Labour Supply and Consumption Smoothing when Income Shocks are Non-Insurable

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Abstract

This paper addresses the question, whether and how employees use second job holdings to smooth out consumption shortfalls from non-anticipated wage shocks in their main employment. The analysis is based on the panel estimation of a dual job labour supply model a unique nationally representative data sets from Ukraine which contains detailed information on wage non-payment. The analysis accounts for workers' unobserved heterogeneity as well as for measurement error in the wage shock information. The estimated labour supply responses confirm that second job holdings are used as self-help devices against wage shocks and follow the lifecycle of wage arrears. Consumption shortfalls can be successfully smoothed out by households that engage in second jobs. Neither do I find anticipatory ex-ante coping behaviour with wage shocks nor can any of the presented alternative hypotheses explain the observed labour supply pattern.

Keywords: Dual job holding, wage shock, consumption smoothing, panel data, IV, Ukraine

1. Introduction

This paper addresses the question whether and how workers in a setting of imperfect markets, credit constraints and missing social security respond to non-anticipated transitory wage shocks in their main employment, particularly whether and how they re-allocate working time between main and second job. The ultimate goal of this research is to understand whether employees and their households are able to smooth out consumption against negative wage shocks in the main employment. This is especially relevant if workers are unable to switch employers at low costs, for instance because wage shocks come in the form of wage arrears which exert a bonding effect towards the current employer or because wage shocks are regionally concentrated.

The underlying theoretical framework of the paper is given by a simple dual job holding model with random wage shocks in the main job, in which second jobs can be taken up in order to smooth out consumption shortfalls. The empirical analysis includes cross-sectional and panel estimations based on a unique nationally representative data set from Ukraine for the early 2000s. The paper addresses several potential empirical problems which might confound the results. For instance, it deals with omitted variable bias by accounting for unobserved heterogeneity through fixed effects estimation. The analysis also addresses measurement error in the reported wage shocks by applying an instrumental variable (IV) method that exploits the fact that firms' pay practices were regionally highly concentrated.

The estimated labour supply responses to wage shocks indicate a re-allocation of working hours from main to second job. Exogenous variation in firms' wage repayment is used to show the robustness of the identified effects. As workers resemble participants of a lottery that cannot determine the arrival of wage repayment, it is possible to test the motivation for holding second jobs and to study the consumption smoothing behavior over the

entire duration of the wage shock cycle. None of the presented alternative hypotheses can convincingly rival the consumption smoothing motive of second job holdings. Furthermore, I find no anticipatory behaviour in the sense that workers might respond to shocks ex-ante. In line with the estimated individual labour supply responses, I find that households cannot fully insure against wage shocks ex-ante but that they manage to smooth out consumption shortfalls with the help of second jobs. When using a five-year regional panel for Ukraine to evaluate the effect of regional wage uncertainty on the regional level of second job holdings, my microeconomic results are reconfirmed.

The contributions of this paper are the following: To the best of my knowledge this is the first empirical study to analyse second job holdings as mode of consumption smoothing in the presence of main job wage shocks. Combining three previously unrelated strands of literature on wage shocks, second job holdings and consumption smoothing helps to gain new insights into how individuals and households manage to cope with shocks. Furthermore, this paper explicitly links firms' wage policies to individual shock responses over the entire duration of the wage shortfall. Wage shocks are not only considered in terms of their adverse effects on workers at the time they occur, but also by looking at the other side of the coin when they end—by using unique information on exogenous repayments. The analysis of both onset and offset of wage shocks lends substantial robustness to the estimates and enables the analysis of behavioural responses over the entire cycle of the wage shock. Finally, this study extends the application of a dual job labour supply model to an emerging country context which has not been done before. The research is based on the supposition that individuals are myopic and credit constrained which seems quite realistic for many developing and emerging countries. The empirical application employs unique data from Ukraine, a large lower-middle income country.

There are two main aspects of this research which are of particular policy relevance: First, the analysis of wage shocks illustrates how firms' payment policies affect labour supply. Legal institutions that are too weak to enforce wage claims drive individuals into coping mechanisms which might potentially imply an inefficient allocation of resources. This is especially so when regional clustering of bad payment practices prevents regional labour markets from proper functioning.[1] Second, this paper investigates the question whether unanticipated wage shocks can be smoothed out by individuals and households in imperfect capital markets, i.e. when wage shocks cannot be insured. The impact of wage shocks is especially immediate in a setting where household savings have been depleted and hence cannot be used to buffer the shortfall (cp. Chapter 3) and where the state does not provide any social security minimum.[2] Low mobility across jobs, sectors and regions prompts 'on-the-job-responses'. Thus, the following research addresses the ability of households to engage in self-help as well as the subsequent welfare implications.

The remainder of the paper is structured as follows: Section 2 reviews relevant economic theories on the labour allocation decision under uncertainty, on multiple job holdings and on consumption smoothing. It also provides background information on the nature of wage shocks in Ukraine in the 2000s. Section 3 introduces the data sets. Section 4 presents and discusses in detail the econometric approach. The results concerning the individual labour supply responses to wage shocks and the consumption smoothing abilities of households are reported and discussed in Section 5. Section 6 discusses potential

[1] As will be briefly discussed in the conclusion, the shift from main to second jobs may also change the role of the informal sector, which might be larger for second job holdings. Unfortunately, informality of labour supply cannot be analysed with the data at hand.

[2] Suffering from wage arrears does not entitle to the receipt of any state benefits.

alternative hypotheses and presents the results of several robustness checks. The final section concludes with some policy implications.

2.1 Theoretical Background

One of the fundamental questions in labour economics is how individuals adapt their labour supply in response to wage or income changes. The huge literature in this field can roughly be divided in studies investigating anticipated permanent increases in wage income (e.g. age-related promotions) and research that analyses transitory wage shocks (cp. Friedman, 1957). The latter have received limited attention for substantial time, as permanent income or consumption insurance models pay disproportional attention to permanent shocks. Consequently, the inter-temporal model of labour supply has largely ignored this class of wage shocks because it expects transitory wage shocks to play only an insignificant role in the lifecycle labour supply decision when the marginal utility of wealth is constant over time. In recent years, however, the interest in wage uncertainty and transitory wage shocks surged as the assumptions of the inter-temporal labour supply model seem too restrictive or even inappropriate in various settings. Mainly, the suppositions of perfect foresight and the absence of credit constraints seem inadequate for many countries, and in particular in countries with incomplete markets and ongoing structural change, like most developing and emerging countries. The latter setting prompts the use of the myopic consumption model, in which individuals react to transitory shocks as they would react to permanent ones (Jappelli and Pistaferri, 2006). Beside theoretical reasons in favour of the study of transitory wage shocks, a higher econometric sensitivity to distinguish anticipated from non-anticipated wage shocks has promoted research on unanticipated transitory wage shocks—a field that had been ignored until recently (Pistaferri, 2003).

In order to investigate the effect of wage shocks in the main job on consumption smoothing through second job holdings, there are three relevant strands of literature. In a standard labour supply model with only one job, the effect of wage uncertainty on labour supply is theoretically ambiguous. According to the seminal paper by Block and Heineke higher wage uncertainty will lead to increased working effort if the substitution effect towards leisure is dominated by the income effect in the Hicks-Slutsky equation (Block and Heineke, 1973). However, this literature does not allow for the possibility of second jobs. The second strand of literature also emerged in the 1970s and invented the first models of multiple job holdings. The focus here was in particular on the labour supply behaviour of individuals who face working hours constraints in the main job. In their model of second job holdings, Shishko and Rostker (1976) formally derived cross-wage labour responses and showed that individuals who are hours constrained will increase second job labour supply with decreasing main job wage if leisure is a normal good. An increase in non-labour income leads unambiguously to a decrease in second job holdings through the income effect. Other authors describe several additional motives to hold a second job—like the portfolio combination of stable and secure with casual prestigious employment—without addressing the role of consumption smoothing (Paxson and Sicherman, 1996; Smith Conway and Kimmel, 1998). The third strand of literature focuses on consumption smoothing in general, and on the question how people reduce income risk specifically. Skepticism has emerged whether consumption can be completely insured against labour market shocks. Different from the truly inter-temporal labour supply model, which expects transitory wage shocks to have no effect on labour supply, today's perception is that insurance is incomplete, especially for unexpected or low-frequency shocks. For countries with at least basic social security systems, one can expect that social protection indeed smoothes out labour market shocks—and simultaneously at least partly crowds out coping mechanisms (Cullen and Gruber, 2000). However, even under these

conditions, increasing inequality over the life cycle is hard to explain when precluding the importance of uninsurable idiosyncratic risks (Storesletten et al., 2001). For both, developing and developed countries, economists have presented evidence that shocks are not perfectly insurable and that households engage in specific consumption smoothing activities which are at least partially successful (Cochrane, 1991; Townsend, 1994; Attanasio and Székely, 2004). My paper combines all three strands of literature in order to pay attention to the potential consumption smoothing motive of second jobs, specifically against main job wage shocks. In this setting the driving force for labour reallocation between main and second job is the coping with income shortfalls of myopic and credit-constrained individuals in order to smooth consumption. The novel aspect of this paper is that it focuses on within-person labour supply responses which crucially depend on the availability of outside insurance options (Low, Meghir and Pistaferri, 2010). In this respect this paper stands in contrast to the added worker literature, which investigates labour supply responses of married women to their husband's unemployment (Lundberg, 1985). Consequently, one caveat of the analysis concerns the joint labour supply decision within households (Becker, 1965) which remains beyond the scope of this research.

The following analysis is based on a simple static model of labour supply. Individuals are assumed to maximise utility $U(c, l)$ which for simplicity only contains two arguments, consumption c and leisure l. Employed individuals allocate effort h between two different jobs (subscript 1 indicating the main job and 2 indicating the optional second job) subject to a total time (T) constraint $T = h_1 + h_2 + l$ with $h_1 > 0$, $h_2 \geq 0$, the budget constraint $y = w_1h_1 + w_2h_2 + A$, where w indicates the wage rate for main or second job and A is a measure of non-labour income, as well as to a non-hiring constraint $h_1 + h_2 \leq T$. In an environment of working hours constraints, Sishko and Rostker (1976) have shown that a decrease in the main job wage

rate lets an individual shift effort towards the second job. It is straightforward to consider a similar problem in a setup with a stochastic wage shock γ (as in Kurkalova and Jensen, 2000).[3] Kurkalova and Jensen show that the behavioural responses can are $\partial h_2/\gamma > 0$ and $\partial h_1/\gamma < 0$. As such, the paper investigates the elasticity of second job labour supply with respect to a wage shock in the main job.

There are two main reasons for choosing a static model of labour supply: First, Ukraine, the country under consideration, is a low income country in which individuals face severe credit constraints;[4] thus a lifecycle model which assumes away credit constraints would be inappropriate. Second, the wage shocks which individuals are facing in this setting (and which will be described in greater detail below) are unanticipated so that employees can be assumed to behave myopically. However, given the assumption of myopic agents even transitory idiosyncratic wage shocks can be expected to affect labour supply decisions. The lifecycle model of labour supply is limited to permanent wage shocks (by measuring the Frisch elasticity) because transitory shocks are irrelevant under the assumed constant marginal utility of wealth.

2.2 Wage arrears

In the following analysis the incidence and extent of wage arrears will serve as a measure of wage shocks. Although the analysis of wage arrears has been closely connected to countries of the former Soviet Union (the incidence and patterns of wage arrears have been

[3] They also discuss whether aggregated consumption models under uncertainty might be potentially biased and provide arguments why this bias is expected to be small in Eastern Europe.

[4] According to the World Bank (2008), access to financial intermediation in Ukraine even lags behind countries like Angola, Burkina Faso, Côte d'Ivoire, El Salvador, Libya and Mongolia—to name just a few.

predominantly analysed for Russia), similar wage shocks can be observed around the world. The degree to which they are under researched makes the analysis of wage arrears especially worthwhile.

As discussed in Chapter Three of this thesis, Ukraine is a lower middle income country. For reasons discussed below it offers an interesting setting to analyse labour supply responses to wage shocks (when people are myopic and credit constrained) and thus may provide evidence that already is and in the future increasingly will be relevant for many less developed countries. Wage arrears, for instance, are already widely spread among migrant workers in China (UNDP, 2005) and in many enterprises in India. In the recent past, wage arrears became again substantial in Ukraine and Russia during the global financial crisis (ILO, 2009).

In industrialized countries, wage arrears are of minor importance on the aggregate level and mostly appear temporarily when firms, e.g. start-ups, undergo financially difficult times; however, more structural wage arrears can be observed for the close-to-poverty part of the working population. In UK, for instance, wage arrears as a consequence of enterprises failing to meet the legal minimum wages were problematic, especially before drastic fines and a short pay-back period were introduced in 2007.[5]

Wage arrears became a characteristic feature of post-Soviet labour markets in the mid-1990s and were initially seen as a consequence of decline in demand during the recession or as a result of firms' illiquidity. The neoclassical view of this phenomenon regarded wage arrears as a flexible tool to cushion the hardship of restructuring overstaffed state enterprises (Lehmann, Wadsworth and Acquisti, 1999; Desai and Idson, 2000). However, this perspective

[5] According to HMRC inquiries, 25,000 low-pay employees were affected by wage arrears in the UK in 2006 (BBC, 2007).

was challenged when matched employer-employee data revealed that wage arrears were observable not only in poorly-performing but also in many well-performing firms and that worker turnovers remained relatively modest despite the substantial losses to individual incomes. From these findings, Earle and Sabirianova (2002) developed an institutional theory of wage arrears which understood wage non-payment as a function of managerial contract-violating behaviour and poor contract enforcing institutions.[6] In other words, poor managerial behaviour and workers' inability to enforce wage claims through courts led to substantial levels of wage non-payment.[7] Wage arrears were found to be sectorally and regionally highly correlated so that the tacit collusion in contract violation restricted outside options for workers (Earle and Sabirianova, 2009). In other words, the local concentration of wage arrears diminished incentives to completely change employers. This added to a generally low mobility of workers across jobs and sectors in transition economies and a particularly low mobility in the most desperate regions (Boeri and Flinn, 1999). When insurance and outside job options are missing, leaving the region might be regarded as an alternative strategy in response to wage non-payment. Yet, mobility rates in transition countries were generally low and even declining despite a substantial rise in regional disparities (Fidrmuc, 2004). Reasons which may explain the low labour mobility and thus contribute to the persistence of shocks in certain regions include liquidity constraints, high search costs, administrative barriers and

[6] The above cited study on China clearly depicts discrimination between home and migrant workers in China as main reason for wage arrears. Also in the UK, non-payment of legal minimum wages can be expected to reflect managerial behavior rather than illiquidity of firms.

[7] In most cases, workers did not file lawsuits, as courts were not assertive and their decisions had huge delays (cp. Earle, Spicer and Sabirianova, 2004). Court decisions in favour of workers were regularly ignored up until mid 2005, when a Ukrainian teacher won her case at the European Court of Human Rights (CFTUU, 2008). The Accounting Chamber of Ukraine states that "the systematic failings and infringements [...] identified [in wage non-payment] suggest an inadequate level of organization [...] and a lack of control" in many administrative bodies of Ukraine (UN CESCR, 2007).

underdeveloped housing markets (Andrienko and Guriev, 2004). These specific features of the regional labour markets make second jobs a plausible alternative for risk diversification.

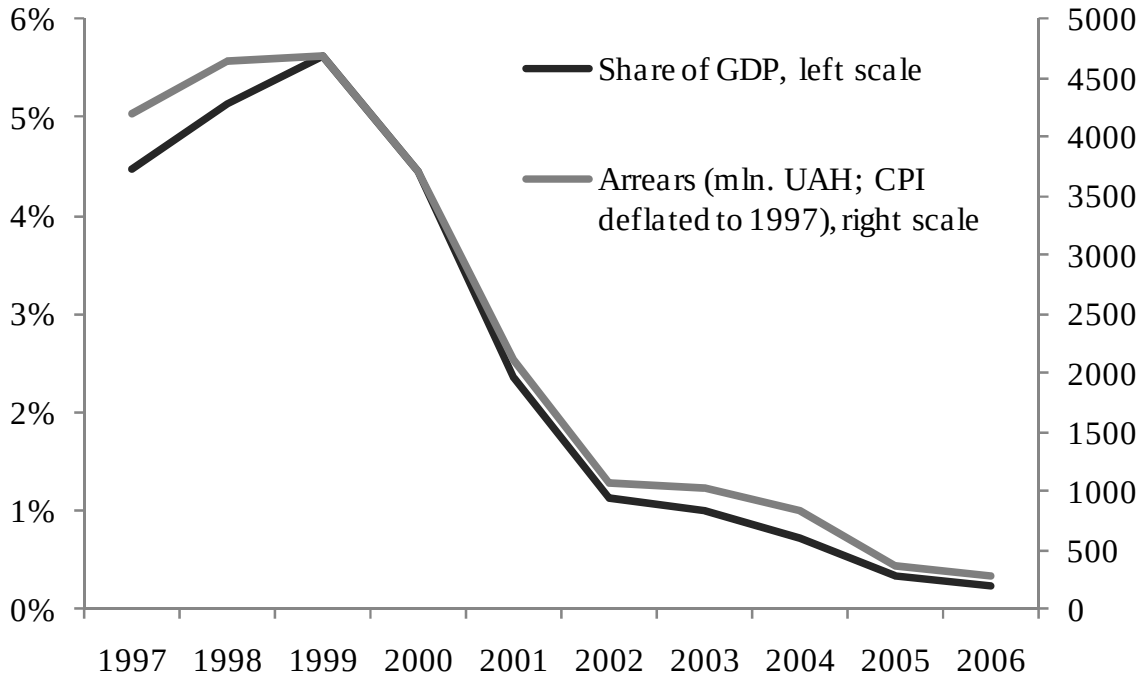
In Ukraine, the incidence of wage arrears peaked at the end of the 1990s and declined thereafter. As in the entire Soviet Union, one-factory-towns and regionally concentrated economic sectors have contributed to a geographic clustering of these shocks.[8] In the mid 1990s, more than 60 percent of the labour force had suffered from labour market shocks such as delayed wage payments (Boyarchuk, Maliar et al., 2005). According to the International Labour Organization, the average Ukrainian employee was owed the amount of six monthly wage payments (ILO, 1996). Starting at this extreme incidence of wage uncertainty, many Ukrainians were paid back outstanding wages during the last years. Figure 2 demonstrates that wage shocks in the form of wage arrears were very high in the late 1990s and declined rapidly thereafter. Still, the aggregate of wages owed by current employers exceeded one percent of annual GDP in the years 2003 and 2004. From the peak in the year 1999 to the years 2003 and 2004, wage arrears were reduced by paying back outstanding wages to workers. Interestingly, arrears were paid back to employees who currently suffered from wage arrears as well as to former employees who had left the firm in the past.

So far, evidence is mixed on the question whether there was differential treatment of employees within firms and whether this might have induced worker selection. While Earle and Sabirianova (2002) find that leading positions in firms suffered less from wage arrears, Gerry, Kim and Li (2004) show that firm managers allocated wage arrears according to equity principles, implying that the least earning workers were spared. To the opposite, Lehmann et al. (1999) find that regional and firm characteristics are strong predictors for wage arrears, while individual characteristics play a negligible role. Generally, there is no evidence of

[8] Earle and Sabirianova (2002) argue that poor outside options in local labour markets might set free a self-enforcing spiral of wage arrears, as local entrepreneurs find it increasingly attractive to hold back wages.

systematic sorting of workers across firms as a consequence of wage arrears (Earle and Sabirianova, 2002).

Figure 1: Aggregate level of wage arrears in Ukraine



Source: State Statistics Committee of Ukraine (http://www.ukrstat.gov.ua/)

One aspect that has been mostly ignored in the literature is the repayment of owed wages. Observations from employer records and employee data indicate that repayments were "occasional and lumpy" (Earle, Spicer and Sabirianova Peter, 2004: 6). As no general bargaining process about the repayment of wage arrears took place in Ukraine, the repayment decision has been taken by the firm management on a monthly basis. So, depending on the predominant nature and cause for wage arrears (liquidity constraints and/or managerial

behaviour), the repayment decision might or might not be at the manager's discretion.[9] From the perspective of the individual employee these repayments can be considered unanticipated. Some employees might not even work in the indebted firm any longer and still receive a repayment. If negative wage shocks had a causal and positive impact on second job holdings and if second job holdings are predominantly used to fill the earnings gap, the repayment of wage shocks should have the opposite effect on labour supply. Thus, using repayment information as the analogue of wage shocks allows shedding some light on the true motivation for second job holdings.

3 Data and descriptive statistics

The most part of the following analysis rests on two waves from a relatively new panel data set, the nationally representative Ukrainian Longitudinal Monitoring Survey (ULMS) for the years 2003 and 2004. The ULMS is a rich data source combining individual level information on socio-demographic characteristics with extensive labour-related data.[10] In addition, a household questionnaire collects rich information on household composition, assets, income and consumption.[11] After carefully cleaning the data and restricting the sample

[9] A simple test of the randomness of repayments is performed with the data set and variables described below: In a multivariate regression of the determinants of arrear repayments, none of the various demographic, job, firm and regional controls delivers a coefficient that is significantly different from zero at the 5 percent level. This indeed suggests that repayments had little structure.

[10] The data are nationally representative and were collected using multi-stage random sampling. If households moved between years, they were not followed across administrative regions (oblasts).

[11] In 2003, information on household consumption was collected only rudimentary. Thus I impute household consumption values for 2003 and 2004 from the extensive questionnaire on food, service and durables consumption in UHBS. This questionnaire is highly comparable to the one used in the ULMS household survey in 2004. To check the robustness of my imputations for 2004, I compared consumption values from UHBS and ULMS for that year and found a very strong positive correlation (coefficient: 0.663; the R^2 in a simple regression is above 99 percent).

to a balanced panel of prime age employees (17 to 60 years) who are working throughout both waves, 1,736 individuals per year provide complete employment and working hours' information. Professional farmers, self-employed and family helpers are excluded from the sample as wages and hence wage shocks are harder to define in their cases. All individuals in the sample are employed and have worked for at least one hour in the reference week and were paid or supposed to be paid a wage.[12] This implies the exclusion of employees on sick or maternity leave or in holidays. A variable overview for the sample can be found in Table A-1.

Labour supply and shock variables

As all individuals in the sample are actually employed, labour supply is measured at the extensive margin by focusing on the participation decision in second jobs (or several second jobs). Additionally, I measure labour supply at the intensive margin by analysing censored hours equations of work in the main job and in the second job(s) along with leisure equations. To impose as few assumptions as possible, leisure is defined as residual day time. The computation is 24 hours minus eight hours sleep minus hours worked in main job minus hours worked in other jobs minus time used for household food production. Although I have carefully checked consistency in the time use data and excluded individuals who report more than 99 hours of total work per week (including all sources of work), some individuals end up with slightly negative leisure per day. In general, the calculation might still be correct, given that some individuals simply need less than eight hours for sleep and personal care per day. Nevertheless, I impose a strict minimum of 0.1 hours of leisure per day.

[12] The overall share of employed persons in the survey rose from 45.7 percent to 47.3 percent between 2003 and 2004.

Generally, work relations are still relatively inflexible in Ukraine. As already elucidated in the previous chapter, the main source of rigidity is the strict Labour Code which has been in place since the Soviet era. Most employees face the choice between working full-time (40 hours per week) and not working at all. Part-time arrangements are still the exception and consequently most employees work indeed 40 hours in the reference week.

Wage uncertainty is measured by worker-specific wage shocks which are defined as any wage payments that fall short of the contractual wage despite the fulfilment of contractual work requirements. In other words, employees who report working normal hours in the reference week (normal in comparison to their "work effort in an ordinary working week") but are paid no or a significantly lower wage than the contractually fixed amount and who report that their employer owes them wage income, are classified as individuals suffering from wage arrears.

These wage arrears are normally transitory wage shocks which are imposed on workers for one up to several months and may comprise part or total monthly wage income. Despite the huge volume of wage arrears in Ukraine at the end of the 1990s (up to almost 6 percent of GDP), the level of outstanding wages has substantially decreased since then. As a consequence, most workers had wage arrears in the past with some currently suffering from them. As also found for Russia, wage arrears show a strong regional character (Earle and Sabirianova, 2002). While some regions have a wage arrears incidence of below one percent, up to 52 percent of employees were still affected in other areas in the 2003/2004 period. The variation across sectors is also substantial. While "only" four percent of employees in public administration suffered then from wage arrears, it was more than one third of agricultural workers (Table 1). Also, the conditional stock of back wages ranges regionally from around

one up to more than six months and was especially high in the transport, agricultural and construction sectors.

Table 1: Wage arrears, second job holdings and hours worked in Ukraine

	Share of workforce with wage shock	Conditional number of monthly wages in arrear	Second job holding
Agriculture	35.0%	3.7	2.0%
Industry	14.5%	2.1	2.1%
Electricity	12.8%	0.9	2.6%
Construction	5.6%	2.7	2.8%
Sale	4.7%	1.5	2.5%
Transport	6.2%	5.9	2.3%
Financial services	8.5%	2.2	4.3%
Public administration	4.1%	0.6	3.7%
Education	4.3%	0.8	2.7%
Other Services	8.4%	1.6	2.8%
Other	6.9%	2.0	0.0%

Note: 3,898 observations. Source: ULMS; author's calculations

Control variables

All regressions include as control variables individual characteristics (gender, age, age squared/100, years of education, marital status) as well as regional (oblast), settlement type fixed effects and a common trend. All regression also control for the natural logarithm of hours worked in the main job in the reference week to account for the time budget constraint and exceptional work load during the reference period. Further controls include job characteristics (economic sector of work, enterprise ownership[13]) and different income (non-labour income, the hourly wage rate and the second job shadow wage[14]) and wealth (asset)

[13] A variable indicating union membership status was not used in the regressions as it never came out significant.

[14] The second job wage rate is obviously unobserved for those not holding a second job. Therefore I perform a reduced form regression of the second job wage rate for second job holders in order to predict a shadow wage for

measures. Some attention should be paid to the construction of the income, wage and welfare variables. As a main job specific control variable, I construct the hourly wage rate from contractual monthly wage income divided by contractual monthly working hours. This variable thus reflects how well a job would be paid under normal working and payment conditions. The analysis accounts for non-labour income by using total consumption net of all members' labour incomes. To use household consumption rather than income helps to clean the analysis from regular consumption smoothing activities (e.g. household production of food from small agricultural land plots) (cp. Blundell and MaCurdy, 1999). Furthermore, given that in some households not all working age members were interviewed (for reasons like absence at the interview date or refusal to participate in the survey), consumption seems the more reliable measure. Household wealth is controlled for by using a set of ten durable goods (e.g., refrigerator, washing machine, car etc.). Using principle component analysis, the group of ten assets is transformed into an asset indicator, which accounts for more than 57 percent of the overall variance in asset holdings. The correlation matrix of single assets with the first principal components is reported in Table A-2.

Additional data come from cross-sectional waves of the nationally representative Ukrainian Household Budget Survey (UHBS) which collects information on 25,000 individuals and 9,000 households on an annual basis. The data comprise a rich set of individual and household characteristics, information on employment as well as incomes. The UHBS is here mainly used for estimating wage shock exposure and for imputing household consumption. It provides information which is highly comparable to that of the ULMS but

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the entire sample. This procedure may later introduce selectivity bias as actual wages offered to those not holding a second job might be structurally lower than the ones offered to second job holders. As a consequence of this over prediction μ_2 will be biased towards zero. Different from studies where individuals are predominantly hours constrained (Shishko and Rostker, 1976) the second job wage rate should play little role in this setting. I also run all regressions without including the second job shadow wage without any impact on the results.

includes more accurate indicators for outstanding wages from current and previous employers. Furthermore, I use four UHBS waves from 2003 to 2006 (comprising 100,000 observations) to construct a regional panel. As highly detailed regional codes are not available and the cell size would suffer from small samples, I construct a panel of 77 larger region cells. These cells are constructed from the UHBS data set as different settlement type areas within the administrative regional units (in Ukraine 24 *oblasts* plus the Autonomous Republic Crimea plus two cities with special status—Kiev and Sevastopol).[15]

4 Methodology

4.1 The labour supply equation

The main challenge of this research is to draw inference about the causal impact of unanticipated wage shocks on labour supply. If wage shocks γ were purely random, one could simply compare the change in second job holdings *y* over time between those employees "treated" with a wage shocks (γ=*1*) and those without a wage shock (γ=*0*). Including as covariates the wage rates w_1, w_2 from the main and second job[16] and household wealth *A* as well as individual characteristics *x* and firm and region controls *J* gives the following formulation of the estimation equation:

$$y_{it} = \alpha + \delta_1 \gamma_{it} + \delta_2 d_t + \mu_1 w_1 + \mu_2 w_2 + \mu_3 A + \mu_4 J_{it} + \beta x_{it} + \varepsilon_i \qquad (1)$$

[15] These cells are substantially larger than districts (in Ukraine 490 *raions*). The "data unit regions" do not correspond to any official administrative unit. More disaggregated regional information is, unfortunately, not available in the UHBS data.The average regional cell size is about 325 observations in each year.

[16] I have also performed all regressions without the inclusion of the second job shadow wage rate. The results are not affected by this omission.

for $i \in \{1, ..., n\}, t \in \{2003, 2004\}$.

The estimator of interest δ_1 compares the conditional propensity of holding a second job between individuals who experienced a wage shock with those without shock. As we expect wage shocks to push workers into second jobs, δ_2 should carry a positive sign. The period dummy d_t captures general time trends like nationwide changes to the demand for and acceptability of second job holdings (e.g. employers in Ukraine might be increasingly ready to employ workers on the basis of contracts with few hours per week). For the hours' equation, I use a semi-log and normal rather than a log-log specification to implicitly account for non-participation (Blundell and MaCurdy, 1999: 1598). I start estimating (1) in a pooled OLS set-up with individual clustered standard errors.[17] Responses at the intensive labour supply margin are estimated with a censored Tobit model with clustered standard errors. Such a model assumes that the participation decision and the hours decision are produced by the same econometric process and that individuals who do not supply any labour to a second job simply chose zero hours. To test the robustness of the estimated effects, two model specifications are used throughout all main results. The first model employs only pre-determined demographic characteristics like age, gender, education and pre-determined location controls. The second model is being nested in the first and removes the parameter restrictions on all other covariates by adding all remaining individual and job characteristics as well as measures for non-labour income and asset wealth. In order to test whether the more complex nested model has additional explanatory power, likelihood ratio (LR) tests are performed for the main tables. The reported p-values refer to the hypothesis that the simpler

[17] As wage shocks were regionally concentrated, I also run these regressions with standard errors clustered by regions. The results lose some precision but remain overall robust.

model is a valid representation for the nested model. In all cases, the LR test suggests the superiority of the more complex specification.

All estimates might suffer from a bias if unobservable (and thus uncontrolled) factors influenced both, the probability to suffer from a wage shock and the probability to take on a second job. As a start, it is useful to think about the character of this bias and detect the potential direction of its impact. One would expect that firm managers might impose wage arrears on their less productive workers first, thus discriminating between workers of different levels of ability or conscientiousness. The firm manager might be doing so, as she is able to observe what remains unobservable to the researcher. In general, we expect that low levels of ability or conscientiousness are negatively correlated with holding a second job, as second job employers value similar characteristics as main job employers. Then, however, estimates which cannot adequately account for unobservables should be downward rather than upward biased.

Using panel data also allows controlling for several unobservable individual characteristics which might impact on labour supply behaviour in a way that is non-traceable when using cross-sectional data. So, the main econometric specification will account for individual heterogeneity by using individual fixed effects. By taking first differences and estimating (1) as a fixed effects panel data model, it is possible to difference away the individual fixed effects which potentially bias standard OLS. For the analysis of second job working hours, the preferred model would be a fixed-effects panel Tobit model. To date, such an estimator has not been developed and I adopt the random-effects Tobit panel model instead. To show that these results are highly robust I additionally employ a fixed-effects linear panel model. This, however, estimates responses to wage shocks for the uncensored sample and will deliver coefficients that cannot be converted into effects for the sample under

consideration (therefore these results are reported for illustrative purposes in Table A-3 in the Appendix).

In order to take into account the possibility of measurement error in the shock variable, I exploit the more comprehensive wage arrears measure from the UHBS data which contains information on outstanding wages in the current job as well as from previous jobs. The general model is again:

$$y_{it} = \beta' x_{it} + \varepsilon_{it} \qquad (2)$$

As this model is endangered to suffer from incorrectly measured wage shock information *x*, we employ an instrument which is more correctly measured. As the measurement problem cannot be solved in the ULMS data set, I make use of auxiliary data (the UHBS) from which one can impute the wage shock probability for the ULMS. In a second step I use the conditional relationship between the observed wage shock variable and the assigned wage risk information to estimate the parameter of interest (β') within the primary data:

$$x_i = \delta' \dot{z}_i + u_i \qquad (3)$$

Beside its size (100,000 observations) the data set used for the prediction of accurately measured wage shocks has the additional advantage of containing similarly detailed firm information as the ULMS. The prevalence of complete wage shocks (including arrears from

previous employers) is predicted from UHBS data on ULMS observations and then used as an instrument for wage uncertainty. This variable contains a substantial degree of specificity as ten firm size categories, eleven economic sectors and four ownership categories are used for the procedure.[18] The econometric model behind this general two-stage least squares estimation (G2SLS) is an instrumental variable approach for panel data. As will be shown below, a Hausman test suggests the use of a random-effects panel model on efficiency grounds. It has, however, remained impossible to compute standard F-statistics for the first stage regression of random-effects panel data models. To evaluate the strength of the instrument, the z-statistics will be reported instead.

Albeit these methodologies correct the measurement bias and the endogeneity bias on the basis of observables and unobservables, neither is as conceptually straightforward as a quasi-experiment. One such experiment is represented by the exogenous repayment of outstanding wages. Luckily, the availability of pay-back information in Ukraine offers the unique opportunity to exploit exogenous variation in firms' wage policies to understand the effect of wage shocks at the employee level over the entire cycle of wage shocks.[19]

4.2 The consumption smoothing equation

The final part of this paper addresses the question to what extent and how successful credit constrained households use second job holdings to smooth consumption. If the

[18] To check the estimation fit in the prediction sample, I first perform a cross-validation of the prediction quality by splitting the UHBS sample randomly and predicting the respective variable for the second part of the sample. The cross-validity coefficient of both sub samples is of reasonable size (+0.35).

[19] In the UHBS data, 14 percent of repayments are directed to employees who have wage arrears with their current employer, while the substantial remaining share is received by those that have no arrears with the current but a former employer.

estimated effect of wage shocks on labour supply is causal (i.e. employees ultimately respond to wage shocks) then the consumption smoothing mechanism of second job holdings should be traceable in the data. Similar to the previous literature, I use a household consumption model which can be consistently estimated even in a two-period set-up (Attanasio and Székely, 2004):

$$\Delta \log c_j = \delta_1 \Delta \log y_j + \delta_2 \Delta s_j + \delta_3 \Delta l_j + \delta_4 \Delta (l_j * s_j) + \beta \Delta x_j + \alpha_j + \varepsilon_j \qquad j \in \{1,..., n\} \qquad (4)$$

Under the absence of any consumption smoothing, the coefficient δ_1 is expected to converge to one, as consumption of household *j* perfectly covaries with the available income resources. In perfect insurance markets, the coefficient should not be different from zero, as consumption is almost entirely uncoupled of income. Furthermore, if insurance mechanisms were fully at work, transitory shocks s_j should have no impact on the level of consumption, thus the coefficient of wage shocks δ_2 should be zero. On the other hand, if the coefficient is statistically significant different from zero and negative, transitory shocks seem not only to be unanticipated but also ex-ante uninsurable. At the centre of interest here is the term reflecting the response to shocks $(l_j * s_j)$ where l_j is an indicator for second job holdings. The sign of δ_4 contains information on whether households that respond to wage shocks by increasing their labour supply in a second job can compensate for the income loss and smooth out consumption. If $\delta_2+\delta_3+\delta_4<0$, households cannot entirely shield their consumption against wage shocks. If $\delta_2+\delta_3+\delta_4=0$, households exactly compensate for their income loss and if $\delta_2+\delta_3+\delta_4>0$, households are on average able to overcompensate their loss. The fixed effects

regressions (with the household fixed effect being indicated by α_j) also control for household size and regional characteristics like access to finance[20], which are subsumed under x.

5 Results

The results of the empirical analysis are presented and discussed in the following order: The first subsection provides a descriptive overview of the relationship between and the determinants of the main variables of interest—wage shocks and second job holdings. Then the causal effect of wage shocks on second job holdings is estimated, before the analysis proceeds to the implementation of an IV approach in order to account for measurement error. The final subsection turns to the role of wage shocks and second job holdings in the consumption smoothing framework.

5.1 Descriptive statistics

Those who currently suffer from a wage shock are more likely to hold a second job. Table 2 indicates that employees who experience wage arrears have a 72 percent higher incidence of multiple job holdings. However, wage arrears are not very persistent over time and across individuals. The middle panel of Table 2 shows that entry to and exit from wage arrears status are substantial between the years. Well above half of employees who suffered from a wage shock in 2003 do not report any similar incidence in 2004, while four percent of employees without previous shocks experience wage arrears in 2004. The third panel of the

[20] Access to finance is measured as the regional share of households who either use a savings or lending facility at a bank. It should be noted, that households might use savings to smooth out consumption. However, as outlined in the previous chapter, the Russian financial crisis of 1998/1999 depleted most of these savings.

table shows the share of employees holding a second job in 2004 by the same four cells of the wage arrears matrix. It becomes evident that those who have no wage arrears in 2004 are less likely to engage in a second job, no matter whether they suffered from insecure income in 2003. Their share of second job holders is around two percent. Employees who suffer from wage shocks in both years are more likely to hold a second job (2.7 percent). However, the highest second job holdings are recorded for those who have wage shocks in 2004 but not in 2003. Six percent of them have a second job, suggesting that the non-anticipated incidence of shocks might be the main driving force behind the observed labour supply pattern. Also, those who currently experience a wage shock work longer hours in the second job (more than 70 percent more; see bottom panel of Table 2). Although these results are suggestive, they are unconditional and descriptive and do not imply any causal relationship so far.

Before proceeding to the estimation of the shock response model it seems crucial to gain a better understanding of the general determinants of second job holdings and wage arrears. The determinants of wage shocks can shed light on whether arrears exhibit a pattern of regional and sectoral concentration, as suggested by the previous literature on Russia. Similarly, the determinants of second job can suggest whether this kind of employment is predominantly used by specific groups of employees. Unlike in later parts of this paper, where I will refrain to the linear probability model for ease of comparability across different specifications, the binary Probit model is preferred here. This exposition should show that the loss of precision in the linear probability model is negligible. The linear probability estimates, however, can be regarded as more conservative throughout this paper.

Table 2: Wage arrears, second job holdings and hours worked in Ukraine

Second job holding			
Currently no wage arrear	2.2%		
Currently wage arrear	3.8%		
Δ	*1.6%*	*Std. E. (0.008)***	
Transition matrix	No wage arrear 2004	Wage arrear 2004	Total
No wage arrear 2003	96.0%	4.0%	100%
Wage arrear 2003	56.9%	43.1%	100%
Second job holding in 2004			
	No wage arrear 2004	Wage arrear 2004	*Δ within row*
No wage arrear 2003	2.2%	6.0%	*3.8%-p. (0.014)****
Wage arrear 2003	2.4%	2.7%	*0.3%-p. (0.014)*
Δ within column	*-0.3%-p.*	*-4.7%-p.*	
Hours worked in second job per week (conditional on holding second job)			
Currently no wage arrear	4.5		
Currently wage arrear	7.6		
Δ	*3.1*	*Std. E. (1.10)****	

Note: Based on balanced panel of 3,472 observations. Source: ULMS; author's calculations

Table 3 shows determinants of wage arrears and second job holdings in Ukraine based on a simple pooled Probit model with individually clustered robust standard errors. Wage shocks are weakly associated with gender and are more common among older workers. The latter finding is intuitive as the bonding effect exerted by arrears is stronger for older workers who have already invested more in job and firm specific skills. Better off employees seem to have a lower propensity to face wage arrears as indicated by the negative coefficient of the asset variable. The main determinants of wage shock, however, seem to be region, sector and firm effects with patterns that are in line with the previous literature (cp. Lehmann, et al., 1999).

The table also provides evidence on the determinants of second job holdings. Given that only about three percent of all employees do actually hold a second job, the marginal

effects are small. Generally speaking, main job hours, human capital and wealth are the main determinants of second job holdings. As expected, the imputed second job shadow wage is positively correlated with second job holdings, but the effect is almost negligible in size. An increase in the average second job hourly wage rate from 10 UAH by 1 UAH (a plus of ten percent) would only imply an increase in the propensity of holding a second job by 1.3 percent. Individual characteristics like gender, age and marital status seem to play no significant role. Married women are less likely to hold a second job. Two aspects deserve special attention. First, employees who work fewer hours per week are more likely to hold a second job. As I will show later, this coefficient reflects a labour substitution between main and second job in the presence of wage shocks rather than second job holdings of workers who are involuntarily time constrained in the main job. Second, non-labour household income promotes second job holdings. It turns out, that while second job holdings are used as coping mechanism against wage uncertainty in the main job, they are more common among employees who are not desperately poor.

5.2 Estimating the effect of wage shocks on second job holdings

When turning to the effect of interest—the response of second job holdings to transitory wage shocks—I find a consistently significant positive coefficient in the naive pooled OLS estimation of equation (1). Table 4 reports results for different measures of wage arrears: a binary variable indicating the presence of a shortfall of wages due to arrears (wage shock), the intensity of wage shocks (measured as stock of outstanding monthly wages), an

Table 3: Determinants of wage arrears and second job holding, marginal effects

	(1)	(2)
Dependent variable	**Wage arrear**	**Second job holding**
	Probit	OLS
Female	-0.022*	0.005
	(0.012)	(0.007)
Age	0.010**	0.003
	(0.004)	(0.002)
Age squared/100	-0.011**	-0.004
	(0.005)	(0.003)
Adjusted years of schooling	0.004*	0.004**
	(0.002)	(0.001)
Center	0.083**	-0.002
	(0.043)	(0.015)
West	0.039	0.023
	(0.039)	(0.017)
East	0.133***	0.002
	(0.046)	(0.014)
South	0.048	0.011
	(0.038)	(0.016)
Asset indicator	-0.010***	0.002
	(0.004)	(0.002)
Log of non-labour income	0.001	0.006***
	(0.003)	(0.002)
Log of main job working hours		-0.025**
		(0.011)
Second job shadow wage		0.001*
		(0.000)
Industry	0.052**	-0.004
	(0.027)	(0.012)
Education	-0.047**	-0.003
	(0.018)	(0.013)
Agriculture	0.208***	0.010
	(0.052)	(0.015)
De novo private firm	-0.037**	0.010
	(0.012)	(0.011)
Time	-0.034***	0.005
	(0.007)	(0.004)
Pseudo R-squared	0.129	0.023
Observations	3472	3472

Note: Base categories are “Kiev region”, “large city”, “state enterprise”, “service sector”. Coefficients on “married”, “village”, “town”, “privatized firm”, “national/international organization”, “Electricity”, “Construction”, “Sale”, “Transport”, “Administration”, and “Finance” sector were insignificant. Robust standard errors clustered by individual id are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: ULMS.

indicator for the receipt of a repayment of wages[21] and an indicator for the receipt of other positive wage shocks. The table shows only the coefficients of interest from regressions of several specifications. Columns 1 to 4 only control for exogenous demographic factors, while columns 5 to 8 add the remaining demographic, job and welfare controls. The complete list of estimated coefficients of all regressors is provided in Tables A-4 and A-5 in the Appendix, which also contains the results based on specification-specific maximal samples. Second job holdings are 2.3 percentage points higher among employees with wage shocks and these results are hardly affected by the inclusion of job and wealth controls (columns 1 and 5). The coefficient on shock intensity (columns 2 and 6) is positive, yet, insignificant. To the opposite, the repayment of back wages significantly lowers the propensity to work in a second job and, interestingly, the size of the coefficient is almost identical to the coefficient indicating the incidence of a wage shock (columns 3 and 7). Although these estimates are no more than correlations so far, this pattern might suggest that the onset of a shock increase second job holdings, while the end of the shock reduces second jobs by the same rate. Such a co-movement of second job holdings with wage arrears might already be an indicator for a causal relationship. Indeed, second job holdings should respond to both, on-set and cessation of wage shocks, if they were used as temporary consumption smoothing mechanisms and driven by a self-help motive.

[21] Wage repayment means the explicit repayment of owed wages, not the return to scheduled monthly payment.

Table 4: Impact of wage shocks on second job holdings (extensive margin). OLS and FE models.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable						**Second job holding**			
OLS model	Wage shock	0.023**				0.024**			
		(0.011)				(0.011)			
	Intensity of shock		0.004				0.004		
			(0.003)				(0.003)		
	Repayment			-0.021**				-0.025***	
				(0.009)				(0.009)	
	Positive shock				0.035				0.019
					(0.034)				(0.034)
	R-squared	0.016	0.018	0.013	0.014	0.020	0.022	0.018	0.018
FE model	Wage shock	0.028**				0.027**			
		(0.013)				(0.013)			
	Intensity of shock		0.006***				0.006***		
			(0.002)				(0.002)		
	Repayment			-0.202***				-0.195**	
				(0.077)				(0.077)	
	Positive shock				-0.027				-0.025
					(0.028)				(0.028)
	LL	3615.96	3627.25	3618.20	3612.82	3643.02	3652.85	3645.15	3639.44
	Prob > Chi2 (df 18)					0.0000	0.000	0.000	0.000
	R-squared	0.007	0.013	0.008	0.005	0.022	0.028	0.024	0.020
	Demographic controls	X	X	X	X	X	X	X	X
	Job & welfare controls	—	—	—	—	X	X	X	X
	Observations	3472	3472	3472	3472	3472	3472	3472	3472

Note: Wage shock is defined as current wage arrear. Intensity is measured in number of monthly payments. All regressions control for individual demographics and regional controls. Robust standard errors in parentheses (clustered by id in OLS); *** p<0.01, ** p<0.05, * p<0.1. Source: ULMS 2003, 2004; author's calculations.

Finally, I analyse whether the repayment effect on second job holdings is simply driven by higher incomes. If this was the case, higher than usual wage payments like bonus payments or gratuities should have a similarly discouraging effect on second job holdings. Columns 4 and 8 indicate that positive wage shocks other than wage repayments are not correlated with second job holdings.

The following paragraphs attempt to establish that the observed labour supply pattern is a causal response to the observed incidence of wage shocks. If unobservable ability was negatively related to the propensity to suffer from a wage shock but positively correlated to the propensity of holding a second job, the coefficients from pooled OLS would be downward biased. As described earlier, the omitted variable (*OV*) is expected to be negatively correlated with wages shocks but positively correlated with second job holdings. As the estimated coefficient on wage shocks in (1) is positive ($Corr(OV, \gamma) < 0$ and $\delta_1 > 0$), δ_1 suffers from a negative bias. To account for this unobservable ability, fixed effects are included in the estimation. The results reported in the lower panel of Table 4 show that the impact of wage arrears on second job holdings becomes substantially larger and remains still statistically significant.[22] Depending on the specification, the coefficient is 13 to 22 percent larger when accounting for unobserved heterogeneity. As Table 4 further reveals, the intensity of wage shocks becomes now highly significant indicating that each additional month of outstanding wages increases the probability of holding a second job by 0.6 percent. The coefficient form the wage shock specification (columns 1 and 5) is 4.7 times larger than the coefficient in the intensity regressions (columns 2 and 6), indicating that the average employee suffering from a wage shock has 4.7 outstanding wage payments. This number corresponds rather well with the conditional sample mean for the shock intensity (see Table A-1). The effect of wage repayment becomes much larger in the fixed effects regression while other forms of positive wage

[22] The effect is significant in villages and towns as well as in large cities, where it is strongest (Table A-7).

shocks remain insignificant, underlining that the estimated effects on second job holdings cannot be simply attributed to the additional income.

All fixed effects regressions in columns 5 through 8 account for changes in job characteristics. While part of these changes can be traced back to changes in firm or job characteristics at the same work place (e.g., through changes in the size of a firm) others might be the result of job changing. This issue will be discussed in greater detail below; however, the fact that controlling for job characteristics does not change any of the results confirms the robustness of the estimated effects.[23]

Table 5: Impact of wage shocks on second job working hours. Tobit and RE Tobit model.

	(1)	(2)	(3)	(4)
Dependent variable		***Working hours in second job***		
	Tobit	Tobit	RE Tobit	RE Tobit
Wage shock	4.761***	4.631***	4.729**	5.066***
	(1.768)	(1.779)	(1.852)	(1.917)
Main job hours	-0.100*	-0.102*	-0.129**	-0.127**
	(0.058)	(0.060)	(0.062)	(0.065)
Log non-labour income		2.415***		2.483***
		(0.680)		(0.690)
Hourly wage main job		0.083		0.010
		(0.370)		(0.392)
Demographic controls	X	X	X	X
Job & wealth controls	—	X	—	X
LL	-574.82	-561.89	-550.19	-532.27
Prob > Chi2 (df 18)		0.0005		0.0074
Pseudo R2 / Chi2	0.034	0.056	27.2	33.7
Observations	3472	3472	3472	3472

Note: Share of uncensored observations: 2.35%. The quadrature approximation of the RE Tobit model was checked using the "quadchk" command in Stata. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

[23] Between 2003 and 2004, almost 9.6 percent of employees were changing jobs. In a separate specification I investigate whether employees who suffered from wage arrears in the previous year were more likely to change their job until the second interview, but could not find any indication in favour of that. Given that wage arrears have a bonding effect to the enterprise (see above), this result is not surprising.

Beside the second job participation decision, wage shocks might lead individuals to intensify their activities in a previously existing second job. Table 5 presents the results from the intensive labour supply margin in a Tobit and random-effects Tobit framework (For the full list of regressors see Table A-6). Individuals who already held a second job increase their labour supply by around 4.5 hours following a wage shock, a very consistent estimate across the different specifications. On average, second job hours are doubled when experiencing a wage shock. Interestingly, the relationship between main job hours and second job hours is comparatively small. One additional hour in the main employment is associated with second job holdings that are on average only one sixth of an hour lower. This probably reflects the low variation in hours of main job employment relations, where the vast majority of labour contracts are fixed at forty hours.

From a policy perspective, it is relevant to understand the mechanism which underlies the increase in second job holdings or hours while employees are still employed in their main job. So, the question is whether workers simply add more effort and increase their overall working time at the expenses of leisure or whether they re-allocate effort between jobs. Reducing main job working hours is, however, limited as contracts are inflexible. On the one hand, it seems reasonable to assume that employees reduced main job effort in exchange for second job effort. On the other hand, the bonding effect of wage arrears might prevent them from reducing effort significantly or from quitting the main job altogether (as a corner solution). Furthermore, the hours' constraint formulated earlier does not allow employees to provide unlimited additional second job labour supply while being still employed in the risky main job. In Table 6, I therefore also present marginal fixed effects of main job hours and leisure with respect to wage shocks. Suffering from a wage shock reduces main job hours' supply by roughly five to nine percent, depending on the specification. Given that virtually all Ukrainians work 40 hours per week, the reduction of working hours ranges between 1.9 and 3.5 hours per week. This reduction is smaller than the associated

increase in second job labour supply estimated from OLS and the FE estimation, indicating that individuals also reduce their available leisure time (see below). Dividing the sample into three groups of individuals according to settlement type, it becomes evident that the reduction in main job hours takes place in villages as well as in towns and large cities. However, the reduction effect is strongest in towns and villages (-12.0 percent) while inhabitants of cities reduce main job labour supply by only 5.9 percent (Table A-7). While the top panel of Table 6 does not account for the main job hourly wage, the bottom panel also includes job characteristics. The compensated Marshallian wage elasticity of the main job hours regressions suggests a reduction of hours by 2 percent (or one hour per week) after an increase in the hourly wage rate by ten percent. This elasticity is very small but seems reasonable given the limited set of wage-hours options Ukrainians can choose from. Furthermore, this elasticity is the compensated Marshallian, i.e. it ignores the potential effect of the wage shock.

Table 6: Change in main job working hours and leisure, linear fixed-effects model

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables:	***Log of main job hours***			***Log of leisure hours***		
Without job and wealth controls						
Wage shock	-0.047*			-0.055**		
	(0.026)			(0.023)		
Shock intensity		-0.002			-0.004	
		(0.003)			(0.003)	
Repayment			-0.123			0.026
			(0.157)			(0.137)
Log of main job hours				-0.433***	-0.431***	-0.431***
				(0.021)	(0.021)	(0.021)
LL	1135.04	1132.12	1132.45	1593.05	1589.57	1587.27
R-squared	0.006	0.004	0.004	0.198	0.197	0.196
Implied change in hours	*-1.9*			*-3.4*		
With job and wealth controls						
Wage shock	-0.085***			-0.057**		
	(0.023)			(0.023)		
Shock intensity		-0.001			-0.003	
		(0.003)			(0.003)	
Repayment			-0.110			0.013
			(0.135)			(0.138)
Log of main job hours				-0.477***	-0.472***	-0.471***
				(0.025)	(0.025)	(0.025)
Log of hourly wage	-0.094***	-0.093***	-0.093***	-0.016***	-0.014***	-0.014***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
LL	1700.74	1686.75	1687.13	1631.05	1625.99	
R-squared	0.282	0.276	0.277	0.216	0.214	0.213
Implied change in hours	*-3.5*			*-3.6*		
LR test, Prob > Chi2 (df 18)	0.000	0.000	0.000	0.000	0.000	0.000
Number of observations	3452	3452	3452	3452	3452	3452

Note: Mean leisure hours (week): 62.4; mean main job working hours (week): 40.9. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

I also find a reduction in leisure as a consequence of wage arrears. On a weekly basis, the reduction ranges between 3.4 and 3.6 hours, depending on the specification. In total, main job hours and leisure are reduced more than the increase in second job hours. The mechanism behind this reduction might be explained in the following way: As leisure is only roughly measured by subtracting from 24 an allowance of eight hours sleep as well as the hours supplied to all jobs (including supplementary activities and private subsidiary farming), one can use this estimate as a cumulative measure of coping. Hence, on a cumulative basis wage shocks induce a labour reallocation between jobs as well as a reduction in leisure time. Consistent with the availability of subsidiary farming opportunities, the reduction in spare time is strongest for employees in villages and towns (Table A-7).

So far we have seen that the incidence of a wage shock pushes employees into second job holdings, while the subsequent repayment of outstanding wages significantly reduces the likelihood of having a second job. Table 9 adds another piece of evidence to this cycle of entry and exit from second jobs by looking at the timing of events. While an adverse wage shock immediately reduces the disposable household income, the search for a second job opportunity might be time-consuming. Table 9 therefore reports labour current supply responses as a function of the timing of the shock. As before, a current wage shock has a positive impact on second job holdings of around two percent. A shock that took place three to six months ago increases second job holdings twice as strong, probably reflecting the individuals' response time to the shock. Wage non-payments that arrived for the first time nine to twelve months ago have no significant impact on current second job labour supply which appears reasonable if we recalled that wage shocks were relatively short lived (on average 4.8 months). Again, this labour supply response pattern supports the idea that second job holdings are co-moving with wage shocks.

Table 9: Response time to wage shocks, RE model

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	***Second job holding***					
Current wage shock	0.023***			0.024***		
	(0.009)			(0.009)		
Shock 3-6 months ago		0.039***			0.038***	
		(0.013)			(0.014)	
Shock 9-12 months ago			0.026			0.023
			(0.017)			(0.017)
Demographic controls	X	X	X	X	X	X
Job & wealth controls	—	—	—	X	X	X
Hausman test, chi2	12.25	14.41	14.75	20.42	22.05	22.33
df	10	10	10	26	26	26
Rho	0.351	0.349	0.350	0.350	0.348	0.349
Chi2 of model 40.96	34.62	40.93	34.24	67.29	68.24	61.98
R-squared	0.014	0.015	0.013	0.023	0.024	0.022
Observations	3472	3472	3472	3472	3472	3472

Note: Critical value for *df(*10*)*: 18.3 and for *df(*26*)*: 38.9 at the 5% significance level. Robust standard errors clustered by id in parentheses; *** p<0.01, ** p<0.05, * p<0.1

5.3 Instrumental variable estimation

Previous results have shown that the incidence of a wage shock increases the propensity to hold a second job and second job working hours. However, these results might be confounded by measurement error in the right hand side variable thus attenuating the estimated coefficient of interest. The relevant coefficient will then appear closer to zero than the true estimate. To solve the potential bias from measurement error in the shock variable an instrumental variable approach is applied. The strategy uses information about wage shocks that comes from another survey that measures the incidence of outstanding wages more accurately than the ULMS. If shocks were inaccurately measured in the ULMS, we should be able to alleviate the inherent attenuation bias by using an instrumental variable approach. In the first step, I compute cell-specific shock risks, which are predicted from the UHBS data set. Similar to the ULMS, the UHBS asks respondents to indicate

the volume of outstanding wages while providing a much larger sample size. Hence wage shocks can be measured quite accurately in detailed region-sector cells.[24] Tables 10 and 11 show instrumental variable estimates for both the extensive and intensive margin (the first stage can be found in Table A-8). The participation equation and hour equation are both estimated with a random effects G2SLS model. In all cases except one, the Hausman test indicates a preference for the more efficient random effects model.

Table 10: G2SLS estimates of second job holding, random effects

	(1)	(2)	(3)	(4)
Dependent variable		***Second job holding***		
Wage shock	0.127***	0.123***		
	(0.046)	(0.046)		
Wage shock intensity			0.032**	0.031**
			(0.015)	(0.014)
Log hours main job		-0.012		-0.007
		(0.010)		(0.013)
Log non-labour income		0.006***		0.005***
		(0.002)		(0.002)
Hourly wage main job		0.004*		0.003
		(0.002)		(0.002)
Second job hourly wage		0.001***		0.001**
		(0.000)		(0.000)
First stage (Dep. variable: wage shock)				
	0.874***	0.868***	3.390***	3.402***
	(0.077)	(0.076)	(0.705)	(0.702)
z-stats	11.16	11.38	4.81	4.85
Demographic controls	X	X	X	X
Wealth controls	—	X	—	X
Hausman test, chi2	0.56	0.46	32.55	18.44
df	13	17	13	17
R-squared	0.010	0.013	0.011	0.012
Observations	3472	3472	3472	3472

Note: For the first stage results of (1) and (2) see Table A-8. The regressions for the Hausman test were specified without time-invariant variables. Critical value for *df*(13): 22.3 and for *df*(17): 27.6 at the 5% significance level. Detailed region fixed effects and job characteristics are not controlled for, as they are measurement units for the shock instrument. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

[24] I use a matrix of 26 regions and 12 economic sectors in order to estimate wage shocks.

To condense information, I only provide the estimates of interest in the Table. The RE G2SLS model does not allow producing an F statistics to assess the strength of the instrument directly; however, the z statistics for the instrumental variable in the first stage are very strong (around 11) providing some comfort regarding the predictive power of the instrument. Results for the second stage of the 2SLS suggest that wage shocks have a much bigger impact on the participation decision than previously found in the OLS or FE models. When estimated with G2SLS, the effect on working hours becomes naturally much smaller and suggests an increase in working time of half an hour. However, it must be noted that in contrast to the Tobit model the G2SLS estimation does not account for censoring in the hours equations. Coefficients can thus not be directly compared. Table A-3 reproduced a standard linear fixed-effects estimation of working hours and its coefficients are the more appropriate basis for comparison. The previous coefficients of 0.2 rose by around 170 to 190 percent when correction the bias from measurement error. The instrumental variable estimation confirms the presence of measurement error which biased previous estimates in the participation and working time decisions towards zero.

Table 11: G2SLS estimation, hours in second job

	(1)	(2)
Dependent variable	***Hours in second job***	
Wage shock	0.551**	0.526**
	(0.268)	(0.267)
Log hours main job		-0.081
		(0.057
Log non-labour income		0.028***
		(0.009)
Hourly wage main job		-0.005
		(0.013)
Second job hourly shadow wage		0.002
		(0.002)
First stage (Dep. variable: wage shock)		
	0.861***	0.868***
	(0.077)	(0.076)
z-value	11.16	11.38
Demographic controls	X	X
Wealth controls	—	X
Hausman test, chi2	3.05	11.50
df	13	27
R-squared	0.010	0.013
Observations	3452	3452

Note: The model treats censored values as uncensored. For the first stage results of (1) and (2) see Table A-8. The regressions for the Hausman test were specified without time-invariant variables. Critical value for *df(*13*)*: 22.3 and for *df(*17*)*: 27.6 at the 5% significance level. Detailed region fixed effects and job characteristics are not controlled for, as they are measurement units for the shock instrument. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

5.4 Wage shocks and quitting behaviour

If workers were generally risk averse, they would always prefer to work in jobs with lower wage uncertainty. Hence, after being affected by wage arrears once, they might be inclined to change jobs. However, as noted by Earle and Sabirianova (2003) the nature of wage arrears exerts a bonding effect, as leaving the firm might reduce the probability of being paid the full amount of

outstanding wages. The resulting trade-off between quitting or not is an empirical question. The availability of second jobs adds a twist to the quitting decision: When faced with wage non-payment workers might prefer to search for second jobs first and quit the main job as soon the second job can be turned into regular (full time) employment. Unfortunately, the data do not allow the exact tracking of each specific employee-employer relationship. Yet, this stepping stone hypothesis can be investigated by analysing differences in exit patterns of workers with and without wage shocks and workers who hold a second job or not. The overall fraction of job changers between the 2003 and 2004 waves is 8.9 percent. As the share of employees who switch job within one year is slightly higher among those who currently suffer from wage arrears (10.1 percent), job quitting might dominate the bonding effect; however, the difference is quite small.[25] Table 12 estimates the conditional impact of current wage arrears on the propensity to change job within one year. The coefficients on both, wage shock indicator and wage intensity are positive—but only weakly significant. Neither second job holdings themselves, nor the holding of a second job conditional on suffering from a wage shock are significantly correlated to a job change in the future. This implies that second jobs are not *per se* used as stepping stones towards new employment by employees with risky job remuneration. Still, the coefficient on the interaction term between shock intensity and second job holdings is highly significant indicating that workers with second jobs start leaving their main job as arrears accumulate.

[25] It should be noted, that the share of involuntary job separations are very low (Brown and Earle, 2003). Also, self-employment is still very rare in Ukraine. The shares of entrepreneurial activities are higher in urban areas (2.8 percent) than in rural areas (2.4 percent), while more persons enter self-employment between 2003 and 2004 in rural areas (2.2 percent) than in urban areas (0.7 percent).

Table 12: Wage shocks and job change, forward looking regressions, marginal effects from Probit

	(1)	(2)	(3)	(4)
Dependent variable	**Job change between *t* and *t+1***			
Wage shock in *t*	0.034*	0.033*		
	(0.022)	(0.23)		
Intensity of wage shocks in *t*			0.003**	0.001
			(0.001)	(0.001)
Second job holding		0.036		0.025
		(0.047)		(0.042)
Wage shock/intensity*second job holding		0.099		0.025***
		(0.144)		(0.007)
Demographic controls	X	X	X	X
Job & wealth controls	X	X	X	X
Pseudo R-squared	0.158	0.188	0.159	0.189
Observations	1736	1736	1736	1736

Note: The interaction term in column (2) is with wage shock, the one in column (4) with wage shock intensity. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

5.4 Consumption smoothing

In the smoothing model (equation 5), I test whether households whose members suffer from a wage shock (at least one household member) consume less and whether they successfully use second job holdings in order to smooth out these shortfalls (Table 13). The coefficients on income indicate that consumption is co-moving with income, however, only partially. Yet, they are statistically different from zero implying that consumption is related to current income and far from being perfectly insurable against income fluctuations in Ukraine. Wage shocks within the household induce on average a three percent shortfall in household consumption, while second jobs per se do not significantly affect consumption levels. As our outcome variable measures total household consumption, the fixed effect regressions also account for household size.

Column (2) adds an interaction term of wage arrear incidence with second job holdings. The coefficient thus measures how consumption levels are affected in households that make use of second job holdings in order to cope with wage shocks. The Table shows a highly significant positive coefficient; however, to study the effect of second job holdings on households suffering

Table 13: Second job holding as consumption smoothing mechanism, household FE model

	(1)	(2)	(3)	(4)
	Full sample	Full sample	Urban sample	Rural sample
Dependent variable:		***Log of household consumption***		
Log of income	0.122***	0.120***	0.121***	0.120***
	(0.007)	(0.007)	(0.009)	(0.012)
Wage arrear in HH (δ_2)	-0.029**	-0.040**	-0.060**	-0.025
	(0.012)	(0.020)	(0.027)	(0.033)
Second job in HH (δ_3)	-0.023	-0.045**	-0.025	-0.107**
	(0.021)	(0.023)	(0.025)	(0.052)
Arrear*Second job (δ_4)		0.099**	0.129**	0.100
		(0.043)	(0.053)	(0.080)
Access to credit		0.417	0.469	0.000
		(0.485)	(0.949)	(0.000)
Arrear*Access credit		0.046	0.273	-0.200
		(0.234)	(0.307)	(0.386)
Town		0.102**		
		(0.044)		
Large city		0.134***		
		(0.046)		
Household size	0.081***	0.081***	0.077***	0.086***
	(0.006)	(0.006)	(0.007)	(0.011)
Constant	5.424***	5.321***	5.418***	5.437***
	(0.047)	(0.063)	(0.093)	(0.085)
$\delta_2 + \delta_3 + \delta_4$		0.014	0.044	-0.032
		(0.044)	(0.054)	(0.076)
Hausman test, chi2	74.00	117.79	51.87	38.24
df	4	10	8	8
R-squared	0.218	0.223	0.209	0.245
Observations	4264	4264	3093	1171

Note: Critical value for *df(4)*: 9.5.9, *df(8)*: 15.5 and for *df(10)*: 18.3 at the 5% significance level. Omitted category: Settlement village for (2) and settlement large city for (3). Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

from a shock, the relevant measure is the joint coefficient of $\delta_2 + \delta_3 + \delta_4$, which is reported at the bottom of the table. The hypothesis (H0) under consideration is that households coping with second jobs cannot smooth out consumption shortfalls from wage shocks, so $\delta_2 + \delta_3 + \delta_4 < 0$.

Although $\delta_2 + \delta_3 + \delta_4$ are jointly positive, they are not jointly statistically significant different from zero. In other words, household suffering from a wage shock and using second jobs to cope with them are no worse off than households without any wage shock. Column 2 also accounts for access to the credit market which might be considered a tool for consumption smoothing in developed economies. As expected above, the financial market plays no significant role in consumption determination and is not used as a consumption smoothing tool in the given setting. Columns 3 and 4 show results after splitting the sample into urban and rural households. Wage arrears have a strong negative impact on household consumption in urban areas (minus 6 percent) while their effect on rural households is only insignificantly negative. The latter result might be partially attributable to the small rural sample as the coefficient on wage arrears becomes minus 0.032 with a standard error of 0.021 (implying a marginally insignificant p-value of 0.134) if one was to remove all interaction terms from the regression. More importantly, rural households might have other coping strategies available which buffer their consumption levels against unforeseen shortfalls, like subsidiary farming (see below). The joint coping term is positive for urban areas and negative for rural areas, but the large standard errors leave the effects insignificant. The overall result, however, suggests that second job holdings are less useful tools for consumption smoothing in rural than in urban areas. The underlying reason is likely to be found in the structure of rural labour markets which have even for Ukrainian standards low dynamics and are thus not capable of absorbing transitory excess labour supply.

In order to make sure that these results are not driven by our specification including household size, Table A-9 in the Appendix shows that these results are robust to the use of adult

equivalence scales. Such scales account for economies of scales in household consumption, or in other words, while household consumption is growing with household size, a part of the consumption goods can be shared by all household members. The scales used here are Oxford equivalence scales which assign the weight of one to the first adult, 0.7 to all additional adults and 0.5 to all children (aged up to 15) in the household. This Table also shows that access to credit has no immediate impact on household consumption (column 2). To allow for another common "consumption generating" activity in Ukraine—the cultivation of small household plots (in rural areas) and dachas (in urban areas)—column 4 adds to the regression an indicator whether the household is using a land plot for personal agricultural production.[26] While agricultural land use is positively related to household consumption, the inclusion of this variable does not change any of the previous results here.

6 Robustness and Alternative Hypotheses

In the following I will evaluate potential alternative hypotheses for the observed labour supply patterns which might pose a threat to the validity of the identified results. In detail, the following section shows that the second job labour supply response cannot be explained by constrained working hours, by a training motive, or by anticipatory *ex-ante* coping.

[26] The practice of subsidiary farming is wide spread since Soviet times. In the ULMS data, the share of rural households engaging in at least some subsidiary farming activities is 95 percent, while the comparable figure for urban households is 54 percent.

6.1 Constrained working hours hypothesis

One alternative explanation for the observed second job holding pattern refers to the initial idea of second job holding models. The early literature analysed second job holdings in the USA, focussing predominantly on constraints in working hours as the main motive. However, these applications were not associated with the consumption smoothing motive. So could it be that second job holdings were merely driven by hours' constraints? Some facts might point into this direction: Employees in Ukraine face a limited choice set of working hours (a fact that was discussed in greater detail in Chapter 3). The Ukrainian Labour Code stemming from the 1970s is rather restrictive with respect to contractual flexibility and prescribes that the work load during one week is 40 working hours. Consequently, almost all employees are contracted for exactly 40 hours. More flexible job contracts are starting to emerge only slowly. Only 4.4 percent of employees usually work less than full time.[27] In our context, problems would arise when enterprises that impose wage arrears on their employees are at the same time reducing their labour demand. This might be plausible if wage arrears reflected negative demand shocks for firms, which are reducing production and labour costs at the same time. In the reference week, less than 1.6 percent of all employees report that they have worked fewer than usual hours because they were either involuntarily sent home, because of work schedule or because demand or input supply was too low. However, to check whether these groups of workers might be more likely to take on a second job, I re-run the participation and hours regressions and interact the wage arrear indicator with two dummies, one indicating that a person is working fewer hours for demand reasons, the other one indicating

[27] Additional 9.8 percent of employees report less than 40 hours work per week, but claim to be considered full-time workers as their contractual work load is lower than 40 hours. This applies in specific, often hazardous, occupations, for night work and for employees aged up to 18 years. The latter group, however, is excluded from the sample. As a robustness check, I re-run the regressions for part-time and full-time subsamples separately. Part-time employment is defined as having working at most 35 hours per week in 2003. The results are qualitatively the same, with part-time workers being slightly more likely to hold a second job in general (albeit with imprecise point estimate owing to the small part-time sample), but showing a similar response to wage arrears as full-time workers (Table A-10). This is not surprising, given that I control for working hours in the main job in the standard analysis.

involuntary leaves from work (Table 14). Neither the variable indicating low demand nor the interaction term has any impact on second job holdings. The compulsory leave dummy shows a positive sign in the working hours model, suggesting that workers from firms that sent (part of) their workforce home work on average twenty hours more in a second job. To further investigate the hypothesis of constrained working hours, I compare the contractual and actual hours worked rather than self-reported absence from work. When interacting the wage shock indicator with a dummy variable that takes on the value of one if an employee simultaneously works less than contractual and suffers from a wage arrear (and zero otherwise) I find that the previous results are robust. Reduced working time alone cannot explain the switch towards second job holdings. This leads me to conclude that wage shocks have a negative impact on main job hours through the shift towards second job holdings (Table 6), not vice versa. Employees thus substitute away effort from the risky main job towards the second job. Finally, I use information on desired working hours among those who were reporting less than forty hours in the reference week.[28] If under normal circumstances time constraints limited these employees, one would expect them to respond with a desired labour supply of more than forty hours. However, 91 percent of those working less than forty hours in the reference week would like to work up to forty hours only. Among those suffering from wage arrears, the share of those wanting to work more than 40 hours is even lower (6.7 percent) and this group is no more likely to hold a second job.

[28] The question on desired working hours is only asked to individuals who work fewer than 40 hours in the reference week.

Table 14: Responses to wage shocks in firms with low labour demand or involuntary leaves, FE and RE Tobit models

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables		**Second job holding**			**Hours in second job**	
	FE	FE	FE	RE Tobit	RE Tobit	RE Tobit
Wage shock	0.028**	0.026**	0.029**	4.758***	2.639**	3.910***
	(0.013)	(0.013)	(0.013)	(1.788)	(1.195)	(1.432)
Low labour demand		-0.005			-1.456	
		(0.028)			(3.681)	
Wage shock*Low labour demand		0.108			6.971	
		(0.066)			(5.593)	
Involuntary leave			-0.017			1.884*
			(0.172)			(1.015)
Wage shock*Involuntary leave			0.010			-50.949
			(0.199)			(1,809.4)
Demographic controls	X	X	X	X	X	X
Job & wealth controls	X	X	X	X	X	X
Rho	0.530	0.523	0.529	0.683	0.271	0.110
LL	3630.9	3630.5	3627.8	-547.9	-598.6	-587.7
R-squared / Chi 2	0.015	0.015	0.016	24.33	32.63	33.76
Observations	3472	3472	3472	3472	3472	3472

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

6.2 Training hypothesis

Another explanation could be related to a training hypothesis. Workers who take a second job might do so in order to receive on-the-job-training which might be valued in their main employment. To be productive, however, such training would be expected to take place in the same occupation as the main job. Even when taking rather broad occupational groups (26 groups in total), a comparison of main and second job reveals that around two thirds of employees chose a different occupation for their second job. This suggests that the predominant motive for second job holding is a motive of diversification rather than concentration. Also, the observation that workers reduce their main job labour supply in response to a wage shock is hard to bring in line with the training hypothesis.

6.3 Anticipation of wage shocks

If wage shocks are more likely to appear in some firms or sectors than in others, workers might observe these differences and sort into sectors or firms according to their risk aversion. However, workers employed in at-risk jobs or occupations should be aware of the wage risk they face and, hence, ex-ante respond to their potential wage shortfalls with precautionary behaviour (cp. Low et al., 2010). In that case, the measured labour supply effect might reflect the anticipation behaviour of at-risk workers rather than ex-post coping strategies. To test the anticipation hypothesis, I exploit the longitudinal nature of the ULMS survey and estimate whether workers who will suffer from shocks in period $t+1$ already adapt their labour supply in period t. The coefficients of forward looking regressions are shown in Table 15. Although all coefficients on future wage shocks carry a positive sign, the precision of the estimates is very low and one cannot reject the hypothesis that anticipatory effects are zero. This finding supports my framework choice in an

important way as the absence of shock anticipation supports the assumption of myopically behaving agents. Furthermore, this result is in line with the presumption that the incidence of wage shocks does indeed have a random component.

Table 15: Anticipation of wage shocks, forward looking regressions

	(1)	(2)	(3)	(4)
	Strict anticipation		**Broad anticipation**	
Dependent variable	**Second job**	**Hours in 2nd job**	**Second job**	**Hours in 2nd job**
Wage shock in *t+1*	0.002	0.017	0.006	0.142
	(0.017)	(0.086)	(0.011)	(0.136)
Log hours main job	-0.008	-0.064	-0.009	-0.090
	(0.014)	(0.060)	(0.012)	(0.080)
Exogenous personal characteristics	X	X	X	X
Job and wealth indicators	X	X	X	X
R-squared	0.024	0.016	0.019	0.020
Observations	1519	1519	1736	1736

Note: Strict anticipation includes only person who do *not* suffer from current wage shocks. Broad anticipation includes entire sample. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

A related explanation for the detected shock response pattern could be associated with past shock experience. The more distant experience of wage shocks is picked up by the individual fixed effects as a 'common history'. Furthermore, having suffered from wage shocks during the 1990s should not have any impact on today's precautionary behaviour as wage shocks then were virtually omnipresent in Ukraine. More recent wage shocks could, however, make the difference: In order to test this hypothesis, a variable indicating the incidence of a wage shock 9 to 12 months ago is included in the models alongside the current wage shock dummy. If recent past wage shocks promoted precautionary second job holdings, this variable should pick up part of the estimated

coping effect from the current shock. As can be seen from Table 16, the estimates of labour supply responses to wage shocks become even larger when controlling for previous shock experience. At the same time, the coefficient of past shock experience is insignificant. This finding further underlines the fact that second jobs are used as immediate coping mechanisms in response to wage shocks.

Table 16: Effects of wage shocks when controlling for recent shock experience, FE and RE Tobit models

	(1)	(2)	(3)	(4)
Dependent variable	***Second job holding***		***Hours in second job***	
	FE	FE	RE Tobit	RE Tobit
Wage shock	0.031**	0.029**	4.718**	4.688**
	(0.013)	(0.013)	(1.984)	(2.037)
Past wage shock (9 to 12 months ago)	-0.015	-0.014	0.696	0.680
	(0.024)	(0.024)	(3.420)	(3.338)
Demographic controls	X	X	X	X
Job & welfare controls	—	X	—	X
Rho	0.522	0.534	0.669	0.711
LL	3611	3643	-552.6	-532.0
R-squared / Chi2	0.004	0.023	20.3	35.3
Observations	3472	3472	3472	3472

Note: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

In sum, the presented evidence on hours' constraints, training and potential anticipatory coping behaviour suggests that the pattern of second job holdings cannot be explained by any of these rivaling hypotheses. The following paragraphs will further support the claim that the estimated second job labour supply responses have a causal meaning. I will show that the estimated micro-economic behavioural responses can even be detected at the level of regional aggregate labour supply. Final robustness tests will provide evidence that the estimated effects are not confounded by sample attrition.

6.4 Regional analysis

Given that wage shocks are regionally highly concentrated, it is possible to exploit the geographic variation across Ukrainian regions in order to see whether microeconomic labour supply responses translate into changes in aggregate labour supply. Table 17 presents the results from a regional fixed-effects estimation based on 77 regional cells in Ukraine. The regressions report changes in the regional share of second jobs in response to changes in the regional incidence of wage arrears.[29] Over the time period 2003 to 2006, an increase in regional wage arrears is associated with a significantly higher regional share of working age population holding a second job. The second job holding elasticity is between nine and ten percent with respect to wage shocks. To account for different macroeconomic conditions, regional per capita income, inequality (measured by the standard deviation of per capita income levels), the unemployment rate and the log of land size under agricultural production are controlled for in specifications (2) and (3). Region specific factors which are time-invariant are accounted for by the region fixed effects in the panel model. To test whether there are any response lags, I also run a regression with one-year lagged wage arrears. However, there is no indication for lags in responses, basically confirming the micro-level evidence from Table 17 where no one-year lagged responses were detectable.

[29] These shares are computed as fractions in the employed working population aged 16 to 60 in a region.

Table 17: Regional second job holding model, 2003-2006, Regional FE models, UHBS data

	(1)	(2)	(3)
Dependent variable:		**Regional share of second jobs**	
Arrear incidence in working population	0.088*	0.096**	—
	(0.045)	(0.046)	
Lag (Arrear incidence in working population)	0.059	0.048	0.026
	(0.049)	(0.049)	(0.049)
Year 2004	-0.011***	-0.019***	-0.019***
	(0.003)	(0.005)	(0.005)
Year 2005	-0.020***	-0.039***	-0.039***
	(0.003)	(0.010)	(0.010)
Year 2006	-0.018***	-0.042***	-0.043***
	(0.003)	(0.013)	(0.013)
Regional Controls	—	X	X
R-squared	0.212	0.228	0.214
Observations	308	308	308
Number of regions	77	77	77

Note: Controls include: Log of land size under agricultural production, log of per capita income level, standard deviation of per capita income level, regional unemployment share. Income values are top winsorised at 1 percent. Base year is 2003. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. Source: UHBS.

6.5 Attrition analysis

One potential source of bias in the ULMS stems from potential non-random panel attrition. Sample attrition of the ULMS amounts to 19.5 percent for the entire sample and 18.6 percent among those employed in 2003. For the purpose of this study it is, however, interesting to analyse exits more broadly and to consider not only individuals who leave the survey but also those who leave the employee status. A more general analysis indicates that a substantial fraction of workers leave the employed sample in the second year of the panel. As the goal is to track the causal effect from labour market shocks on labour supply, it is important to investigate, in which labour market states workers moved, and whether they potentially left jobs as a response to wage uncertainty. From 2003 to 2004, the raw exit rate from dependent employment is at 31 percent of the 2003

sample of dependently employed, while 19 percent newly entered into this employment status. The substantial share of exits accounts for persons who have reached pension age, engaged in entrepreneurial or professional farming business, left their job temporarily in the reference week (e.g. for sickness reasons, holidays or maternity leave) or left the labour force voluntarily (all together 9.3 percent) or became unemployed (3.1 percent). The remaining 18.6 percent attrited from the survey. Table 18 sheds light on the hypotheses that wage arrears might be correlated with different kinds of exit behavior from dependent employment. Therefore simple binary indicators are constructed which take on the value of one if an employed ULMS respondent of 2003 left the sample for any of the given reasons, and zero otherwise. These dummies are regressed on a wage shock indicator and some demographic and regional characteristics employing a simple Probit regression framework. If attrition was perfectly random, we expect no statistically significant association between the propensity to leave the sample and any right-hand side variables. This is rather unlikely and indeed, we find that the demographics carry the expectable signs. Women and older respondents are less likely to leave the survey, while education matters for unemployment. The results also suggest some specific geographic patterns of panel attrition with inhabitants of the Center and East region being more reluctant to drop out of the panel. Most importantly, however, there is no significant positive or negative correlation between the incidence of a wage shock in 2003 and subsequent exit from employment or the survey.

Two approaches are used in order to investigate the impact of sample attrition on the estimated second job holding responses: First, beside results stemming from a balanced panel, the robustness of the results is shown with a maximal data sample (Tables A-4 and A-5). Second, the main results are re-estimated using inverse probability weights (Wooldridge, 2002) that account for

the predominant attrition of specific subgroups (Tables A-11 and A-12).[30] Both procedures have very little impact on the estimation results and confirm the robustness of the findings.

Table 18: Determinants of sample attrition, exit from the workforce and unemployment

	(1)	(2)	(3)	(4)
Dependent variable:	***Sample attrition in t+1***	***Survey attrition in t+1***	***Unemployment in t+1***	***Other exits from employ-ment in t+1***
Wage arrear in *t*	0.006	-0.027	0.008	0.015
	(0.027)	(0.021)	(0.010)	(0.014)
Age	-0.001	-0.002***	-0.000	0.001**
	(0.001)	(0.001)	(0.000)	(0.000)
Years of education	-0.008**	0.000	-0.003**	-0.003
	(0.004)	(0.003)	(0.001)	(0.002)
Female	-0.017	-0.038**	0.009	0.022**
	(0.018)	(0.015)	(0.006)	(0.009)
Married	0.033*	0.022	0.002	0.001
	(0.019)	(0.015)	(0.006)	(0.011)
Pseudo R-squared	0.062	0.132	0.049	0.030
Observations	3097	3097	3097	3097
Fraction of 2003 sample	28.9%	18.6%	3.1%	7.2%

Note: The sample consists of all individuals who were eligible for re-interview in 2004. The estimation adopts a forward looking linear probability model. Cases (2), (3) and (4) are sub items of (1). All regressions control for regions. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Source: ULMS, author's calculations.

7 Conclusions

This paper tested whether individuals use second jobs as consumption smoothing device against transitory wage shocks, in a setting of myopic and credit constrained agents. The empirical analysis is based on a unique panel data set from Ukraine which provides detailed information on employment relations, wages and wage non-payment. The results suggest a significantly positive albeit small effect of the incidence of wage shocks and shock intensity on second job holdings and

[30] Inverse probability weighting proceeds in two steps, where in the first step an attrition indicator for *t+1* is regressed on the covariates at *t*. In the second step, the fitted attrition probabilities are used as inverse weights.

working hours. At the same time working hours in the main job as well as leisure are reduced. These results prove robust when accounting for unobserved heterogeneity of employees by controlling for fixed effects. Exogenous repayment of outstanding wages is used as a supportive quasi-experiment to test the coherence of the hypothesis at the end point of the shock cycle. In order to reduce measurement error, an instrumental variable approach is used which exploits more comprehensive variation in wage shocks from a second data source. I also consider several alternative explanations for the observed second job holding patterns, like hours constraints in the main job, training, anticipation of shocks and gradual job change, but cannot find support for these competing hypotheses. To test the effectiveness of this coping behaviour with respect to households' ability to buffer their consumption level against wage shocks, I conduct a simple econometric test of household consumption smoothing. It reveals that non-anticipated transitory wage shocks cannot be perfectly insured ex-ante. However, households whose members cope with wage shocks by re-allocating work effort from main to second job manage to keep up their consumption levels. Hence, second job holdings enable households to fully smooth out income shortfalls from wage arrears.

My results are in line with the general consumption smoothing literature which suggests that individuals and households put coping mechanisms in place when insurance and foresight are imperfect. The paper adds to this literature a perspective for imperfect markets: employees use second jobs on the labour market as coping mechanism against wage shocks and adapt their response to transitory wage shocks over the life cycle of wage shocks. These results are consistent with the prediction from the static theory of labour supply. The paper also adds to the scarce empirical evidence on labour supply in lower middle income countries.

The findings from my research have several interesting policy implications. First, in the absence of protective social security institutions individuals strive to engage in second job holdings

as a coping activity in order to reduce the consequences of wage shocks. This evidence indicates that individuals and households might manage to feed themselves, however, politics that rely on this mechanism must keep in mind the potentially limited scope for self-help, e.g. through low demand on a second job market. Second, the paper has shown how firms' wage payments may lead to evasive movements in labour supply and thus spill-over from firm policies on labour supply. The results suggest that employees do not entirely retreat from the labour market but on average reduce main employment effort in substitution for second job holdings. These jobs, however, may potentially be less productive or located in the informal sector. Unfortunately, I am unable to distinguish formal and informal second job holdings in the data, but potential evasion into the informal economy implies negative consequences for tax revenues. Third, the reallocation of work may impact on the regional labour supply, as wage shocks were found to be regionally highly concentrated. The previous literature on wage arrears in transition countries has regarded the clustering of shocks in combination with low job mobility as the main reason why employees refrain from switching employers. My paper delivers another aspect which has been ignored in the literature so far: If employees command well functioning coping mechanisms to smooth out consumption in the short run, their desire to switch jobs might be reduced.

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Appendix

Table A-1: Overview of variables

Variable	Mean	Min	Max
Labour market information			
Second job	2.3%	0	1
Hours second job h_2	0.12	0	24
Conditional hours in second job, $(h_2 \mid h_2 > 0)$	5.1	0.5	24
Hours in main job (reference week)	40.9	1	100
Leisure time (hours per week)	62.3	12	109
Wage shock Prob($\gamma > 0$) (arrear)	10.6%	0	1
Intensity of shock γ (number of arrear months)	0.30	0	69
Conditional intensity of shock γ (number of arrear months), $(\gamma \mid \gamma > 0)$	5.2	0.1	69
Repayment	1.6%	0	1
Effort related positive shock	1.2%	0	1
Demographic characteristics			
Female	54.9%	0	1
Married	71.9%	0	1
Age	40.6	17	60
Adjusted years of schooling	12.0	4	15
Regional characteristics			
Village	27.4%	0	1
Town	27.4%	0	1
City	45.2%	0	1
Kiev (region)	5.5%	0	1
West (region)	18.7%	0	1
East (region)	27.2%	0	1
South (region)	24.9%	0	1
Center (region)	23.7%	0	1
Welfare indicators			
Asset indicator	0.3	-3.398	4.346
Log of non-labour income	5.5	0	9.1
Job characteristics			
Contractual hourly wage in main job	2.2	0.1	45
Economic sector		1	12
Business ownership category		1	4

Note: Sample size: 3,472 (balanced sample). Source: ULMS.

Table A-2: Correlation matrix for asset items and asset indicators (Factor predictions from Principal Component Analysis)

	Color TV	PC	Phone	Mobile phone	Refrigerator	Washing machine	Car	Motorcycle	Dacha	Other apartment, house
Color TV	1									
PC	0.1338 *0.000*	1								
Phone	0.2362 *0.000*	0.1877 *0.000*	1							
Mobile phone	0.1636 *0.000*	0.2821 *0.000*	0.1462 *0.000*	1						
Refrigerator	0.3892 *0.000*	0.1004 *0.000*	0.2316 *0.000*	0.1287 *0.000*	1					
Washing mashine	0.3108 *0.000*	0.1237 *0.000*	0.2022 *0.000*	0.1389 *0.000*	0.3281 *0.000*	1				
Car	0.1828 *0.000*	0.1398 *0.000*	0.191 *0.000*	0.2116 *0.000*	0.1596 *0.000*	0.1949 *0.000*	1			
Motorcycle	0.0625 *0.000*	-0.0387 *0.000*	-0.0298 *0.000*	-0.0139 *0.082*	0.0344 *0.000*	0.0573 *0.000*	0.0248 *0.002*	1		
Dacha	0.0907 *0.000*	0.0755 *0.000*	0.1399 *0.000*	0.0639 *0.000*	0.0891 *0.000*	0.0881 *0.000*	0.1111 *0.000*	0.0114 *0.154*	1	
Other apartment, house	0.0177 *0.027*	0.0273 *0.001*	0.0132 *0.097*	0.0608 *0.000*	0.0084 *0.290*	0.0282 *0.000*	0.0291 *0.000*	0.0349 *0.000*	0.0769 *0.000*	1
Score for component 1	0.6491 *0.000*	0.4401 *0.000*	0.5609 *0.000*	0.4777 *0.000*	0.6254 *0.000*	0.6078 *0.000*	0.5038 *0.000*	0.0592 *0.000*	0.2966 *0.000*	0.0996 *0.000*

Note: Sample size: 3,472 (balanced sample). The Table displays pair wise correlation coefficients; p-values of significance levels in italics. Source: ULMS.

Table A-3: Hours responses to wage shocks, intensive margin. Linear FE model.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable			***Hours in second job***			
Wage shock	0.206**			0.182*		
	(0.093)			(0.094)		
Intensity of wage shock		0.082***			0.080***	
		(0.011)			(0.011)	
Repayment			-1.505***			-1.474***
			(0.553)			(0.557)
Log hours main job	-0.169**	-0.170**	-0.182**	-0.222**	-0.231**	-0.245**
	(0.085)	(0.084)	(0.085)	(0.100)	(0.098)	(0.100)
Demographic controls	X	X	X	X	X	X
Job & wealth controls	—	—	—	X	X	X
R-squared	0.007	0.034	0.008	0.017	0.043	0.019
Observations	3472	3472	3472	3472	3472	3472

Note: Regressions for illustration only. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A-4: Full list of main regressors, extensive margin, OLS model
Comparison of maximal sample (col. 1 to 8) with constant sample size (col. 9 and 10)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable:	***Second job holding indicator (0/1)***									
	Maximal sample				Maximal sample				Constant sample	
Wage arrear	0.021**				0.023**				0.023**	0.025**
	(0.010)				(0.010)				(0.011)	(0.011)
Number of arrears		0.004				0.004				
		(0.003)				(0.003)				
Repayment			-0.026***				-0.028***			
			(0.008)				(0.009)			
Positive shock				0.032				0.031		
				(0.033)				(0.035)		
Female	0.001	0.001	0.000	0.000	0.002	0.002	0.001	0.000	0.003	0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Age	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.001	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age squared/100	-0.003	-0.003	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	-0.002	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Years of education	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Second job hourly	0.001*	0.001*	0.001	0.001	0.001	0.001	0.001	0.001	0.001*	0.001
shadow wage	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log hours main job	-0.027***	-0.026**	-0.027***	-0.027***	-0.021*	-0.021*	-0.023*	-0.024**	-0.021*	-0.020
	(0.010)	(0.010)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.013)
Village	-0.001	-0.001	-0.000	0.000	-0.001	-0.001	-0.000	-0.000	-0.008	-0.005
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
Town	-0.004	-0.004	-0.004	-0.004	0.000	-0.000	-0.000	-0.000	-0.002	-0.000
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)
Married					-0.008	-0.008	-0.008	-0.009		-0.010

					(0.006)	(0.006)	(0.006)	(0.006)		(0.007)
Asset indicator					0.002	0.002	0.001	0.002		0.001
					(0.002)	(0.002)	(0.002)	(0.002)		(0.002)
Log of non labour					0.005***	0.005***	0.006***	0.006***		0.006***
income					(0.001)	(0.001)	(0.001)	(0.001)		(0.001)
Hourly wage main job					0.003	0.003	0.002	0.002		0.001
					(0.002)	(0.002)	(0.002)	(0.002)		(0.002)
Kiev	0.004	0.003	0.002	0.002	-0.001	-0.001	-0.002	-0.002	0.014	0.008
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.015)	(0.015)
West	0.021**	0.021**	0.020**	0.020**	0.024***	0.024***	0.023***	0.023***	0.033***	0.030***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
East	0.003	0.004	0.003	0.003	0.002	0.003	0.003	0.003	0.010	0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)
South	0.019**	0.019**	0.018**	0.018**	0.020**	0.020**	0.019**	0.019**	0.025***	0.023**
	(0.009)	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
Time	0.002	0.002	0.001	0.001	-0.001	-0.001	-0.002	-0.001	0.005	0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Constant	0.025	0.021	0.027	0.026	-0.040	-0.043	-0.033	-0.032	0.014	-0.041
	(0.055)	(0.055)	(0.055)	(0.055)	(0.064)	(0.064)	(0.064)	(0.064)	(0.065)	(0.072)
Sector and job characteristics	—	—	—	—	X	X	X	X	—	X
R-squared	0.015	0.016	0.013	0.013	0.022	0.024	0.020	0.020	0.016	0.021
Observations	4282	4282	4282	4282	4022	4022	4022	4022	3472	3472

Robust standard errors in parentheses are clustered by id; *** p<0.01, ** p<0.05, * p<0.1

Table A-5: Full list of main regressors, extensive margin, FE model
Comparison of maximal sample (col. 1 to 8) with constant sample size (col. 9 and 10)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable:	***Second job holding indicator (0/1)***									
	Maximal sample				Maximal sample				Constant sample	
Wage arrear	0.027**				0.027**				0.028**	0.027**
	(0.011)				(0.013)				(0.013)	(0.013)
Number of arrears		0.006***				0.006***				
		(0.001)				(0.002)				
Repayment			-0.170**				-0.195**			
			(0.068)				(0.077)			
Positive shock				-0.023				-0.025		
				(0.026)				(0.028)		
Age	-0.006	-0.007	-0.005	-0.006	-0.012	-0.015	-0.011	-0.013	-0.012	-0.012
	(0.014)	(0.014)	(0.014)	(0.014)	(0.023)	(0.023)	(0.022)	(0.022)	(0.023)	(0.023)
Age squared/100	0.008	0.010	0.007	0.008	0.011	0.014	0.010	0.012	0.013	0.011
	(0.016)	(0.016)	(0.016)	(0.016)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Years of education	-0.003	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Second job hourly shadow wage	0.001	0.001	0.001	0.001	-0.000	0.000	0.000	0.000	0.001	-0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Log hours main job	-0.022**	-0.023**	-0.024**	-0.024**	-0.020	-0.022	-0.023*	-0.023	-0.026**	-0.020
	(0.011)	(0.011)	(0.011)	(0.011)	(0.014)	(0.014)	(0.014)	(0.014)	(0.012)	(0.014)
Town	-0.011	-0.013	-0.013	-0.013	-0.010	-0.012	-0.011	-0.011	-0.012	-0.010
	(0.018)	(0.018)	(0.018)	(0.018)	(0.020)	(0.019)	(0.021)	(0.021)	(0.019)	(0.020)
Time	0.007	0.007	0.006	0.006	0.008	0.009	0.008	0.008	0.007	0.008
	(0.009)	(0.009)	(0.009)	(0.009)	(0.014)	(0.014)	(0.013)	(0.013)	(0.014)	(0.014)
Married					0.026*	0.027*	0.027*	0.027*		0.026*
					(0.015)	(0.015)	(0.015)	(0.015)		(0.015)
Asset indicator					-0.003	-0.003	-0.003	-0.003		-0.003

					(0.004)	(0.004)	(0.004)	(0.004)		(0.004)
Log of non labour income					0.005**	0.005**	0.005**	0.005**		0.005**
					(0.002)	(0.002)	(0.002)	(0.002)		(0.002)
Hourly wage rate main job					0.002	0.001	0.001	0.001		0.002
					(0.003)	(0.002)	(0.002)	(0.003)		(0.003)
Constant	0.228	0.260	0.237	0.246	0.295	0.385	0.334	0.335	0.390	0.332
	(0.329)	(0.328)	(0.329)	(0.330)	(0.641)	(0.640)	(0.639)	(0.640)	(0.639)	(0.665)
Sector and job characteristics	—	—	—	—	X	X	X	X	—	X
R-squared	0.007	0.012	0.007	0.005	0.022	0.028	0.024	0.020	0.007	0.023
Observations	4282	4282	4282	4282	4022	4022	4022	4022	3472	3472

Note: Robust standard errors in parentheses are clustered by id; *** p<0.01, ** p<0.05, * p<0.1

Table A-6: Full list of main regressors, intensive margin, Tobit and RE Tobit models

	(1)	(2)	(3)	(4)
Dependent variable		***Hours in second job***		
	Tobit	**Tobit**	**RE Tobit**	**RE Tobit**
Wage shock	4.924***	4.758***	4.870***	5.094***
	(1.779)	(1.788)	(1.862)	(1.909)
Hours main job	-0.098*	-0.104*	-0.128**	-0.124*
	(0.057)	(0.060)	(0.061)	(0.064)
Second job shadow hr. wage	0.166**	0.159**	0.183**	0.170*
	(0.074)	(0.074)	(0.087)	(0.087)
Female	0.800	0.308	0.422	0.086
	(1.288)	(1.338)	(1.512)	(1.636)
Age	0.168	0.518	0.068	0.364
	(0.455)	(0.469)	(0.531)	(0.549)
Age squared/100	-0.315	-0.714	-0.192	-0.551
	(0.572)	(0.585)	(0.667)	(0.685)
Years of education	0.873***	0.789**	0.682*	0.628*
	(0.323)	(0.331)	(0.356)	(0.370)
Village	-0.729	0.038	-1.132	-1.650
	(1.792)	(1.826)	(2.121)	(2.311)
Town	0.722	1.112	0.543	0.453
	(1.507)	(1.528)	(1.750)	(1.796)
Kiev	4.813	3.386	4.619	2.555
	(3.221)	(3.164)	(3.765)	(3.779)
West	7.488***	6.720***	7.454***	7.154***
	(2.237)	(2.208)	(2.584)	(2.592)
East	4.023*	3.164	4.063	3.398
	(2.308)	(2.288)	(2.645)	(2.655)
South	7.351***	6.407***	7.055**	6.253**
	(2.470)	(2.442)	(2.835)	(2.824)
Time	0.897	0.837	1.138	0.861
	(1.219)	(1.247)	(1.045)	(1.062)
Married		-2.198		-1.741
		(1.452)		(1.617)
Asset indicator		-0.060		-0.256
		(0.511)		(0.551)
Log non-labour income		2.404***		2.505***
		(0.679)		(0.688)
Hourly wage main job		0.010		-0.018
		(0.385)		(0.400)
Job characteristics	X	X	X	X
Rho			0.683	0.719
LL	-572.3	-559.5	-547.9	-532.3
Pseudo R-squared / Chi2	0.039	0.060	24.33	34.09
Observations	3472	3472	3472	3472

Note: Omitted categories: Region "Centre", settlement type "large city"; Job characteristics include economic sector, firm ownership type and number of employees. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A-7: Shock response patterns by geographic location, RE and FE models

	(1)	(2)	(3)	(4)	(5)	(6)
	Town & Village	**City**	**Town & Village**	**City**	**Town & Village**	**City**
Dependent variables	**Second job**		**Log hours main job**		**Log leisure**	
	RE	RE	FE	FE	RE	RE
Wage shock	0.025**	0.034**	-0.120***	-0.059*	-0.045*	-0.013
	(0.011)	(0.016)	(0.031)	(0.036)	(0.025)	(0.021)
Log non-labour income	0.005**	0.009***	-0.003	-0.004	-0.005	-0.002
	(0.002)	(0.003)	(0.006)	(0.005)	(0.005)	(0.003)
Hourly wage main job	-0.001	0.003	-0.091***	-0.095***	0.034***	0.021***
	(0.002)	(0.002)	(0.007)	(0.004)	(0.006)	(0.003)
Rho	0.236	0.377	0.738	0.677	0.211	0.290
LL			843.9	985.3		
(Pseudo) R-squared	0.034	0.048	0.179	0.432	0.189	0.108
Observations	1904	1568	1904	1568	1904	1568

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A-8: First stage of G2SLS model

	(1)	(2)
Dependent variable:	***Wage shock indicator (0/1)***	
Wage shock instrument (UHBS)	0.861***	0.868***
	(0.077)	(0.076)
Female	-0.013	-0.042***
	(0.011)	(0.011)
Age	0.011***	0.014***
	(0.004)	(0.004)
Age squared/100	-0.018***	-0.022***
	(0.005)	(0.005)
Log of working hours main job	-0.017	-0.082***
	(0.016)	(0.017)
Years of education	0.002	0.008***
	(0.002)	(0.003)
Kiev	-0.006	-0.003
	(0.026)	(0.026)
West	-0.015	-0.019
	(0.016)	(0.016)
East	0.009	0.004
	(0.015)	(0.016)
South	-0.012	-0.030*
	(0.017)	(0.017)
Village	0.079***	0.037**
	(0.014)	(0.014)
Town	0.036***	0.018
	(0.013)	(0.013)
Time	-0.038***	-0.021**
	(0.010)	(0.010)
Second job hourly wage		-0.002***
		(0.001)
Log of non-labour income		-0.003
		(0.003)
Hourly wage main job		-0.032***
		(0.003)
Asset indicator		-0.008*
		(0.004)
Constant	-0.091	0.158
	(0.098)	(0.104)
Wald chi(*df*)	255	389
df	13	17
Prob > chi2	0.0000	0.0000
Observations	3472	3472

Note: Detailed region fixed effects and job characteristics are not controlled for, as they are measurement units for the shock instrument. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A-9: Consumption smoothing model with adult equivalence scales, FE model

	(1) Full sample	(2) Full sample	(3) Full sample	(4) Full sample	(5) Urban sample	(6) Rural sample
Dependent variable:			***Log of household consumption***			
Log of income	0.130***	0.128***	0.128***	0.129***	0.131***	0.124***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.013)
Wage arrear in HH (δ_2)	-0.025**	-0.025**	-0.037*	-0.039*	-0.058**	-0.025
	(0.012)	(0.012)	(0.021)	(0.021)	(0.028)	(0.034)
Second job in HH (δ_3)	-0.011	-0.011	-0.033	-0.032	-0.009	-0.113**
	(0.022)	(0.022)	(0.024)	(0.023)	(0.026)	(0.055)
Arrear*Second job (δ_4)			0.102**	0.101**	0.138**	0.100
			(0.044)	(0.044)	(0.054)	(0.084)
Access to credit		0.411	0.408	0.343	0.655	0.000
		(0.501)	(0.501)	(0.502)	(0.974)	(0.000)
Arrear*Access credit			0.056	0.078	0.278	-0.111
			(0.242)	(0.241)	(0.315)	(0.404)
Subsidiary farming				0.025**		
				(0.011)		
Town		0.100**	0.100**	0.106**	-0.031	
		(0.045)	(0.045)	(0.045)	(0.033)	
Large city		0.130***	0.131***	0.139***		
		(0.047)	(0.047)	(0.047)		
Househ. adult equivalences	0.082***	0.083***	0.082***	0.079***	0.076***	0.091***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.015)	(0.029)
Constant	5.475***	5.372***	5.375***	5.362***	5.436***	5.534***
	(0.052)	(0.068)	(0.068)	(0.068)	(0.097)	(0.102)
R-squared	0.166	0.169	0.172	0.174	0.167	0.174
Observations	4264	4264	4264	4264	3093	1171

Note: Adult equivalence scales according to the Oxford scale.

Table A-10: Second job holding responses to wage shocks, full-time vs. part-time sample, linear FE model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	**Second job holding**							
	Full-time job				**Part-time job**			
Wage shock	0.025*				0.052			
	(0.013)				(0.043)			
Intensity of wage shock		0.002				0.011***		
		(0.002)				(0.004)		
Repayment			0.003				-0.437**	
			(0.091)				(0.187)	
Positive wage shock				0.004				-0.121
				(0.027)				(0.087)
Log hours main job	-0.022	-0.024	-0.023	-0.024	-0.016	-0.020	-0.027	-0.041
	(0.018)	(0.018)	(0.018)	(0.019)	(0.035)	(0.034)	(0.034)	(0.041)
Log non-labour income	0.005**	0.005**	0.005**	0.005**	0.004	0.004	0.007	0.007
	(0.002)	(0.002)	(0.002)	(0.002)	(0.008)	(0.008)	(0.008)	(0.009)
Hourly wage main job	0.004	0.003	0.003	0.002	-0.000	-0.001	-0.002	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.006)
R-squared	0.021	0.019	0.019	0.018	0.114	0.148	0.130	0.108
Observations	2974	2974	2974	2974	498	498	498	498

Note: Part-time is defined as working 35 hours per week or less in 2003. In 2004, individuals can work any number of working hours. This procedure is applied in order to keep the panel balanced and to prevent from a mechanical sample selection. This would be the case if, for instance, full-time employees suffer from a wage shock and reduce their working hours enough to switch from full-time to part-time employment in 2004. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A-11: Weighting with attrition probability, pooled OLS and Tobit models

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	**Second job holding**			**Hours in second job**		
	OLS	OLS	OLS	Tobit	Tobit	Tobit
Wage shock	0.023**	0.025**	0.026**	4.566**	4.617***	4.621***
	(0.011)	(0.012)	(0.012)	(1.787)	(1.780)	(1.716)
Log hours main job	-0.020	-0.021*	-0.022*	-3.583**	-3.515**	-3.211*
	(0.012)	(0.013)	(0.013)	(1.785)	(1.727)	(1.694)
Log non-labour inc			0.006***			2.387***
			(0.001)			(0.796)
Hrly wage main job			0.000			-0.109
			(0.002)			(0.367)
Second job shadow wage			0.001*			0.147*
			(0.000)			(0.079)
Weights	*Unweighted*	*Weighted*	*Weighted*	*Unweighted*	*Weighted*	*Weighted*
Demographic contr.	X	X	X	X	X	X
Job & wealth contr.	—	—	X	—	—	X
LL				-574.1	-383.9	-374.1
R-squared / Chi2	0.014	0.015	0.024	0.035	0.037	0.062
Observations	3472	3472	3472	3472	3472	3472

Note: Weights are inverse probability weights. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A-12: Weighting with attrition probability, panel FE and RE models

	(1)	(2)	(3)	(4)
Dependent variable	**Second job**		**Hours in second job**	
	FE linear	FE linear	RE Tobit	RE Tobit
Wage shock	0.029**	0.033**	4.845**	4.816**
	(0.013)	(0.013)	(1.905)	(2.217)
Log hours main job	-0.021	-0.020	-3.927**	-3.666*
	(0.014)	(0.014)	(1.823)	(2.134)
Log non-labour income	0.006***	0.006**	2.452***	2.422***
	(0.002)	(0.002)	(0.680)	(0.836)
Hourly wage main job	0.002	0.002	-0.068	-0.129
	(0.003)	(0.003)	(0.377)	(0.466)
Second job shadow wage	-0.000	-0.000	0.165*	0.178
	(0.005)	(0.005)	(0.086)	(0.111)
Weights	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
Demographic controls	X	X	X	X
Job & wealth controls	X	X	X	X
Rho	0.530	0.519	0.713	0.684
LL	3630.9	3541.9	-532.0	-357.9
R-squared / Chi2	0.016	0.018	35.1	23.3
Observations	3472	3472	3472	3472

Note: Weights are inverse probability weights. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1