups		12180

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 31: France - One Lag (1994-2007)Manuf., S. 1-100, Ext. Spec.

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.773***	0.207***	0.200***	0.265***
	(0.00549)	(0.00528)	(0.0311)	(0.0441)
Value added	0.336***	0.313***	0.244***	0.282***
	(0.0109)	(0.00299)	(0.0464)	(0.0731)
(first lag)	-0.206***	-0.0502***	-0.0513*	-0.0347
	(0.0101)	(0.00352)	(0.0304)	(0.0461)
Tax	-0.0184***	-0.0156***	-0.0322***	-0.0437***
	(0.00102)	(0.000580)	(0.0103)	(0.0156)
(first lag)	0.00639***	0.00146**	0.0138	0.0123
	(0.000863)	(0.000569)	(0.00949)	(0.0149)
Size	0.00168***	-0.0149***	0.0416	0.0611
	(0.000497)	(0.00215)	(0.0423)	(0.0436)
Minimum Wage *(Dummy)*	-0.140***	-0.154***	-0.137	-0.0339
	(0.00970)	(0.00662)	(0.157)	(0.175)
Employment Change	-0.0415***	-0.0499***	-0.0622**	-0.108**
	(0.00951)	(0.00161)	(0.0300)	(0.0465)
GDP Growth Rate	-0.00591***	-0.00978***	0.0308***	0.0224***
	(0.000834)	(0.000711)	(0.00581)	(0.00621)
Unemployment Rate	-0.0109***	-0.0439***	-0.0455***	-0.0339***
	(0.00115)	(0.00107)	(0.00800)	(0.00885)
R^2	0.889	0.714		
Observations	43752	43752	29585	43752
Groups		11310	8684	11310
Instruments			159	184
AR(1) p-value			0.001	0.000
AR(2) p-value			0.630	0.007
Hansen p-value			0.353	0.875

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 32: France - Three Lags (1994-2007)Manuf., S. 1-100, Ext. Spec.

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.540***	0.147***	0.194***	0.331***
	(0.0125)	(0.00864)	(0.0665)	(0.105)
(second lag)	0.209***	0.0338***	0.0420	0.0978**
	(0.0117)	(0.00856)	(0.0417)	(0.0484)
(third lag)	0.120***	-0.000664	0.0133	0.0249
	(0.00993)	(0.00800)	(0.0212)	(0.0327)
Value added	0.316***	0.309***	0.149***	0.232***
	(0.0206)	(0.00469)	(0.0562)	(0.0784)
(first lag)	-0.158***	-0.0404***	-0.0295	-0.0124
	(0.0154)	(0.00582)	(0.0374)	(0.0456)
(second lag)	-0.0478***	0.00795	-0.0311	-0.0181
	(0.00966)	(0.00578)	(0.0435)	(0.0511)
(third lag)	-0.0287***	0.0110**	0.00147	0.00899
	(0.00805)	(0.00559)	(0.0265)	(0.0442)
Tax	-0.0188***	-0.0160***	-0.0243**	-0.0313*
	(0.00204)	(0.000876)	(0.0102)	(0.0164)
(first lag)	0.00552***	0.000388	0.00232	-0.00183
	(0.00135)	(0.000934)	(0.00925)	(0.0104)
(second lag)	0.00380***	0.00115	0.00824	0.00691
	(0.00112)	(0.000942)	(0.0129)	(0.0169)
(third lag)	0.000735	-0.00294	-0.00328	-0.00328
	(0.000929)	(0.000868)	(0.0101)	(0.0156)
Size	0.000595	-0.0125***	0.0329	0.0617
	(0.000648)	(0.00374)	(0.0536)	(0.0740)
Minimum Wage *(Dummy)*	-0.122***	-0.143***	-0.0872	-0.130
	(0.0157)	(0.00929)	(0.148)	(0.165)
Employment Change	-0.0760***	-0.0807***	-0.171***	-0.173***
	(0.0195)	(0.00321)	(0.0614)	(0.0665)
GDP Growth Rate	-0.00836***	-0.0127***	0.0365***	0.0127
	(0.00108)	(0.000983)	(0.00997)	(0.0102)
Unemployment Rate	-0.00348***	-0.0290***	-0.0552***	-0.0199
	(0.00130)	(0.00162)	(0.0141)	(0.0138)
R^2	0.912	0.706		
Observations	19931	19931	13250	19931
Groups		6344	4695	6344
Instruments			153	176
AR(1) p-value			0.000	0.000
AR(2) p-value			0.398	0.820
Hansen p-value			0.862	0.977

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 33: France - Alternative GMM Estimations (1994-2007)

GMM Type	"twostep"		"twostep robust"		"orthogonal"	
Dependent Variable: Wage	GMM (Difference)	GMM (System)	GMM (Difference)	GMM (System)	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.212***	0.259***	0.212***	0.259***	0.235**	0.371***
	(0.0443)	(0.0412)	(0.0544)	(0.0725)	(0.109)	(0.0191)
(second lag)	0.0307	0.0383*	0.0307	0.0383	0.0494	0.108***
	(0.0202)	(0.0199)	(0.0268)	(0.0290)	(0.0489)	(0.0151)
Value added	0.257***	0.283***	0.257***	0.283***	0.271***	0.291***
	(0.0412)	(0.0419)	(0.0574)	(0.0618)	(0.0824)	(0.0328)
(first lag)	-0.00290	-0.00226	-0.00290	-0.00226	-0.0215	-0.00645
	(0.0273)	(0.0278)	(0.0397)	(0.0377)	(0.0504)	(0.0202)
(second lag)	-0.00522	0.000531	-0.00522	0.000531	-0.00944	-0.0169
	(0.0215)	(0.0210)	(0.0302)	(0.0282)	(0.0387)	(0.0182)
Tax	-0.0281***	-0.0307***	-0.0281***	-0.0307***	-0.0334*	-0.0297***
	(0.00824)	(0.00867)	(0.00972)	(0.0107)	(0.0185)	(0.00833)
(first lag)	-0.00349	-0.00793	-0.00349	-0.00793	-0.0103	-0.0157**
	(0.00794)	(0.00824)	(0.0100)	(0.0102)	(0.0147)	(0.00703)
(second lag)	0.00268	0.00192	0.00268	0.00192	0.00266	0.00784
	(0.00744)	(0.00733)	(0.00967)	(0.00921)	(0.0125)	(0.00590)
Size	0.0729*	0.0371	0.0729	0.0371	0.0249	-0.00473
	(0.0393)	(0.0303)	(0.0533)	(0.0394)	(0.0529)	(0.00994)
Minimum Wage *(Dummy)*	-0.00202	-0.0346	-0.00202	-0.0346	-0.0943	-0.0730
	(0.123)	(0.125)	(0.138)	(0.142)	(0.253)	(0.108)
Employment Change	-0.141***	-0.137***	-0.141***	-0.137**	-0.0943*	-0.119***
	(0.0335)	(0.0332)	(0.0513)	(0.0551)	(0.0507)	(0.0203)
GDP Growth Rate	0.0214***	0.0202***	0.0214***	0.0202***	0.0679	0.0677**
	(0.00644)	(0.00530)	(0.00794)	(0.00735)	(0.0603)	(0.0281)
Unemployment Rate	-0.0325***	-0.0307***	-0.0325***	-0.0307***	0.00666	0.000470
	(0.00915)	(0.00732)	(0.0113)	(0.0102)	(0.0485)	(0.0392)
Observations	19931	29585	19931	29585	20015	29585
Groups	6344	8684	6344	8684	6358	8684
Instruments	157	182	157	182	157	182
AR(1) p-value	0.000	0.000	0.032	0.000	0.004	0.000
AR(2) p-value	0.398	0.775	0.574	0.828	0.314	0.361
Hansen p-value	0.647	0.959	0.647	0.959	1.000[a]	0.000[a]

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%. (iv) [a] Sargan p-value instead of Hansen p-value.

Table 34: France - Manufacturing, Basic Spec., "Moulton"

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.591***	0.160***	-0.0648	0.300***
	(0.00901)	(0.00657)	(0.0693)	(0.0437)
(second lag)	0.258***	0.0355***	-0.0643***	0.0655***
	(0.00845)	(0.00629)	(0.0246)	(0.0243)
Valued added	0.354***	0.359***	0.247***	0.282***
	(0.0138)	(0.00346)	(0.0415)	(0.0553)
(first lag)	-0.196***	-0.0601***	-0.0605**	-0.0186
	(0.0119)	(0.00444)	(0.0291)	(0.0418)
(second lag)	-0.0630***	0.000887	0.0137	-0.00402
	(0.00689)	(0.00432)	(0.0191)	(0.0293)
Tax	-0.0214***	-0.0206***	-0.0258***	-0.0371***
	(0.00138)	(0.000672)	(0.00857)	(0.0125)
(first lag)	0.00790***	0.00107	-0.00641	-0.00989
	(0.00110)	(0.000718)	(0.00763)	(0.00992)
(second lag)	0.00344***	0.000993	-0.00778	0.00399
	(0.000772)	(0.000676)	(0.00596)	(0.00977)
Size	0.00117**	-0.0172***	0.0569	0.0371
	(0.000495)	(0.00261)	(0.0358)	(0.0378)
R^2	0.906	0.728		
Observations	35014	35014	24361	35014
Groups	9340	9340	6997	9340
Instruments			239	270
AR(1) p-value			0.044	0.000
AR(2) p-value			0.365	0.395
Hansen p-value			0.264	0.800

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 35: France - Manufacturing, Extended Specification, "Moulton"

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.596***	0.182***	-0.0239	0.326***
	(0.00883)	(0.00643)	(0.0748)	(0.0434)
(second lag)	0.250***	0.0385***	-0.0478	0.0675***
	(0.00821)	(0.00612)	(0.0294)	(0.0258)
Value added	0.326***	0.333***	0.233***	0.276***
	(0.0138)	(0.00344)	(0.0404)	(0.0528)
(first lag)	-0.173***	-0.0463***	-0.0370	-0.00252
	(0.0119)	(0.00434)	(0.0297)	(0.0398)
(second lag)	-0.0590***	0.00158	-0.00538	-0.00932
	(0.00665)	(0.00421)	(0.0265)	(0.0320)
Tax	-0.0198***	-0.0192***	-0.0246***	-0.0337***
	(0.00135)	(0.000655)	(0.00835)	(0.0122)
(first lag)	0.00752***	0.000930	-0.00697	-0.0133
	(0.00105)	(0.000698)	(0.00787)	(0.00957)
(second lag)	0.00302***	0.000667	-0.00208	0.00389
	(0.000736)	(0.000657)	(0.00764)	(0.0100)
Size	0.000991**	-0.00815***	0.0704*	0.0343
	(0.000487)	(0.00255)	(0.0388)	(0.0352)
Minimum Wage (Dummy)	-0.137***	-0.153***	-0.106	-0.187
	(0.0128)	(0.00731)	(0.0986)	(0.117)
Employment Change	-0.0809***	-0.0673***	-0.133***	-0.144***
	(0.0152)	(0.00214)	(0.0361)	(0.0438)
R^2	0.912	0.743		
Observations	35014	35014	24361	35014
Groups	9340	9340	6997	9340
Instruments			239	270
AR(1) p-value			0.023	0.000
AR(2) p-value			0.477	0.605
Hansen p-value			0.629	0.920

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 36: UK - Manufacturing, Basic Specification, "Moulton"

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.583***	0.242***	0.0978*	0.397***
	(0.00846)	(0.00758)	(0.0522)	(0.0500)
(second lag)	0.213***	0.0454***	-0.0256	0.0547
	(0.00785)	(0.00735)	(0.0264)	(0.0333)
Value added	0.507***	0.510***	0.369***	0.566***
	(0.00957)	(0.00454)	(0.0469)	(0.0553)
(first lag)	-0.250***	-0.0877***	-0.143***	-0.163***
	(0.00925)	(0.00624)	(0.0414)	(0.0525)
(second lag)	-0.0946***	-0.00646	-0.00938	0.00126
	(0.00663)	(0.00610)	(0.0350)	(0.0444)
Tax	-0.0362***	-0.0374***	-0.0301***	-0.0271**
	(0.00120)	(0.000846)	(0.00890)	(0.0123)
(first lag)	0.0123***	0.000120	-0.00542	-0.00878
	(0.00103)	(0.000938)	(0.00924)	(0.0122)
(second lag)	0.00671***	0.000115	-0.00532	-0.00661
	(0.000839)	(0.000921)	(0.00906)	(0.0114)
Size	-0.000907	0.00785***	0.0912***	0.0352
	(0.000632)	(0.00243)	(0.0307)	(0.0320)
R^2	0.967	0.940		
Observations	25346	25346	17726	25346
Groups	6306	6306	4704	6306
Instruments			239	270
AR(1) p-value			0.000	0.000
AR(2) p-value			0.746	0.558
Hansen p-value			0.241	0.223

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.

Table 37: UK - Manufacturing, Ext. Specification, "Moulton"

Dependent Variable: Wage	OLS	FE	GMM (Difference)	GMM (System)
Wage *(first lag)*	0.579***	0.242***	0.0943*	0.387***
	(0.00844)	(0.00751)	(0.0518)	(0.0507)
(second lag)	0.209***	0.0443***	-0.0243	0.0604*
	(0.00778)	(0.00727)	(0.0263)	(0.0337)
Value added	0.494***	0.495***	0.356***	0.544***
	(0.00952)	(0.00456)	(0.0483)	(0.0601)
(first lag)	-0.243***	-0.0841***	-0.141***	-0.165***
	(0.00916)	(0.00618)	(0.0409)	(0.0518)
(second lag)	-0.0900***	-0.00424	-0.0114	-0.00400
	(0.00658)	(0.00603)	(0.0343)	(0.0442)
Tax	-0.0352***	-0.0361***	-0.0294***	-0.0262**
	(0.00119)	(0.000839)	(0.00882)	(0.0124)
(first lag)	0.0121***	0.000172	-0.00543	-0.00844
	(0.00101)	(0.000927)	(0.00914)	(0.0122)
(second lag)	0.00626***	-0.000223	-0.00483	-0.00574
	(0.000834)	(0.000911)	(0.00887)	(0.0114)
Size	-0.000794	0.00979***	0.0918***	0.0384
	(0.000630)	(0.00241)	(0.0304)	(0.0322)
Minimum Wage (Dummay)	-0.100***	-0.113***	-0.0903	-0.161**
	(0.00621)	(0.00593)	(0.0655)	(0.0804)
Employment Change	-0.0247***	-0.0249***	0.000838	0.0492
	(0.00603)	(0.00310)	(0.0401)	(0.0536)
R^2	0.967	0.941		
Observations	25346	25346	17726	25346
Groups	6306	6306	4704	6306
Instruments			239	270
AR(1) p-value			0.000	0.000
AR(2) p-value			0.262	0.460
Hansen p-value			0.150	0.140

Notes: (i) Year and industry dummies and a constant term are included in all estimates. (ii) Robust standard errors are reported in parentheses. (iii) * Significant at 10%, ** at 5%, *** at 1%.