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Russian Migration Liberalization in 2007–2008: Lower Wages and Other Consequences

Sergey Onenko[1], **Sergey Kokovin**[2]

[1] National Research University Higher School of Economics,
123, Griboedov canal, Saint Petersburg, 190068, Russian Federation.
E-mail: sergeyonenko@mail.ru

[2] National Research University Higher School of Economics,
123, Griboedov canal, Saint Petersburg, 141400, Russian Federation.
E-mail: skokov7@gmail.com

We explore the noticeable liberalization of Russian labor migration 2007–2008, as a natural experiment. How did it influence the labor market equilibrium and especially the wages of certain categories of Russian employees? We use various data, including remittances from Russia, and restore related increase in official and unofficial labor migration. According to our estimate, the number of migrant workers increased significantly, from 3,3 million in 2006 to 4,2 million (2007) and then to 4,55 million (2008). This did not cause additional unemployment, but did influence wages. We follow Borjas's method of assessing the impact of natural experiments, and we are interested in equilibrium wage elasticities and the interdependencies among labor groups in Russia. To reveal the elasticity of equilibrium wages responding to 2007–2008 inflow of (mostly unskilled) labor, we run difference-in-difference regressions on RLMS data. For some Russian residents, their wages responded noticeably to new policy. The most affected were pre-established Asian migrants: they lost 14–17,5% wages in response to the 8%–14% increase in the migrant work force. Blue collar ethnic Russians or those with low qualifications lost about 4,5–5,5% of their wages, while the impact on white-collar workers was insignificant. The macro-economic consequences of such liberalization policies for Russia, include losses for some categories of employees, which can be compared with additional GDP generated.

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Sergey Onenko – research fellow, graduate student, National Research University Higher School of Economics.

Sergey Kokovin – PhD in Physical and Mathematical Sciences, senior researcher, National Research University Higher School of Economics and Novosibirsk State University.

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Introduction

Whenever migrants integrate successfully, they can provide substantial economic benefits. They improve demographic proportions, balance retirement payments, increase the competitiveness of local businesses and improve international relationships. On the other hand, they can cause ethnic conflict and criminality. These two evils are not too prominent in Russia because of the long tradition of coexistence. What bothers the Russian public, the government and the Central Bank are the possible impact on wages, unemployment and other macroeconomic parameters.

To describe the context, we recall that during 1990s, after the fall of Soviet Union, many millions of Russians, and some other ethnic groups, came to Russia from Asian Soviet republics; they got citizenship. Afterwards, labor migration became mostly cyclical. According to [Lokshin, Chernina, 2013], typical migrants are men 20–40 years old from Asian, Caucasian and European CIS countries, mostly from Uzbekistan, Tajikistan, Ukraine, Moldova and Belorussia. They usually come for a year or less, for seasonal jobs and are restricted by a temporary work permit. They earn money for their families who remain at home where life is cheaper; they send home monetary remittances and return home for short or long periods[1]. Then they come again and again, because wages are 3–5 times higher in big Russian cities than at home, in small towns or villages. Migrants, even cyclical ones, would typically like to work legally, or even get residence and subsequently citizenship, to be more protected, and to work for longer periods. Getting residence is expensive and time consuming, so migrants typically do not bring their families to Russia, unless they obtain a legal long term contract. Their families usually continue agricultural activities, cultural and religious life in their homeland. In this descriptive discourse we rely on [Lokshin, Chernina, 2013] for a portrait of migrants. The current paper focuses on the wage shifts of locals after the liberalization of migration rules 2007–2008, conditional on education, age, and other observed characteristics. Was this short liberalization policy economically successful? Does it provide a lesson for future policies?

Methodologically, the task of disentangling the impact of migrants on macroeconomics from other influences is difficult. However, natural experiments like our short and deep liberalization are better suited for such a task[2]. There is some literature for such cases: our study is

[1] During 2000s some remittance-dependent countries received 20–33% of their GDP through transfers. In 2008, Tajikistan received 49% of GDP through such transfers. In 2015 three out of ten most remittances dependent countries in the world were Moldova, Tajikistan and Kyrgyz Republic (World Bank data: http://www.worldbank.org/en/topic/migrationremittancesdiasporaissues/brief/migration-remittancesdata).

[2] According to [Angrist, Pischke, 2008], a perfect experiment should isolate a region and observe a huge surge or exodus of people forced by a non-economic trigger (A small country accepting war refugees and providing them with access to the labor market would be a great case). Another, even more desirable and precise experiment (in the science-fiction way) would measure the wages of individuals, rewind the time, have the policy changed and ask the same people again.

inspired by Card (1990). Unlike our experiment with the whole country, Card studies the Mariel Boatlift incident, i.e., the 1980 labor supply shock on Miami and neighboring cities, after Cuba allowed 125000 of its citizens to emigrate by sea. Card finds no influence on local wages, even on those of pre-established migrants. However, his results are revisited by Borjas (2015), who applies some methodological improvements, found a significant influence on pre-established migrants and low-skilled locals[3]. We also apply the improvements of the natural experiment method like Borjas. The improvements consist of matching the skills of migrants with the skills of locals to correctly measure the depth of the treatment. To implement this idea, we pick several reasonably specified comparison groups and merge some into one synthetic group, to average out any biases. This allows us to better evaluate the actual effect.

We find that the mass of legally working migrants (see Table 5) gradually increased from 0,23 million in 2000 to 1 million in 2006. When the liberalization policy was introduced, the number grew by 70% in 2007 and later by 41% in 2008 (to 1,7 million, 2,4 million, respectively). The mass of unregistered workers probably grew with similar rate or slower, according to our estimates, based on remittances and other indirect information (it was difficult to obtain the legal status, see [Zayonchkovskaya, 2010]). This increase in the labor force is not very large relative to the total Russian labor pool of approximately 70 million people. However, it is significant when we look on the comparable groups of labor. The estimation of the natural experiment should use not the total additional labor inflow in 2007 compared to 2006, but the additional inflow caused by the policy, compared to the general migration trend. In this way, our regressions show that the policy caused a substantial (18–20,5%) wage drop for pre-established migrants of Asian origin (the inclusion of low-skilled Ukrainians and Belarusians does not change the results numerically), a 3–4% decrease for ethnic Russians with secondary or secondary technical (blue-collar) education, but had no significant effect for high-educated workers. The obtained elasticities of wages to labor inflow look reasonable[4].

For interpretations and consequences of these migration-wage dependencies, we rely on the broad literature on migration, reviewed in [Kerr, 2011]. Labor inflow should intuitively have a downward pressure on wages. However, there are various complications as to why sometimes migration does not suppress local wages or employment levels. Such mechanisms are: the creation of new jobs due to multiplication effects (cheap low-skill labor), a redistribution of locals to other regions under high internal population mobility, new products available through cultural diversity, etc. Altonji and Card (1990) state that specific, unskilled labor intensive industries adjust their demand swiftly to exogenous labor supply shocks. Other authors, including Combes (2003), Borjas (2016), and Partridge et al. (2008) question the causality between migration and wages, because the decision to migrate is not random. Usually people migrate into the regions where jobs are available. Therefore, the straightforward regressions often do not show any significance. Unlike the Russian situation, a small impact on wages in some developed countries can be explained by the downward rigidity of wages. Many migrants cannot find a job, or just abstain

[3] As Borjas shows, the Mariel Boatlift is significant enough for wages change if one matches skills of new workers with existing ones. He obtains a significant elasticity lying in the range (–1,5; –0,5), in spite of the very high internal migration rate in the USA.

[4] The only comparable paper exploiting the impact of migrants on employment and wages is Lazareva (2015), where repatriates were found to have some impact on employment, but not on wages.

from working for various reasons, including social benefits[5]. «One reason for small wage effects in Europe may be that immigrants do not usually find work immediately», states Kerr (2011). Observing too many hypotheses and contradictions in migration effects, Borjas (2016) concludes that existing non-experimental literature may not have successfully overcome those statistical difficulties. Thus, our natural experiment is a rare opportunity to infer the real elasticity of Russian wages and employment to labor inflow.

In our case, as we have mentioned, the 2007–2008 migration policy did not boost unemployment; which even decreased in this period. Instead, it pulled down some (low-skill) wages. In the last section we argue that such an impact on the economic equilibrium can serve as an anti-crisis measure. It is favorable not only for GPD growth, but also for lowering inflation and job creation. The price of these benefits is a wage drop for low skilled workers. However, this drop can be compensated through redistribution, while the opposite policy can destroy value through shutting down firms and increasing unemployment. In this view, the abolition of migration liberalization in 2009 can be seen as a non-adequate response to the world crisis[6].

In brief, this paper is a rare attempt to infer the elasticities of the Russian labor market from a unique natural experiment. It aims to provide a better understanding of labor markets in CIS countries, and some recommendations for policy makers.

The paper is organized as follows. Section 2 describes the data sources, explaining how the data were generated and used. Section 3 describes the historical background and general picture of labor migration, to better interpret the data and outcomes. Section 4 justifies the econometric framework and the methods used. Section 5 describes and interprets the empirical results. Section 6 concludes.

Data description

Detailed official data on migration, unfortunately, are not available as a source for research[7]. Instead, this research relies on evidences from Rosstat (the Russian Federal State Statistics Service), the Russian Central Bank, the Federal Migration Service (FMS), and two micro-level datasets based on surveys: Living Standards Measurement Survey (LSMS) in Tajikistan provided by World Bank, and our main source Russian Longitudinal Monitoring Survey (RLMS) gathered by HSE.

RLMS provides a wide range of information about the Russian population starting from 1994. It includes about 10000 people surveyed every year, composing more than 3000 households. The sample is designed by randomly assigning addresses across Russia and surveying the household living in that address year after year. If the household moved, it still can be captured by the survey, if the family remains in the same city. We cannot observe a household changing its city of residence, so we cannot estimate the city size premium with fixed effects. The size of the

[5] In particular, Borjas (2003) finds that a 10% increase in the share of migrants causes a 3–4% decrease in local wages. Longhi (2008) states that 1% increase in labor force by migrants brings –0,21% to local wage in US and –1,61% in Europe, also suppressing employment.

[6] Some other scholars also think so. For descriptive picture see also: http://russiancouncil.ru/analytics-andcomments/analytics/migratsionnyy-aspekt-globalnogo-krizisa-2008-goda/

[7] The data can exist, because when migrants apply for a work permit in Russia, they have to report their gender, age, planned period of stay in the country, and their education level. When a person leaves Russia, the departure is typically documented. These migration databases are not open for a public use.

dataset varies across time. We use RLMS data to distinguish the socio-economic groups of interest and to gauge their responses to our treatment. Such groups are: pre-established migrants, low skilled individuals, the high skilled workers (split by gender), entrepreneurs, and blue collar workers.

After merging RLMS 2000–2010 surveys and tracking the personal identifiers, we obtained a database with 41845 people and 130364 person-year observations. In order to get a representative homogenous set, comparable with migrants, the observations for people younger than 21 and older than 54 were removed. Years 2009 and 2010 after an examination of wage trends were removed as the wage dynamics changed during crisis and including that period would skew the estimates. That left 33133 people-year observations. The resulting panel is unbalanced, since the vast majority of people are not surveyed throughout the whole period. The explanatory variables we control for are age, gender, self-employment status, migration background, professional category, ethnicity and, importantly, the educational level obtained. We also take into account the city (or village) size, which can have a positive influence on wages, (see [Baum-Snow, Pavan, 2012; Combes, Duranton, Gobillon, 2008]).

Table 1.

Descriptive statistics for Russian labor after data cleaning

Variable	Observations	Mean	Min	Max
Hourly wage	33133	43,3	2,7	2000
Gender		46,4%	0	1
Age		37,4	21	54
School		92%	0	1
Prof. education		29,3%	0	1
Higher Education		25,25%	0	1
Living in SPb		3,85%	0	1
Living in Moscow		8,85%	0	1
City size		1,26 mln	0,013 ths	8,9 mln
Non ethnic Russian		0,39%	0	1
Entrepreneur		4,80%	0	1
Educated men		9%	0	1
Educated women		15%	0	1
Blue collars		29%	0	1
Ex migrants		0,25%	0	1
Low skilled locals		43,15%	0	1

Source: authors' tabulations from RLMS.

Table 1 provides the descriptive statistics for our sample of Russian workers (wage is total income without government transfers).

These personal-level data are combined with figures about the Russian labor market in the 2000s from Rosstat, to infer the shares of migrants in each group.

Describing the flow of migrants, we use figures about the numbers of migrants and job permits in the 2000s from FMS data (reported by Rosstat), data about remittances from Russia to CIS (from the Russian Central Bank, based on 9 main payment systems: Anelik, BLIZKO, Contact, InterExpress, Unistream, Western Union, Colibri, Zolotaya Corona, Leader, Post of Russia). The age/sex characteristics of working migrants we find in [Chudinovskikh, 2015]. To age/sex of Tajik migrants, we use LSMS (2007, 2009) data for Tajikistan. Tajikistan appears to be an important representative of Asian source countries for labor migration to Russia (there are no good LSMS migrant data for other countries, Ukrain, Byelorussia and Moldova may differ). The LSMS data on migrants are close to the goals of our study in respect of the relevant period, the high dependence of Tajikistan on remittances, and the clear underlying migration pattern.

We need age, gender, education of migrants. Table 2 shows only the Tajikistan example; more generally, the age and gender of working migrants are explained in our subsection «Composition of migrants» (see report [Chudinovskikh, 2015]). The average age of potential Tajik migrants is 33 years, they stayed for half a month on average (0,476) in Russia 2007–2008. There are more men (1), than women (0) 54% in the surveyed households; 44% of the observations relate to the period of 2008; the rest of the dummies represent the shares of people with different degree of education and from specific Tajik regions (the capital, Sogdiana, etc.).

Table 2.

Descriptive statistics for Tajik population surveyed

Variable	Observations	Mean	Min	Max
Age	12700	32,84	15	54
Longitude of stay		0,48	0	12
Gender (men)		0,54	0	1
Affected by policy		0,44	0	1
School		79%	0	1
Professional education		13,8%	0	1
Higher education		13%	0	1
Dushanbe		13,8%	0	1
SOGD		20,5%	0	1
Khatlon		32,0%	0	1
RRP		23,4%	0	1
GBAO		10,2%	0	1

Source: authors' tabulations from Lokshin and Chernina (2013) and LSMS.

Relying on this database, Lokshin and Chernina (2013) report that most migrants are relatively young men with secondary education and significant number of them are heads of

their household. More than half of them are the only person with a paid job within their family. They tend to do low-skilled jobs or work in the service sector.

Table 3.

The Tajik migrants characteristics, %

	2007	Standard deviation	2009	Standard deviation
Migrants' characteristics:				
share of males	96,7	0,02	92,7	0,01
share of migrants among households	13,8	0,05	60,0	0,03
earnings in Russia	313,1	146,6	361,2	269,4
average monthly transfer during the past 12 months	241,0	410,1	234,2	201,4
share of migrants, conducting transfers	83,3	0,04	81,1	0,03
share of legally registered migrants	72,9	0,06	62,8	0,03
share of migrants working legally	54,6	0,20	87,4	0,02
industry sector:				
factory workers, builders (ISCO 712, 713, 714)	56,0	0,06	40,3	0,03
low-qualified workers (ISCO 9)	23,9	0,06	41,7	0,03
service sector and trade (ISCO 5)	10,5	0,04	11,2	0,02
other	9,6	0,03	7,4	0,02

Source: [Lokshin, Chernina, 2013].

Comparing Tables 1 and 2, the Russian population is on average 5 years older than the Tajik population. This can mean that migrants are younger not because of a selection effect, but because the original sample is simply younger on average. In the case of Tajik migration to Russia, these are not the youngest people who tend to migrate.

We also use LSMS survey data in Table 4 (borrowed from [Lokshin, Chernina, 2013]), to compare it with the registered Tajik workers in Russia.

Table 4.

An increase of 47% in the number of migrants from Tajikistan 2007–2009

	2007	2009
Households surveyed	4858	1503
Share of households with migrants	21,7%	35,5%
Number of men of working age in the households	9068	3162
Number of migrants (during last 2 years)	1160	594
Share of migrants (men of working age only)	12,8%	18,8%

Source: [Lokshin, Chernina, 2013].

Descriptive analysis of labor migration

Before constructing an econometric model, we start with a general description of migration and of the 2007–2008 policy change to justify what we consider important, and to formulate the hypotheses.

During the 1990–2000 socio-economic crisis in the post-soviet space, migration included millions of people, mainly returning to Russia from Asia[8]. The free borders agreement among all the CIS countries appeared in 1993, and the borders were weakly controlled. Later, as a response to illegal migration and drugs, the Russian government tightened the registration rules for foreigners: foreign citizens were obliged to have both residence and job to stay in the country. The motive to work in Russia for citizens from Asian CIS countries was (and remains) the significant difference in wages, and after 2000 these migrants were mainly cyclical workers: they come for a year or less to earn money and then return home, they also regularly send home remittances. Some of them apply for residence and become Russian citizens, at the moments when Russian policy allows.

However, the bureaucratic difficulties of registration made it almost impossible for ex-soviet citizens to legally work in Russia. According to some estimates, only about 15% of labor migrants were working legally in the early 2000s. Restrictive but weakly enforced regulation led to shadow recruitment and other problems. By 2007, the regulation of 2002 was perceived as a

[8] In 1990s, the permanent migration was dominantly an exodus of Russians, but the ethnic minorities are established in Russia too. As reported in Zayonchkovskaya (2013), about 8 million people permanently migrated to Russia 1981–2007, 20% of them having non-Russian ethnicity (reported in RLMS). 2,5 million established migrants arrived here 1991–1995, about 2,1 million 1996–2000, but only 0,9 million 2001–2006 (with 83% of them coming from Asia and the Caucasus). A lot of people arrived via the citizenship reunification program, which was eligible only for ethnic Russians, living in former Soviet republics. At first, the permanent migrants were middle-class representatives, relatively well educated. Later on, this growing diaspora supported the cyclical labor migration. Such pattern of more skilled people migrating first and pulling their less educated friends and relatives later, occurs all over the world [Beine, Docquier, Ozdenc, 2011].

cure as bad as the disease. The government decided to decrease the legislative barriers. New rules, significantly relaxing the requirements for obtaining a work permit, were applied for two years: from January 2007 until December 2008, when the world-wide economic crisis stopped liberalization (later on, given the large amount of illegal migrants, there were other migration policy regulations)[9].

Namely, according to [Zayonchkovskaya, 2008] (giving a complete comparison of laws), before 2007, a work permit was given to the employer, making a migrant totally dependent on her employer. After 2007, the migrants themselves became eligible to apply and obtain the work permit. Thus they became able to change their job, remaining in Russia. Moreover, the application procedure was simplified. The migrant workers from visa-free (CIS) countries, could now apply for a permit within 90 days of arrival, instead of 3 days. The migration service became obliged to give the permit if all the official requirements were satisfied, the chance of rejection became minimal. The discretion power of migration services decreased, not much room was left for corruption. Therefore, most of the labor migrants were expected to become legal. However, a lot of migrants (especially those from rural areas) were not well informed about the law change in 2007 and how it worked in practice. Only during 2008 did the information propagated widely. More and more migrants explored the new procedure. In other words, we expect a year lag in migrant reaction to the new policy.

As a result of these 2007–2008 changes, the number of registered migrant employees with a work permit (reported every year in June), increased substantially. It had already been steadily increasing before the regulation, then it jumped under the new regulation, then decreased because of the world economic crisis, as shown in Table 5. It summarizes two our estimates of annual migrant workers (AllLMig1, AllLMig2, explained later on), and shows the labor dynamics compared to similar dynamics of wages in construction[10], and remittances from Russia to CIS countries through 9 typical payment systems[11].

Most figures in Table 5 come from FMS, Central Bank and Rosstat, while variables *AllLMig1*, *AllLMig2* are calculated by us, as we explain below (similar numbers of legal workers in 2010–2014 one can find in [Chudinovskikh, 2015]). Both *AllLMig1* and *AllLMig2* alternatively reflect annual migrant labor force that we need for our goals, because we see two ways to calculate such force: either through legal workers mass, multiplied by some (changing) coefficients of legalization, or through remittances. The annual legal migrant labor force can be approximated with the number of work permits and patents granted in a given year, because the typical period of work is about a year, during which a person may come and go 2 or more times. In contrast, the mass of migrants reported by FMS reflects only border crossings into Russia, so, it is a bad proxy for the annual

[9] See more about regulations: https://www.moveoneinc.com/blog/migration/enrussia-curiosity-work-patent-visafreecitizens/ and http://tjk.rus4all.ru/city_msk/20140121/724823551.html

[10] See: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/wages/

[11] See: https://www.cbr.ru/statistics/CrossBorder.

These Central Bank data on remittances take into account only 9 main payment systems: Anelik, BLIZKO, Contact, InterExpress, Unistream, Western Union, Colibri, Zolotaya Corona, Leader, Post of Russia, performing international transfers for individuals. Interfirm payments, capital flows and personal investments to Europe go by other channels, while these 9 are important in personal transfers to CIS countries. One can compare Table 5 with all personal remittances from Russia, including ones to Western countries: 3,23 in 2003, 5,19 in 2004, then 7,01, 11,47, 17,76, 26,14, 18,61 in 2009, 24,8 in 2013 (billion US$, World Bank data).

working force. According to the Rosstat 2010 annual report, migrants more often stay for the whole year than for seasonal work. Only 22,5% stayed less than 6 months in 2010, while 60% stayed for 9–12 months (12 months is the maximum period allowed, it cannot be prolonged, except for family reunification cases). The same results were provided by FMS survey. For our inter-temporal comparisons, 60% or 99% work similarly, provided this share remains stable.

Table 5.

The labor dynamics

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
LegLMig	0,213	0,284	0,360	0,378	0,460	0,703	1,014	1,717	2,426	2,224	1,641	1,720	2,766	2,929	3,714
%Leg	15%	16%	17%	18%	19%	27%	35%	42%	50%	50%	50%	50%	50%	50%	50%
AllLMig1	1,775	1,893	2,000	1,989	2,300	2,812	3,380	4,293	4,852	4,448	3,282	3,440	5,532	6,0	7,428
AllLMig2	–	–	–	1,447	1,914	2,431	3,279	4,194	4,540	4,056	4,120	4,822	5,532	6,053	6,05
RemCIS	–	–	–	1,2	2,0	3,2	5,41	9,67	13,95	9,55	11,82	17,2	19,2	21,73	19,05
R/$	28,1	29,2	31,3	30,7	28,8	28,3	27,1	25,6	24,9	31,7	30,4	29,4	30,8	31,8	38,4
Monthly Wage, R	2640	3859	4807	6177	7305	9043	10869	14333	18574	18122	21172	23682	25951	27701	29354

Comments: (LegLMig) Legal labor migrants to Russia those with a job permit (million); (%Le) share of workers legalized (%, episodic estimates extrapolated); (llLMig1) all migrants (million, experts estimate by share of legals); (AllLMig2) all migrants (million, estimate by remittances); (RemCIS) remittances from Russia to CIS through 9 payment systems (bln US$); (R/$) the Rouble/$ exchange rate; (MonthlyWage, R) Rouble monthly wage in construction.

Sources: Russian Central Bank, FMS, authors' tabulations and calculations for AllLMig1, AllLMig2.

For our goals of estimating the wage response to the abrupt inflow of labor, we need to know the whole additional labor force in 2007–2008, not only the officially registered one (additional means comparing the *stock* of labor in 2007–2008 with a stock that would without liberalization in the same period). It is not an easy question, here we rely on episodic references and proxies. We have mentioned the estimate of 15% legalization of workers in early 2000s. In 2006, according to Public Opinion Fund survey [Zayonchkovskaya, Turukanova, Florinskaya, 2011] provide this reference, but we were not able to find the survey itself), only 19% of migrant workers were paid officially, while 73% worked unofficially (8% did not respond). This estimate looks too low for us. In 2009 FMS estimated the illegal migrant workers as about 4 million (This estimate looks too high for us, it is double what we suggest in Table 5). Kovalchuk (2004) estimates the mass of illegal migrants at 4–5 million. For 2015–2016 years there are similar contradictory estimates[12].

The World Bank suggests there were 3 million illegals in 2013, which makes about 6,5–7 million total migrant workers if we add the 2930000 officially registered Belarusian and Kazakh-

[12] See: http://www.rbc.ru/politics/06/12/2016/5846d3b89a79470b6f8738fa

stan citizens, or believe that 50% are working legally[13]. According to Lokshin and Chernina, officially registered migrants in 2009–2010 represented 3,1% of the total labor pool in Russia. Considering expert estimates of illegal migration, the total foreign labor pool consisted of 3,2–5,2 million people, therefore the actual share of migrants in the Russian labor market is in range of 4,7–7,7% (see also [Zayonchkovskaya, Turukanova, 2011]). Thus, they consider legals as 3,1 / 4,7 ≈ 0,65, share of all migrant workers in 2009 2 × 3,1 / (4,7 + 7,7) = 0,5, which looks much bigger than other estimates, but could be a continuing result of the 2007–2008 liberalization. The percentage of legal Tajik labor in Russia is estimated in Table 4 as 54,6% in 2007 and 87,4% in 2009 which looks unrealistically large (the interviewees could be insincere about legalization, even when there is no rational reason to lie).

In contrast, a very low estimate of the share of legal workers comes from LSMS data in Lokshin and Chernina, given in Table 4 (12,8% and 18,8%). The typical migrants are men of working age, there are about 2,2 million of them, which is half of the 4,4 million Tajik labor force in 2009. According to Table 4, only 18,8% of Tajik men were migrant workers (during 2 years before the review), this makes only 0,41 million Tajik migrants in 2009 (mostly going to Russia). Tajikistan during 2000s provided about 19–20% of all registered migrant workers in Russia (while Uzbekistan gave 30–31%). This gives a total of only 2,05 million labor migrants in 2009. This makes the LSMS estimate looking unreliable, giving a very low estimate, 1,5 times less than expected (possibly because Tajik migrants might have higher rates of legal permission to work)[14].

All these episodic contradictory estimates of legal and illegal migration are summarized in Table 5 within our hypothesis regarding percentage of legalization %*Leg*. It displays a smoothly ascending trend in the legal share. These 15 numbers {15%,...,50%} result from our intuitive interpolation of the episodic data outlined above and some least-squares estimate, displayed by Fig. 1 below. To support our smooth interpolation, we argue that in social systems all reforms work gradually, with lags. In Russia, the consolidation of governmental power and control over the country was gradual during 2000s. It grew noticeably in 2004 and around 2008. Preceding and following the presidential elections in these two important years, the government launched campaigns against corruption and oligarchy, including the Yukos legal case and our migration experiment in 2007–2008. The consolidation of power was supplemented by gradually increasing discipline among governmental officials. The practice of extorting bribes from individuals (unlike firms) decreased[15]. There are also technical-economic arguments for the smoothness of the changes. We know that governmental enterprises and big firms in Russia became better controlled in late 2000s; they could not hire migrant workers unofficially and they paid taxes on the wages of those employed legally. By contrast, most small private companies which construct private houses or repair flats and houses always prefer to hire foreigners

[13] See: http://www.worldbank.org/en/news/feature/2013/10/02/migration-and-remittance-flows-in-europe-and-central-asia-recent-trends-and-outlook-2013-2016

[14] FMS (2015) reports 10,9 million foreign citizens present in Russia at January 2015 (working or not). Only 1,8 million permits were issued throughout the year. 113000 people were deported and 209000 people were given Russian citizenship. Most of the migrants are of working age from CIS countries, particularly: Ukraine (2,6 million), Uzbekistan (2,3 million), Tajikistan (1,1 million). All of these countries have borders free agreements. See other estimates of Tajik remittances and composition of migrants in: https://cyberleninka.ru/article/n/tadzhikskie-trudovyemigranty-i-ih-mezhdunarodnye-denezhnye-perevody

[15] In the early 2000s, every Asian-looking person was often, sometimes twice a day, stopped in the street by a policemen for document control, which usually meant exerting the standard bribe of 100 rubles.

and Russians unofficially, to evade taxes. Thereby, the share of legal/illegal migrant workers starting from 2009–2010 should be stable, dependent on the distribution of migrant workers across sectors of employment, rather than on legislation. Construction, transportation, house and retail services are the main employment spheres for migrants. Personal relationships between the employer and employee are a long-term investment in a country with insignificant trust among people. This creates stability in employment. According to Rosstat data, migrants who work legally, tend to perform low skill and/or physically intensive jobs: in 2014, 40% of them worked in construction, 10% in manufacturing, 7% in agriculture, 5% in transportation and 30% in the retail services[16]. Furthermore, we do not have any legitimate reason to believe that illegal migrants do more complex or simpler work than legal ones.

In this view, the liberalization of rules in 2007–2008 could have worked indirectly and positively on both legal and illegalized labor. This explains why both legal and illegal workers could be stimulated to come to Russia during and after 2007–2008 (excluding the peak of the crisis), and why the share of legal migrants stabilized at about 50% in 2010s, as we suggest, calculating our *AllLMig1* raw of variables in Table 1.

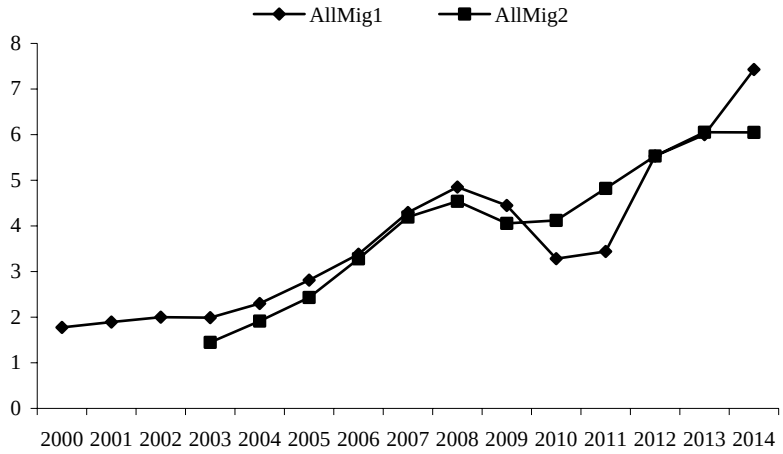
Line *AllMig2* in Table 1 represents another way of estimating illegal and total migration numbers. It is built on the personal remittances from Russia to CIS countries, registered by 9 payment systems, including Western Union, Colibri, Zolotaya Corona, etc. We stick to hypothesis that the remittances serve as a proxy for all labor migrants coming from these countries, not only for registered workers[17]. To calculate the mass of workers *AllMig2*, the typical monthly wage in rubles and the exchange rate are taken into account. E.g., the remittances drop in 2009 that we see in Table 1 reflects a decrease in migration combined with the falling ruble and a drop in wages (we take the migrant wage from the construction sector as a proxy, because other blue-collar and low-skill wages follow suit). The migrants are usually reported to send home 60% or more of their wages. That is why yearly remittances, divided by the dollar wage in each year are a good proxy for the number of all migrant workers in this year.

To obtain sufficiently coordinated variables *AllMig1* and *AllMig2*, we have used the vector of such proxies for 2003–2014 and the least-squares method to find the coefficient (4,12) making this vector close to *AllMig1*. This means that an average migrant was sending home about 4,12 monthly wages each year during 2003–2014 (this figure, 41% appears smaller than reported 60% of yearly wages, because some migrant workers worked less than a year, and some took money home in cash). This calculation generates variables *AllMig2* in Table 1. This *AllMig2* is also the curve with big squares in Fig. 1, compared with *AllLMig1* depicted by the dark curve. Both curves follow a similar pattern, but the line built from remittances is smoother. For us, the AllMig2 curve looks more realistic. Probably, the AllMig1 hypothesis of a constant legal share of 50% after 2009 is wrong. First, the abolition of liberal rules could push down the share

[16] Though recent Russian laws prohibit migrants from working in shopping malls and open marketplaces, there is a circumventing practice when migrants register as workers in an intermediate company and the latter provides services to retailers.

[17] There is a caveat regarding remittances. Since financial services were not widespread and expensive, some part of money was taken home physically in cash, by friends and relatives, or saved until returning home. However, risk of theft (first of all by Russian or domestic police) during travelling was also significant. Financial services became more widely available and cheaper during 2000s and the risks decreased. We are not aware which tendency worked stronger on the cash share of remittances, and assume it is constant and relatively small.

of legal workers in 2009–2011, and we see this drop. Second, the introduction in 2014 a new easy procedure to receive legal permission to work could yield an increase of the share of legal workers, and we see this in 2014 within Fig. 1. An economist might ask: why do the curves go up? Why are more and more migrant workers coming to Russia, though the main motive, the wage advantage of Russia did not change very much? Our explanation is that both sides were gradually learning. The migrants learn how to find jobs and organize life abroad, and Russian business learns how to absorb them.



Comments: All labor migrant estimated: (1) by the smoothly changing legalization share hypothesis; (2) by the remittances.

Fig. 1. Estimates for number of migrants

Source: FMS and authors calculations.

The takeaway from these calculations for our estimations, is that the temporary liberalization of migration caused both, some legalization, and some inflow of migrants in 2007–2008. This inflow of 1,5 million is significant, comparable to the 71 million domestic work force, especially in the specific sectors/groups affected[18]. That is why estimating the wage reaction to the 2007–2008 liberalization is a reasonable task.

The liberalization reform did not last long. It ended in 2009 despite increasing legalization rate, an increase in the corresponding tax revenues, many positive opinions about new rules from both migrants and their employers. The reason was the world financial crisis, which reached Russia at the end of 2008. After financial panic and a decline in Russian wages, the idea of liberalizing the foreign labor force became quite unpopular and migration rules were tightened once again. Both wages and the number of legal migrants fell, followed by a fall in remittances to CIS countries. Later on, the migration restored. We use this after-crisis period 2010–2014 in Table 1 and Fig. 1 just to describe a restored general tendency of migration. However, we exclude this last period from our regressions, because the crisis probably has changed the wage trends, which could spoil our difference-in-difference results.

[18] The Russian domestic labor force included about 30,5 million low-educated, 19 million with secondary technical education and 20,9 million high-educated employees.

The composition of migrants

There are two main segments of labor migrants into Russia (leaving aside the 2% of migration coming from Western Europe and US). A large part is the semi-legal circular migration of relatively young, low-qualified males from Central Asian and the Caucasian post-Soviet republics. Another, smaller part represents the better educated and gender-balanced composition of people from Ukraine and Belarus (about 26% of the migrant labor)[19]. The age distribution reported by FMS in 2014 is presented in Fig. 2. More than 80% of registered labor migrants are men; about 60% of them are under 40, the age-gender pattern is very persistent over time, but proportion of people working legally is volatile (annual FMS report). Similar figures for 2015 one can find in [Chudinovskikh, 2015]: 64% are men among all Kyrgyzstan workers, 68% among Moldova, 76% Ukraine, 79,5% Azerbaijan, 82% Armenia, 86,9% Uzbekistan, 87,1% Kazakhstan, 89,9% Tajikistan.

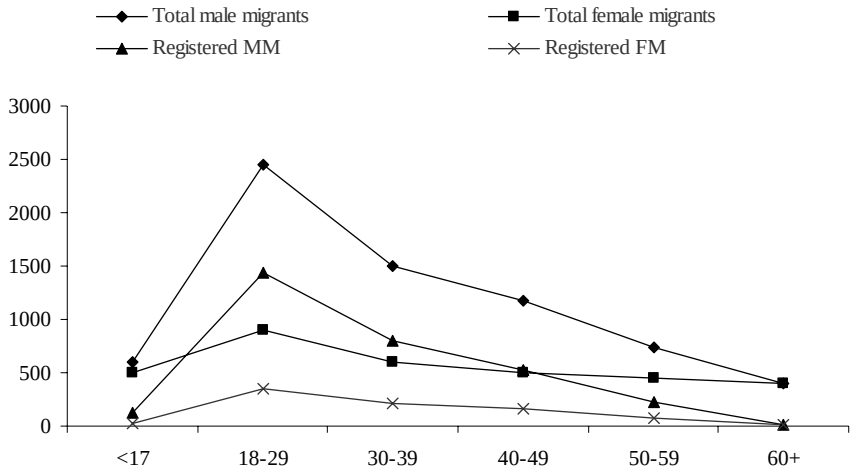


Fig. 2. Composition of migrants

Source: FSSS.

As we have said, migrants who work legally, tend to perform low-skilled and/or physically intensive jobs. In 2014, 40% of them worked in construction, 30% in retail services (including house maintenance and cleaning), 10% in manufacturing, 7% in agriculture, and 5% in transportation. We use this fact in order to justify the choice of the vulnerable group among the Russian citizens and residents. We expect the new rules to adversely affect low-skilled locals, especially established immigrants, competing against new waves of migrants. Another hypothesis is that a more liberal migration regime can provide some advantages to local entrepreneurs.

Table 6(a, b) compares educational levels in 2006 and 2002. Overall there is a decline in the level of education (the share of highly educated decreased from 19,7% to 13% in only four

[19] Two core differences are ethnicity and cultural backgrounds: European CIS countries are dominantly urban, while middle Asia is largely rural.

years). Quite often, taking the low-skilled jobs in Russia looks like a downshifting for this well-educated labor force.

Table 6a.

Migrants' education distribution in 2006 survey by FOM, %

	Higher	Unfinished higher	Professional	Secondary	Secondary unfinished	Elementary
Education 2006:						
migrants	13	6	30	34	14	3

Source: FSSS.

Table 6b.

Registered migrants in 2002 compared to Russians, %

	Higher	Unfinished higher	Professional	Secondary unfinished	Elementary
Education 2002:					
Russians	16,2	3,1	27,5	44,4	8,8
migrants	19,7	3,1	30,4	43,1	3,7

Source: FSSS.

To assess the accuracy of such surveys, and to compare migrant educational levels with those of locals, see Table 6(a, b). On average migrants have slightly more years of schooling than Russians, though they agree to do low-skill jobs in Russia, that is, there can be professional downshifting.

Estimation setup

Studying the specific change in migration regulations of 2007–2008, we have in mind to satisfy general economic interest for any episodes of this kind. How sensitive is the Russian labor market to an abrupt inflow of a low-skilled labor force? Which categories of incumbent workers suffer most in terms of wages? Which categories of citizens may benefit directly or indirectly?

In view of such goals, the inflow of all migrant workers is used as a predictor, it looks better than the inflow of only legal workers (this estimation strategy explains the purpose of previous section). The explained variable will be the logarithm of wages per hour. It was calculated by dividing the total wages by the reported hours worked. We use reported hours worked instead of the official working week, because unpaid extra hours are not rare in Russia, especially for low-income groups. The core of the research is that different groups of people are affected differently by the change in migration policy. We use age, ethnicity, gender, employed and entrepreneur dummies, actual qualification at the work place, education and place of birth as groups of interest. Ethnicity and country of birth allow to identify of locals, ethnical minorities and es-

tablished migrants. We treat ethnic Russians who have migrated to Russia the same way as locals. We introduce a dummy for ethnic minorities (locals) to measure a possible race discrimination effect; two setups were used for calculations. One considers only people of Asian nationalities born outside Russia treated as true migrants, another include Ukrainians and Belarusians as migrants in this study. (This definition of a migrant follows the tradition of Lokshin & Chernina.)

Our initial regressions, without differentiating established European and other migrants, gave a result of slightly higher wages for established migrants than for locals. This fact can be explained as follows. Most established migrants arrived during the 1990s and the first waves were relatively well educated: Russian engineers and teachers were returning home. That means a positive selection in terms of unobserved ability. A group which is ethnically similar, does not encounter the same sort of discrimination and can provide a higher income level during 2000–2009 (this effect is explained in [Borjas, 1987]). After excluding ex-Ukrainian and Belorussian citizens, we end up with non-significant coefficient for having a migration background for wages.

Among the locational variables determining wages, we omit the administrative status of cities; it would require 4 additional dummies without giving much; the most important information is incorporated in the city size. Instead, we add dummies for Moscow and St. Petersburg which have very specific status compared to other cities in Russia.

To control for qualifications, we introduce a number of social groups: female labor with higher education (FHE) and male labor with higher education (MHE); we define entrepreneurs (ENTR) as anyone who owns the enterprise he or she works at; those with a trade education are blue collar (BC); plus two low skilled groups: low skilled locals (LQL); and low skilled established migrants (LQEM)[20]. Age was chosen in such a way to exclude people who are too young to work and those who retired during the period explored. In RLMS we exclude 2,5% of the population with the lowest incomes and those who did not report any wage at all. Excluding the richest individuals did not make a significant difference, so we did not discard richest individuals. During the short period studied, our unbalanced panel shows rare switches between the groups, though some people appear in or disappear from the sample. More than 90% of established migrants were present before 2007 and remained in the sample. Our estimates say more about the impact on each member of a group than about the changing composition of the groups. Since we include estimations with fixed effects, these two impacts can be separated.

To control for occupations, we used 10 occupations, reported in RLMS (we group them and estimate separately, or together with the educational groups): Legislators or senior managers or officials; Professional technicians and associated professions; Clerks; Service workers and market workers; Skilled agricultural and fishery workers; Craft and related trades; Plant and machine operators and assemblers; Elementary (unskilled) occupations; Armed forces. The results do not differ significantly from those based on education, see Table 9.

[20] In our regressions, we do not control for the number of years of education; years are unlikely to be informative. Though in the world more years of education mean a better education, in Russian case there are a number of confounding factors. In particular, year 10 in a secondary school can be comparable with year 12 in a secondary technical school; in universities bachelor-master or specialist program (4–6 vs. 5 years) were mixed during our period, and so on. A better idea could be controlling for the university rankings or exam performance, but such information is not in the data.

General idea of the estimation

We focus mainly on the direct impact of the new policy. To construct the estimation strategy, we rely on the idea that the closer a group of workers is to the new entrants, the more the group suffers from competition, and vice versa (we find confirmation of this hypothesis). Moreover, it is not impossible [Card, 1990; Borjas, 2015] that some occupations may benefit; an inflow of low-skilled workers can generate additional demand for highly educated managers and engineers, or/and new benefits to entrepreneurs (this hypothesis is not confirmed).

The structural model that could express these ideas is the labor demand for n categories of employees, a vector-function $L(\omega_1, \omega_2, \ldots \omega_n) \in R^n$, dependent upon n wages. The equilibrium wages are those that make this demand equal to some supply vector function $S(\omega_1, \omega_2, \ldots \omega_n) = (s_1, s_2, \ldots s_n) = L(\omega_1, \omega_2, \ldots \omega_n)$. Our treatment means that the first component of the supply increases. This should have a direct impact on related first wage w_1, and also have some spillovers onto other wages, because of substitution or complementarity, embedded in the labor demand function L (derived from some production function of the economy). If we were interested in estimating such labor supply and demand functions with our data, the problems of endogeneity of equilibria would arise.

However, our goal is to predict the macro-economic consequences of the policy stimulating labor migration. For this purpose, instead of L, S, it is sufficient to look at equilibrium wages $W(s_1, s_2, \ldots s_n)$ as a vector function of the observed labor supply vector. We estimate our natural experiment (supplying more low-skilled labor) in the absence of a control group. Following the literature, we use a linear trend in this role and the usual difference-in-difference method.

To construct a trend, one can roughly estimate how many additional (legal and illegal) migrants Russia gained due to the new migration policy from Fig. 3. Here the crossed line extrapolates the trend that persisted before the new policy in 2003–2006, and follows after the policy in 2009 (the triangles line can be another alternative to estimate the trend, since 2006 does not lay on the same line as 2003–2005). These extrapolations of additional migrants (0,92 million in 2007 and 1 million in 2008 for the crossed line and 0,65 million and 0,75 million for the triangles) serve as predictions for migration, while the difference between predicted and actual numbers is due to our natural experiment, that is, how we gauge the impact of the policy. The fact the numbers of additional migrants are about the same, witnesses that the policy effect of 2007 should have similar weight in 2008. Since 2008 is when the global economic crisis started, we cannot simply treat the obtained influence of the dummy as a true impact of the labor reform. Instead, we make an assumption about relative weights of legal migration for 2007 and 2008 being equal. At the second step, we calculate the difference vector for predicted wages and actual wages for people from different groups. These two differences are supposed to be equal, and any deviation from equality is related to the policy change. This approach is known as difference-in-difference and is widely used in cases with too many unobserved factors. Finally, when we know the inflow of the labor force induced by the policy and have estimated its impact on wages, we can estimate the degree to which our groups substitute or complement each other.

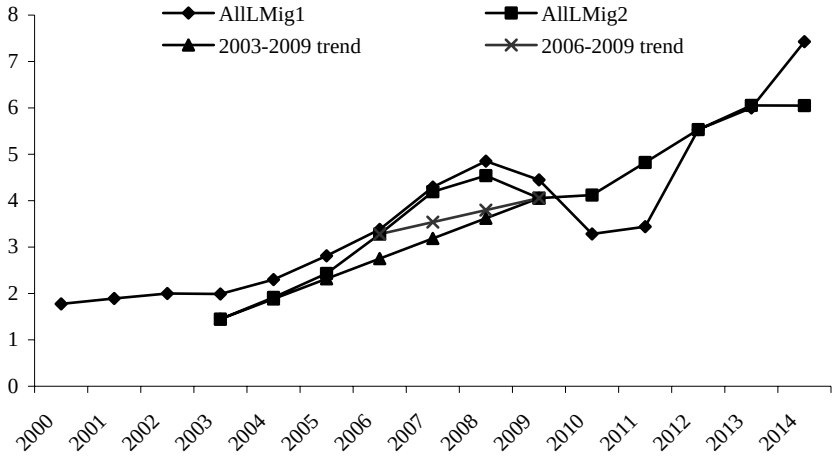


Fig. 3. Actual labor migration and linear trend

Source: FMS and authors' tabulations.

If there is complementarity, one would expect positive policy effects for entrepreneurs, since they hire cheaper migrant workers. Another group with an expected positive outcome is educated people. Card (1990) has shown these labor groups to be complements rather than substitutes for the US market. According to [Lazareva, 2015; Zavodny, 2011], each highly skilled worker creates 0,5–2,5 new jobs in the long run, though this estimate is unlikely to be very relevant for Russian market.

We expect to observe two effects of the liberalization of the migration policy: a wage decrease for substitute labor and a wage increase for complementary labor, supported by economic growth via cheaper labor. We do not expect a negative impact on the welfare of Russia's economy; this would imply that migrants are harmful for the companies they work at[21].

With this in mind, we selected the six labor groups named above. Among Russian citizens and residents, the closest substitutes to migrant workers are low skilled workers, especially those originating from the same CIS countries: Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan, Azerbaijan, Armenia, Georgia. These 7 countries of origin generate the majority of migrant workers. Low skilled labor of Slavic origin is a weaker substitute, because we assume some discrimination against non-Slavic groups (the race discrimination hypothesis was not confirmed for Russia). To control for discrimination and separate it from the substitution effect, we include a Slavic/non-Slavic indicator for other groups of workers. Since many migrant workers are blue-collar, we have included this group too. Finally, highly skilled workers are included to test the hypothesis of complementarity. Since the majority of migrant workers are men, we expected that high skilled female labor should face the smallest competition from migrant workers. We have a similar hypothesis about entrepreneurs.

[21] The hypothesis of harm seems bizarre. Even if migrants at the first stage completely squeeze all locals out of their jobs, the businesses still become more efficient. As a result, under free entry assumption, new companies would emerge, providing the newly unemployed workers with new working places; the total overall effect must be positive.

Strategy of estimating the wage effects

The main focus of this paper is on estimating the impact of the 2007–2008 migration policy on wages, targeting various worker groups. To the best of our knowledge, this is the first attempt in Russia to apply an experimental method (Lazareva (2015) also investigates the natural experiment of Russians migrating to Russia in 1990s, but the time period and type of migration are different from our case). We formulate the identification strategy, based on the difference-in-difference technique, isolating effects of simultaneous shock. To measure the effects, we use the two-step approach.

1. Using the time period before the policy implementation, we estimate the coefficients β_{hat} for age, age^2, $education_{1,2,3}$, $\ln(size)$, exploiting a number of dummies: Moscow-dummy, SPb-dummy, gender, migrant background, entrepreneur-dummy. As a robustness check, we have included worker occupation. The regional differences are included as Moscow and St. Petersburg, whereas including dummies for all cities would generate infeasible cardinality. Instead, using fixed effects covers stable regional attributes.

2. We introduce a dummy for the crisis year 2008 and dummies for the time period when the liberalization policy was active – 2007 and 2008. Thanks to the incomplete simultaneity of these partially overlapping events, assuming the policy effects to be as high in 2008 as in 2007, we can single out the impact. The policy induced inflow was 0,65–0,9 million people in 2007 and 0,75–1 million in 2008, that is why the dummy for 2008 is assumed to have equal weight. Further, using the obtained estimates and splitting people into 6 treatment groups, we estimate the intercepts of the group-dummies with policy-dummies. Also, introducing two comparison groups and averaging across them allows us to establish the synthetic impact level (about a –1% wage drop).

To calculate the policy effects, we use the difference-in-difference approach with the predetermined groups of interest. This approach has became widely used after [Card, Ashenfelte, 1985]. The underlying idea is to introduce treatment and comparison groups and observe them for at least two periods – with and without treatment. With an assumption that representatives from both of these groups evolve in the same manner over time, we can observe the relative change in the outcomes for the groups. In the absence of treatment, we would expect the income gap to remain constant between groups. If the gap changes, its change is inferred to be the policy effect. A number of caveats will be discussed later as we proceed.

$$\omega_{i,t} = \beta_0 + \lambda \cdot t + \sum_i \beta_i \cdot x_{i,t} + c_i + \tau_g \cdot \delta_t + \eta_{g,t} + \varepsilon_{i,t}. \quad (1)$$

Here $\omega_{i,t}$ is the (hourly, for example) income of the individual, λ is the common time trend, $x_{i,t}$ are her observed characteristics, c_i are the unobserved fixed characteristics of the individual (fixed effect), τ_g is the treatment effect of interest for a generic representative from a group g, δ_t is a dummy variable which is 1 for the period with active treatment and 0 otherwise, $\eta_{g,t}$ is a group specific simultaneous time shock; lastly $\varepsilon_{i,t}$ is an idiosyncratic error for each individual. It is indifferent for us to include nominal or real wage growth, because we get rid of the trend anyway.

We compute first difference for each individual to get rid of individual fixed effects:

$$
\begin{aligned}
&FD_g = E_t\left(\omega_g \mid t+1\right) - E_t\left(\omega_g \mid t\right) = \\
&= E\left[\left(\beta_0 + \lambda\cdot(t+1) + \sum_i \beta_i x_{i,t+1} + c_i + \tau_g \delta_{t+1} + \eta_{g,t+1} + \varepsilon_{i,t+1}\right) - \right. \\
&\left. - \left(\beta_0 + \lambda\cdot t + \sum_i \beta_i x_{i,t} + c_i + \tau_g \delta_t + \eta_{g,t} + \varepsilon_{i,t}\right)\right] = \\
&= \sum_i \beta_i \Delta x_{i,t} + \lambda + \tau_g + E\left(\eta_{g,t+1} - \eta_{g,t}\right).
\end{aligned} \tag{2}
$$

For the comparison group τ_g has to be as close to 0 as possible. It is also reasonable to ignore the explained part $\sum_i \beta_i \Delta x_{i,t}$ since we can immediately subtract it.

At the next step, we take the second difference, which is the difference of first differences between two groups. The obtained number is the magnitude of interest:

$$
\begin{aligned}
&DiD = FD_{tr} - FD_{com} = \lambda + \tau_{tr} + E\left(\eta_{tr,t+1} - \eta_{tr,t}\right) - \\
&\quad - \left(\lambda + \tau_{com} + E\left(\eta_{com,t+1} - \eta_{com,t}\right)\right) = \\
&\quad = \left(\tau_{tr} - \tau_{com}\right) + \left(E\left(\Delta\eta_{tr}\right) - E\left(\Delta\eta_{com}\right)\right).
\end{aligned} \tag{3}
$$

As usual, τ_{com} and the errors differences are assumed to be 0, but there might be a number of effects which would make the standard technique implausible. Such effects can be: another simultaneous shock specific to a certain group; the partial indirect effect of the policy; the drift of the groups' unobserved characteristics; non-parallel time trends. A synthetic comparison group is a method to soften such hazards. The new error for the synthetic group has half the variance. In our case, a group of educated men and a group of educated women in Russia with equal weights make up the synthetic comparison group.

The synthetic reference level magnitude is taken as the average between the dummies of interest for the two groups:

$$
bl = \frac{\tau_{com1} + \tau_{com2}}{2}. \tag{4}
$$

The numeric results for the dummies will be compared with this number; the difference will be interpreted as the actual treatment effect.

Table 7, showing wage trends, demonstrates why an assumption of parallel time-trends among our 6 groups is reasonable. The factor of interest here is the average annual growth in log points for the corresponding group. We included all the other known variables into the regression so that these estimates were not, as much as possible, biased.

Table 7.

Test for parallelism of wage trends for different groups

Random-effects GLS regression	Number of obs = 33133
Group variable: idind	Number of groups = 10427
R-sq: within = 0,5527	Obs per group: min = 1
between = 0,4577	Obs per group: avg = 3,2
overall = 0,4679	Obs per grou: max = 9
corr(u_i,X) = 0 (assumed)	Wald chi2 (27) = 36399,46
	Prob > chi2 = 0

ln_hour_wage	Coef.	Std. err.	z	P>|z|	[95% Conf. interval]	
entr_trend	0,2466283	0,0076698	32,16	0	0,231596	0,261661
mhe_trend	0,2373627	0,0061339	38,7	0	0,22534	0,249385
fhe_trend	0,2535247	0,0046981	53,96	0	0,244317	0,262733
bc_trend	0,2420949	0,0034557	70,06	0	0,235322	0,248868
lqe_trend	0,2184866	0,0177581	12,3	0	0,183681	0,253292
lql_trend	0,2254433	0,0027994	80,53	0	0,219957	0,23093

Source: authors' tabulations

Two categories, FHE and LQL, can be robustly distinguished from BC. As we show later, R^2 does not increase with the inclusion of separate time trends. With the statistical difference for the time trends being 1–2%, it seems that we can ignore the differences between groups during 2007–2008 and actually take the trends of our 6 groups as equal. The generated errors will be swamped by other group specific characteristics (the alternative would be to use 6 trends for 6 groups, but such complication would introduce too many variables without improving explanatory power, thus the information criteria suggest we take a common time trend). Another important test is that the correlation between the error term and the explanatory variables is null. If our data do not satisfy this condition, OLS cannot be applied. As can be seen from general statistics in Appendix (Fig. 5, https://www.hse.ru/user/?_r=1028055.7072070644331#tab-main), X_b and u_i do correlate, but at 0,09, it is small. We explain such a correlation with selection into universities and higher job positions. Therefore, we would expect estimates for treatment effects to be closer to the true value for the fixed effects (FE) model. At the same time, since covariance between explanatory factors and disturbance in the random effects (RE) model seems to be reasonably small, we trust the estimates for time-constant variables, which cannot be obtained using the FE model. Our numerical estimates lie in a range of estimates obtained by other researchers, so we conclude these results are robust and accurate for the data we have. Significant R^2 also gives reason to believe that most of the important factors were taken into considerations. The results are discussed below in Section 5.

Estimation results

This section first describes our estimates, showing how regulation and other socio-economic factors influenced Russian wages. Afterwards, we interpret these results and compare them with similar estimates for other countries in the literature. One will see that the Russian labor market has specific features compared with developed countries, including a high sensitivity of wages to labor inflow.

How Russian wages responded to migrant inflows

Let us see how Russian wages responded to the sharp increase in the supply of migrant labor in 2007–2008. We use RLMS data, namely, a panel 2000-8 with special attention to the liberalization years 2007–2008. Choosing this period looks more relevant to our question, than 2000–2010, because the economic crisis reached Russia in September 2008 and the trends changed[22].

Our sample includes 10427 Russian workers, it accounts for 33133 person-year observations. Out of the complete RLMS data, we have excluded individuals younger than 21 and older than 54 years old (to make the sample comparable with the migrants). Table 1 describes all the people, characterized by gender, location, education, and, most importantly, type of occupation.

As preliminary information, we explain our sample. Table 7 splits our 10427 observations into 6 nonintersecting groups: Entr, MHE, FHE, BC, LQE and LQL. Any of these 6 can belong to the Non-ethnic category. Our sophisticated division of groups include combinations of gender, qualification, ethnicity and former citizenship, according to our hypotheses that incumbent groups can compete with the new migrants (we find maximal competition with low-qualified men, ethnically different from the majority of labor).

Regarding qualification as a source of wage differences, we note that the exact level of occupational qualification is unavailable in the data; we have education and age as imperfect proxies. We distinguish 3 levels: Higher education, Secondary technical, and Low qualified labor, the latter meaning a high school diploma or below. Distinguishing gender is not necessary for our goals, we apply it only among highly educated persons (to test the hypothesis that highly educated women and highly educated men compete with the low-qualified migrants in a different manner). But we still find a considerable wage gap between men and women.

The important distinction is between LQE and LQL. We want to test the hypothesis, that new temporary migrants, who are not included into these 6 groups, should mostly compete with previously settled migrants, who have already gained citizenship, but remain comparable in qualification and ethnicity. These are the ethnic minorities who got citizenship after 1991. Presumably, they should compete with LQL (having Russian or other Slavic ethnicity). Traditionally for such exercises, we should disentangle the competition from only ethnic discrimination. For this purpose, we include in the regressions a factor called Non-ethnic-Russians: these are various ethnic minorities born in Russia, i.e., those, who do not belong to Russian or Ukrainian/Belorussian ethnicity, by RLMS data, they may belong to 5 of our groups of labor, except LQE (ethnicity

[22] Specifically, in 2008, the crisis influenced wages only during October-November-December, slowly but increasingly. Still, we include a dummy for crisis in 2008. We did analyze also the periods 2000–2009 and 2000–2010, but both show some weaker wage-changes, because the crisis has changed the trends. So, we need not analyze the bigger time period.

shows no statistical influence, nor economic significance). Table 8 shows the differences among the wages of our 6 groups, dispersion, and influence of other factors.

Table 8.

Wages differentiation by groups and factors

ln(hourly wage)	Coefficient	t-stat	P-value
Nominal wage growth rate	0,235***	129,6	0
Gender	0,346***	27,24	0
Age	0,052***	13,6	0
Age squared	–0,000678***	–13,47	0
Non-ethnic Russian	0,0000503	–0,33	0,738
ln(city size)	0,0607***	24,1	0
Spb indicator	0,263***	8,94	0
Moscow indicator	0,4123***	18,62	0
School diploma	0,078***	5,55	0
Secondary technical education	0,178***	4,88	0
Higher education	0,367***	9,19	0
Entrepreneurs	0,118***	3,47	0,001
Educated women	0,084***	3,59	0
Blue collars	0,0136	0,31	0,756
LQE	0,064	0,81	0,416
LQL	0,089**	2,16	0,03
Policy effects			
Educated men	–0,0434*	–1,9	0,057
Educated women	0,0007	0,04	0,969
Entrepreneurs	–0,059	–1,46	0,143
Blue collars	–0,061***	–4,17	0,000
LQE	–0,085	–0,72	0,000
LQL	–0,048***	–3,86	0,472
Crisis-2008	0,023***	2,22	0,026
Crisis-2009	–0,022***	–16,92	0,000
Const	–469,8	–129,3	0,000

Source: authors' tabulations.

To address the treatment influence on wages, we run two regressions for two specifications: one with random effects and another with fixed effects, with and without consideration of professional level. FE models provide better accuracy for factors which vary over time, like occupation, entrepreneurship status, experience. There is on-going debate on whether a model with fixed or random effects should be used in every particular application. The estimation results for the liberalization treatment appear very robust among these two regressions, summarized in Table 9 (a detailed version with general statistics see in Appendix, Fig. 6, https://www.hse.ru/user/?_r=1028055.7072070644331#tab-main).

Table 9.

Wages response to migration liberalization: Random or Fixed Effects methods

Variables	RE, full specification	FE, full specification	RE, w/o job codes	FE, w/o job codes
Average annual growth	**0,24*****	**0,25*****	**0,237*****	**0,25*****
Gender	**0,32*****	–	**0,361*****	–
Age	**0,05*****	**0,074*****	**0,052*****	**0,076*****
Age squared	**–0,00062*****	**–0,00103*****	**–0,00069*****	**–0,00108*****
ln(city size)	**0,06*****	–	**0,062*****	–
Spb indicator	**0,26*****	–	**0,258*****	–
Moscow indicator	**0,41*****	–	**0,4*****	–
School diploma	**0,074*****	**0,038*****	**0,083*****	**0,042****
Secondary technical education	**0,16*****	0,06	**0,187*****	0,061
Higher education	**0,29*****	0,03	**0,366*****	0,041
Entrepreneurs	0,064*	–0,027	**0,114*****	–0,015
Educated women	0,043*	0,015	**0,076*****	0,016
Blue collars	–0,0153*	–0,056	0,00733	–0,0535
LQE	0,064	–0,0074	0,084*	–0,005
LQL	**0,151****	0,016	**0,172*****	0,025
Senior officials	0,091	0,0274	–	–
Senior managers	–0,06	–0,054	–	–
Skilled workers	**–0,12****	–0,114	–	–
Middle ranking officials	–0,097	–0,072	–	–
Low skilled workers	**–0,31*****	–0,21*	–	–
Policy effects				
Educated men	**–0,051****	**–0,057****	–0,043*	–0,05*
Educated women	0,027	**0,039****	0,03	**0,042****
Entrepreneurs	–0,075*	–0,064	–0,063	–0,06
Blue collars	**–0,055*****	**–0,065*****	**–0,054*****	**–0,064*****
LQL	**–0,045*****	**–0,057*****	**–0,045*****	**–0,058*****
Established low-skilled migrants	**–0,151***	**–0,182***	**–0,151***	**–0,19***
Only Asian migrants	**–0,178***	**–0,201***	**–**	**–**
Const	–473,6809	–500,1685	–474,1484	–504,7196

Source: authors' tabulations.

We obtain essentially similar significance levels for the policy effects of both RE and FE estimations. Therefore, these results are robust to the inclusion of additional information such as individual fixed effects. As an additional robustness check, we examine more thoroughly migrants depending on their ethnicity. Table 9 presents these two estimates. In the first version low-qualified Byelorussian and Ukrainian citizens are treated as LQE. In the alternative version, considering the long period of assimilation these people had, we treat them as LQL. There are 50% more observations for Slavic migrants than for non-Slavic in the data. The depth of treatment decreases by 0,027 and 0,019 log points, which means that established Slavic migrants experience the policy shock of 80% of that of Asian ex-migrants, being much closer to the other ex-migrants, than to LQL. The growth of statistical significance when we expand the dataset should confirm our claim that the only reason for the weak statistical significance for the treatment effect is the small number of observations. All the other coefficients remain the same, when we redefine this group of migrants. We believe this proves our results to be robust.

Table 9 depicts **the general situation** in 2000–2008 labor (the context of our natural experiment):

(1) Among the general factors like time and location, we see that wages grew at a nominal rate of 0,24–0,25 log points annually. Accounting for high inflation, the real rate is smaller, about 10–15%. Still, this wage growth means that in 8 years the average real income has grown by a factor of 2,5–3.

(2) The gender gap in wage amounts to about 0,32–0,36 log points, somewhat bigger than one measured in USA (which was about 30% in the 1990s).

(3) The city size brings an increase of 0,06 log points in wages, comparable with the result of Glaeser & Gottlieb: 8% for USA. In particular, both Moscow and Saint Petersburg provide higher nominal wages, than smaller cities[23].

(4) We include age and its square into the regressors because both are well-known factors of income. We see that wage grows by 2–4% per year of life, but slows down with age (our regression does not contradict this tendency and numerically our coefficients are close to findings of the others).

(5) Among educational factors, unfinished schooling was taken as a reference level. A high school diploma adds about 0,075 log points of wages, and a secondary technical education 0,15 log points. Our estimates show 0,29 log points of wage increase for higher education, which is equivalent to about 5,5–8% increase per year of education. To compare, Arabsheibani, Staneva (2012) report estimates of 5,5–7,5% per year of education, while USA and Europe have estimates of 10% per year of schooling (our estimates lie in this range). It is important to keep in mind that here we report on the systematic difference in wages for people having diploma and those without; thus it should not be interpreted as the impact of education itself given the self-selection of more able and richer people into universities.

(6) Among professional groups, highly educated men of Russian origin were a reference point. A change in the coefficients due to the inclusion of the job variable could be interpreted as

[23] We can compare this fact with a belief in regional migration theories – people migrate freely across the country until real wages equalize. In Russia this tendency need not hold; at least, here 0,4 log points for Moscow and 0,27 for SPb could agree with such belief, only if we include regional PPI (which is not done in this paper because of lack of reliable data for PPI). Robust migration patterns suggest that wages are higher in the capitals.

the fact, that educated men in Russia tend to do jobs below their level of education. As soon as we take that information into consideration, the penalty for being educated man becomes smaller, but still remains.

(7) Observing dummy crisis-2008, one can see that in 2008 the crisis had not hit wages yet (only in 2009, see Table 8).

The impact of our treatment on wages. Having the general context of our natural experiment, we can interpret now the main object of interest: how the experiment influenced wages of our six labor groups. Generally wages suffered due to increased migrantion, except for highly educated women.

The difficulty for estimating our natural experiment is the absence of a control group. In choosing one, we argue that educated women are far from low-skill migrant workers (mostly males), but can still experience specific shocks. It seems reasonable to include another remote group: educated men, who can suffer other shocks. There is a trade-off: this synthetic group is closer to low-skill labor, but has the advantage of better time-shock persistence. Such a synthetic comparison group, combining several distant groups is used in similar empirical studies [Borjas 2015; Abadie, Diamond, Haimmueller, 2007].

Using a synthetic comparison group – the average between educated men and educated women – means the reference level would lie between the estimates obtained for the policy effects of these two groups. As a consequence, all the numbers should be corrected by adding 0,01 log points. Then, the impact on MHE is small and barely significant: about –0,04 or –0,045, depending upon the RE or FE regression (that is what we hoped to obtain, since otherwise that would have meant we cannot use MHE to construct comparison group and should redo the regressions). Somewhat stronger is the negative impact on ENTR: –0,055 or –0,065. Counter-intuitively, we suspect that the income of entrepreneurs has slightly declined. Such a conclusion is due to the very small number of observations for entrepreneurs (they account for 4,5% of our population). If entrepreneurs were as numerous as any other major group of locals, the corresponding variance would have been about 3–3,5 times smaller, giving us 0,01 significance level for the policy effect. We expected a positive impact on the educated labor groups, because of complementarity between high-skill and low-skill labor. However, high education reported in RLMS data does not mean that the person is actually working as a manager for low educated labor (including migrants). Instead, a large share of educated people (especially recent graduates) in Russia perform low-skill jobs[24]; such downshifting is quite widespread in Russia. Therefore, the complementarity of migrants with high-skill occupations during this experiment could be outweighed by the substitution with low-skill occupations of similarly highly-educated labor. Similarly, the individuals registered as entrepreneurs in RLMS, are largely private taxi-drivers and small merchants. These occupations are often substitutable with migrants, rather than complimentary, which is why the impact on them is (slightly) negative[25].

More pronounced is the negative impact of additional migrants on the blue collar workers: –0,045 or –0,055 (both significant). Since many migrants in Russia have such qualifications, they compete with BC. Unexpectedly, the group of LQL suffered somewhat less than BC (only –0,035 or –0,047, but statistically strongly significant). The explanation could be that the minimum

[24] See: https://ria.ru/society/20120813/722231749.html; http://www.kp.ru/daily/26300.5/3178190/

[25] If entrepreneurs were more numerous in data, the impact would be statistically significant, because the coefficient itself is noticeable, but variance is high due to the small numbers.

wage was almost doubled by the government in September 2007, influencing only people getting low wages[26].

The most unfavorable (expectedly) was the impact on former migrants to Russia. Being comparable in many respects, they compete directly with new migrants[27]. Though the pre-established migrants may have spent more than 10 years in Russia, their wages responded 2–3 times more strongly, than those of Russian locals. Indeed, we observe as much as –0,14 or –0,172 log points of wage drop. In percentage, this impact of migration liberalization on the closest substitute group is very painful: a 15–18,5% drop in wages (this calculation includes a correction –1% for averaged error)[28]. A similar impact of natural experiments on close substitutes can be found in [Kerr, 2011; Longhi, 2008]. For instance, it was found that new Cuba migrants in USA were competing mostly with similar former migrants.

What can an economist learn about Russian labor market from our tables and estimates, reflecting the 2007–2008 natural experiment?

First, a significant inflow of migrants and some legalization of labor already working resulted from the liberalization of migration. With the overall number of migrants and established migrants of 7–8,5 million workers, the inflow amounts for 0,65–1 million, or 8–14% added to the work force of this type.

Second, the wages of former migrants were seriously affected: they lost about 14–17,2% of their wages in response to the increase in the number of similar workers. This means an elasticity about 1–2,1 and a maximum likelihood of 1,5[29].

Third, all labor groups were also noticeably affected by this inflow of 1 million newcomers, including 30,5 million low-educated, 19 million technically educated and 20,9 million high-educated employees. About 20 million BC workers lost about 5% of their wages. The low-qualified group was positively affected by the simultaneous minimum wage increase, but still it lost about 4% of their wages. Only the high-qualified group did not show a significant loss. Even entrepreneurs were negatively affected. This means that Russian entrepreneurship is mostly forced, they are typically self-employed workers, as in under-developed countries (these estimates are only slightly significant). The effect on high-educated groups, was not significant either statistically or economically, confirming that they were a good pick for a comparison group. According to Gimpelson, the downward flexibility of Russian wages is a cultural phenomenon, distinguishing this economy from western ones.

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[26] Namely, before May 1, 2006, the official minimal wage was RUR 1100. From September 1, 2007 it became RUR 2300, from January 1, 2009, it became RUR 4330.

[27] This confirms a widespread belief that migrants compete amongst each other and represent a buffer which softens labor market shocks.

[28] Log points are transformed into percentage as follows: $100(e^{\Delta}-1)$.

[29] A similar estimate by Borjas (2015) on Cuban migrant inflow to Miami shows a smaller elasticity, only about 0,5–1,5. The difference can be explained by weaker labor mobility and higher employment in Russia: almost all migrants work.

A few words on the welfare impact of enforced migration

If not for bounds of a short paper, this research could be extended to estimating the overall gains and losses for the Russian economy from the liberalized migration policy of 2007–2008. We confine ourselves to the following macroeconomic comments.

The popular belief that migrants take jobs was the motive to quit liberalization in 2009, but we show it to be false. As Table 10 shows, unemployment was decreasing during the experiment, until the crisis peak in 2009.

Table 10.

Unemployment dynamics

Year	Total labor force, th.	Employed, th.	Unemployed, th.	Unemployment rate, %
2000	72770	65071	7699	10,58
2001	71547	65122	6425	8,98
2002	72357	66655	5702	7,88
2003	72273	66339	5934	8,21
2004	72985	67321	5664	7,76
2005	73581	68342	5239	7,12
2006	74419	69172	5247	7,05
2007	75289	70772	4517	6,00
2008	75700	71007	4693	6,20
2009	75694	69411	6283	8,30
2010	75478	69930	5548	7,35
2011	75779	70853	4926	6,50
2012	75676	71544	4132	5,46

Source: FSSS.

This table, together with our estimates, confirm the downward flexibility of Russian wages, instead of employment, in response to tougher competition. This feature of the economy allows for a smoother adaptation to crises, because instead of bankruptcies and lockouts (unemployment and non-produced value pro-cyclical effects), the Russian system responds by value redistribution from labor to business and increasing profitability, which brings a counter-cyclical effect.

According to Table 10, the additional 0,65–1 million workers came to Russia without squeezing out anybody from their jobs. They performed additional jobs and generated additional value. The value was shared between the migrants, the entrepreneurs and the governmental budget, where the domestic groups of interest directly got more than half (because of underpaying and high taxation, the labor share in Russian GDP was 30–35% in 2008, according to the official

statistics)[30]. Additionally, cheaper foreign and domestic labor generated new firms and created jobs. Part of the increasing domestic employment in 2007–2008 could be (paradoxically) attributed to the indirect effect of additional migration. We see that the Russian labor market is downward wage-elastic in response to labor supply, unlike the more rigid European labor market, and macroeconomists should take this into account.

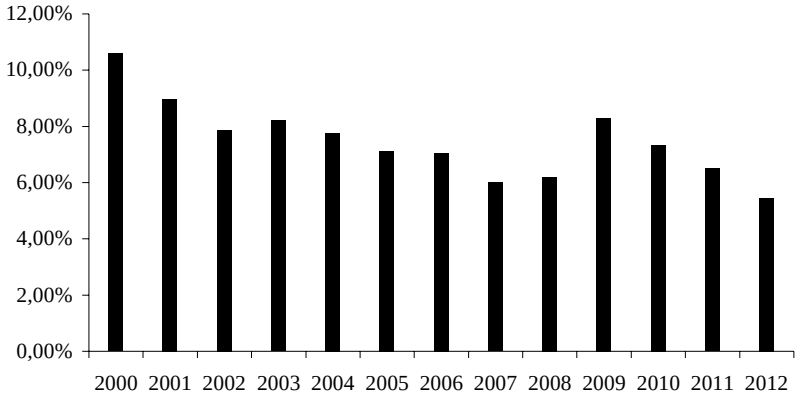

Fig. 4. Unemployment rate, 2000–2012

Source: FSSS.

To summarize, from the macroeconomic point of view, the liberal migration policy of 2007–2008 looks to be welfare enhancing overall for the price of a social loss for some workers. The policy probably suppresses inflation, fosters new firms (profitable under cheap labor), and thus serves as an anti-crisis measure. Later on, during the crisis, the politically motivated Russian government reversed the liberalization policy. For the price of smaller GDP, it thereby supported the poorest workers. However, a direct redistribution to them could be a better anti-crisis measure in 2009, saving business and employment, instead of damaging both.

Conclusions

To make a general assessment of the Russian migration liberalization during 2007–2008, this paper:

(1) combines various data to characterize the number and type of migrant workers in 2000–2014;

(2) estimates the impact of this liberalization on the wages of various groups;

(3) interprets the findings for policy implications.

[30] Rough estimate: $\Delta Y = \sum_t \Delta L_t \bar{w}_{m,t} \left(\frac{1}{s_{m,t}} - TR_t \right) \cdot \bar{m}_t$; TR_i – transfer = 64% in 2007; subject to estimation in 2008; $\bar{m}$ – number of months spent in Russia.

Based on various proxies, extrapolations and estimates, the liberalization of 2007–2008 brought an additional 0,65–1 million cyclical labor migrants to Russia, in comparison with the general upward trend of migration. About half or fewer were legally registered workers. The legal share increased because of the liberalization. The composition of migrants included mostly young men, taking low-skill or blue-collar jobs.

Employment did not decrease but wages did. Among Russian domestic labor groups (low-educated, technically educated and high-educated), the latter group did not suffer from the migration liberalization. By contrast, low-skill and blue-collar employees suffered a 4–5% wage loss, in comparison with the general upward trend. The most affected were pre-established migrants of various labor skills (Russian citizens and residents, ethnically distinguishable former migrants): their wages show about 15% loss in 2007 and 2008.

The first general conclusion, common with other studies of the Russian labor market, is that here the unemployment rate should not noticeably increase in response to additional migration, while wages are rather flexible, they drop in response to tougher competition (moreover, we find related elasticities for special labor groups).

These observations suggest some hints for the macroeconomic goals of migration policy. Namely, in Russia, a liberalization of migration in some situations can be used as an anti-crisis measure, suppressing wages and inflation, simultaneously enhancing GDP, entrepreneurship and the governmental budget. The steps taken by the government in 2010–2014 to legalize, control and tax migrants, such as permits and exams, probably went in the right direction. Further research could use the newly available data to assess these new policies of 2014–2015.

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https://www.hse.ru/user/?_r=1028055.7072070644331#tab-main (Appendix for «Russian migrate-on liberalization 2007–2008».)