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**Ph.D. Dissertation of Economics**

**Income Shocks and Coping Strategies of  
Russian Households**

**러시아 가계의 소득 충격 대응전략**

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**Graduate School of Economics  
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# **Income Shocks and Coping Strategies of Russian Households**

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## **Abstract**

# **Income Shocks and Coping Strategies of Russian Households**

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Russia began its transition toward a market economy in the early 1990's. However, its transition has not been smooth as it experienced a severe transition recession and several economic crises in the 1990's-2010's. This led households to use various coping strategies in response to these negative economic conditions and high uncertainty. These coping strategies include not only formal but also informal economic activities. In this regard, Russia is an interesting case for understanding household informal economic activities as a coping strategy given a large income shock.

This thesis sets out to analyze the coping strategies of Russian households in a response to income shocks using the data from the Russian Monitoring Longitudinal Survey of the Higher School of Economics (RLMS-HSE) for the years 2002 to 2015. In more detail, it addresses the following three questions: 1) To what extent did business cycles affect informal economic activities? 2) Which coping strategies were utilized to respond to income shocks? 3) To what extent did such coping strategies contribute to consumption smoothing?

This study finds that informal economic activities in the form of working without contract rose during a boom but not a recession. By contrast, unincorporated self-

employment is not associated with business cycles. This finding suggests that part of Russia's informal economy is driven by the demand side rather than by the supply side. Also, this thesis examined the causality relationship between income shocks and coping strategies. The estimated results rejected the hypothesis ( $H_0$ : Causal relation). Similarly, there is no significant consumption smoothing effects of such informal coping strategies.

The main contribution of this thesis is that we studied empirically on households' shock adapting responses within informal institutions. Previous research has not addressed the cyclicity of informal labor supply with micro-based data sets. Moreover, research has not fully considered informal institutions as a package of coping strategies. Nor has it addressed the consumption smoothing abilities within a setting given economy-induced changes with policy-induced changes.

The second contribution of the thesis is methodological. Thanks to abundant information in RLMS-HSE, we analyzed heterogeneity of informal labor supply over the decades, as well as consumption smoothing abilities in Russia since 2000. In addition, we exploit the quasi-experimental variation in income caused by decentralization of minimum wage across the regions.

The third contribution of the thesis is that our research focus was on workers who grew up and educated in post-transition era faced institutional uncertainty, in which emerged between the demolishing of old institutions and the construction of new ones. Old cohorts with obsolete human capital from a socialist economy but with few market economy experiences, left the labor market in the 2000s. Then, younger cohorts replace the place who were also educated during the Soviet era but acquired more market-oriented experience since the start of the economic transition.

The results of the thesis show that informal economy in the current Russian informal economy is interwind motivated and single logic is not enough to explain its rationale and motivations. Thus, in order to understand the informality accurately, both micro-based data and macroeconomic changes have to be considered at the same time. More rigorous analysis on underlying assumptions of research and assumed unobservable characteristics would be needed.

**Keywords: Informal Job, Private Transfer, Home-produced Products, Coping Strategy, Transition Economies**

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## Chapter 1. Introduction

Knowledge of informality in transition countries has a great importance for researchers as well as policy makers because it affects the welfare of households, fiscal policy, and growth dynamics.<sup>1</sup> As regards the aspect of welfare, informal sectors have some benefits to workers and households: a “stepping stone” enabling accumulating human capital for those who want to shift their career towards self-employed activities in the future (Guariglia & Kim, 2006; Slonimczyk, 2013); a survival strategy for those who are facing wage arrears or primary job constraints (Karen Smith Conway 1998; Renna, 2006). On the other hand, by its tax-evading nature, informal sectors have negative effects on tax revenue and thus economic development (Slonimczyk, 2013). Particularly, tax revenues are scarce resources for transition economies that need to develop infrastructure and institutions. For these reasons, understanding scale and mechanism of informal job holding is essential for transition economies.

Understanding the informal economy provides an opportunity to improve the provision of welfare and to design sound fiscal policy. This effect is more clearly pronounced in developing and transition countries where an informal economy is large. Formal institutions in developing countries, unlike in advanced countries, are not fully working. Hence various forms of informal institutions were practiced. Multiple jobs, raising livestock or grains, private transfers among relatives and friends.

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<sup>1</sup> Informal economic practices can be generally defined as unreported (or in other ways hidden from the state) activities of entrepreneurs/entrepreneurial firms whose business is not ‘antisocial in intent’ (De Soto, 1989) and who produce goods and services not forbidden by law. Also, it refers to economic activities that are not captured by official statistics.

Knowing the dynamics of informal economy is also important. On one hand, the existence of an informal sector may add resilience to the economy when times are hard. In other words, informal economic activities are counter-cyclical, as they can mitigate the negative effects of business cycles on consumption. On the other hand, the erosion of the tax base greatly complicates the task of fiscal policy makers at a time of ballooning public deficits. In fact, revenue losses seem to be the main cause of the dramatic increase in debt-to-GDP of ratios that typically follows the explosion of a banking crisis (Reinhart and Rogoff, 2009).

A related issue lies in the question of whether informal employment is an attractive opportunity or a strategy of last resort (Falco and Haywood 2016; Günther and Launov 2012; Loayza and Rigolini 2011). In more detail, a group of researchers claim that the less education and skilled tend to work informally because they are not able to find a job in the formal sector. By contrast, other scholars argue that workers flexibly move between the formal and the informal sector to maximize their welfare and to protect from income shocks. Recent studies have been claiming that the informal sector is not homogenous and the earlier dualist views may not be consistent as the general case. Context matters since size and structure of informal sectors varies across regions and how it interacts with given institution may give different impacts on its evolution of structure. However, there are few empirical studies emphasized evolution of informal labor market, its changing structures, and heterogeneity of informal sector participants.

In the Russian context, Merkuryeva (2006) used 2003 NOBUS dataset and found that the role of informal employment in Russia is combined with inferior disadvantaged sector and superior entrepreneurial sector. According to Gimpelson (2014), Russia is different from most other informality-ridden countries in the following aspects. First,

Russia's agricultural share of employment is under 10% and its share of rural population is around 25%, making it a non-agricultural economy. Second, the majority of the informal employment has a form of hired labor, rather than self-employment. On the other hand, most developing economies are dominated by various self-employment types, such as smallholder farmers, retail business owners, basic manufacturers and petty traders (Falco and Haywood, 2016). Third, the rise in informality can largely be attributed to a prolonged transition towards a market economy rather than to rural-urban migration from underdevelopment. Finally, informal workers in Russia is relatively highly educated compared to those in other countries.

The existing literature on the informal economy in transition and development economies focused on either 'the choice of coping strategies' or 'the examination of the consumption smoothing ability', instead of linking both. In addition, the relationship between business cycles and informal economic activities is not sufficiently explored. Investigating these three inter-linked issues simultaneously will provide a more complete understanding the nature of Russia's informal economy and its implications for household welfare.

This thesis sets out to examine three issues regarding the informal economy which are inter-linked using the data from the RLMS-HSE. It is a nationally-representative annual survey designed to monitor the effects of Russian reforms on the health and economic welfare of households and individuals in the Russian Federation. The RLMS-HSE covers more than 4,000 households (between 7,413 and 9,444 individual respondents), starting from 1992. Our study utilizes rounds 5 through 24 of the RLMS, a time span from 1994 to 2016. The data cover 33 regions, or 31 oblasts (krays, republics), Moscow and St. Petersburg.

The detailed issues which this thesis investigates are as follows: First, we investigate the effects of income shock on informal jobs in the context of business cycles. Second, it is examined which smoothing channels were used to respond to income shocks. Third, we discuss the extent to which such channels were effective in consumption smoothing.

The evolution of Russian labor market can be divided into three stages. Each stage demonstrates drastic changes in labor market performances. The first stage, during 1991-1998, is known as the ‘deep transformational recession’ which involved considerable changes in GDP, employment, working hours, and real wages, as well as hyper-inflation. The transformational recession in the 1990s was accompanied by a drastic decline in GDP by 40% (at the trough of the 1998 crisis compared to 1991) but the employment was down by less than 15%. In other words, each percentage point of lost GDP caused employment downsizing by only 0.30-35 percentage points. This is a stark contrast with most of the Central and Eastern European Countries (CEEs), where the impact on employment change was bigger. Low sensitivity of employment to fluctuations in GDP is what differentiates the Russian labor market from others’ (Gimpelson and Kapelieu, 2011).

The second stage, during the period of 1999-2008, is the period of post-recession recovery. Following the economic crisis in 1998, Russia devalued its currency, which contributed to economic recovery. At the same time, the price of oil at the world market, which is the most important export item in Russia, substantially increased. As a result, there was a rapid improvement in the labor market performance. From 1998 to 2008, GDP almost doubled and total employment increased by 78% (Gimpelson and Kapelieu, 2011).

The third stage is the period of post-economic crisis. The 2008-2009 economic crisis reduced the Russian GDP by 7.9% from 2008 to 2009. However, total employment declined only by a modest 2.2% in 2009. As for unemployment, it grew from 6.4% to 8.4%, or by 2 percentage points, in the same period. However, from the middle of 2009, general unemployment tended.

This thesis consists of five chapters. Chapter 1 describes the background and the purpose of this research. Chapter 2 analyzes the impact of income shocks on individual decision of informal job holdings. Both Chapter 3 and Chapter 4 examine the rationales and motives for conducting informal activities in Russia. In more detail, Chapter 3 examines the relationship between income shocks and informal coping strategies. Chapter 4 discusses the extent to which households' coping strategies contributed to their consumption smoothing. Chapter 5 summarizes the overall results and concludes.

## **Chapter 2. Income Shock and Informal Job Holdings**

### **2.1. Introduction**

Researchers are interested in understanding why workers hold informal jobs. The literature is divided into two contrasting views (Falco and Haywood 2016; Günther and Launov 2012; Loayza and Rigolini 2011). The first one is that workers are forced to work informally because there are no available jobs for them. In other words, informal employment (or self-employment) is an attractive employment or a strategy of last resort for the workers who are less educated and low-skilled.(Lewis, 1954; Harris and Todaro, 1970; Fields, 1990; Stiglitz, 1976) The second view is that working in informal can be seen as voluntary opportunistic choice or hedging strategy against income shocks such as displacement of main job or decrease of wage earnings. Hence, informal workers are not necessarily low-skilled and less educated.(Rosenzweig, 1988; Magnac, 1991; Gindling, 1991; Pretap and Quintin, 2006; Maloney, 2004; Kolev, 1998; Foley, 1997; Braithwaith, 1995)

In the Russian context, Merkuryeva (2006) found that informal employment in Russia is combined with inferior disadvantaged sector and superior entrepreneurial sector. In contrast to a large number of works on cross-sectional differences in determinants of informal job holding, not much emphasis was made on the effects of income shocks on

informal employment across business cycles.<sup>2</sup> (Amuéd-Dorantes, C., & Kimmel, J., 2009)

One of the main reasons includes the deficiency of the data. Panel data for a relatively long period is difficult to come by. This leads to insufficient understanding on informal employment across business cycles. Income shocks are likely to affect informal employment because the latter may be regarded as a supplementary source of income in bad times.

Having said that, the effects of income shocks on informal employment may also differ on the type of employment. Informal employment has diverse features. For example, some informal jobs are readily available and easy to enter while others are not. The extent to which income rises is also dependent on the type of informal jobs. There are various types of informal sectors with different characteristics. Depending upon its characteristics and participating motivations, the response of informal job workers against income shock varies. Furthermore, establishing the connection between business cycles and informal job holding is difficult since both economic downturn and upturn could affect informal job holding in two contrasting ways (Hirsch et al., 2016). On one hand, when the economy turns to recession and primary jobs become insecure, the possibilities of having informal jobs would increase to make up lower primary job earnings. On the other hand, due to less demand of informal jobs, the possibilities of having informal jobs would decrease. Even during the economic recovery, the likelihood of having informal jobs would be asymmetric. Thus, it is necessary to consider these counterbalancing forces. However,

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<sup>2</sup> In macroeconomic literature, however, there is considerable research on the relationship between informal economy and business cycle (e.g., Schneider and Buehn, 2012; Elgin and Oztunali, 2012; Colomno, Onnis, and Tirelli, 2016).

the investigation of whether or not informal job holding varies over the business cycle has largely ignored the life-cycle perspective of occupational choice.

Aggregate data are not appropriate for this kind of research. They reveal only the overall picture without proper differentiation between the various types of informal economy activities (Thomas, 1992; Levenson and Maloney, 1998; Schneider and Enste, 2000). There are substantial differences on why workers hold informal jobs and what effects the jobs have their welfare. Such differences also depend on the types of the informal jobs. Ignoring this heterogeneity may lead to considerable and possibly misleading simplification of their true motives and effects.

Previous empirical evidence on cyclical pattern of informal employment is mixed. A number of studies argued that the informal economy acts as a buffer, increasing its size in periods of recession (Shneider and Buehn, 2012; Elgin and Oztunali, 2012). By contrast, Bajada (2003) and Giles (1997) found a procyclical relationship in Australia and New Zealand, respectively. In addition, Moore and Mueller (2002) found that self-employment decisions are uncorrelated with the unemployment rate.

This chapter is organized as follows. In Section 2, the evolution of the Russian labor market is described. In Section 3, we discuss on the measure of key variables, illustrate the data used, and provide some summary statistics. Section 4 shows the empirical specification and discusses on econometric issues. Section 5 analyzes the dynamics of informal employment over the business cycles of the Russian working-age population. Section 6 discusses our findings and concludes.

## **2.2. Data and Methodology**



In an effort to evaluate the relationship between business cycles and informality, we use the Russia Longitudinal Monitoring Survey of Higher School of Economics (RLMS-HSE) from rounds 8-24 covering the period 1998-2015. The RLMS-HSE is a nationally-representative annual survey designed to monitor the effects of Russian reforms on the health and economic welfare of households and individuals in the Russian Federation. It covers more than 4,000 households (between 7,413 and 9,444 individual respondents), starting from 1992, with 32 oblasts (regions) and 7 federal districts of the Russian Federation. Since the questions on informality have been included in the survey since 2002, despite the fact that the sample were available from 1994, we employ post-2002 data.

In our sample, only individuals who report having a main job, aged between 18 and 60 for men and 18 and 55 for women, were included, based on the different retirement ages for each group. Since the study focused on labor mobility, we only keep individuals who were observed in at least two consecutive rounds. Note that the labor incomes are wages received during the last 30 days from a main job which were taken net of taxes and social security contributions. To obtain before-tax wages data<sup>3</sup>, the after-tax wages were multiplied by 1.149 ( $\approx 1/(1 - 0.13)$ ), reflecting a flat income tax rate of 13 percent in Russia.<sup>4</sup> Furthermore, observations with missing data in key variables, such as age, education, earnings and number of hours worked, were eliminated. Individuals who report zero earnings or zero working-hours were also restricted. These restrictions leave an unbalanced panel of 54,738 observations in the baseline sample.

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<sup>3</sup> It enables us to analyze the effects of minimum wage reforms across the regions in section 4.

<sup>4</sup> Slonimczyk (2012) analyzed the effect of the 2001 Russian flat tax reform on informal employment using a differences-in-differences approach.

There is no consensus on definition of the informality.<sup>5</sup> In terms of informal employment, it has been defined in various ways depending on measurement methodologies, available data sets, or purposes of research. Furthermore, as Bernabé (2008) pointed out, it is necessary to construct mutually exclusive categories for econometric analysis. Also, it is obvious that too many categories would undermine the robustness of results due to small sample size.

To address this, we use the questions regarding the status of employment and whether or not one works at an enterprise or organization. Similar to Slonimczyk (2012) and Lukiyanova (2015), we first use the replies to the question on whether or not respondents are working at an enterprise or organization at their primary job. After distinguishing between working at an enterprise or not, we identify whether workers at an enterprise are officially registered. If respondents are both working at an enterprise and officially registered, then, they are regarded as formal job holders. Otherwise, either hired employee without formal registration at an enterprise or organization (workers without contract), or self-employed individuals (and their employee) working on their own account but not at an enterprise or organization are measured as informal job holders (self-employed).

First, if respondents answer “yes” to following question, then we regarded them as “workers in formal sector,” assuming entrepreneurs and employees in the sector are similar. If they answer “No”, then we defined them as “self-employed” (entrepreneurs and employees), that is, informal sectors.

---

<sup>5</sup> To comprise this blurredness of informality, Lehmann and Zaiceva (2013) used all of the existing definitions to provide coherent results.

*“Tell me, please: Does this job belong to an enterprise or organization? I mean any organization or enterprise where more than one person works, no matter if it is private or state-owned. For example, any establishment, factory, firm, collective farm, state farm, farming industry, store, army, government service, or other organization.”*

Next, workers belong to enterprise or organization who did not register officially were regarded as “workers without contract” based on this question:

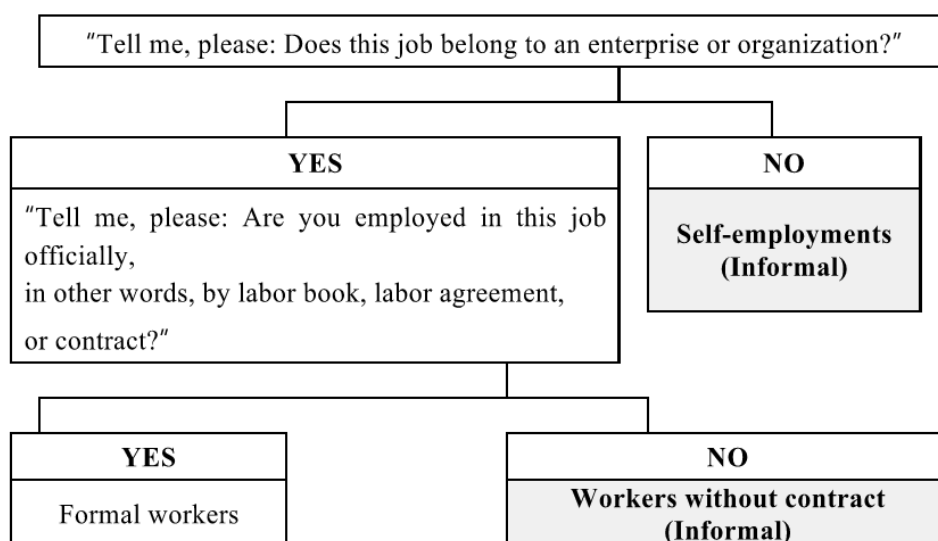
*“Tell me, please: Are you employed in this job officially, in other words, by labor book, labor agreement, or contract?”*

Finally, we get three mutually exclusive employment groups; workers in the formal sector (employer and employee<sup>6</sup>), workers without contract, and informal self-employment (employer and employee). Hence, in this thesis, informal employment is defined as being either informal self-employment or employment without contract. Figure 1 shows a conceptual framework of informal employment used in this chapter.

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<sup>6</sup> We assumed employer and employee in formal sector as well as in self-employment have similar characteristics. In fact, we divided formal sector into formal entrepreneurial and formal employee based on questionnaire asking whether they are doing entrepreneurial activities. The estimate results were similar to our main results.

**Figure 1. A Framework of Informal Employment**



In order to identify income shock, we construct a composite indicator. Given that the Russian labor market adjusts to economic shocks primarily through reducing wages rather than eliminating jobs<sup>7</sup>, we used the answers from questionnaire whether respondents have experienced either wage arrears, unpaid leave, or unexpected wage cut. Hence income shocks equals 1, if respondents were “yes” to one of those questions, and 0, otherwise.

In fact, wage flexibility is a distinctive feature of the Russian labor market (Gimpelson and Kapeliushnikov, 2011). The labor market institutions in Russia enabled employers to easily cut wages because the constant or base wage rate makes up about two-thirds of the average payable wage in Russia. The rest includes additional bonuses and compensation—paid monthly, quarterly or annually, which are governed by local employer-issued norms or by collective agreements. A notable characteristics is that these

<sup>7</sup> Hence we did not accounted unemployment as income shocks. In addition, informal employment per se can be seen as another forms of hidden unemployment.

norms and the provisions of the collective agreements usually stipulate the company's financial sustainability. Therefore, at the end of 2008 and during 2009, when the financial crisis seriously hit Russia, most employees experienced a cut in the additional bonuses (Gimpelson, 2008). Indeed, several studies documented the volatile changes in income in Russia (Bogomolova and Tapilina, 1999; Denisova, 2007; Lokshin and Popkin, 1999; Lokshin and Ravallion, 2000; Lukiyanova and Oshchepkov, 2012)<sup>8</sup>.

## **2.3. Descriptive Statistics**

Table 2-1 shows the means of all observable characteristics that we use in our analysis by employment status: formal workers; workers without employment contracts (abbreviate to 'workers without contracts'); and unincorporated business workers (abbreviate to 'self-employments'). Compared to formal workers, informal workers tend to be younger, less educated, and more likely to be male. In addition, the average years of tenure for informal workers are much less than formal workers: approximately 2.2 years for workers without contracts, and 4.5 years for self-employments, while formal workers have 7.5 years of tenures at their main jobs in average.

Note that even though there were some distinctions between formal and informal workers, one can find some similarities as well, in terms of hourly wages measured by real monthly wages divided by monthly working-hours, and households' wealth measured by non-labor household income. Furthermore, the last two columns show that,

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<sup>8</sup> In recent years, it has been observed as rather moderate (Gorodnichenko et al., 2010).

even within the same informal sectors, some characteristics vary depending on which ‘informal sub-sector’ they belong to. For example, ‘workers without contracts’ are more likely to be regional center inhabitants whereas ‘self-employments’ are inclined to be rural inhabitants. In terms of main job occupations, Table 1 coincides with the common belief that informal sector would be less skilled workers except the ‘legislators, senior officials, or managers’; the ‘self-employments’ account for the highest proportions of respondents.

**Table 2- 1 Means of Variables**

Employment status	Informal					
	Formal (1)		Workers without employment contracts (2)		Unincorporated business (Self-employments) (3)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Main job occupations						
Legislators, managers, officials	0.079	0.27	0.02	0.141	0.116	0.32
Professionals	0.184	0.387	0.034	0.182	0.042	0.201
Technicians	0.178	0.382	0.109	0.312	0.054	0.225
Clerical	0.046	0.209	0.031	0.173	0.014	0.119
Service workers, market workers	0.126	0.332	0.225	0.418	0.297	0.457
Skilled agriculture & fishery workers	0.004	0.06	0.002	0.044	0.013	0.112
Craft and related trades	0.157	0.364	0.257	0.437	0.213	0.41
Plant & machine operators assemblers	0.174	0.379	0.187	0.39	0.184	0.387
Elementary occupations	0.053	0.224	0.134	0.34	0.067	0.251
Log of hourly wages	4.506	0.763	4.406	0.762	4.404	0.778
Tenure of primary job	7.521	8.307	2.234	3.548	4.539	5.358

**Note:** Education, Main job occupations, settlement type, and regional variables are dummy variables coded as 0 or 1.

**Source:** RLMS, rounds 8 to 24.(2002-2015)

Table 2-2 presents the transition probabilities of employment status for 2007-2015. The table indicates that the shares of informal job holdings in Russian labor market is steadily stable during the years of sample periods<sup>9</sup>. This would be an evidence that rigid barriers separating formal and informal jobs hardly exist. Our findings are consistent with Fields' idea of a two-tiered structure of the informal labor market (Fields, 1990; Fields, 2009) and empirical results of Slonimczyk (2013) who finds little evidence of entry barriers to the formal sector.

---

<sup>9</sup> Karabchuk (2012) found that, with Rosstat data, informal employments were even increasing during the years of both shock therapy and economic growth.



**Table 2- 2 Transition probabilities of informality**

<b>Informal job holding ratio</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
Present periods	14.4%	13.6%	15.8%	15.2%	15.7%	17.4%	17.3%	17.7%	15.9%
New out of total informal job holdings		19.1%	22.2%	13.8%	18.7%	18.8%	19.2%	20.5%	17.6%
Holding in present and previous years		60.5%	70.3%	71.5%	69.5%	67.1%	68.1%	71.8%	68.4%
Holding in present, previous years, and two periods before			81.1%	82.1%	78.0%	73.7%	79.4%	80.2%	78.3%
Holding in present, previous years, two, and three periods before				85.9%	85.3%	78.6%	83.1%	83.8%	83.8%
Holding in present, previous years, two, three, four periods before					89.1%	79.2%	88.2%	83.3%	86.1%
Holding in present, previous years, two, three, four, and five periods before						82.6%	87.8%	86.0%	90.3%
Holding in present, previous years, two, three, four, five, and six periods before							87.3%	87.7%	91.4%

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Source: RLMS-HSE, Author's calculation.

On the other hand, all informal types of employment are self-reproducing and are largely separated from the formal labor markets. The fact that workers obtaining formal salaried positions are less likely to move to any other type of job suggests that they assign a high value to formality and prefer it over alternatives.<sup>10</sup>

In aggregate terms, the overall structure remains stable during two decades. Structure within informal sectors varies over the periods. While regular informal jobs were steadily increasing, irregular informal jobs were slightly decreasing.

## 2.4. Methodology

Although the analysis presented in Table 2-2 suggests the transitory nature of informal employment, we need to go through whether the results would hold when control variables are included. In addition, the transition of employment status compared to staying in formal sector would give some more accurate information on the determinants.

In order to estimate the individuals' informal job holding decisions, we specify following model for the individual  $i$  in  $t$  years:

$$\text{INFORMAL}_{i(t+1)}^* = X_{it}'\beta + u_i + u_t + \varepsilon_{it}, \text{ where} \quad (2-1)$$

$$\text{INFORMAL}_{i(t+1)} = 1 \text{ if } \text{INFORMAL}_{i(t+1)}^* > 0, \text{ and} \quad (2-2)$$

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<sup>10</sup> If, however, income is under-reported, some individuals will be incorrectly included in the control group. Thus, the resulting DID estimate is a lower bound of the true effect of the reform on informality. (from. slonimczyk,tax-reform). Gorodnichenko et al. (2009) found that there was a substantial underreporting of income in the RLMS-HSE data in Russia for 1998-2004.

$$\text{INFORMAL}_{i(t+1)} = 0 \text{ if } \text{INFORMAL}_{i(t+1)}^* \leq 0 \quad (2-3)$$

The corresponding dependent variable of its latent variable  $\text{INFORMAL}_{i(t+1)}^*$  indicates the unobservable individual propensity to hold informal jobs in the next periods. The regressions include the full set of repressors  $X_{it}$  controlling for family background, demographics, and other decision affecting variables. Each error term  $u_i, u_t$  and  $\varepsilon_{it}$  denotes unobservable factors, time-specific factors, and idiosyncratic components in  $t$  years.

An individual  $i$  chooses an informal job if the utility from this choice,  $U^{\text{INFORMAL}}$  is higher than the utility from a formal job,  $U^{\text{FORMAL}}$ . Thus, the probability of observing individual  $i$  to be an informal job holder is:

$$\begin{aligned} \Pr(\text{INFORMAL} = 1) &= \Pr(U^{\text{INFORMAL}} > U^{\text{FORMAL}}) \\ &= \Pr(X_{it}'\beta^{\text{INFORMAL}} - X_{it}'\beta^{\text{FORMAL}} + \varepsilon_{it}^{\text{INFORMAL}} - \varepsilon_{it}^{\text{FORMAL}} > 0) \\ &= \Pr(X_{it}'\Gamma + \varepsilon_{it} > 0) = \Phi(X_{it}'\Gamma) \end{aligned} \quad (2-4)$$

Assuming that the unobserved components  $\varepsilon_{it}$  follows logit distribution, the binary choice between formal and informal job holding can be estimated using a standard logit model.<sup>11</sup>

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<sup>11</sup> Although we conducted regressions from equation (2-4), since job mobility between formal and informal sector is the purpose of this research rather than mere probability of taking informal jobs.

Another approach takes advantages of the panel data and estimates the probabilities of transition between different employment status. Dynamic interchange between the formal and informal sectors in Russia provides the opportunity to use an alternative approach to the income shock effects estimation. The dependent variable in equation (2-5) is the probability of a formal sector-working individual changing his status to informal sector workers. Equation (2-5) is as follows:

$$InflowINF_{it} = 1[\alpha_1 + X_{it}\beta_1 + \gamma_1 Shock_{it} + \varepsilon_{it} \geq 0] \quad (2-5)$$

in which  $InflowINF_{it}$  equals 1 head of household  $i$  was in *formal sector* in year  $t$  and became *informal sector* in year  $t+1$ , and equals 0 if household  $i$  was in *formal sector* in year  $t$  and stayed in *formal sector* in year  $t+1$ , as follows:

$$InflowINF_{it} = \begin{cases} 1 & \text{if } INF_{it} = 0, INF_{it+1} = 1 \\ 0 & \text{if } INF_{it} = 0, INF_{it+1} = 0 \end{cases} \quad (2-6)$$

where  $INF \in \{ \text{workers without contracts, self-employments} \}$

To account the heterogeneity of informality, our third approach is assuming that workers make a choice  $j$  at  $t$  year and conducting multinomial logit model estimation. Again, we focused on the probability of a formal sector-working individual changing his status to two types of informal job compared to maintaining status quo.

We model flows among three different employment states: workers in formal sector ( $j=1$ ), workers without contracts ( $j=2$ ), and self-employed. ( $j=3$ ). The individual's utility in each state is specified as:

$$InflowJOB_{ijt} = j [\alpha_{ij} + X_{ijt}\beta_{ij} + \gamma_{ik}Shock_{ijt} + \varepsilon_{ijt} \geq 0] \text{ where } j = 1,2,3 \quad (2-7)$$

$$InflowJOB_{ijt} = \begin{cases} 1 & \text{if } FORMAL_{ijt} = 1, FORMAL_{ijt+1} = 1 \\ 2 & \text{if } FORMAL_{ijt} = 1, FORMAL_{ijt+1} = 0, INF1_{ijt+1} = 1 \\ 3 & \text{if } FORMAL_{ijt} = 1, FORMAL_{ijt+1} = 0, INF2_{ijt+1} = 1 \end{cases} \quad (2-8)$$

where  $j = 1,2,3$  and  $JOB \in \{ FORMAL, INF1, INF2 \}$  and

$$INF1 = \text{workers without contracts, } INF2 = \text{self-employed} \quad (2-9)$$

where  $i$  and  $t$  index individuals and time, respectively. The  $X_{it}$  vector represents observable characteristics influencing employment states. These include variables affecting potential earnings in each state – which we proxy with measures of the highest completed education, age, and age squared – preferences over non-pecuniary characteristics of jobs as determined by marital status and family structure with year and region dummies. Non-observable individual heterogeneity in preferences is represented by  $\alpha_{ij}$ , which is assumed constant over time and independent of the observable characteristics of the individual. Finally,  $\varepsilon_{itj}$  is a time-varying random component to utility that is assumed independent of the other determinants and has an extreme value distribution.

## 2.5. Econometric Issues and Minimum Wage Reforms in Russia

Using quasi-experimental variation as identification strategy for income shocks gives clear intuitions and easy to infer from the estimate results. One limitation of this approach, however, is that some of the income shocks cannot be considered as truly exogenous nor unexpected events. In addition, some unobservable characteristics affecting both income shocks and informal job decisions would exist coincidentally. Hence, an alternative method to lessen these endogeneity problems would be required for validity of our results.

To achieve this, we exploit minimum wage variations induced by the minimum wage reform. The federal minimum wage, which had experienced relatively modest increases per year, had been the sole standard for almost all Russian regions. According to Labour Code of Russian Federation of 2001, the amount of the national minimum wage ought to be increased in line with the national subsistence minimum. However, the government, however, interpreted this legal provision as rather long-term goal; there exists the difference between the minimum wage and the subsistence minimum. Table 2-3 presents the difference from 2002 to 2011.

**Table 2- 3 Federal minimum wage and subsistence minimum (in roubles)**

Year	Federal Minimum wage	Subsistence Minimum per employee	Ratio Minimum Wage /Subsistence minimum
2002	450	1968	22.8
2003	600	2304	26
2004	720	2602	27.6
2005	800	3255	24.5
2006	1100	3695	29.7
2007	2300	4159	55.3
2008	2300	4971	46.2
2009	4330	5572	77.7
2010	4330	6138	70.5
2011	4611	6792	67.8

Source: Bolsheva, A. (2012). *Minimum wage development in the Russian Federation* (No. 15). Global Labour University working paper.

There was a large increase, however, in September of 2007, when the minimum wage nearly doubled, increasing from 1,100 to 2,300 roubles in nominal terms. The next increase, in January of 2009, was also significant when the nominal minimum wage increased to 4,330 roubles.

In addition, after the Labor Code amendments, regions were permitted to use a new mechanism to form their own standards. Following the logic of the federal minimum wage setting, the criterion for the regional minimum wage is the regional subsistence minimum. However, some regions set regional minimum wages above regional subsistence minimums.

Based upon this institutional background, we conduct analyses to compare for the regions that simply adopted the new federal threshold for the minimum wage (regions with the federal minimum) and those that opted for higher wage floors (regions with own minima). In order to obtain statistical evidence on the effect of the reform and control for these possible confounding effects of observable characteristics, we estimate the following DID equation<sup>12</sup>:

$$INF_{it} = X_{it}\beta + Z_i\gamma + \psi Post_t + \mu Treat_i + \alpha(Treat_i \times Post_t) + \varepsilon_{it} \quad (2-10)$$

where  $INF_{it}$  is one of the informality-related dependent variables,  $X_{it}$  and  $Z_i$  represent sets of time-varying and time-invariant individual characteristics respectively,

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<sup>12</sup> We obtained minimum wage data collected by Kapelyuk (2015) and then combine our RLMS-HSE data sets. A detailed list of all of the regional laws and agreements establishing regional minimum wages in Russia can be obtained from the website: (<https://sites.google.com/site/skapelyuk/baza-dannyh-po-regionalnym-mzp-v-rossii>)

$Post_t$  is a post-reform dummy,  $Treat_i$  is the treatment group indicator, and  $\varepsilon_{it}$  is the error term. The main object of interest is,  $\alpha$ , interaction term that measures the average change on the probability of the informal status for the treatment group relative to the control group, conditional on all the observables. All of the control variables in model (2) is identical to those in logit and multi-logit models.

Albeit improved, the above comparison between the two groups of regions may not fully resolve the potential endogeneity of the regional minimum wages as well leading to biased estimates. Hence, we need to discuss whether or not the minimum wage variations are able to serve as a relevant proxy of income shocks.

First, endogeneity may arise when individuals move to regions with higher minimum wages. If the decision to engage in interregional migration is related to regional minimum wage changes than the results of the estimation may be biased (Neumark and Nizalova, 2007). Furthermore, since RLMS-HSE does not track individuals and households when they change regions of residence labor mobility induced endogeneity would be complicated. However, Andrienko and Guriev (2003) as well as Bornhorst and Commander (2004) argue that labor mobility in Russia is severely constrained because of underdeveloped housing markets, a host of regional regulations inhibiting movements of labor, and high search and moving costs. According to Andrienko and Guriev (2003), internal migration in Russia was merely 2 percent of the total population, of which is significantly lower than in OECD standards.

Second, one can raise a question on the enforcement and the compliance with minimum wage laws and agreements. A high level of non-compliance indicates that the minimum wage may have little or no impact on labor outcomes. Therefore, it is difficult to consider the minimum wage as a factor affecting labor supply decisions. With this



regard, Kapelyuk (2015) provides empirical evidence suggesting that there was strong enforcement mechanism and non-compliance was modest. Also, Gavrikova (2009) describes the enforcement mechanism for national and regional minimum wages and supports the compliance.

Last but not the least, it may not be regarded as purely exogenous if the reform is linked to economic indicators such as poverty line, since it would affect the decision of informality of workers as well. However, Lukyanova and Vishnevskaya (2015) provides some evidence for refutation, suggesting that economic considerations were not the main driving force behind the regional governments' decisions to introduce regional minimum wages.

The above discussion would provide some assurance that the minimum wage variations can be used as a relevant measure of income shocks.

## **2.6. Results and Discussions**

In this section we present the key results for the income shock effects analysis. From equation (2-5) and equation (2-6), Table 2-3 and Table 2-4 report the odds ratios and t-values for the variables from the two logit models, respectively. Table 2-3 and Table 2-4 represent the probability of a formal sector-working individual changing his status to workers without contracts (or self-employed). Hence, values above one indicate that higher values of the explanatory variable increase the predicted probability of moving into workers without contracts (or self-employed sectors) compared to staying in formal sector. A set of regressors include household characteristics such as age and age squared of the household head, number of the children 0-6 years of age, number of the working

aged males, number of adults above retirement age, type of settlement as well as geographical regional dummies. The results in we have no statistically significant results of Table 2-3. The same holds for the results in Table2-4. While some coefficients are large, they fail to achieve statistical significance.

Next, Table 2-5 report the odds ratios and t-values for the variables from the multinomial logit model. The first two columns report the estimated effects of the variables during 2002-2015, of which compare stayers (i.e., workers continuously enrolled in formal sector) with movers (i.e., workers in formal sector at t year, then change their main jobs into informal sectors). Values above one indicate that higher values of the explanatory variable increase the predicted probability of moving into informal sectors compared to staying in formal sector. In this multinomial specification, income shocks such as wage arrears, wage cut, or compulsory unpaid leave increased the likelihood of ‘changing their main jobs into workers without contracts’ relative to ‘staying in formal sector’ approximately 37.9 % higher, indicating that there was a ‘workers without contracts’-increasing effect of the income shocks, which was statistically significant.

Other variables including gender, age, the number of household members-associated variables, level of educational attainments, and settlement types are also important determinants.

We further examine whether there are differences in such a movement from the formal to the informal sector across business cycles. To answer this question, the results in columns (3)-(8) provide the estimated effects of the variables in the subdivided years: prior to the crisis (2002-2007); during the crisis (2008-2011); and after the crisis (2012-2015). We can see that income shock effect on moving towards workers without contracts

is statistically significant and positive only in Column (3). That is, when the Russian economy recorded real GDP growth rate of an average 7% per year (2002: 4.7%, 2003: 7.3%, 2004: 7.2%, 2005: 6.4%, 2006: 8.2%, 2007: 8.5%), workers who experienced wage arrears, wage cut, or compulsory unpaid leave are more likely to change their main job into workers without contracts in the next periods rather than stay in formal sectors. This result suggests that entry into the informal sector is driven largely by the demand side. In other words, it is affected by the availability of informal employment as a form of work without contract not by individuals who want to work informally in recessions. This finding is consistent with De Paula and Sheinkman (2008) who emphasized that informal activity is mainly driven by tax avoidance. In addition, Günther and Launov (2012) suggested that informal employment provides flexibility in working, which serves as an additional argument why individuals prefer being employed in the informal sector despite considerably lower wages, given the same individual characteristics<sup>13</sup>.

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<sup>13</sup> In more detail, using the data from the urban labor market in Côte d'Ivoire, Günther & Launov (2012) examine whether the informal sector is a strategy of last resort or an attractive employment opportunity. They find that the informal market consists of both voluntary and involuntary employment and argue that their empirical results are a consequence of non-wage preferences for the informal sector rather than entry barriers into the formal sector. Whereas the formal sector provides employment rights and access to social security, medical insurance and pension funds for employees and legal protection, the informal sector offers more flexibility for employees and less regulations for the self-employed. For some workers, the latter may seem more attractive.

**Table 2- 4 Logit estimation results (workers without contracts)**

<b>Dependent variable:</b> <b>Formal at t, Workers without contract at t+1</b>	<b>Full years</b>	<b>Before crisis</b>	<b>Crisis</b>	<b>After crisis</b>
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
<b>Income shocks</b>	1.217 (1.043)	1.456 (0.995)	0.933 (-0.193)	1.570 (1.199)
<b>Demographic characteristics</b>				
Male	1.184 (0.841)	0.729 (-0.790)	1.376 (0.857)	1.280 (0.610)
Age	0.807*** (-3.886)	0.775** (-2.258)	0.787** (-2.150)	0.785** (-2.142)
Age squared/100	1.285*** (3.544)	1.395** (2.250)	1.300* (1.842)	1.314* (1.918)
Marital status (single = 0; married =1)	1.229 (0.918)	0.667 (-0.933)	2.664** (2.159)	1.360 (0.719)
Russian	1.235 (0.905)	1.177 (0.403)	0.670 (-0.852)	1.209 (0.372)
Number of children aged 0-6	1.004 (0.0239)	0.986 (-0.0398)	1.205 (0.644)	0.999 (-0.00357)
Number of working aged males	0.977 (-0.189)	1.314 (1.179)	1.063 (0.263)	0.769 (-1.078)
Number of elderly	0.740** (-2.153)	0.360*** (-3.187)	1.145 (0.537)	0.680 (-1.408)
<b>Education</b>				
Under high school	1.577 (1.593)	1.133 (0.185)	0.850 (-0.303)	2.366* (1.670)
High school education	1.312 (1.166)	1.517 (0.834)	0.660 (-0.912)	1.740 (1.293)
Vocational Training	1.376 (1.337)	2.081 (1.455)	0.613 (-1.005)	1.434 (0.820)
Log of hourly wages (Household head)	0.837 (-1.305)	0.732 (-1.145)	0.774 (-1.023)	1.092 (0.312)
Log of households' wealth	1.108 (1.158)	1.184 (0.897)	0.978 (-0.163)	1.023 (0.113)
<b>Observations</b>	1,199	401	395	362

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2- 5 Logit estimation results (self-employed)**

Dependent variable: Formal at t, Self-employed at t+1	Full years	Before crisis	Crisis	After crisis
	(1)	(2)	(3)	(4)
<b>Income shocks</b>	0.957 (-0.225)	1.291 (0.736)	0.816 (-0.588)	0.817 (-0.470)
<b>Demographic characteristics</b>				
Male	1.055 (0.311)	1.434 (1.066)	0.854 (-0.493)	0.853 (-0.503)
Age	0.925 (-1.472)	0.793** (-2.033)	1.102 (0.929)	0.860 (-1.547)
Age squared/100	1.068 (0.955)	1.355** (2.006)	0.835 (-1.283)	1.161 (1.223)
Marital status (single = 0; married =1)	1.281 (1.112)	1.484 (0.930)	0.913 (-0.211)	1.629 (1.115)
Russian	1.040 (0.172)	0.978 (-0.0505)	0.524 (-1.414)	1.472 (0.950)
Number of children aged 0-6	0.732*** (-2.629)	0.631* (-1.686)	0.700 (-1.572)	0.760 (-1.387)
Number of working aged males	1.017 (0.164)	0.992 (-0.0419)	0.944 (-0.311)	1.183 (0.843)
Number of elderly	0.837 (-1.409)	0.617 (-1.625)	0.779 (-0.900)	1.068 (0.323)
<b>Education</b>				
Under high school	1.043 (0.179)	0.925 (-0.141)	0.655 (-0.932)	1.489 (1.000)
High school education	0.898 (-0.568)	1.217 (0.517)	0.537* (-1.675)	0.796 (-0.674)
Vocational Training	1.080 (0.401)	0.892 (-0.308)	1.114 (0.286)	1.054 (0.151)
Log of hourly wages (Household head)	0.902 (-0.873)	1.068 (0.314)	0.660* (-1.829)	1.096 (0.373)
Log of households' wealth	0.971 (-0.448)	1.141 (1.018)	0.920 (-0.766)	0.835 (-1.238)
<b>Observations</b>	1,430	466	486	461

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2- 6 Multinomial Logit Model of Income Shock Effects on Informal Employments**

Dependent variable: (Base)Formal at t, Formal at t+1	Full years		Before crisis		Crisis		After crisis	
	Without	Self	Without	Self	Without	Self	Without	Self
	contracts	employed	contracts	employed	contracts	employed	contracts	employed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Income shocks</b>	1.379** (2.143)	0.838 (-1.107)	1.592* (1.748)	1.011 (-0.0407)	1.064 (0.238)	0.759 (-0.999)	1.528 (1.591)	0.736 (-1.002)
<b>Demographic characteristics</b>								
Male	1.407** (2.452)	1.415*** (2.741)	1.246 (0.897)	1.229 (0.899)	1.616** (1.993)	1.438 (1.588)	1.479 (1.570)	1.485* (1.829)
Age	0.846*** (-4.105)	0.970 (-0.722)	0.807*** (-2.872)	1.011 (0.138)	0.885* (-1.667)	1.020 (0.256)	0.820*** (-2.779)	0.892* (-1.728)
Age squared/100	1.222*** (3.828)	1.013 (0.230)	1.325*** (2.903)	0.966 (-0.316)	1.150 (1.466)	0.943 (-0.570)	1.260** (2.556)	1.124 (1.387)
Marital status (single = 0; married =1)	1.042 (0.247)	1.451** (2.165)	0.917 (-0.295)	1.587 (1.492)	0.932 (-0.249)	1.520 (1.325)	1.532 (1.318)	1.309 (0.946)
Russian	0.812 (-1.288)	1.173 (1.014)	0.545** (-2.266)	1.237 (0.741)	0.777 (-0.895)	1.019 (0.0655)	1.169 (0.481)	1.450 (1.400)
Number of children aged 0-6	0.753** (-2.459)	0.773** (-2.548)	0.842 (-0.781)	0.577** (-2.466)	0.766 (-1.325)	0.871 (-0.801)	0.726* (-1.683)	0.827 (-1.234)
Number of working aged males	0.723*** (-3.446)	0.873 (-1.603)	0.767* (-1.650)	0.864 (-0.939)	0.745* (-1.823)	0.734* (-1.954)	0.638** (-2.536)	1.017 (0.120)
Number of elderly	0.814* (-1.863)	0.840* (-1.755)	0.569** (-2.438)	0.714 (-1.644)	0.976 (-0.128)	0.727 (-1.611)	0.863 (-0.806)	1.069 (0.455)
<b>Education</b>								
Under high school	1.637** (2.511)	0.720* (-1.844)	1.324 (0.649)	0.499* (-1.689)	1.400 (0.998)	0.735 (-0.960)	2.114** (2.461)	0.846 (-0.620)
High school education	1.502*** (2.591)	0.759** (-2.033)	1.694* (1.763)	0.775 (-1.053)	1.373 (1.176)	0.704 (-1.375)	1.538 (1.626)	0.789 (-1.063)
Vocational Training	1.495** (2.355)	1.029 (0.194)	1.845* (1.906)	0.754 (-1.034)	1.354 (1.025)	1.316 (1.035)	1.429 (1.234)	1.130 (0.522)

Log of hourly wages (Household head)	0.910	0.824**	0.904	0.848	0.911	0.696**	0.843	0.939
	(-0.915)	(-2.064)	(-0.575)	(-1.033)	(-0.517)	(-2.106)	(-0.858)	(-0.366)
Log of households' wealth	1.015	1.058	1.090	1.125	0.906	1.090	1.012	0.952
<b>Settlement type</b>	(0.233)	(0.969)	(0.768)	(1.138)	(-0.993)	(0.900)	(0.0848)	(-0.450)
Regional Center	1.582***	0.753**	0.968	0.871	1.318	0.577**	2.974***	0.839
	(2.795)	(-2.049)	(-0.108)	(-0.496)	(1.032)	(-2.299)	(3.560)	(-0.755)
Urban	1.137	0.904	0.781	1.139	0.674	0.744	2.297***	0.925
	(0.752)	(-0.755)	(-0.779)	(0.484)	(-1.344)	(-1.305)	(2.694)	(-0.344)
Settlement of city type (PGT)	1.050	0.909	1.087	0.616	0.942	0.507	1.280	1.672
Observations	4,177	4,177	1,437	1,437	1,353	1,353	1,387	1,387

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The effect of the minimum wage was estimated using a pooled multi-logit model based on panel data, as follows:

**Table 2- 7 DID estimation results of Minimum Wage Effects on Informal Employments**

Dependent Variables	Formal sector at t Without contract at t+1	Formal sector at t Self-employed at t+1
	(1)	(2)
<b>After 2007</b>	1.158 (1.211)	1.405*** (2.966)
<b>Regional minimum wage affected</b>	0.557* (-1.920)	0.959 (-0.182)
<b>After 2007 * Regional minimum wage affected</b>	1.734 (1.606)	0.938 (-0.237)
<b>Demographic characteristics</b>		
Male	1.382** (2.377)	1.422*** (2.854)
Age	0.848*** (-4.084)	0.965 (-0.877)
Age squared/100	1.223*** (3.867)	1.022 (0.407)
Married	0.971 (-0.179)	1.510** (2.439)
Russian	0.939 (-0.407)	1.135 (0.842)
Numbers of children aged under 6	0.741*** (-2.642)	0.778** (-2.525)
Numbers of working aged males	0.692*** (-4.005)	0.855* (-1.889)
Numbers of elderly	0.865 (-1.375)	0.844* (-1.733)
<b>Education</b>		
Under secondary	1.581** (2.396)	0.815 (-1.187)
Secondary education	1.436** (2.354)	0.809 (-1.624)
Vocational Training	1.441** (2.172)	1.052 (0.359)
<b>Log of hourly wages (Household head)</b>	1.086 (0.865)	0.791*** (-2.694)
<b>Log of households' wealth</b>	1.034 (0.527)	1.039 (0.685)
<b>Observations</b>	4,185	4,185

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



One possibility is that adjusting to the wage increase for employers is more difficult in the regions where the minimum wage hikes were substantial, while it is more anticipated in the regions with the federal minimum wage. These results are in line with the findings in Muravyev and Oshchepkov (2013), who adopt the region panel data approach by Neumark and Wascher (1992) to study the effect of the minimum wage on employment in Russia. Muravyev and Oshchepkov (2013) argue that these two groups differ not only in the magnitude of the minimum wage hikes (the regional minima are by definition larger, and often much larger, than the federal minimum), but also in employers' ability to anticipate (and hence, adjust in advance to) the new wage floors. In particular, while the federal hikes were regular and more-or-less expected by employers throughout the 2000s, the institution of the regional minimum wages was first introduced in the federal law N 54 FZ passed on April 20, 2007. Regional hikes in the minimum wage adopted between April 2007 and the fall of 2007 are likely to have been much more unexpected among employers than any of the federal hikes in the 2000's.

## **2.7. Concluding Remark**

In this chapter, we examine the effect of the income shocks on individual decision on the informal sector. Data from RLMS-HSE for the years 2002 to 2015 were used for analysis with logit model. Our main focus was job mobility of workers facing income shocks. To achieve this, we conducted logit regression and found no significant income shock effects on changing formal into informal sector. Taking formal job as our base category, we also conducted both logit and pooled multinomial logit (MNL) regressions allowing for the two additional employment status: workers without contracts, and self-employment.

We find that, the effects of the income shocks were positively associated with entry into workers without contract but not informal self-employment. In addition, the effect of income shock on work without contract is significant only in the periods when the Russian economy displayed a strong growth. Furthermore, this effect diminished over the period. According to Lukyanova (2015), informal employment has been financially more attractive or at least has yielded similar incomes as working in the formal sector, particularly for middle- and high-skilled workers.

Workers without contracts may attribute less value to gains from being formal sector such as job protection and social benefits. Even more, the social security nets provided by governments were perceived as low quality, these may not worth the contributions for them. Conversely, tax underreporting is widespread, and formal workers often receive part of their remuneration in their pay envelopes. (Lukyanova, 2015)

## **Chapter 3. Multiple Job Holding, Private Transfers, and Home-Production as Coping Strategies**

### **3.1. Introduction**

There exists a plethora of literature on developing economics estimating the income shock effects on households response (Townsend,1994; Udry, 1994; Wolpin,1982; Paxson, 1993; Gertler and Gruber, 2002). Although considerable research has been devoted to identify household income shocks, it has tended to capture only one type of shock at a time (e.g., illness, rainfall, crop loss or job loss). Another challenge for identifying income shock is that it may not be necessarily unpredictable or not acted on by the agent (Low et al., 2010).

In this regard, Russian economy provides a unique quasi-experimental variation. Over the two decades, Russia experienced four different nature of the shocks: banking crisis (1995); the public debt crisis (1998); the private foreign debt crisis (2009); and the oil crisis (2014). Table presents the main indicators of each episode. Somewhat consistent findings have been presented that Russian household consumption appears to be smoothed (Stillman, 2001; Skoufias, 2003; Mu, 2006; Gerry and Li, 2010; Notten and Crombrugghe, 2012). Given the absence of formal institution such as supports from governments or well-functioning financial system, this finding would imply that households adapted to income shock with various coping strategies in which beyond formal institutions.

This chapter aims to evaluate in a unique quasi-experiment setting how such potential consumption smoothing channel react to income changes. This chapter is

structured as follows. Section 2 illustrates our data, and presents some descriptive statistics. In Section 3, we describe our empirical methodology, and in Section 4, the results of our regressions. Section 5 concludes.

### **3.2. Data and Methodology**

The paper employs data from RLMS-HSE for the years 2002 to 2015. We restrict our sample to individuals who have a main job, and who are aged between 18 and 60 for men, and between 18 and 55 for women, given the different retirement ages for the two groups, with non-missing information on key variables such as age, education, and wage of primary job. For the purposes of the analysis, household and individual data were merged into one sample. For empirical analysis, we identified the key variables as following:

First, the income shocks variable is an indicator if respondents experienced wage arrears, compulsory unpaid leave, or reduced wage. Second, multiple job holdings, private transfer, and home-produced products were considered as informal coping strategies. Multiple job holders were defined as workers who have main job plus some additional jobs, or engaged in irregular economic activities (e.g., giving a ride, sewing clothing, and getting paid for services). In practice, we classify an individual as a multiple job holder if he or she answered “yes” to either of the following questions:

*“Tell me please, do you have some other kind of work?”* , or

*“Tell me please, in the last 30 days did you engage in some additional kind of work for which you got paid? Maybe you sewed someone a dress, gave someone a ride in a car,*

*assisted someone with apartment or car repairs, purchased and delivered food, looked after a sick person, or did something else that you were paid for?”*

The questionnaire structure is such that no one may answer questions on a secondary job unless they have a primary job. Private transfers were defined as income received from informal social networks such as relatives, or friends. In practice, we classify an individual received private transfers if he or she answered “yes” to the following question, and gave some information on how much they received.

*“Has your family received gratuitous money or goods in the last 30 days, and, if so, how would you estimate this in rubles?”*

Home produced products were defined as the total value of food produced and consumed at home in last 30 days. Lastly, we followed Notten and Crobruggehe (2012)’s approach and coded consumption and income variables as zero if they are missing. In addition, all variables were adjusted to 30 days basis amounts. Finally, 18,533 individuals in 8,088 households were used for analysis.

Descriptive statistics on the key variables are reported in Table 3-1. Each column represents mean and standard deviation by coping strategies. Note that coping strategies-related variables are not mutually exclusive. Although problematic in terms of econometric specification, it would more realistic setting since households tend to opt for composite strategies rather than single one. In addition, we added means of variables of whom did not participate any of such behaviors for comparison.

First, as shown in Table 3-1, home-produced products is the most common shock mitigating practice among respondents, and multiple job holdings is much less one than others. In addition, part of income of the multiple job holders or the private-transfer received comes from home-produced products, while the home-produced producers are less likely to hold multiple jobs or to receive private transfers at the same time. Compared to none-participants, Table 3-1 shows that others are more likely to be exposed to income shocks. Furthermore, demographic characteristics variables such as age, number of children aged 0-6, or education attainments level suggest that the private-transfer received might be the most vulnerable<sup>14</sup> groups.

It is interesting that, contrast to a common belief that home-produced products would be a rural-specific practice, Table 3-1 does not clearly show the earnings from home-produced products are observed only in non-urban areas. The last row of Table 3-1 represents the mean value of home-produced products indicator in urban areas (Column 5) is 0.553. Admittedly, it is much less than mean value of others (Multiple job holding = 0.795, Private transfer = 0.754, None of them = 0.856). However, the fact that half of urban residents indeed earned some parts of income from home-produced products may imply that home-produced products in Russia would have a rather pervasive feature across the areas than certain area specific practices. Based on this finding, in order to estimate the degree to which changes in the coping strategies affected by income shocks have depended on areas, we use pooled panel data from the RLMS-HSE. Similar to Chapter 2, minimum wage reform after 2008 was used for this analysis.

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<sup>14</sup> Of course, more rigorous tests would be required to prove this argument, and it is out of the scope of this chapter. Since identifying the vulnerable groups and its rationale can be another branch of research.

**Table 3- 1 Descriptive statistics by hock mitigating activities**

Variables	Multiple job		Private transfer		Home product		None	
	Mean (1)	SD (2)	Mean (3)	SD (4)	Mean (5)	SD (6)	Mean (7)	SD (8)
<b>Number of observations</b>	2805		12064		20800		18054	
<b>Demographic characteristics</b>								
Male	0.513	0.5	0.587	0.492	0.597	0.491	0.576	0.494
Number of children aged 0-6	0.215	0.467	0.325	0.541	0.207	0.473	0.192	0.436
Number of working aged males	0.825	0.683	0.823	0.645	1.079	0.755	0.869	0.724
Number of elderly	0.168	0.438	0.11	0.357	0.339	0.6	0.212	0.474
Married	0.878	0.327	0.889	0.314	0.872	0.334	0.853	0.354
Russian	0.884	0.32	0.887	0.316	0.865	0.342	0.867	0.339
Urban	0.795	0.404	0.754	0.431	0.553	0.497	0.856	0.351
Age	37.719	9.811	34.951	9.306	40.544	10.334	38.357	10.185
<b>Education</b>								
Under secondary	0.078	0.268	0.104	0.306	0.119	0.324	0.096	0.294
Secondary education	0.309	0.462	0.34	0.474	0.363	0.481	0.338	0.473
Vocational Training	0.262	0.44	0.265	0.441	0.268	0.443	0.259	0.438
University or higher	0.351	0.477	0.291	0.454	0.249	0.433	0.307	0.461
<b>Log of hourly wages (Household head)</b>	4.43	0.827	4.424	0.766	4.349	0.794	4.65	0.723
<b>Log of households' wealth</b>	10.042	1.076	9.786	1.101	9.813	1.183	10.149	0.961
<b>Regions</b>								
Moscow and St. Petersburg	0.117	0.321	0.071	0.256	0.072	0.258	0.184	0.387
Northern and North Western	0.083	0.277	0.066	0.248	0.06	0.237	0.08	0.271
Central and Central Black-Earth	0.164	0.371	0.2	0.4	0.179	0.383	0.198	0.398
Volga-Vaytski and Volga Basin	0.178	0.383	0.195	0.397	0.185	0.388	0.146	0.353
North Caucasian	0.081	0.273	0.105	0.306	0.128	0.334	0.1	0.299
Ural	0.165	0.372	0.151	0.358	0.163	0.369	0.146	0.353
Western Siberian	0.129	0.335	0.121	0.326	0.114	0.318	0.069	0.254
Eastern Siberian and Far Eastern	0.082	0.274	0.092	0.289	0.1	0.3	0.077	0.266

<b>Income shocks</b>	0.167	0.373	0.124	0.33	0.124	0.33	0.087	0.281
<b>Tenure of main job</b>	6.578	7.671	5.601	6.758	7.935	8.804	6.633	7.522
<b>Dummy: Multiple job holding</b>	-	-	0.084	0.277	0.055	0.228	-	-
<b>Dummy: Private transfer</b>	0.36	0.48	-	-	0.191	0.393	-	-
<b>Dummy: Home-produced products</b>	0.406	0.491	0.329	0.47	-	-	-	-
<b>Log of working hours of multiple job</b>	3.436	1.146	0.308	1.031	0.209	0.869	-	-
<b>Log of income from private transfer</b>	2.819	3.832	7.901	1.214	1.494	3.121	-	-
<b>Log of total value of home-produced products</b>	3.589	4.445	2.867	4.181	8.894	1.429	-	-



### 3.3. Empirical Specifications

In this section, we provide empirical specification to draw the causal impact of transitory adverse income shocks on potential consumption smoothing candidates. We carry out estimations following three regression models. The first model takes advantage of the panel data and estimates the probabilities of transition between different shock mitigating strategies. Each dependent variable in regression equation is the probability of being entrants of the one of the coping strategies: the private transfer received, and the home-produced producers. Equation (3-1) is following:

$$Entrants_{it} = 1[\alpha_i + X_{it}\beta_i + \gamma_i Shock_{it} + \varepsilon_{it} \geq 0] \quad (3-1)$$

$Entrants_{ijt}$  equals 1 if households  $i_t$  do not take part in year t, and become the multiple job holdings, the private transfer received, or the home-produced products in year t+1.  $Entrants_{it}$  equals 0 if households  $i_t$  do not take part in year t and stay in year t+1, as follows:

$$Entrants_{it} = \begin{cases} 1 & \text{if } Y_{it} = 0, Y_{it+1} = 1 \\ 0 & \text{if } Y_{it} = 0, Y_{it+1} = 0 \end{cases} \quad (3-2)$$

In which  $Y_{it}$  is one of the coping strategies-related indicators. Note that all of the control variables in equation (3-1) are identical. In addition, variables including log of working hours of multiple job holdings, log of income from private transfer, and log of total value of home-produced products were used as dependent variables in ordered to

evaluate intensive margins using fixed effects estimations. If we can assume that income shocks were purely random, it would be possible to draw causality by comparing the change in  $Y_t$  (multiple job, private transfer, or home-produced products) over time between those employees ‘treated’ with an income shock ( $\gamma_t = 1$ ) and those without an income shock ( $\gamma_t = 0$ ).

### 3.4. Results and Discussions

The main results of our empirical analysis are shown in Tables 3-2 and 3-3. These tables show the results of full sample periods (2002-2015) as well as sub-sample periods divided by years of macro-economic changes: prior to crisis (2002-2007); during crisis (2008-2011); and after the crisis (2012-2015).

Each column in Tables 3-2 and 3-3 represent six dependent variables respectively, namely multiple job holding (MJ), private transfer (PT), and home-produced products (HP). These are binary variables having 0 and 1. We also use log of working hours from multiple job holdings (LMJ), log of income from private transfer (LPT), and log of income from home-produced products (LHP) as dependent variables for an additional estimation.

The coefficients for the main variables of interest from logit estimation of Equation (3-1) are shown in Tables 3-2. It provides the odds ratios and t-values for the regressors. A set of regressors include household characteristics such as age and age squared of the household head, number of the children 0-6 years of age, number of the working aged males, number of adults above retirement age (elderly), type of settlement as well as geographical regional dummies.

As shown in first row of Table 3-2, it seems that income shocks do not play an important role in determining the probability that household would choose those practices. While most odds ratio are consistent with the presence of adverse effects of the income shocks, none of them, except for Column (4), are statistically significant at the conventional level. In particular, among those households experienced income shocks prior to the crisis, the odds of holding multiple job is 38.3% higher than that of holding single job. In terms of private transfer decision, it is the marital status, family structure, and wealth of households that play the most important role in determining the probability that a household will receive transfers from his/her relatives or friends. In particular, those households with more numbers of working aged males are less prone to opt for private transfers.

Moreover, results of Columns (8), (9), (11), and (12) show that number of the elderly in households affects the likelihood of opting for private transfer as well as home-produced products but in the opposite directions. It would be possible that the pension benefiting the elderly, alongside with the pension reform which undertook in 2010, would play some buffering roles within a household against income shocks. Hence, those households with more elderly members may have less incentives for receiving transfers from other social networks. This finding is consistent with empirical evidence of Abanokova and Lokshin (2015) that changing household structure is an important mechanism to cope with adverse economic shocks.

Column (12) shows the significant adverse effects of nationality (Russian=1) and positive effects of the number of the elderly on the odds of home-production. It may imply that home-produced products are rather easily accessible practices for those households with less competitive working abilities when they suffered from income shocks.

The same holds for the overall results of fixed effect model in Table 3-3. While some coefficients are large, they fail to achieve statistical significance. Overall, except multiple job holding in some cases, most of the coping strategies fail to respond to income shocks.

**Table 3- 2 Logit estimates results of Income shock effects on coping strategies (intensive margins)**

Dependent Variables	2002-2015			Before crisis, 2002-2007			Crisis, 2008-2011			After crisis, 2012-2015		
	MJ	PV	HP	MJ	PV	HP	MJ	PV	HP	MJ	PV	HP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<b>Income shocks</b>	1.143 (1.264)	1.063 (0.788)	1.071 (0.628)	1.383** (2.017)	1.182 (1.353)	1.058 (0.297)	0.745 (-1.047)	0.998 (-0.0098)	0.784 (-1.006)	1.134 (0.703)	1.012 (0.0936)	1.256 (1.282)
<b>Demographic characteristics</b>												
Male	1.015 (0.169)	1.056 (0.944)	1.185** (2.026)	1.008 (0.0550)	0.988 (-0.113)	1.557*** (2.600)	0.993 (-0.0355)	1.164 (1.188)	1.386* (1.888)	1.044 (0.310)	1.050 (0.561)	0.890 (-0.932)
Age	0.950* (-1.693)	0.978 (-1.070)	0.985 (-0.535)	0.963 (-0.727)	0.923** (-2.206)	0.921 (-1.499)	0.972 (-0.423)	1.040 (0.863)	0.997 (-0.0549)	0.936 (-1.383)	0.988 (-0.366)	1.036 (0.776)
Age squared/100	1.061 (1.510)	0.998 (-0.0703)	1.023 (0.621)	1.026 (0.380)	1.061 (1.264)	1.082 (1.098)	1.057 (0.624)	0.929 (-1.254)	1.024 (0.300)	1.081 (1.263)	0.988 (-0.301)	0.970 (-0.531)
Marital status	0.953 (-0.420)	1.409*** (4.153)	1.000 (-0.0022)	0.976 (-0.125)	1.491*** (2.671)	1.428 (1.552)	0.920 (-0.328)	1.232 (1.242)	0.813 (-0.858)	0.978 (-0.119)	1.479*** (3.059)	0.970 (-0.167)
Russian	1.142 (1.076)	1.072 (0.870)	1.108 (0.862)	1.092 (0.448)	1.059 (0.411)	1.435 (1.551)	1.579 (1.519)	1.332 (1.637)	1.865** (2.574)	0.984 (-0.0824)	0.968 (-0.272)	0.685** (-2.071)
Number of children aged 0-6	1.075 (0.939)	1.018 (0.372)	0.886* (-1.676)	1.252 (1.471)	0.886 (-1.206)	0.723** (-1.960)	1.110 (0.564)	1.101 (0.862)	0.836 (-1.134)	0.994 (-0.0525)	1.041 (0.608)	0.963 (-0.379)
Number of working aged males	0.880** (-2.155)	0.785*** (-6.451)	0.910* (-1.797)	0.936 (-0.669)	0.804*** (-3.248)	0.771** (-2.432)	0.665*** (-3.107)	0.752*** (-3.610)	0.839 (-1.617)	0.941 (-0.626)	0.778*** (-4.361)	1.041 (0.513)
Number of elderly	0.906 (-1.177)	0.760*** (-4.980)	1.256*** (2.949)	0.968 (-0.250)	0.906 (-1.038)	1.272 (1.463)	0.944 (-0.290)	0.744** (-2.281)	1.387* (1.878)	0.803 (-1.547)	0.691*** (-4.475)	1.226* (1.882)
<b>Education</b>												
Under high school	0.932 (-0.448)	0.832* (-1.851)	0.911 (-0.654)	0.846 (-0.584)	0.751 (-1.430)	0.738 (-0.958)	0.526* (-1.696)	0.906 (-0.447)	0.779 (-0.808)	1.175 (0.706)	0.854 (-1.135)	1.020 (0.0978)
High school education	1.155 (1.237)	0.962 (-0.523)	1.096 (0.871)	1.085 (0.404)	0.861 (-1.079)	1.297 (1.181)	0.878 (-0.486)	1.107 (0.640)	0.681* (-1.765)	1.372* (1.745)	0.991 (-0.0802)	1.196 (1.132)
Vocational Training	1.046 (0.418)	1.000 (-0.0040)	1.170 (1.580)	0.998 (-0.0088)	0.965 (-0.275)	1.530** (2.078)	0.824 (-0.791)	1.206 (1.252)	0.767 (-1.298)	1.117 (0.656)	0.931 (-0.699)	1.277* (1.651)

<b>Log of hourly wages of main job</b>	0.896 (-1.614)	0.946 (-1.214)	0.969 (-0.461)	0.881 (-1.174)	0.904 (-1.358)	1.107 (0.829)	1.165 (0.980)	0.966 (-0.332)	0.827 (-1.333)	0.777** (-2.216)	0.977 (-0.320)	0.892 (-1.035)
<b>Log of households' wealth</b>	1.011 (0.260)	0.916*** (-3.129)	0.983 (-0.387)	1.060 (0.885)	0.892** (-2.560)	0.866* (-1.939)	0.912 (-1.035)	0.927 (-1.194)	0.917 (-0.968)	0.983 (-0.242)	0.923* (-1.733)	1.136 (1.582)
<b>Tenure</b>	1.001 (0.0641)	0.978** (-2.398)	1.003 (0.249)	0.997 (-0.120)	0.982 (-1.136)	0.993 (-0.257)	0.981 (-0.585)	0.982 (-0.863)	1.066** (2.226)	1.035 (1.463)	0.970** (-2.251)	0.984 (-0.837)
<b>Tenure squared/100</b>	1.012 (0.227)	1.078** (2.229)	0.991 (-0.187)	1.034 (0.366)	1.079 (1.300)	0.996 (-0.0455)	1.066 (0.557)	1.088 (1.098)	0.806** (-2.090)	0.899 (-1.177)	1.092* (1.736)	1.081 (1.070)
<b>Observations</b>	4,814	8,914	4,952	1,745	2,860	1,571	997	1,950	1,148	2,025	4,094	2,212

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3- 3 Fixed effects estimates results of Income shock effects on coping strategies**

Dependent Variables	2002-2015			Before crisis, 2002-2007			Crisis, 2008-2011			After crisis, 2012-2015		
	LMJ	LPV	LHP	LMJ	LPV	LHP	LMJ	LPV	LHP	LMJ	LPV	LHP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<b>Income shocks</b>	-0.100 (-1.303)	-0.108 (-0.787)	0.129 (1.198)	-0.130 (-0.938)	-0.262 (-1.107)	0.138 (0.828)	-0.754*** (-3.426)	0.179 (0.446)	0.114 (0.470)	0.0277 (0.208)	0.158 (0.694)	0.271 (1.526)
<b>Demographic characteristics</b>												
Male	0.0113 (0.117)	-0.0769 (-0.446)	-0.111 (-0.838)	0.160 (0.954)	0.0706 (0.228)	0.0881 (0.414)	0.292 (0.951)	-0.119 (-0.202)	-0.249 (-0.756)	0.0633 (0.329)	-0.240 (-0.802)	-0.337 (-1.467)
Age	0.00706 (0.164)	0.0994 (1.248)	0.0505 (0.844)	0.0532 (0.603)	0.0146 (0.0819)	-0.135 (-1.182)	-0.142 (-0.830)	0.296 (1.066)	-0.0939 (-0.561)	0.00728 (0.0786)	0.00730 (0.0449)	0.0811 (0.674)
Age squared/100	-0.00805 (-0.144)	-0.180* (-1.741)	-0.0353 (-0.458)	-0.0846 (-0.709)	-0.0222 (-0.0929)	0.144 (0.957)	0.178 (0.782)	-0.353 (-0.950)	0.149 (0.666)	-0.00546 (-0.0450)	-0.0440 (-0.206)	-0.0735 (-0.475)
Marital status	-0.216 (-1.219)	0.808** (2.436)	-0.106 (-0.427)	-0.0649 (-0.179)	-0.494 (-0.708)	0.912** (1.983)	0.367 (0.699)	1.458 (1.510)	-0.385 (-0.685)	-0.0412 (-0.119)	0.386 (0.646)	-0.653 (-1.484)
Russian	-0.0488 (-0.270)	-0.781** (-2.362)	0.593** (2.391)	0.0945 (0.263)	0.790 (1.198)	0.610 (1.282)	0.476 (0.768)	-0.590 (-0.503)	-0.115 (-0.192)	-0.326 (-0.938)	-1.166** (-2.055)	0.573 (1.386)
Number of children aged 0-6	0.0419 (0.406)	-0.220 (-1.356)	0.0949 (0.715)	-0.167 (-0.711)	-0.0248 (-0.0654)	0.443 (1.595)	0.519* (1.849)	-1.207** (-2.388)	-0.238 (-0.759)	0.124 (0.695)	-0.525* (-1.877)	0.147 (0.629)
Number of working aged males	-0.0466 (-0.603)	-0.165 (-1.217)	0.167* (1.730)	-0.272 (-1.577)	0.233 (0.806)	0.216 (1.166)	-0.283 (-1.340)	0.390 (0.996)	-0.0629 (-0.322)	0.0366 (0.247)	0.156 (0.587)	-0.0236 (-0.123)
Number of elderly	-0.0662 (-0.497)	-0.446* (-1.898)	0.958*** (5.718)	-0.121 (-0.426)	-0.0166 (-0.0331)	0.150 (0.485)	0.197 (0.365)	0.0422 (0.0520)	0.0226 (0.0503)	-0.342 (-1.203)	0.454 (0.995)	0.764** (2.324)
<b>Education</b>												
Under high school	-0.241 (-1.277)	omitted	0.161 (0.636)	0.376 (0.950)	-0.726 (-1.053)	0.0381 (0.0777)	omitted	omitted	-0.719 (-0.952)	-0.740** (-2.017)	omitted	-0.268 (-0.606)
High school education	-0.0560 (-0.396)	-0.581** (-2.179)	0.424** (2.170)	0.390 (1.346)	-0.384 (-0.730)	0.127 (0.342)	-0.659 (-0.838)	-1.344 (-1.304)	-0.408 (-0.785)	-0.241 (-0.779)	-0.785* (-1.791)	-0.106 (-0.288)

Vocational Training	-0.226 (-1.640)	-0.271 (-0.888)	0.430** (2.261)	0.175 (0.660)	-0.697 (-1.403)	0.0457 (0.132)	-1.851** (-2.293)	-0.505 (-0.416)	-0.105 (-0.208)	-0.210 (-0.710)	-0.432 (-0.854)	0.0483 (0.138)
University or higher	Omitted	-0.664** (-2.019)	omitted	omitted	omitted	omitted	-0.843 (-1.117)	-1.292 (-1.013)	omitted		-0.296 (-0.504)	
Log of hourly wages	-0.0907 (-1.291)	-0.0938 (-0.745)	0.00112 (0.0116)	-0.103 (-0.907)	-0.233 (-1.186)	0.0462 (0.333)	-0.0416 (-0.204)	0.218 (0.597)	-0.212 (-1.025)	-0.130 (-0.895)	0.211 (0.963)	-0.121 (-0.680)
Log of households' wealth	0.0145 (0.356)	0.0162 (0.218)	-0.0463 (-0.856)	-0.0138 (-0.207)	0.176 (1.593)	0.0920 (1.244)	-0.0147 (-0.132)	-0.122 (-0.472)	-0.107 (-0.864)	-0.0893 (-1.053)	-0.00596 (-0.0443)	0.0845 (0.806)
Tenure	0.00174 (0.105)	-0.0269 (-0.880)	0.0311 (1.420)	0.0150 (0.527)	-0.0246 (-0.445)	0.0251 (0.753)	-0.0264 (-0.455)	-0.0481 (-0.460)	0.0291 (0.502)	-0.0348 (-0.996)	-0.0194 (-0.357)	-0.0251 (-0.649)
Tenure squared/100	0.0458 (0.753)	0.196* (1.702)	-0.0760 (-0.968)	0.00882 (0.0809)	0.204 (0.929)	-0.0840 (-0.718)	0.120 (0.565)	0.205 (0.511)	-0.160 (-0.722)	0.106 (0.833)	0.145 (0.706)	0.0921 (0.653)
<b>Observations</b>	3,135	6,357	6,588	1,400	2,555	2,757	569	1,254	1,332	1,166	2,548	2,499

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table 3- 4 DID Estimates results**

<b>Dependent variable</b>	<b>Multiple job (1)</b>	<b>Private transfer (2)</b>	<b>Home production (3)</b>
After 2007	0.629*** (-5.924)	1.097* (1.898)	0.924 (-1.168)
Regional minimum wage affected	1.126 (0.893)	1.217** (2.122)	1.545*** (3.370)
After 2007 * Regional minimum wage affected	1.416** (2.029)	1.120 (0.999)	0.940 (-0.387)
Observations	24,910	19,761	15,791

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.5. Concluding Remarks

This chapter mainly discussed on the relationship between income shocks and coping strategies in informal institution. We find that having multiple job holding, private transfer, and home=products would be helpful to some groups with unobservable characteristic. It would be hard to draw a conclusion that causality relationship between income shocks and coping strategies.

## **Chapter 4. Consumption Smoothing Effects of Informal Coping Strategies**

### **4.1. Introduction**

Understanding the magnitude of households coping with income shocks has importance for design and reform of public programs. For example, if public programs largely ‘crowd out’ private support activities, the net value of public safety nets and programs is reduced (Jensen, 2000). The existing literature focused mainly on multiple job holdings (or moonlighting), precautionary motives (Guariglia & Kim, 2003), consumption smoothing (Danzer, 2011, Gerry and Li, 2010), and career pathways (Pouliakas, 2017). By contrast, the role of informal labor supply and home productions has received little attention despite the fact that they are pervasive in developing economies and often considered as an important transmission mechanism to smooth consumption. One of the problems is that the role of informal labor supply is ambiguous due to its heterogeneity and measurement difficulties.

Do income shocks affect standards of living of Russian households? Do coping strategies work as insurances against income shocks? One consistent empirical finding in most of this recent work is that household consumption appears to be smoothed against income shocks, although partially for the Russian case. Given the absence of mature formal insurance, this suggests that some informal institutions allow households to mitigate to such shocks.

Nevertheless, the previous findings tend to only reflect the outcome of a mix of various insurance mechanisms on household consumption without identifying such

channels of consumption smoothing such as adjusting labor supply, savings or assets, home production (livestock, crops) or through private transfers from family and friends. Hence, the extent to which the consumption smoothing can be accounted for by these underlying forces remain unclear. There exist some exceptions. Skoufias (2003) concentrated only on the likelihood of using various coping strategies. Gerry and Li (2010) explored the explicit contributions they make but for the role of labor supply, they implicitly assumed additional work, and simplified it as ‘entering work’ only. Although there are a large number of studies that have examined and tested the full consumption risk-sharing model, few studies have looked the way households respond and how risk-coping measures are used when well-functioning credit markets or social security nets are lacking. This is an important issue because government policy should take account of the heterogeneity across households in terms of their ability to employ different coping measures in respond to the damage caused by income shocks.

The remainder of this chapter is structured as follows. Section 2 illustrates our data, and presents some descriptive statistics. In Section 3, we describe our empirical methodology, and in Section 4, the results of our regressions. Section 5 concludes.

## **4.2. Data**

We utilize the same RLMS-HSE data that were used in the previous chapters. For our baseline specification, we focus on households with currently working and married, with non-missing information on key variables such as age, education, and wage of primary job.

Total household consumption is defined as the sum of expenditures on food, the value of home-produced goods consumed or given away, and expenditures on non-food, such as clothing, fuel, transportation, repairs, laundry, postal services, medical services, marriages/funerals, rent, child support, schooling, sanatorium, travel, and clubs.

Total household asset is defined as the sum of earnings from workplace of household members, rent, interest receipts, investments, pension benefits, unemployment benefits, stipends, and the value of home-produced food (cash and in kind); excluding depletion of assets, property and jewelry sales, transfers received from friends and relatives, and cash borrowings.<sup>15</sup>

In addition to household consumption and asset, data on wages and earnings of the breadwinner also required.<sup>16</sup> The survey collects data on monthly labor earnings and on monthly hours of work. To construct the hourly wage, we divide monthly earnings by monthly hours. Hence, we have a measure of the average monthly wage. To create a measure for real monthly household food expenditures, we use information on the quantity and monetary value of the previous week's purchases on 56 categories of foods, alcoholic and non-alcoholic drinks, and tobacco products. Expenditures on services, utilities and fuels are measured in the month prior to the interview, while clothes are measured in the three months prior to the interview. We convert all expenditures to monthly values. We also use household expenditures on food groups, including grain, meat, dairy, fruit, sweets, and beverages. Following Notten and Crobruggehe (2012)'s

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<sup>15</sup> All the relevant income, expenditure, and saving variables are expressed in 2010 roubles.

<sup>16</sup> Following previous literature using RLMS-HSE, we defined the head of households if he or she is working aged, and the largest earner among household members. If head of household is not uniquely defined (e.g., same earnings waged couple), the older one was assigned to be a head of household. We admit that assuming single breadwinner is too bold to reflect the reality; analysis with more information on other earners would be our future work.

approach, missing variables in the consumption and asset subcategories were coded as zero.

Table 4-1 provides summary statistics for the income, expenditure, and income shock-related variables in average; all amounts are expressed in constant 2010 ruble prices. In Table 4-1, we can observe several findings as follows.

First, household income and consumption expenditure were increased over the period until 2008. They sharply dropped in 2009 due to 2008's financial crisis, and then recovered after one year. This is consistent with Kwon and Spilimbergo (2005) who argued that Russia faced very large scale but short-lived shocks, which is typical for transition economies.

Second, it is worth to point out that consumption expenditure is larger than income in RLMS-HSE, which is counterfactual. In addition, it was consistently observed in previous research using RLMS-HSE data sets (e.g., Mu,2006;Skoufias, 2003) We attribute this feature to the respondents' low incentives to report exact amounts of their income in an attempt to pay lower taxes or other social expenses.

**Table 4- 1 Income, Expenditure, and Income shock indicators (2002-2015)**

Year	Observation	Average Income	Average expenditure	Income Shock			
				Composite Income shock	Wage arrears	Wage cut	Compulsory unpaid-leave
<b>2002</b>	3,457	3,190	8,971	0.196	0.196	0.077	0.026
<b>2003</b>	3,507	21,123	10,679	0.165	0.164	0.067	0.024
<b>2004</b>	3,544	5,860	11,629	0.152	0.137	0.064	0.027
<b>2005</b>	3,461	9,118	13,012	0.117	0.105	0.050	0.021
<b>2006</b>	4,177	11,878	15,950	0.105	0.080	0.055	0.020
<b>2007</b>	4,092	14,152	18,573	0.084	0.062	0.035	0.022
<b>2008</b>	3,994	45,612	23,305	0.091	0.059	0.056	0.024
<b>2009</b>	3,984	22,078	22,727	0.155	0.068	0.140	0.046

<b>2010</b>	6,011	19,367	30,157	0.092	0.045	0.073	0.027
<b>2011</b>	6,105	25,970	30,580	0.077	0.044	0.048	0.022
<b>2012</b>	6,223	30,599	33,477	0.064	0.036	0.044	0.017
<b>2013</b>	5,986	34,106	35,903	0.061	0.034	0.046	0.019
<b>2014</b>	4,905	38,969	38,420	0.065	0.032	0.053	0.020
<b>2015</b>	4,916	40,525	38,834	0.098	0.033	0.084	0.028

Lastly, the composite income shock variable, which comprise of wage arrears, wage cut, and compulsory unpaid leave indicators, decreased gradually until 2007. Then, it soared from 0.084 in 2007 to 0.155 in 2009 due to the crisis. Again, after one year, the number returned to the level of before crisis. In addition, we can see that each income shock-related variable shows different pattern over the periods. In particular, while ‘wage arrears’ occurred relatively other types of income shocks in the early 2000s, after the economy was hit by the crisis, the incidence of ‘wage cut’ has been higher than others. Compared to others, ‘compulsory unpaid-leave’ recorded consistently low trends over the periods. During periods of crisis (2008-2009) is an exception, as it doubled from 0.024 to 0.046. Hence, we can infer that various measures were used to employers to adapt economic shocks through it all. It implies that, in the Russian case, measuring only one source of income shocks would not be sufficient to capture the whole income shock effects. Conversely, since each income shock has its own different pattern, the composite indicator by simply adding up can also mislead the results. To address this issue, we divided sample periods in various ways and used our analysis as a robustness check.

### 4.3. Methodology

In this section, we follow the permanent-income or life-cycle models in order to empirically measure the consumption smoothing abilities of Russian households. Notten and Crombrugghe (2012) refer to consumption smoothing as ‘the extent to which it actually insuring its consumption expenditure from all kinds of recorded shocks.’ The life-cycle models stemmed from Milton Friedman’s permanent income theory<sup>17</sup>, assuming consumption is determined by the present value of life-time resources. Friedmans’ permanent income model has been extended and used in various ways such as consumption smoothing over agricultural production cycles, business cycle, and working life as well as consumption smoothing over the life-time (Browning and Crossley, 2001). Related to our thesis, Notten and Crombrugghe (2012), and Stillman (2001) used the permanent-income, life-cycle model to assess the consumption smoothing abilities of Russian households<sup>18</sup>.

We start from the basic static specification model estimating the following (linear) reduced form consumption functions:

$$\ln C_{it} = \beta_1 \ln Y_{it} + \sum_{j=1}^J \gamma_j X_{jit} + v_i + u_t + \varepsilon_{it} \quad (4-1)$$

where  $\ln C_i$  and  $\ln Y_i$  denote the logarithms of consumption and income, respectively, for household  $i$  in periods  $t$ ;  $X_{jit}$ ,  $j=1, \dots, J$ , indicate ‘taste shifters’, in other words, the

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<sup>17</sup> Attansio and Weber (2010) and Jappelli and Pistaferri (2010) provide the relevant theoretical and empirical literature.

<sup>18</sup> In order to directly identify the consumption response to shocks, certain statistical assumptions about the income process, alongside covariance restrictions on the joint behavior of consumption and income growth are required. (Stillman, 2001; Jappelli and Pistaferri, 2010) By relying on this model, the estimates of the marginal propensity to consume of Russia or transition economies would be a fruitful contribution to literature.

household characteristics affecting the marginal utility of consumption;  $v_i$  and  $u_t$  are time-invariant and time-varying unobserved household-specific individual effect;  $\varepsilon_{it}$  is an error term. In this case,  $\beta_1$  is the main parameter indicating income elasticity of consumption. If  $\beta_1 = 0$ , consumption changes induced by income changes are fully insured and all income shocks have no impact on the level of consumption. In contrast, if  $\beta_1 = 1$ , income changes affect consumption proportionally and no smoothing at all. Based on this model, Stillman (2001) tested a permanent income, life-cycle hypothesis, and reject the hypothesis with little smoothing. Likewise, Skoufias (2003), Mu (2006), and Gerry and Li (2010) tested full insurance hypothesis in Russia case. They interpreted the smoothing behavior as risk-sharing instead of Stillman (2001)'s life-cycle interpretation. By and large, they rejected the full insurance hypothesis and suggested availability of coping mechanism to households. As an extension, Notten and Crombrugghe (2012) used an error-correction model allowing for delayed adjustments and long-term dynamics.

Based on this background, this chapter addresses the question on how successful households use multiple jobs, private transfers, and home-produced products to smooth consumption. To achieve this, we used a set of household fixed effects consumption models, of which is similar to Danzer (2011)'s model:

$$\Delta \ln C_{it} = \beta_1 \Delta \ln Y_{it} + \theta_1 \Delta \text{Shock}_{it} + \psi_1 \Delta \text{MJ}_{it} + \delta_1 (\Delta \text{Shock}_{it} * \Delta \text{MJ}_{it}) + \sum_{j=1}^J \gamma_j \Delta X_{jit} + \Delta \varepsilon_{it} \quad (4-2)$$

$$\Delta \ln C_{it} = \beta_2 \Delta \ln Y_{it} + \theta_2 \Delta \text{Shock}_{it} + \psi_2 \Delta \text{PT}_{it} + \delta_2 (\Delta \text{Shock}_{it} * \Delta \text{PT}_{it}) + \sum_{j=1}^J \gamma_j \Delta X_{jit} + \Delta \varepsilon_{it} \quad (4-3)$$

$$\Delta \ln C_{it} = \beta_3 \Delta \ln Y_{it} + \theta_3 \Delta \text{Shock}_{it} + \psi_3 \Delta \text{HP}_{it} + \delta_3 (\Delta \text{Shock}_{it} * \Delta \text{HP}_{it}) + \sum_{j=1}^J \gamma_j \Delta X_{jit} + \Delta \varepsilon_{it} \quad (4-4)$$



$$\begin{aligned} \Delta \ln C_{it} = & \alpha_1 \Delta \ln Y_{it} + \alpha_2 \Delta \text{Shock}_{it} + \alpha_3 \Delta \text{MJ}_{it} + \alpha_4 \Delta \text{PT}_{it} + \alpha_5 \Delta \text{HP}_{it} \\ & + \alpha_6 (\Delta \text{Shock}_{it} * \Delta \text{MJ}_{it}) + \alpha_7 (\Delta \text{Shock}_{it} * \Delta \text{PT}_{it}) + \alpha_8 (\Delta \text{Shock}_{it} * \Delta \text{HP}_{it}) + \sum_{j=1}^J \gamma_j \Delta X_{jit} + \Delta \varepsilon_{it} \end{aligned} \quad (4-5)$$

where  $i \in \{1, \dots, n\}$ ,  $t \in \{2002, \dots, 2015\}$  and

$$\text{Entrants}_{it} = \begin{cases} 1 & \text{if } Y_{it}=0, Y_{it+1}=1 \\ 0 & \text{if } Y_{it}=0, Y_{it+1}=0 \end{cases} \quad (4-6)$$

where  $\text{Entrants}_t \in \{\text{Multiple job, Private transfer, and Home-produced products}\}$

Consider followings from Equation (4). Under the lack of any insurance mechanism, if  $\alpha_1=1$ , then consumption changes were not insured at all and perfectly co-vary with income changes. In the case of  $\alpha_1=0$ , consumption changes are fully insured and entirely independent of income changes.

Furthermore, if insurance mechanisms were fully at work, transitory shocks  $\Delta \text{Shock}_{it}$  should have no impact on the consumption, thus the coefficient of wage shocks  $\alpha_2 = 0$ . On the other hand, if the coefficient is statistically significant and  $\alpha_2 < 0$ , transitory adverse income shocks seem not only to be unanticipated but also ex-ante uninsurable. At the center of interests here are the response to income shocks-related terms  $\alpha_6, \alpha_7$ , and  $\alpha_8$ , where  $\Delta \text{MJ}_{it}$  is changes in multiple job holdings,  $\Delta \text{PT}_{it}$  for private transfers, and  $\Delta \text{HP}_{it}$  for home-produced products. The signs of  $\alpha_6, \alpha_7$ , and  $\alpha_8$ , contain information on increased shock mitigating activities against income shocks that can play some roles for smoothing channel. The fixed effects regressions also control for family structure and region dummies, which are subsumed under X.

#### 4.4. Results and Discussions

In the preceding sections, we provide the background for the estimation of the consumption equation. In this section, we explore the effect of income shocks on consumption smoothing abilities with several coping strategies with household panel data.

**Table 4- 2 Fixed effect estimates of consumption expenditure determinants**

<b>Log of consumption expenditure at t+1</b>	<b>Full year (1)</b>	<b>2002-2007 (2)</b>	<b>2008-2011 (3)</b>	<b>2012-2015 (4)</b>
Income shock	-0.00495 (-0.397)	-0.0183 (-0.818)	-0.00564 (-0.174)	0.00912 (0.482)
Male	0.0218** (1.987)	-0.00675 (-0.299)	-0.0452 (-1.504)	-0.00330 (-0.199)
Russian	0.0349 (1.635)	0.0983* (1.956)	-0.0688 (-1.107)	0.0254 (0.843)
Age	0.00516 (1.068)	-0.00645 (-0.592)	0.0107 (0.773)	0.000456 (0.0574)
Age squared/100	-0.00726 (-1.165)	0.00988 (0.690)	-0.0153 (-0.847)	0.000805 (0.0785)
Secondary education	0.0198 (1.224)	-0.0382 (-0.994)	0.0263 (0.554)	-0.0167 (-0.633)
Vocational Training	0.0349* (1.828)	-0.0291 (-0.829)	0.0115 (0.241)	0.0134 (0.518)
University or higher	0.0697*** (3.266)	omitted	omitted	omitted
Married	0.0765*** (4.092)	0.0531 (1.209)	0.0620 (1.277)	0.0261 (0.894)
Urban	0.0847 (1.037)	0.717 (1.504)	0.290 (1.460)	0.302 (0.642)
Numbers of children aged under 6	0.0292*** (2.805)	-0.0120 (-0.440)	-0.0274 (-0.943)	0.0223 (1.440)
Numbers of elderly	-0.00166 (-0.124)	-0.0394 (-1.242)	-0.0353 (-0.999)	-0.0147 (-0.645)
Numbers of working aged males	0.0236*** (3.060)	0.0257 (1.493)	-0.0145 (-0.798)	-0.0157 (-1.193)
Log of hourly wages	-0.0147* (-1.756)	-0.0769*** (-4.906)	-0.107*** (-5.064)	-0.0564*** (-4.322)
Log of households' wealth	0.0470*** (9.867)	0.0625*** (7.368)	0.0776*** (6.239)	0.0602*** (7.835)
Observations	28,007	9,398	6,582	12,027

R-squared	0.047	0.046	0.043	0.043
Number of households	11,651	5,604	4,306	5,192

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4-2 provides a descriptive analysis result on consumption expenditure determinants. First row of Table 4-2 clearly shows that income shock effect on consumption expenditure is not statistically significant over the sample periods (2002-2015). Moreover, the result does hold even in the crisis periods (2008-2011) of Column (3). An in-depth discussion on this concern would be in next section.

Based on this, the analysis uses fixed effects regressions as well as DID-regressions. Throughout, we test our model on two different datasets. First, we use the most complete possible panel, comprising 14 waves (2002–2015). Next, we see how the results are affected when we use the three shorter panels respectively.

Table 4-3 and Table 4-4 report the key results for the consumption smoothing effect analysis. In more detail, the tables present marginal effects and t-statistics for the income shock variable, as well as other main covariates and interaction effects. Table A4.1 and Table A4.2 in the Appendix report the full set of coefficients for models (1)-(4) with the coping strategies interaction effects. The list of covariates in regressions include characteristics of head of household such as gender (male=1), nationality (Russian=1), age, age squared, the highest completed education dummies, marital status (married=1), urban (urban=1), addition to household specific characteristics such as number of children 0-6 years of age, number of the working aged males, and number of elderly (adults above retirement age) with year and regional dummies.

**Table 4- 3 Consumption smoothing effects (Extensive margins)**

Dependent variable: Log of consumption expenditure at t+1	Full years (2002-2015)			Before crisis (2002-2007)			Crisis (2008-2011)			After crisis (2012-2015)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Income shocks	-0.018 (-0.663)	-0.003 (-0.140)	0.014 (0.481)	-0.014 (-0.309)	-0.027 (-0.704)	0.021 (0.426)	-0.046 (-0.620)	-0.044 (-0.841)	-0.110 (-1.534)	0.070* (1.763)	-0.005 (-0.147)	0.068 (1.614)
Multiple job	0.034 (1.182)			0.007 (0.166)			0.093* (1.761)			0.011 (0.250)		
Income shocks * MJ	-0.007 (-0.127)			-0.015 (-0.189)			-0.051 (-0.430)			-0.101 (-1.215)		
Private transfer		-0.032* (-1.911)			-0.028 (-0.924)			-0.125*** (-2.692)			-0.014 (-0.536)	
Income shocks * PT		-0.017 (-0.510)			0.045 (0.818)			0.021 (0.265)			0.027 (0.533)	
Home production			0.134*** (6.223)			0.059 (1.441)			-0.021 (-0.316)			0.016 (0.475)
Income shocks * HP			-0.021 (-0.596)			-0.048 (-0.825)			0.119 (1.346)			-0.063 (-1.187)
Male	0.089*** (3.110)	0.042** (2.077)	0.039** (1.963)	0.102** (2.282)	0.029 (0.808)	0.034 (0.961)	-0.151** (-2.460)	-0.072 (-1.187)	-0.049 (-0.855)	0.036 (0.705)	-0.032 (-0.965)	-0.038 (-1.132)
Russian	0.024 (0.454)	0.054 (1.401)	0.056 (1.489)	0.102 (1.013)	0.049 (0.614)	0.039 (0.474)	-0.251** (-2.081)	-0.135 (-1.125)	-0.152 (-1.430)	0.146 (1.626)	0.057 (0.919)	0.076 (1.247)
Age	0.020* (1.649)	0.028*** (3.087)	0.028*** (3.199)	-0.009 (-0.360)	0.019 (0.936)	0.006 (0.333)	0.015 (0.481)	0.061** (2.211)	0.053* (1.942)	0.011 (0.470)	0.019 (1.066)	0.013 (0.736)
Age squared/100	-0.029* (-1.861)	-0.037*** (-3.124)	-0.037*** (-3.275)	0.015 (0.463)	-0.024 (-0.845)	-0.004 (-0.151)	-0.028 (-0.701)	-0.086** (-2.367)	-0.078** (-2.191)	-0.005 (-0.143)	-0.020 (-0.875)	-0.015 (-0.690)
Under secondary	-0.210*** (-3.739)	-0.170*** (-4.355)		-0.143 (-1.372)	-0.017 (-0.203)	-0.048 (-0.575)	0.061 (0.409)				-0.049 (-0.749)	-0.052 (-0.795)
Secondary education	-0.145*** (-3.394)	-0.080*** (-2.641)	0.047 (1.543)	-0.079 (-0.998)	-0.002 (-0.039)	-0.042 (-0.660)	0.040 (0.403)	-0.103 (-0.964)	-0.203* (-1.840)	0.078 (1.085)	0.056 (1.025)	0.010 (0.179)
Vocational Training	-0.134***	-0.108***	0.057	-0.073	0.001	-0.049		-0.241*	-0.220*	0.056	0.032	0.011

	(-3.209)	(-3.635)	(1.604)	(-0.987)	(0.010)	(-0.817)		(-1.939)	(-1.735)	(0.667)	(0.605)	(0.212)
University or higher			0.154***				-0.055	-0.189	-0.261**	0.032		
			(4.003)				(-0.506)	(-1.439)	(-1.994)	(0.320)		
Married	0.079	0.078**	0.100***	-0.059	0.046	0.005	0.117	0.121	0.113	-0.020	-0.036	0.058
	(1.559)	(2.085)	(2.708)	(-0.627)	(0.571)	(0.067)	(1.169)	(1.221)	(1.165)	(-0.208)	(-0.535)	(0.874)
Urban	-0.063	-0.117	0.080		-0.505*	-0.525**		0.409	0.599*			
	(-0.403)	(-1.120)	(0.838)		(-1.803)	(-2.027)		(1.035)	(1.956)			
Numbers of children aged under 6	-0.004	0.019	0.008	0.077	0.050	-0.025	0.010	-0.074	-0.066	-0.000	-0.029	-0.025
	(-0.142)	(0.981)	(0.402)	(1.240)	(1.077)	(-0.540)	(0.161)	(-1.435)	(-1.198)	(-0.002)	(-0.944)	(-0.729)
Numbers of working aged males	-0.011	-0.010	-0.017	-0.099	-0.074	-0.069	-0.119	-0.142*	-0.047	0.019	0.046	0.039
	(-0.299)	(-0.361)	(-0.691)	(-1.316)	(-1.246)	(-1.335)	(-1.201)	(-1.759)	(-0.626)	(0.250)	(0.909)	(0.819)
Numbers of elderly	0.091***	0.053***	0.063***	0.034	-0.013	0.086***	-0.025	0.016	0.001	0.008	-0.031	-0.047*
	(3.957)	(3.310)	(4.287)	(0.741)	(-0.363)	(2.721)	(-0.528)	(0.404)	(0.028)	(0.199)	(-1.053)	(-1.704)
Log of hourly wages	0.017	0.015	-0.003	-0.078**	-0.059**	-0.068***	-0.074*	-0.092**	-0.106***	-0.024	-0.029	-0.051*
	(0.784)	(0.969)	(-0.177)	(-2.561)	(-2.429)	(-2.886)	(-1.802)	(-2.449)	(-2.953)	(-0.614)	(-1.186)	(-1.939)
Log of households' wealth	0.036***	0.047***	0.054***	0.048***	0.056***	0.060***	0.081***	0.109***	0.098***	0.036	0.042***	0.050***
	(2.931)	(5.450)	(6.534)	(2.592)	(4.246)	(4.726)	(3.300)	(4.244)	(4.466)	(1.591)	(2.804)	(3.222)
Observations	3,589	7,255	7,560	1,613	2,952	3,191	1,367	1,424	1,529	1,313	2,879	2,840
R-squared	0.082	0.082	0.091	0.050	0.043	0.051	0.098	0.098	0.098	0.046	0.040	0.049
Number of households	1,329	2,695	2,874	855	1,603	1,745	901	897	985	529	1,164	1,162

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4- 4 Consumption smoothing effects (Intensive margins)**

Dependent variable	Full years, 2002-2015			Before crisis, 2002-2007			Crisis, 2008-2011			After crisis, 2012-2015		
Log of consumption expenditure at t+1												
Income shocks	-0.017 (-0.641)	-0.007 (-0.304)	0.016 (0.586)	-0.016 (-0.359)	-0.033 (-0.871)	0.010 (0.218)	-0.030 (-0.402)	-0.039 (-0.738)	-0.117* (-1.673)	0.062 (1.566)	-0.005 (-0.162)	0.077* (1.880)
LMJ	0.004 (0.474)			-0.002 (-0.214)			0.023* (1.667)			-0.007 (-0.614)		
Income shocks * LMJ	-0.002 (-0.136)			-0.002 (-0.083)			-0.025 (-0.813)			-0.018 (-0.766)		
LPT		-0.004* (-1.829)			-0.003 (-0.749)			-0.016*** (-2.786)			-0.002 (-0.718)	
Income shocks * LPT		-0.001 (-0.272)			0.007 (1.052)			0.001 (0.066)			0.004 (0.570)	
LHP			0.018*** (7.203)			0.004 (0.882)			-0.010 (-1.267)			0.001 (0.253)
Income shocks * LHP			-0.003 (-0.725)			-0.004 (-0.593)			0.015 (1.525)			-0.009 (-1.527)
Male	0.089*** (3.102)	0.042** (2.080)	0.039* (1.954)	0.102** (2.281)	0.029 (0.791)	0.033 (0.935)	-0.153** (-2.495)	-0.074 (-1.224)	-0.048 (-0.824)	0.032 (0.626)	-0.032 (-0.962)	-0.038 (-1.132)
Russian	0.025 (0.457)	0.055 (1.409)	0.057 (1.524)	0.103 (1.019)	0.051 (0.641)	0.042 (0.504)	-0.251** (-2.083)	-0.140 (-1.166)	-0.150 (-1.420)	0.147 (1.643)	0.057 (0.923)	0.076 (1.248)
Age	0.021* (1.693)	0.028*** (3.083)	0.027*** (3.107)	-0.008 (-0.334)	0.019 (0.941)	0.006 (0.342)	0.015 (0.482)	0.059** (2.168)	0.052* (1.901)	0.013 (0.551)	0.019 (1.063)	0.012 (0.733)
Age squared/100	-0.030* (-1.901)	-0.037*** (-3.117)	-0.036*** (-3.193)	0.014 (0.439)	-0.024 (-0.848)	-0.004 (-0.157)	-0.029 (-0.705)	-0.084** (-2.326)	-0.077** (-2.153)	-0.007 (-0.221)	-0.020 (-0.874)	-0.015 (-0.684)
Under secondary		-0.171*** (-4.368)				-0.045 (-0.547)	0.060 (0.405)				-0.049 (-0.746)	-0.051 (-0.780)
Secondary education	0.065	-0.080***	0.044	0.065	0.015	-0.042	0.036	-0.105	-0.200*	0.075	0.056	0.010

	(1.407)	(-2.640)	(1.463)	(0.847)	(0.240)	(-0.664)	(0.357)	(-0.989)	(-1.818)	(1.043)	(1.025)	(0.183)
Vocational Training	0.076	-0.109***	0.056	0.071	0.017	-0.049		-0.241*	-0.218*	0.058	0.032	0.011
	(1.460)	(-3.641)	(1.589)	(0.815)	(0.251)	(-0.825)		(-1.947)	(-1.719)	(0.698)	(0.614)	(0.210)
University or higher	0.212***		0.152***	0.144	0.016		-0.055	-0.185	-0.262**	0.029		
	(3.775)		(3.968)	(1.382)	(0.193)		(-0.501)	(-1.413)	(-2.006)	(0.291)		
Married	0.078	0.078**	0.102***	-0.059	0.046	0.004	0.119	0.122	0.111	-0.022	-0.035	0.057
	(1.530)	(2.085)	(2.783)	(-0.628)	(0.571)	(0.049)	(1.187)	(1.233)	(1.153)	(-0.233)	(-0.525)	(0.866)
Urban	-0.060	-0.117	0.090		-0.505*	-0.535**		0.416	0.601**			
	(-0.385)	(-1.119)	(0.947)		(-1.806)	(-2.064)		(1.054)	(1.966)			
Numbers of children aged under 6	-0.004	0.019	0.010	0.077	0.049	-0.026	0.006	-0.073	-0.068	0.002	-0.029	-0.025
	(-0.135)	(0.973)	(0.488)	(1.247)	(1.070)	(-0.559)	(0.092)	(-1.408)	(-1.226)	(0.041)	(-0.943)	(-0.736)
Numbers of elderly	-0.012	-0.009	-0.021	-0.100	-0.073	-0.068	-0.119	-0.144*	-0.042	0.021	0.046	0.039
	(-0.319)	(-0.341)	(-0.847)	(-1.322)	(-1.236)	(-1.317)	(-1.198)	(-1.787)	(-0.565)	(0.278)	(0.908)	(0.829)
Numbers of working aged males	0.091***	0.053***	0.061***	0.035	-0.012	0.088***	-0.025	0.017	0.005	0.008	-0.031	-0.047*
	(3.950)	(3.311)	(4.170)	(0.755)	(-0.349)	(2.799)	(-0.534)	(0.413)	(0.151)	(0.197)	(-1.051)	(-1.693)
Log of households' wealth	0.038***	0.047***	0.054***	0.049***	0.056***	0.059***	0.082***	0.109***	0.095***	0.039*	0.042***	0.049***
	(3.021)	(5.447)	(6.563)	(2.638)	(4.266)	(4.654)	(3.326)	(4.261)	(4.358)	(1.700)	(2.791)	(3.203)
Observations	3,589	7,255	7,560	1,613	2,952	3,191	1,367	1,424	1,529	1,313	2,879	2,840
R-squared	0.081	0.081	0.093	0.050	0.043	0.050	0.097	0.100	0.100	0.047	0.040	0.050
Number of households	1,329	2,695	2,874	855	1,603	1,745	901	897	985	529	1,164	1,162

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4- 5 DID estimates results of Regional minimum wage effects on consumption**

<b>Dependent variable</b>	<b>Coefficients</b>
<b>Log of consumption expenditure</b>	<b>(t-statistics)</b>
After 2007	0.123*** (17.49)
Regions Regional minimum wage affected	0.0363** (2.349)
After 2007 * Regional minimum wage affected	-0.0364** (-2.084)
Male	0.0654*** (11.04)
Russian	-0.0388*** (-4.155)
Age	0.0140*** (6.267)
Age squared/100	-0.0178*** (-6.280)
Married	0.106*** (11.51)
Numbers of children aged under 6	0.00965 (1.622)
Numbers of working aged males	0.0997*** (16.71)
Numbers of elderly	0.119*** (29.89)
Under secondary	-0.143*** (-13.21)
Secondary education	-0.128*** (-16.18)
Vocational Training	-0.0863*** (-10.82)
Urban	-0.0764*** (-8.183)
Log of hourly wages (Household head)	0.378*** (85.76)
Log of households' wealth	-0.0716*** (-27.16)
Observations	50,882



From Table 4-3 and Table 4-4, our key finding is that the estimated coefficients of variables including income shocks were either insignificant or opposite signs to our expectations. In particular, statistically insignificant income shock effects imply that consumption changes are fully insured and income changes do not affect to consumption changes. In other words, full insurance hypothesis cannot be rejected.

This result is a striking contrast to previous research on consumption smoothing of Russia with same RLMS-HSE data sets (Stillman, 2001; Gerry and Li, 2010; Skoufias, 2003; Mu, 2006; Notten and Grombrugghe, 2012). Although the value of coefficient of income shock effect was somewhat various depending on sample-periods, model specifications, or measurement of key variables, the previous empirical evidences have indicated little smoothing and a strong rejection of the permanent income hypothesis. For instance, Notten and Grombrugghe (2012) reported that a 10% of income shock is likely to affect the household food consumption by 2.3%. Likewise, Skoufias (2003) reported 2% of income shock effects on loss of consumption expenditure with pooled OLS estimate.

This distinction between previous results and ours can be attributed by the following: 1) different sample periods; 2) different nature of shocks; 3) different economic environments of Russia; and 4) different adapting abilities of the workers. Since each possible reason has its own importance requiring more in-depth discussion, in which is beyond the scope of this research, this chapter leave it as a future research.

## 4.5. Concluding Remarks

The primary purpose of this chapter is to analyze the role of “specific shock mitigating channels” between income changes and consumption changes. In particular, this chapter focused on potential smoothing channels given lack of formal institution settings (e.g., supports from governments or financial intermediaries). In order to test consumption smoothing effects, we conducted fixed-effects regression, and DID-estimations.

Contrast to previous results, the estimated effects of overall variables and interaction terms were insignificant. More studies and discussions would be needed to reconcile the distinct results between previous literature with ours. In this chapter, we suggested some possible explanations. One may be so-called bad control problems. For example, multiple job holders choose to have other jobs because their main jobs are more vulnerable than single job holders. Private transfer would be the case as well. By Glewwe and Hall (1998)’s definition on ‘vulnerability’, the results of this analysis rather identified ‘the market-induced’ or ‘the robust vulnerable groups’ than ‘the extent of ability adapting to income shocks’.

## Chapter 5. Conclusions

Since economic shocks have become frequent in recent decades, it would be more important than previous era to understand how economic shocks affect standards of living as well as how people adjust to those shocks.

There would be mainly two channels for individuals and households responding to income shocks. One of this channel is the adjustment in labor market during bad times. Workers faced Income shocks, would give more labor supply, work in informal sector, or spouse of breadwinner or other household members would participate in labor market as well.

The other channel would be the adjustment of consumption expenditure. Indeed, according the RLMS-HSE survey in 1998, the respondents answered that most commonly practiced shock mitigating measure was cutting consumption expenditure on clothes or other items.

Throughout this research, it can be concluded that informal economy in the current Russian economy is interwind motivated and has its own distinct features with other developing economies. As formal institutions and adapting abilities of people have been improved, the main reason of participating informality would be less likely to make ends meet. Still, however, it does serve as an insuring device for those who are more vulnerable to shocks. Thus, in order to understand the informality accurately, both micro-based data and macroeconomic changes have to be considered at the same time. More rigorous analysis on underlying assumptions of research and assumed unobservable characteristics would be needed.

## 국문 초록

본고의 연구목적은 비공식경제활동의 소득 충격에 대한 대응전략으로서의 역할을 검증 하는 데에 있다. 실증분석을 위하여 러시아 가구패널자료(RLMS-HSE)의 2002년-2015년 사이의 정보가 이용되었다. 장기간 축적된 RLMS-HSE의 풍부한 정보, 상대적으로 낮은 표본탈락(attrition)의 문제, 그리고 데이터의 용이한 접근성 등은 장기간에 걸친 불황 및 경제충격과 사람들의 대응행동을 분석하기에 적합한 강점이다.

소득충격과 다양한 형태의 비공식노동과의 관계(2장), 그리고 친척 또는 지인간 사적이전 및 가내생산과의 관계(3장) 및 각각의 소비평탄화 효과(4장) 등을 로짓모형, 멀티로짓모형, 그리고 이중차분 모형을 통하여 검증하였다. 특히 본고는 임금지불유예, 임금삭감, 강제적인 무급휴가 등에 의한 임금충격을 소득충격 변수로서 활용하였다. 뿐만 아니라, 2007년 이후 시행된 최저임금제도의 개혁을 이중차분 모형과 함께 활용하여 내생성의 문제점을 보완하고자 하였다.

결론적으로, 본고의 실증분석은 러시아의 비공식 경제가 경제충격에 취약한 계층이 선택하게 되는 소득충격 대응전략으로서의 부분적인 역할을 함과 동시에 경제환경과 제도의 높은 불확실성 하에서 전략적이고 자발적인 선택으로서의 역할이 혼재되어 있다고 평가할 수 있겠다.

주제어: 비공식노동, 사적이전, 가내농업, 대응전략, 이행기경제, 러시아

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## Appendices

**Table A 1 Logit estimates results of Income shock effects on coping strategies (by 4 years)**

Variables	2002-2005			2006-2009			2010-2013		
	MJ	PV	HP	MJ	PV	HP	MJ	PV	HP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Income shocks</b>	1.322 (1.548)	1.251 (1.568)	0.917 (-0.387)	1.957 (1.636)	0.940 (-0.246)	2.213* (1.793)	0.793 (-1.171)	1.052 (0.404)	0.995 (-0.0288)
<b>Demographic characteristics</b>									
Male	1.070 (0.396)	0.935 (-0.518)	1.868*** (2.865)	0.741 (-0.878)	1.069 (0.365)	0.888 (-0.379)	0.911 (-0.681)	1.245** (2.504)	1.171 (1.297)
Age	0.950 (-0.813)	0.933 (-1.485)	0.969 (-0.452)	1.045 (0.429)	0.884** (-1.995)	0.772** (-2.396)	0.929 (-1.567)	1.005 (0.151)	1.036 (0.815)
Age squared/100	1.038 (0.451)	1.029 (0.476)	1.014 (0.151)	0.929 (-0.553)	1.150* (1.727)	1.341** (2.138)	1.099 (1.553)	0.972 (-0.701)	0.976 (-0.435)
Marital status	0.844 (-0.717)	1.620** (2.511)	1.534 (1.390)	1.450 (0.947)	1.267 (0.950)	1.344 (0.737)	1.042 (0.227)	1.429*** (2.916)	0.827 (-1.097)
Russian	1.186 (0.761)	1.035 (0.202)	1.590 (1.635)	0.523 (-1.198)	1.450 (1.509)	1.627 (1.096)	1.059 (0.294)	1.032 (0.269)	1.182 (0.938)
Number of children aged 0-6	1.324 (1.565)	0.799* (-1.714)	0.864 (-0.734)	1.142 (0.399)	0.992 (-0.0505)	0.393*** (-2.850)	0.903 (-0.850)	1.079 (1.072)	0.971 (-0.286)
Number of working aged males	0.940 (-0.513)	0.823** (-2.302)	0.757** (-2.007)	1.140 (0.629)	0.751** (-2.502)	0.777 (-1.350)	0.885 (-1.360)	0.750*** (-5.223)	0.903 (-1.330)
Number of elderly	0.901 (-0.673)	0.816* (-1.706)	1.179 (0.794)	0.970 (-0.106)	1.082 (0.440)	1.456 (1.189)	0.854 (-1.137)	0.757*** (-3.264)	1.299** (2.252)
Urban	1.398 (1.087)	1.041 (0.194)	0.327*** (-3.396)	0.983 (-0.0421)	1.339 (1.153)	0.653 (-1.114)	1.061 (0.333)	0.899 (-0.962)	0.788 (-1.419)
<b>Education</b>									
Under high school	0.728 (-0.838)	0.775 (-0.944)	0.798 (-0.508)	1.088 (0.160)	0.700 (-1.126)	0.863 (-0.274)	0.969 (-0.140)	0.842 (-1.241)	1.061 (0.301)
High school education	1.110	0.884	1.378	1.264	0.797	1.296	1.151	1.047	1.063



	(0.435)	(-0.708)	(1.136)	(0.542)	(-0.927)	(0.614)	(0.786)	(0.422)	(0.400)
Vocational Training	1.036	1.028	1.710**	1.040	0.915	1.934*	1.025	1.032	1.041
	(0.154)	(0.175)	(2.047)	(0.0995)	(-0.388)	(1.691)	(0.150)	(0.306)	(0.276)
Log of hourly wages of main job	0.838	0.938	1.011	1.219	0.823	1.598*	0.895	0.950	0.905
	(-1.394)	(-0.693)	(0.0707)	(0.845)	(-1.439)	(1.776)	(-1.035)	(-0.715)	(-0.973)
Log of households' wealth	1.058	0.892**	0.866	1.023	0.874	0.737*	1.017	0.918**	1.007
	(0.722)	(-2.104)	(-1.629)	(0.171)	(-1.533)	(-1.754)	(0.250)	(-1.973)	(0.0948)
Tenure	0.988	0.972	0.995	0.981	1.003	1.002	0.990	0.973**	0.998
	(-0.415)	(-1.414)	(-0.143)	(-0.321)	(0.0869)	(0.0426)	(-0.457)	(-1.989)	(-0.106)
Tenure squared/100	1.048	1.114	1.002	1.205	1.007	0.925	1.033	1.093*	1.020
	(0.437)	(1.485)	(0.0177)	(0.701)	(0.0682)	(-0.453)	(0.394)	(1.704)	(0.284)
<b>Observations</b>	1,407	2,046	1,218	350	850	380	2,032	4,087	2,263

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A 2** Logit estimates results of Income shock effects on coping strategies (by 5 years)

Variables	2002-2006			2006-2010			2010-2014		
	MJ	PV	HP	MJ	PV	HP	MJ	PV	HP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Income shocks</b>	1.298 (1.497)	1.149 (1.042)	1.101 (0.471)	1.102 (0.363)	0.997 (-0.0148)	1.013 (0.0499)	0.827 (-1.079)	0.968 (-0.278)	1.075 (0.452)
<b>Demographic characteristics</b>									
Male	0.991 (-0.0570)	0.982 (-0.154)	1.575** (2.368)	0.963 (-0.177)	1.080 (0.601)	1.222 (1.077)	0.963 (-0.305)	1.156* (1.847)	1.130 (1.116)
Age	0.942 (-1.046)	0.930* (-1.794)	0.981 (-0.313)	1.023 (0.333)	0.969 (-0.710)	0.818*** (-3.084)	0.941 (-1.440)	0.995 (-0.189)	1.026 (0.659)
Age squared/100	1.054 (0.700)	1.043 (0.803)	1.005 (0.0584)	0.966 (-0.396)	1.018 (0.318)	1.295*** (3.086)	1.085 (1.502)	0.985 (-0.403)	0.989 (-0.219)
Marital status	0.904 (-0.465)	1.577*** (2.705)	1.252 (0.848)	1.116 (0.423)	1.223 (1.179)	1.213 (0.765)	0.964 (-0.228)	1.380*** (2.903)	0.901 (-0.663)
Russian	1.120 (0.547)	1.042 (0.264)	1.649* (1.916)	1.106 (0.325)	1.285 (1.415)	1.402 (1.301)	1.149 (0.784)	1.074 (0.666)	1.073 (0.449)
Number of children aged 0-6	1.285 (1.496)	0.767** (-2.245)	0.858 (-0.827)	0.998 (-0.00986)	1.008 (0.0670)	0.588*** (-2.678)	0.958 (-0.412)	1.109* (1.678)	0.967 (-0.372)
Number of working aged males	0.982 (-0.164)	0.858** (-2.064)	0.747** (-2.384)	0.865 (-1.130)	0.786*** (-3.090)	0.763** (-2.397)	0.874* (-1.650)	0.754*** (-5.614)	0.938 (-0.922)
Number of elderly	0.952 (-0.352)	0.882 (-1.176)	1.174 (0.855)	0.928 (-0.390)	0.943 (-0.461)	1.474** (1.982)	0.870 (-1.126)	0.727*** (-4.140)	1.217* (1.944)
Urban	1.306 (1.010)	1.209 (1.069)	0.390*** (-3.417)	1.190 (0.650)	1.157 (0.853)	0.922 (-0.318)	1.148 (0.858)	0.951 (-0.505)	0.715** (-2.243)

**Table A 3 Fixed effects estimates results of Income shock effects on coping strategies (by 4 years)**

	2002-2005			2006-2009			2010-2013		
	Multiple job (1)	Private transfer (2)	Home production (3)	Multiple job (4)	Private transfer (5)	Home production (6)	Multiple job (7)	Private transfer (8)	Home production (9)
<b>Income shocks</b>	-0.0700 (-0.487)	-0.452* (-1.731)	0.232 (1.265)	-0.453 (-0.761)	0.0432 (0.0738)	-0.290 (-0.668)	-0.319** (-2.450)	-0.00957 (-0.0416)	0.0964 (0.593)
<b>Demographic characteristics</b>									
Male	0.0665 (0.399)	-0.0887 (-0.276)	0.118 (0.530)	1.564 (1.319)	1.107 (0.915)	-0.321 (-0.362)	-0.0298 (-0.165)	0.111 (0.364)	0.00157 (0.00750)
Age	0.0583 (0.626)	-0.185 (-0.981)	-0.256** (-2.079)	0.466 (0.953)	1.159 (1.565)	-0.103 (-0.221)	-0.103 (-1.141)	0.263* (1.682)	-0.0383 (-0.367)
Age squared/100	-0.0870 (-0.687)	0.239 (0.945)	0.319* (1.955)	-0.764 (-1.203)	-1.552 (-1.555)	-0.00409 (-0.00684)	0.139 (1.190)	-0.341 (-1.638)	0.0926 (0.675)
Marital status	-0.140 (-0.380)	-0.539 (-0.761)	0.861* (1.797)	2.126 (0.874)	0.121 (0.0341)	2.791 (1.382)	-0.356 (-1.010)	0.976* (1.668)	-0.157 (-0.388)
Russian	0.0800 (0.231)	0.559 (0.817)	0.813* (1.681)	omitted	3.733 (1.565)	-3.732 (-1.549)	0.638* (1.798)	-0.562 (-0.893)	0.530 (1.265)
Number of children aged 0-6	-0.0666 (-0.274)	0.0942 (0.234)	0.387 (1.369)	-0.513 (-0.530)	-0.0247 (-0.0215)	1.029 (0.930)	0.00802 (0.0452)	-0.306 (-1.041)	0.362* (1.686)
Number of working aged males	-0.320* (-1.780)	0.302 (0.965)	-0.129 (-0.619)	-0.336 (-0.433)	-0.797 (-0.917)	0.731 (1.452)	0.162 (1.242)	0.0549 (0.240)	-0.263* (-1.897)
Number of elderly	-0.349 (-1.147)	-0.0419 (-0.0789)	0.230 (0.675)	0.772 (0.676)	-0.600 (-0.283)	-0.0313 (-0.0304)	-0.160 (-0.519)	0.594 (1.239)	0.0177 (0.0593)
<b>Education</b>									
Under high school	0.430 (1.078)	-0.366 (-0.485)	omitted	omitted	omitted	3.260* (1.964)	-0.506 (-1.537)	0.782 (1.330)	0.149 (0.376)
High school education	0.332 (1.092)	-0.0826 (-0.144)	0.643 (1.581)	0.551 (0.217)	-0.178 (-0.105)	1.844 (1.246)	-0.105 (-0.383)	0.345 (0.697)	0.379 (1.132)
Vocational Training	0.236 (0.888)	-0.759 (-1.438)	0.657 (1.475)	-0.0909 (-0.0346)	2.395 (1.091)	0.357 (0.237)	-0.520* (-1.941)	-0.130 (-0.274)	0.414 (1.300)

University or higher	omitted	omitted	0.702 (1.313)	-0.798 (-0.262)	4.547** (2.029)	omitted	omitted	omitted	omitted
Log of hourly wages of main job	-0.0895 (-0.794)	-0.108 (-0.538)	0.109 (0.769)	-0.166 (-0.169)	-1.685* (-1.749)	-0.672 (-1.079)	-0.0656 (-0.512)	-0.0706 (-0.314)	0.0296 (0.195)
Log of households' wealth	-0.0488 (-0.705)	0.0428 (0.374)	0.0512 (0.661)	0.286 (0.878)	1.353*** (3.177)	0.411* (1.664)	0.0262 (0.360)	0.0206 (0.150)	-0.0608 (-0.704)
Tenure	0.00484 (0.171)	-0.0263 (-0.461)	0.00715 (0.199)	0.256 (0.978)	0.198 (0.838)	0.0187 (0.162)	-0.000849 (-0.0269)	0.0782 (1.407)	0.0591* (1.654)
Tenure squared/100	0.0419 (0.390)	0.286 (1.284)	-0.0409 (-0.323)	-0.988 (-0.898)	-1.763* (-1.704)	-0.0779 (-0.199)	0.0480 (0.427)	-0.157 (-0.769)	-0.239* (-1.888)
<b>Observations</b>	1,232	2,129	2,269	176	451	520	1,144	2,525	2,605

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A 4 Logit estimates results of Income shock effects on coping strategies (by 5 years)**

	2002-2006			2006-2010			2010-2014		
	Multiple job (1)	Private transfer (2)	Home production (3)	Multiple job (4)	Private transfer (5)	Home production (6)	Multiple job (7)	Private transfer (8)	Home production (9)
<b>Income shocks</b>	-0.0700 (-0.487)	-0.394 (-1.513)	0.288 (1.569)	-0.341 (-0.583)	0.253 (0.471)	-0.151 (-0.378)	-0.306*** (-2.759)	-0.197 (-0.988)	0.0703 (0.474)
<b>Demographic characteristics</b>									
Male	0.0693 (0.416)	-0.0707 (-0.222)	0.162 (0.737)	0.917 (0.986)	0.954 (0.908)	-0.690 (-0.958)	-0.0196 (-0.129)	0.0395 (0.153)	-0.0433 (-0.232)
Age	0.0583 (0.626)	-0.108 (-0.589)	-0.202* (-1.669)	0.159 (0.360)	0.0215 (0.0420)	-0.166 (-0.485)	-0.0471 (-0.633)	0.0909 (0.690)	-0.0204 (-0.226)
Age squared/100	-0.0871 (-0.688)	0.133 (0.540)	0.241 (1.512)	-0.292 (-0.534)	0.0495 (0.0732)	0.143 (0.320)	0.0666 (0.686)	-0.116 (-0.663)	0.0680 (0.576)
Marital status	-0.133 (-0.363)	-0.414 (-0.588)	0.860* (1.831)	1.377 (0.585)	0.985 (0.443)	1.210 (0.854)	-0.454 (-1.531)	1.047** (2.077)	-0.268 (-0.758)
Russian	0.0814 (0.236)	0.524 (0.767)	0.718 (1.490)	-3.016 (-0.562)	2.926 (1.593)	-0.217 (-0.157)	0.197 (0.680)	-1.012* (-1.910)	0.283 (0.759)
Number of children aged 0-6	-0.0673 (-0.277)	0.0164 (0.0409)	0.388 (1.369)	-0.573 (-0.606)	-0.524 (-0.533)	-0.589 (-0.700)	0.0149 (0.103)	-0.201 (-0.857)	0.382** (2.128)
Number of working aged males	-0.318* (-1.774)	0.333 (1.087)	0.0381 (0.188)	-0.243 (-0.334)	-0.230 (-0.337)	0.358 (0.867)	0.00865 (0.0800)	-0.132 (-0.679)	-0.102 (-0.813)
Number of elderly	-0.344 (-1.132)	0.116 (0.227)	0.274 (0.836)	0.729 (0.647)	0.632 (0.358)	-0.868 (-0.999)	-0.139 (-0.584)	0.287 (0.730)	0.379 (1.520)
<b>Education</b>									
Under high school	omitted	omitted	-0.548 (-1.062)	omitted	omitted	1.367 (1.023)	-0.527* (-1.827)	omitted	omitted
High school education	-0.103 (-0.340)	0.352 (0.638)	-0.127 (-0.332)	1.419 (0.587)	-0.596 (-0.414)	0.123 (0.111)	-0.183 (-0.779)	-0.562 (-1.483)	0.328 (1.248)
Vocational Training	-0.188 (-0.563)	-0.341 (-0.556)	-0.0711 (-0.201)	0.484 (0.189)	1.908 (0.988)	-0.606 (-0.559)	-0.445* (-1.921)	-0.395 (-0.881)	0.283 (0.886)

University or higher	-0.414 (-1.049)	0.286 (0.391)	omitted	0.210 (0.0720)	3.171* (1.688)	omitted	omitted	-0.595 (-1.170)	0.155 (0.432)
Log of hourly wages of main job	-0.0936 (-0.838)	-0.106 (-0.533)	0.0799 (0.567)	-0.0825 (-0.0866)	-1.544* (-1.948)	-0.540 (-1.036)	-0.0273 (-0.247)	0.0788 (0.411)	-0.103 (-0.757)
Log of households' wealth	-0.0465 (-0.677)	0.0483 (0.423)	0.0496 (0.642)	0.303 (0.946)	1.301*** (3.418)	0.326 (1.389)	0.0220 (0.350)	-0.0247 (-0.215)	-0.0326 (-0.420)
Tenure	0.00603 (0.215)	-0.0199 (-0.353)	0.0118 (0.332)	0.123 (0.649)	-0.00922 (-0.0495)	0.0827 (0.851)	-0.00215 (-0.0801)	0.0545 (1.168)	0.0286 (0.907)
Tenure squared/100	0.0383 (0.360)	0.253 (1.142)	-0.0419 (-0.334)	-0.339 (-0.489)	-0.391 (-0.517)	-0.290 (-0.860)	0.0686 (0.707)	-0.0743 (-0.436)	-0.130 (-1.144)
<b>Observations</b>	1,316	2,330	2,507	439	1,024	1,136	1,431	3,147	3,204

Note: RLMS, rounds 8 to 24 (2002-2015). Year, region, and main job occupations dummies (not shown) were included in all regressions.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1