DO LESS-EDUCATED WORKERS GAIN LESS FROM EXPERIENCE? EVIDENCE FROM UKRAINE

by

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UNHCR United Nations High Commissioner for Refugees

SSSU State Statistical Service of Ukraine

IER Institute for Economic Research and Policy Consulting

CHAPTER 1. INTRODUCTION

The labor market is always changing. To keep up, it's crucial to understand the events and challenges that affect it. Several decades ago, having a higher education was prestigious, rare and very valuable, while today it seems to be much more common and accessible. Many companies are starting to question: is formal education still that important? As more and more employers focus on developing specific hard and soft skills needed for the job, a new dilemma arises: does formal education still impact your financial success, or you can have similar returns based mainly on their hands-on experience?

It makes this question relevant for many hiring decisions today. It tests traditional beliefs about the role of education and pushes both companies and workers to rethink what truly drives productivity and career growth. This thesis focuses on these questions within Ukrainian labor market: do less-educated workers in Ukraine gain less from job experience compared to their more-educated colleagues?

Ukrainian labor market, even before the full-scale war, was very complex. While the country has very high rates of university-educated workers, many Ukrainian employees report that their degree educations do not directly lead to career growth. According to the 2019 survey[1], 55% of Ukrainian workers believe that their formal education is not useful for them in their current job. Moreover, they found practical, on-the-job experience more important for career advancement. Such a situation can be

[1] Happy Monday, "Що не так (або так) із вищою освітою? Результати опитування Happy Monday" URL: https://happymonday.ua/chy-potribna-vyshcha-osvita-rezultaty-opytuvannia.

connected to the phenomenon called "diploma inflation", making the whole society value formal education much less.

This question is very relevant and useful for Ukrainian labor market, particularly for companies and policymakers who want to understand the factors affecting workforce productivity and wage development and provide employees with fair pay and growth prospects. Since the full-scale war started in 2022, Ukraine has faced even more difficult labor market challenges. The UNHCR[2] reports that more than 3.7 million Ukrainians have been internally displaced. Moreover, an additional 6.3 million have become refugees. This mass displacement has led to severe shortages of workers in critical sectors, like healthcare, manufacturing, and agriculture. According to the rapid enterprises survey[3], 61% of companies indicated "lack of personnel" as an impediment to have business. Also Ukrainian businesses now identify a lack of skilled workers as their Top-1 challenge, ahead of issues like inflation and energy costs.

The results from this study can provide business leaders with useful insights and help to improve hiring processes, training systems and compensation strategies in way that aligns with Ukrainian post-war economic needs. This research holds both theoretical and practical relevance. For example, HR specialists can find it helpful in order to see the broader picture of how (or whether) practical experience can replace formal education for certain roles. Also personally, for job seekers, understanding the importance of experience versus education can help to create their own personal development plan or during wage negotiating that happens quite often due to a competitive job market. For policymakers, this research can give insights that can develop policies aimed to maximize

[2] UNHCR. "Ukraine Situation." URL: https://reporting.unhcr.org/operational/situations/ukraine-situation.

[3] IER. "Economic trends from a business point of view (September 2024)" Institute for Economic Research and Policy Consulting. URL: http://tfdialogue.ier.com.ua/archives/category/eng

workforce potential and support the recovery of Ukraine through effective workforce strategies.

In such evolving labor market, understanding how education and experience affect productivity and wage growth seems to be more important than before. Employers now face the question whether practical experience alone is enough to cover the lack of formally educated workers, and visa versa. This issue affects not only businesses, but also policymakers whose work is aimed to rebuild and stabilize Ukraine's economy.

In the next Chapter 2 existing literature from from both Ukrainian and foreign researchers will be reviewed, that is connected to wage-experience profile, the factors affecting wage, the experience premium, and the role of education in wage growth. Chapter 3 describes the methodology used in this study, including the regression models applied to test the selected hypotheses. Chapter 4 describes data, descriptive statistics, distribution, and visualization of wage trends. Regression analysis results, the returns to experience at various levels of education and occupational groups, are presented in Chapter 5. Chapter 6 gives some policy recommendations and directions for future research, in particular, in the context of post-war recovery in Ukraine.

CHAPTER 2. LITERATURE REVIEW

The relation of education and experience in wage determination is one of the most fundamental topics in labor economics. The foundation is the classical theories of Adam Smith (1776) and Alfred Marshall (1890). While many authors previously wrote on this subject, the first to present a formal model of how education and experience affect wage were Schultz (1960), Becker (1964), and the most famous of all, Mincer (1974). Speaking of education, Schultz considered it as an investment, which makes people more valuable on the market and Becker demonstrated that both education and experience allow people to develop skills that help them to earn more. Mincer developed a model demonstrating increases in wages as related to more schooling and additional work experience. Works explain why individuals earning more money usually have more education and greater experience.

In general there are two main ideas that explain why experience increases wages: human capital theory and seniority-based pay model. The first one says that a employee's wage is mostly determined by their "human capital", general and firm-specific one, that represents the skills and knowledge that make them productive at work.

General human capital includes skills and knowledge that are useful in almost any job and valued by all employers, like basic problem-solving, communication skills or other soft skills. Firm-specific human capital includes skills that are valuable specifically to a certain company where the worker is employed, for example, knowing the company's systems or processes. The theory states that when employees gain more experience, they become more proficient and productive, hence manage to contribute more. It, therefore, encourages employers to raise the wage for such workers in reflection of increased value and performances.

The second theory is the seniority-based pay model, which indeed does connect wage growth to tenure rather than to productivity. That is related to the implicit contract

theory of Lazear, which says that companies pay employees a bit less during the initial period compared to the value of worker's productivity. Then they gradually increase wages over time. This way it becomes a reason why employees stay loyal to the organization. Over the years, as employees gain seniority, their wages can even exceed their current productivity levels. For employees, it makes long-term employment financially profitable, and for companies, such an approach is also very effective for reducing employee turnover.

While education and experience both effect wages, their impact can be different depending on different factors. Many studies specifically in developed economies researched a connection between education and wage growth. For example, Gustavsson (2004), using Mincer's model, found that the returns on a three-year college education in Sweden increased from 18% in 1992 to 25% by 2001. Psacharopoulos and Patrinos (2004) also confirmed high returns on education in developed countries using large datasets and OLS regression. They observed that such returns are typically higher for low- and middle-income countries compared to high-income economies.

Mincer's original analysis was based on cross-sectional data. Such an approach can consider the differences in wage returns across different regions or occupational groups. For example, Andini 2013 also uses a cross-sectional data to study regional differences in wages in Italy. His research showed how such methods may provide evidence of the dynamics of wages that are determined by specific local factors.

Different occupations often mean different returns on both education and experience. For instance, Wannakairoj (2013) did a research about Thailand where it was found that higher-skilled occupations are associated with better returns to both education and experience. In this regard, such studies underscore the importance of understanding specific contexts of occupation groups while estimating the benefits accruing from education and experience.

Gorodnichenko and Sabirianova Peter (2004) also studied returns to schooling in Russia and Ukraine using household survey data. They applied Oaxaca-Blinder decomposition and semiparametric analysis to compare wage outcomes. Results also show that returns to schooling increased in both countries, indicating that education still affects wage a lot in a transitional economy. This study also slightly touched the question of returns to experience regarding the education level, meaning that wage growth from experience was especially limited for workers with less education.

Horie, Iwasaki, Kupets, Ma, Mizobata, and Satogami (2023) in their research investigated how work experience influences wages in China and Eastern Europe. They analyzed over 3000 data points and found that wage level is positively connected to experience. But their results followed an 'inverted U-shape' pattern. In other words, wages go up with experience, but after a while eventually slow down or even decline with age of worker. The pattern is consistent with traditional economic theories that wages increase with experience, but at a decreasing rate. In addition, the labor market has changed over time, and the tendency to pay for performance and productivity has reduced the effect of experience on wages today comparing with previous periods. This study overall reveals that even though impact of experience had declined over recent years, wage growth still depends on experience.

Regarding education return, which is also relevant to this thesis, Ukrainian researcher Kupets (2016) found that a lot of highly educated people work in the position, where their education is not necessary. This is largely a result of the oversupply of graduates and changes in the structure of the economy which lead to overeducation, especially among older workers. In fact, it means that the higher education does not necessarily lead to better employment in Ukraine. So in conclusion, it complicates the relationship between education, experience, and wage. In context of this thesis it raises a logical question: do less-educated workers, who rely more on practical experience, gain significantly less than those who rely on education? This dynamic is important for understanding the returns to experience by education level.

While there are many researches done on wage returns to education there are still gaps in understanding the interaction of education experience in transitioning economies such as Ukraine, particularly. This paper, therefore, tries to fill this gap by investigating whether or not more-educated workers receive a higher experience premium than less-educated workers. Given the focus on the Ukrainian context, this study will be able to help in underlining the impact of economic transition on the valuation of education and experience. Understanding these relationships might provide valuable insights into the way in which education policy and the structure of the labor market impact wage growth and inequality in an obviously changing economy.

CHAPTER 3. METHODOLOGY

The Mincarian model mentioned in the previous chapter is oftenly used in different studies in labor economics. This thesis also uses the approach as it is suitable for exploring the research question and measuring the effects of education and experience on wages. To test research hypotheses, that are described further in this chapter, a two-step approach is applied using both basic and extended Mincerian models. At first, an overall Mincerian model will be applied. Then it will divided by educational groups to see the differences of effect of experience on wages depending on level of education. After that, these 2 steps will be applied to different occupational groups. This way this research will give both a general analysis and a detailed comparison inside different occupations.

So, the main hypotheses are:

H1: Workers with lower levels of education face lower wage gains from work experience compared to more educated ones.

This hypothesis means that the positive effect of work experience on wages is smaller for lower-education workers than for higher-education ones. In other words, education help a worker to use their experience more effectively, that results in greater wage growth.

H2: The returns to work experience differ significantly across different occupational groups.

The second hypothesis means that there are certain differences in returns to experience for workers in general and of different education levels, particularly in different occupational groups.

As mentioned earlier, to analyze these relationships, the classical basic Mincer regression model is used. At first, a general regression model is estimated for the entire sample:

$$\mathbf{log(Wage_i) = \beta_0 + \beta_1 \cdot Education_i + \beta_2 \cdot Experience_i + \beta_3 \cdot Experience_i^2 + \epsilon_i} \quad (1)$$

- $\log(Wage_i)$ is the natural logarithm of the hourly wage for individual i.
- $Education_i$ represents the years of formal education completed by the individual.
- $Experience_i$ is the number of years of work experience.
- $Experience_i^2$ captures the diminishing returns to experience, reflecting the nonlinear effect of experience on wages.
- ϵ_i is the error term.

The same logics are then applied for the extended Mincerian model, which includes more variables that can influence the wage. Using both the Basic and Extended models, it is possible to compare results. The Extended Mincerian model used in this thesis can be presented like:

$$\mathbf{ln}(\text{Hourly Wage}) = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} \cdot \text{Education Years} + \boldsymbol{\beta_2} \cdot \text{Experience Years} + \boldsymbol{\beta_3} \cdot \text{Experience Years}^2 + \boldsymbol{\beta_4} \cdot \text{Gender} + \boldsymbol{\beta_5} \cdot \text{Region} + \boldsymbol{\beta_6} \cdot \text{Sector} + \boldsymbol{\beta_7} \cdot \text{Firm Size} + \boldsymbol{\beta_8} \cdot \text{Occupational Group} + \boldsymbol{\epsilon_{ij}} \quad (2)$$

The second stage will do separate regressions for different occupational groups to establish whether returns to education and experience differ across groups. This is completed by splitting the dataset into three larger occupational categories for better interpretation:

- Managers and Professional (high-responsibility roles and specialists with advanced qualifications);
- Technicians and Clerical Support (technicians, associate professionals, and clerical workers);
- Skilled and Manual Workers (skilled trades, service workers, plant operators, and manual labor).

Both general and occupations-specific analysis included classical Mincer regression and educational group-specific regression, that was also done by dividing years of education into 3 big groups:

1. Low Education: 9 - 11 years of education (school education);
2. Medium Education: 12-14 years of education, representing incomplete higher or vocational-technical education;
3. High Education: 15+ years of education, including bachelor's, master's degrees or higher.

Such approach allowed to do separate regressions for each educational group in order to observe how returns to experience differ for different levels of education. By that, taking a look at each single group separately shows all the differences and reveals how exactly work experience influences wages due to the specific educational level of workers.

In addition, predictive approach was used to dive deeper into the analysis of the trend in wage experience profiles for different education levels, which was done by separate regressions based on an extended Mincerian model. This instrument is used rather in order to show general trends than to predict the result for particular individuals.

In conclusion, all these steps allow to identify both the overall trends in the data and the specific differences across occupational groups. Instead of than running one regression to characterize the general wage determination in the Ukrainian labor market, the analysis provides more insight about the inequalities and differences.

Another consideration in this study is the issue of multicollinearity. Having experience and experience squared in the model, problem was present and in order to solve ir mean centering was performed on this variable. A mean-centered variable can be created by subtracting mean from each value to re-scale the values. Practically, the new mean becomes 0. It reduced the multicollinearity, so in this research centered experience is used in regressions. In addition, variance inflation factors (VIF) were calculated to confirm the efficiency of mean centering and did reveal a substantial decrease of multicollinearity after such adjustment.

It is important to mention that this research is based on cross-sectional data to study the connection between education, work experience and wages in Ukraine. While such type of data has its limitations like no possibility to examine changes over time of individual cases, it can give a useful snapshot about key patterns and inequalities that exist within the labor market at a certain point in time.

So, these methods help to explain wage differences by exploring how different occupations affect the returns to education and experience and test the hypotheses mentioned earlier. These findings will be an unique addition to other researches on wage determination in countries like Ukraine with its transitioning economy and complex challenges.

CHAPTER 4. DATA

This research uses anonymous microdata from the survey "Wages of Employees by Gender, Age, Education, and Occupational Groups in 2020", that was collected and provided by the State Statistics Service of Ukraine as part of a regular statistical survey conducted to understand wage patterns in Ukraine.

The dataset represents firm-level data for formal employees in Ukraine. The data is based on a sample survey of enterprises, institutions and organizations from different economic activities in the Ukraine. There are different specific characteristics of the employees included like gender, age, level of education, and occupational group, providing a complex picture of wage structures in different sectors. The survey follows the international standards for data collection using a census of larger enterprises (with 250 or more employees) and a stratified random sampling of smaller enterprises (with 10 to 249 employees). For further details of the survey methodology and data collection process, see SSSU 2020. The survey includes 166,200 employees from 15,200 enterprises from different sectors, except for "Household activities" and "Activities of extraterritorial organizations." This data was collected based on reports submitted by enterprises, that provided detailed wage information for their employees as of October 31, 2020.

The dataset includes the following variables:

- Gender: female, male.
- Age: Up to 25 years, 25-34 years, 35-44 years, 45-54 years, 55-59 years, 60-64 years, 65 years and older.
- Level of Education: Master's Degree or Higher, Bachelor's Degree, incomplete higher education, vocational-technical education, complete secondary education, basic secondary or lower.

- Work Experience: Up to 2 years, 2-4 years, 5-9 years, 10-14 years, 15-19 years, 20 years or more.
- Occupational Group: Based on the International Standard Classification of Occupations (ISCO). These groups include:
    1. Managers
    2. Professionals
    3. Technicians and associate professionals
    4. Clerical support workers
    5. Service and sales workers
    6. Skilled agricultural, forestry, and fishery workers
    7. Craft and related trades workers
    8. Plant and machine operators and assemblers
    9. Elementary occupations
- Sector: Categorized according to the NACE classification, which is the European equivalent of the Ukrainian "КВЕД." The sectors include:
    1. Agriculture, forestry, and fishing
    2. Mining and quarrying
    3. Manufacturing
    4. Electricity, gas, steam, and air conditioning supply
    5. Water supply; sewerage, waste management, and remediation activities
    6. Construction
    7. Wholesale and retail trade; repair of motor vehicles and motorcycles
    8. Transportation and storage
    9. Accommodation and food service activities
    10. Information and communication
    11. Financial and insurance activities
    12. Real estate activities
    13. Professional, scientific, and technical activities
    14. Administrative and support service activities

15. Public administration and defense; compulsory social security
16. Education
17. Human health and social work activities
18. Arts, entertainment, and recreation
19. Other service activities

- Firm Size: Up to 10 employees, 10-49 employees, 50-99 employees, 100-499 employees, 500-999 employees, 1,000-4,999 employees, more than 5,000 employees.
- Region: Kyiv, Vinnytsia, Volyn, Dnipropetrovsk, Donetsk, Zhytomyr, Zakarpattia, Zaporizhzhia, Ivano-Frankivsk, Kyiv region, Kirovohrad, Luhansk, Lviv, Mykolaiv, Odesa, Poltava, Rivne, Sumy, Ternopil, Kharkiv, Kherson, Khmelnytskyi, Cherkasy, Chernivtsi, Chernihiv, Sevastopol.
- Hourly Wage in 2020: This variable was calculated by author using the data on the total number of hours worked in a year and the total earnings in hryvnias for the year. The hourly wage was derived using the formula:

$$\text{Hourly Wage} = \text{Total Hours Worked in the Year} / \text{Total Annual Earnings} \quad (3)$$

To make the data suitable for regression analysis and easier to interpret, the categorical variables for education and work experience were transformed into numerical values. This way it is easier to include them in the regression model in a straightforward way.

The education as a variable originally in the dataset has six categories, that were converted into years of education. Each category was assigned the amount of years that represents the typical duration to achieve that level of education:

- Basic Secondary or Lower: 9 years
- Complete Secondary Education: 11 years
- Vocational Technical Education: 13 years
- Incomplete Higher Education: 13 years

- Basic Higher Education (Bachelor's Degree): 15 years
- Higher Education (Master's Degree or Higher): 17 years

By transforming education into years, it is possible to see how each additional year of education affects wages. To convert the work experience into numerical values, the mid-level for each range was used:

- Up to 2 years: 1 year
- 2-4 years: 3 years
- 5-9 years: 7 years
- 10-14 years: 12 years
- 15-19 years: 17 years
- 20 years or more: 25 years

Such transformation allows the model to estimate the direct effect of experience on wages, and whether the impact of experience diminishes after some point. But it does have some limitations - converting education and experience into numbers does not give you specific numbers, but rather more general results that cannot represent the very detailed differences between categories. It does not tell the whole story, but it does let us see the the general trends and relationship between these factors and wages. While these limits are caused by the available dataset, this approach has more positives than negatives in this situation, yet future research could use more specific data points.

The dataset contains 165772 observations. Most of the sample is in the middle age range. The two largest groups are ages 35–44 (26.7%) and 45–54 (24.7%). In contrast, only 4.1% of the sample is the youngest workers (under 25), and only 5.5% are 65 and older. The sample therefore includes younger and older workers, but the sample mostly represents mid career workers. As for education, 33.5% of the sample has at least higher education degree, while 21.7% have vocational or technical training. The workforce in

the dataset is generally well educated, with less than 3% having only completed secondary education or lower.

Table 1. Summary statistics for socio-demographic variables

Variable	N	%
Gender		
Male	86277	52,05
Female	79495	47,95
Age		
up to 25 years	6844	4,13
25-34 years	31458	18,98
35-44 years	44293	26,72
45-54 years	40917	24,68
55-59 years	20063	12,1
60-64 years	13106	7,91
65 and older	9091	5,48
Education		
Higher education	55587	33,53
Basic higher education	22751	13,72
Incomplete higher education	17573	10,6
Vocational-technical education	35905	21,66
Complete secondary education	29532	17,81
Basic secondary and lower	4424	2,67

Source: author's calculations based on data from SSSU

Jobs are categorized according to professional codes from the State Statistics Service. From Table 2, it can be observed that the "Craft and related trades workers" constitutes the highest percentage, with 19.4%, followed by "Professionals with high qualifications," with 18%. These combined are quite a large part of the workforce representing skilled trades and professional areas in the sample. "Managers" make up 11.7%, indicating a very decent number of leaders among the respondents. On the contrary, occupations such as "Skilled agricultural, forestry, and fishery workers" make up less than 2% of the sample. By industry, "Manufacturing" equals about a quarter of all respondents at 25.7%. The other two biggest industries are "Retail and repair of motor vehicles" at 11.5% and "Healthcare" at 11.9%. The smallest industry in this data is "Arts,

entertainment, and recreation" at 1.5%. Geographically, Kyiv is the leading region and took part in 21% of all participants (see Appendix A).

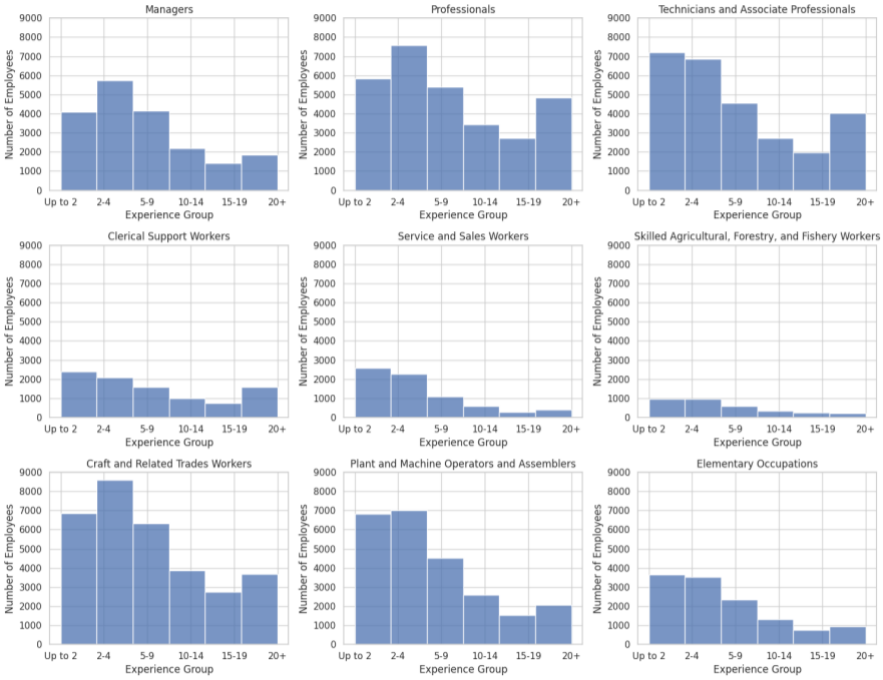
Table 2. Summary statistics for Job Types and Sectors

Variable	N	%
Occupational Groups		
Managers	19464	11,74
Professionals	29836	18
Technicians and associate professionals	27382	16,52
Clerical support workers	9372	5,65
Service and sales workers	7202	4,34
Skilled agricultural, forestry, and fishery workers	3351	2,02
Craft and related trades workers	32088	19,36
Plant and machine operators and assemblers	24503	14,78
Elementary occupations (unskilled jobs)	12574	7,59
Sector		
Agriculture, forestry, and fishing	8281	5
Mining and quarrying	4961	2,99
Manufacturing	42559	25,67
Electricity, gas, steam, and air conditioning supply	5416	3,27
Water supply; sewerage, waste management, and remediation	3311	2
Construction	7655	4,62
Wholesale and retail trade; repair of motor vehicles	19133	11,54
Transportation and storage, postal and courier activities	7839	4,73
Accommodation and food service activities	1725	1,04
Information and communication	4712	2,84
Financial and insurance activities	3384	2,04
Real estate activities	2598	1,57
Professional, scientific, and technical activities	8334	5,03
Administrative and support service activities	4774	2,88
Public administration and defense; compulsory social sec.	10239	6,18
Education	7209	4,35
Human health and social work activities	19702	11,88
Arts, entertainment, and recreation	2515	1,52
Other service activities	1425	0,86

Source: author's calculations based on data from SSSU

Figure 1 presents the histograms with distributions of experience across different occupational groups in the dataset with x-axis as experience groups, ranging from "Up to 2 years" to "20+ years," and the y-axis as the number of employees in each category. Looking at all occupational groups, most of employees do not have experience more than 9 years. Therefore, there is a large group of not very inexperienced employees in this dataset. For most groups, the absolute number of employees with more than 10 years of experience is quite low. "Managers" and "Professionals" groups include a bigger percentage of employees with experience beyond 15 years, indicating such roles tend to attract more experienced people. In contrast, groups as "Elementary Occupations" and "Service and Sales Workers" include more employees with lower levels of experience, where very little amount of workers has over 10 years in these positions. It can reflect the nature of these roles - lower barriers to entry, higher turnover, less need for extensive experience.

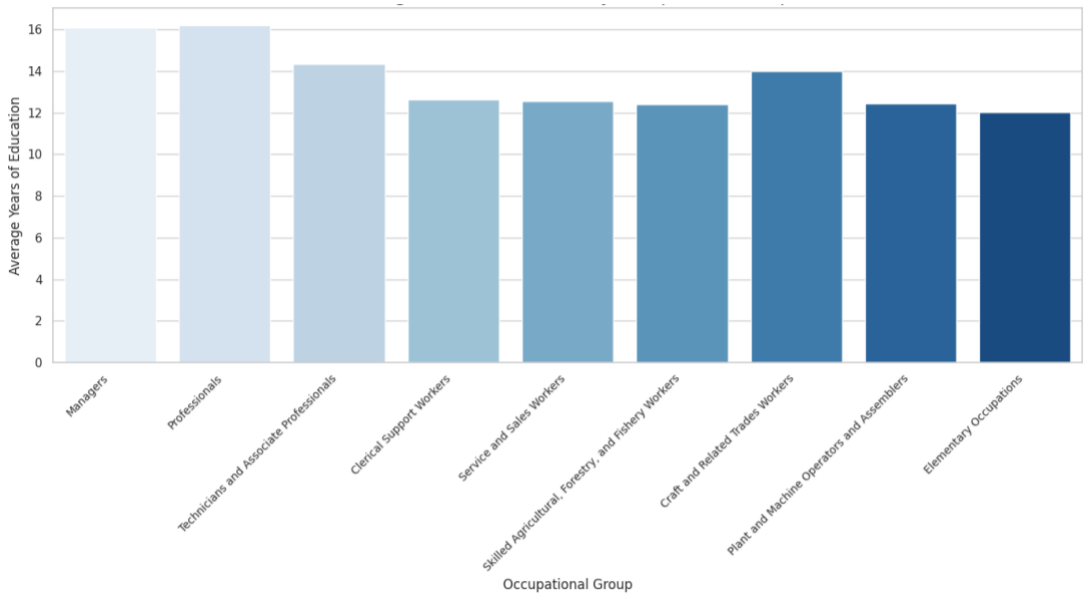
Figure 1. Experience Distribution Across Different Occupational Groups



Source: made by author based on data from the SSSU

As it is seen on Figure 2, "Managers" and "Professionals" have the highest average years of education, both reaching around 16 years, meaning that these roles can generally require higher levels of formal education. On the contrary, "Elementary Occupations" and "Plant and Machine Operators and Assemblers" have lower average education levels, around 12 years, that can mean that these positions are more accessible without advanced education.

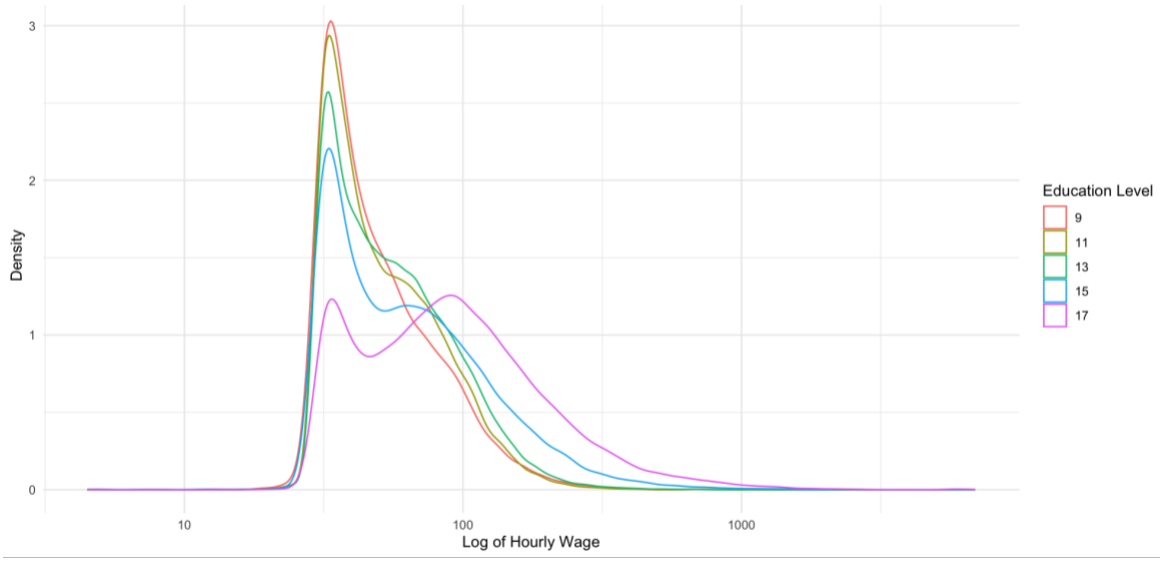
Figure 2. Average Years of Education by Occupational Group



Source: made by author based on data from the SSSU

According to kernel density distribution in the Figure 3, as education level increases, wage distribution shifts to the right. What it really means is that generally, workers with higher years of education can be associated with higher wages. More importantly, though, while a higher level of education can be related to higher earnings, it increases wage dispersion at the same time. Finally, the effect of education can be bounded for the very top earners since the upper end of each line flattens out, and maybe other factors can be important, like particular skills or even the industry type itself.

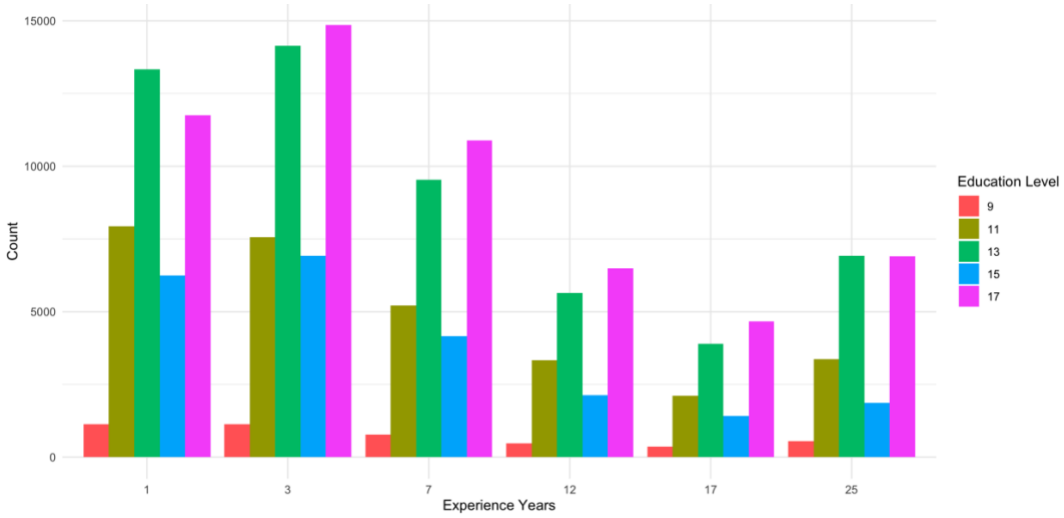
Figure 3: Kernel Density Distribution of Log Hourly Wages by Education Level



Source: made by author

Figure 4 presents distributions of workers by experience for different education levels. Looking at the distribution of workers depending on their experience by education groups, one can easily notice that workers with 17 and 13 years of schooling are the biggest share in this dataset, as they are predominant regardless of the number of experience. Speaking generally, a greater part of employees in this sample has up to 7 years of experience. The school graduates naturally are concentrated at 1-3 years of experience. Workers having 13 and 17 years of education are well represented in each of the experience classes and would seem to indicate that the careers for persons of higher education are steadier. All education levels reveal a pronounced peak in early experience (1–3 years), which is common entry into the workforce. After this early career phase representation falls off gradually for all groups. Interestingly, experience increases slightly as we hit 25 years of experience, across all education levels. Distribution of these statistics indicates that all workers enter the labor market almost identically, but workers with more years of schooling are also those whose careers will be longer and more stable.

Figure 4: Distribution of Experience Years by Education Level



Source: made by author

So, the dataset used in this study provides a complex look on wages across different sectors and occupational groups in Ukraine. With over 160,000 observations, it offers a strong foundation to analyze the connection between education, experience, and wages. This dataset is now ready for regression analysis as categorical variables were converted into numbers. Though this data set does not reflect the changes of wages over time, it does carry very useful information regarding changes in wages according to education and experience at a certain point in time. The results of the analysis will be presented in the next chapter, including the key drivers of wage differences and a deeper analysis of differences in wage determination by different education level or occupation.

CHAPTER 5. RESULTS

In this chapter the results of this research are discussed focusing on the effects of education and work experience on the wage. The analysis was conducted around two central hypotheses mentioned previously - first, that less-educated workers experience lower wage gains from accumulated work experience compared to more-educated workers, and second, that the returns experience for different levels of education differ significantly across occupational groups. Conducting both general model and detailed subgroup regressions allows to provide a more complex picture of wage determination, highlighting who benefits most from education and experience.

In Table 3 general regression for the whole dataset was completed. It includes both basic and extended Mincerian model. According to the basic one the coefficient for Education Years is 0.092, meaning that each additional year of education leads to a 9.2% increase in hourly wages. Each additional year of experience contributes 1.4% to wage growth. The diminishing returns are again confirmed by the negative coefficient for Experience Squared.

An extended Mincerian model was also estimated which captures the effect of additional control variables which could impact the level of wages. Even though additional variables are added to the extended model in an attempt to improve overall accuracy and take into consideration all the aspects, all the variables will not be displayed in Table 2 as they are not explicitly related to our primary research question regarding the changes in wages caused by education and experience. In the extended model the coefficient of Education Years is slightly smaller than in the basic model, suggesting that with all other controls considered an additional year of education increases wages by roughly 5.9%. Experience remains positive and significant with negative diminishing returns shown through a negative Experience Ssquared term.

Table 3. Regression Results: Basic and Extended Mincerian Model

Variable	Basic Mincerian Model	Extended Mincerian Model
Years of Education	0.092*** (0.001)	0.059*** (0.001)
Experience	0.014*** (0.001)	0.013*** (0.0003)
Experience Squared	-0.001*** (0.00003)	-0.001*** (0.00003)
Constant	2.773*** (0.009)	3.155*** (0.020)
Observations	165772	165772
Adjusted R^2	0.127	0.299

Note: *p<0.1; **p<0.05; ***p<0.01

Further analysis splits the sample into three distinct educational categories as it presented in Table 4: low, medium, and high education. Here the same approach will be used – estimation both basic and extended Mincerian model. Regarding the first one, for workers with Low Education the returns to experience are quite low. Each year of experience increases wages only by 1.0%. Moreover, in this group the squared term for experience is larger than in other group indicating stronger diminishing returns. It means that the positive effect of experience is more limited for workers with lower education levels, and wages may plateau after a certain point.

Medium Education group shows 1.3% increase in wages for each additional year of experience. The highest returns to experience are found in the High Education group. For workers with 15 years of education or more, every additional year of experience translates into a 1.8% increase in pay. The squared effect for both groups is also negative, indicating diminishing returns, but this effect is smaller than in a group that is less educated. In general, this means that higher-educated workers are more likely to find their wages growing more continually. Further, the base wages is depicted by constant terms across the models. The most educated group gets the highest intercept. The extended model presents that workers with the highest education do have the best returns to

experience - in that each additional year of experience pays around 1.6% on their salary. It means that education brings more long-run value to experience.

Table 4. Regression Results: Basic and Extended Mincerian Model by Education

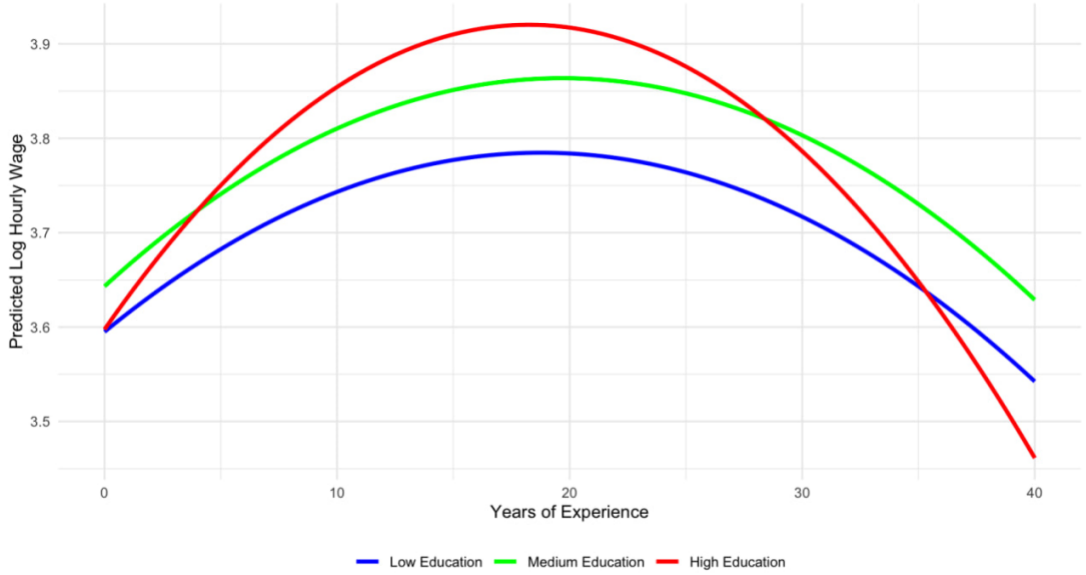
Variable	Basic Mincerian Model			Extended Mincerian Model		
	Low Education Group	Medium Education Group	High Education Group	Low Education Group	Medium Education Group	High Education Group
Experience	0.010*** (0.001)	0.013*** (0.0004)	0.018*** (0.001)	0.011*** (0.0005)	0.011*** (0.0004)	0.016*** (0.001)
Experience Squared	-0.0005*** (0.00005)	-0.001*** (0.00004)	-0.001*** (0.0001)	-0.001*** (0.00004)	-0.001*** (0.00004)	-0.001*** (0.00004)
Constant	3.974*** (0.004)	4.047*** (0.003)	4.451*** (0.004)	3.782*** (0.042)	3.969*** (0.025)	3.924*** (0.028)
Observations	33956	53478	78338	33956	53478	78338
Adjusted R^2	0.012	0.021	0.015	0.248	0.222	0.251

Note: *p<0.1; **p<0.05; ***p<0.01

Following the methodology described before, the analysis also makes use of a predictive approach applying the extended Mincerian model. Figure 5 presents the results in graphical form and reveals an clear downward U-shaped pattern for all levels of education.

In every case wages initially increase with experience, reach a peak, and then gradually decline. This peak is much higher for those with high education, with sharper rise and fall, showing higher wage growth but also sharper fall in later career stages. Interestingly, the U-shape of the medium education group appears flatter with a higher starting wage than the low education group and with a steadier wage path over time. This may mean that worker medium education with incomplete higher or vocational-technical education experienced a more consistent wage trajectory, not showing the sharp peaks and drops of high education, but earning more than those with low education.

Figure 5. Hourly Wage by Experience and Education Level



In conclusion, the findings indicate that education increases the returns to experience, in both wage growth and initial wages. Those who have higher levels of education not only are paid more at the beginning but also receive higher wage increases with experience. This way it supports Hypothesis 1 meaning that educated workers do get more from their experience.

In Table 5, there are the general results of the extended Mincerian model applied to different occupational groups. It is seen that, for managers and professionals, each additional year of education increases wages by 9.2%, and 1 additional year of experience does so by 1.5%. This group gains the most from formal schooling. The returns to education for technicians and clerical support are lower than for managers; additional years of education translate into an increase in wages of 6.9% for each additional year of education. Here, experience also counts, adding 1.1% to wages per year. For skilled and manual workers, education has a moderate effect, with each additional year of education increasing wages by 7.4%. This group also experiences a stronger impact of experience, 1.6 percent wage increase per year of experience. An interesting thing to notice here is the varying base wages, with the lowest base wage being related with managers and

professionals, and the highest being associated with technicians and clerical support, as seen from the Constant term of 2.859. It can imply a more organized wage system in technical and skilled labor jobs than in management jobs.

Table 5. Regression Results of Extended Mincerian Model by Occupational Group

Variable	Managers and Professionals	Technicians and Clerical Support	Skilled and Manual Workers
Education Years	0.092*** (0.002)	0.069*** (0.001)	0.074*** (0.001)
Experience	0.015*** (0.001)	0.011*** (0.001)	0.016*** (0.0004)
Experience Squared	-0.001*** (0.0001)	-0.001*** (0.00004)	-0.001*** (0.00004)
Constant	2.403*** (0.047)	2.859*** (0.034)	2.778*** (0.026)
Observations	49300	43956	72516
Adjusted R^2	0.238	0.233	0.272

Note: *p<0.1; **p<0.05; ***p<0.01

Even though occupation-specific analysis showed some general insights about each job category and what effect education or experience has on the wage, however, it is still hard to answer whether the returns to experience are higher for more educated workers or not in these occupations. That is why, following the methodology, the extended Mincerian Model is estimated again separately for each educational group inside every occupational group.

The results provided in Table 6 are consistent with the idea that in most cases, as education levels increase, so do the wage gains from each additional year of experience. However, the managerial group deviates slightly from this trend. Here, the medium-educated workers show the lowest return to experience, even lower than those with low education. This suggests that managerial roles can be not as structured as other occupations. It can also mean that maybe in this occupational group, depending on

sector, experience can pay off most for those with either advanced specialized knowledge (high education) or practical, hands-on expertise (low education), while medium education doesn't provide the same advantage. In contrast, the technicians and clerical support, as well as skilled and manual worker groups, align well with the general pattern. For these groups, returns to experience rise steadily with each increase in education level, supporting the idea that more education consistently enhances the value of experience in technical and hands-on roles.

Table 6. Regression Results of Extended Mincerian Model by Occupation and Education

Variable	Managers and Professionals			Technicians and Clerical Support			Skilled and Manual Workers		
	Low Education	Medium Education	High Education	Low Education	Medium Education	High Education	Low Education	Medium Education	High Education
Experience	0.013*** (0.004)	0.010*** (0.002)	0.016*** (0.001)	0.005*** (0.001)	0.009*** (0.001)	0.018*** (0.001)	0.014*** (0.001)	0.015*** (0.001)	0.021*** (0.001)
Experience Squared	-0.0001 (0.0004)	-0.001*** (0.0001)	-0.001*** (0.0001)	-0.0003*** (0.0001)	-0.0004*** (0.0001)	-0.001*** (0.0001)	-0.001*** (0.0001)	-0.001*** (0.0001)	-0.001*** (0.0001)
Constant	3.983*** (0.246)	3.826*** (0.078)	3.851*** (0.038)	3.721*** (0.052)	3.838*** (0.042)	3.731*** (0.061)	3.682*** (0.039)	3.702*** (0.031)	3.824*** (0.057)
Observations	496	501я0	43794	9140	18601	16,215	24320	29867	18329
Adjusted R^2	0.158	0.119	0.219	0.155	0.176	0.224	0.246	0.239	0.246

Note: *p<0.1; **p<0.05; ***p<0.01

These findings confirm Hypothesis 2, demonstrating that the effects of experience on wages are not uniform - they depend a lot on a worker's level of education and the type of occupation they are in. It means that maximizing the wage with only tenure or experience is a more difficult task, than doing the same but with a higher level of education. Or answering the central question of this research - yes, less-educated workers really gain less from experience, but how much the returns are different depends on occupation too.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

This thesis touches an important question regarding Ukrainian labor market: is there any difference in returns to experience considering different level of education? Or basically, do workers with lower education gain less from experience compared to those with higher education?

Ukrainian economy and labor market specifically now undergoes through big challenges and understanding how education and experience together contribute to the level of wage can help go through these struggles in the best way. For exemple, business or employers can use these insights to create a fair and profitable compensation systems for their employees, trainings programs that can develop skills and knowledge that will actually pay off. Being more specific, also HR teams not only should generally understand the general trends in labor market they directly work with in order to adjust their strategy to always changing reality, but also this understanding can help them build a strong foundation for attracting new and keeping existing employees in the company for a longer time. Moreover, since workers with higher education gain more from their experience, businesses could create pay models that recognize this difference.

Increased access to training programs for the less educated, aimed at raising the skills of such workers, may make wage growth more sustainable for this type of workers. In this way, it might help in building a more balanced labor market in Ukraine, with wage growth greater both at the low and high levels of education as well as across occupations. Academic institutions can also adjust the programs to be more relevant for the workplaces. As for the workers themselves, this research can simply prove to them that all developments, whether it be new learning skills, new experience, or even additional education, translate to more pay. Every career path is unique, however, with the insight of how experience and education influence wage growth, it can be better understood through the specifics of the selected occupation, enabling workers to make more strategic choices that will pay off better in the future.

This study used the Mincerian model to determine how education and experience affect wages by looking at data from more than 160,000 workers in different industries, regions and occupations and finds a clear gap in returns for workers with different education backgrounds. This main finding underscores that factors determining wage are not fully independent, and definitely affect each other too. Not only do workers with bachelor's or master's degrees begin at higher wages but they also experience faster wage growth per additional year of experience. Such a phenomenon is consistent with the idea that education at the higher level gives essential skills, which allow workers to get more experience and, consequently, to have a stronger effect on wage growth. Wage growth is more constrained for workers with only secondary or vocational education: their wages are less responsive to additional years of experience comparing to the more educated peers. This insight confirms the central question of this research - workers with lower education levels really do face smaller gains in pay from their experience.

The analysis also shows that the effect of experience on wages diminishes across all education levels over time. However, again this slowdown is especially pronounced for workers with lower education. In this case, for these workers, the wage benefits of experience plateau sooner, so these workers may have the potential to continue to maintain the wage growth if they develop their expertise, receive additional training or qualifications. On the other hand, more educated workers have less steep decline in returns from experience so they can benefit more from each year of work for a longer period of time.

Obviously it is more common to meet a doctor or a manager with higher education than a manual worker, for example. This is the reason why this study also tried to dig into occupations too, comparing wage dynamics inside. Employers in skilled and manual workers' jobs place greater importance on hands-on knowledge than formal education and thus, they appear to get more from accumulated years on the job than from formal education. Wage growth in technical and clerical roles displays an 'experience plateau': wage increases at first but then begins to level off or even slightly

decline. That might be the sign that employers and businesses in those jobs prefer to hire newer and cheaper workers over workers with a ton of experience, limiting long-term wage growth for more experienced workers.

Interestingly, the study also finds that specifically among managers, workers with medium levels of education, like vocational training, face lower wage growth from experience than do workers with either high or even low education levels. This may reflect that for managers employers either value either advanced strategic skills associated with higher education or the practical experience of long-tenured workers with less formal education. Such a gap suggests that people with middle level education might need additional training boosting the potential of increase in wages.

Higher education, in general, has higher returns of experience, although these they are limited, with workers reaching their wage peak at an early age. These results provide a framework for creating a fairer labor market that supports wage growth for all, helping workers, employers, and policymakers make more conscious decisions in the Ukrainian evolving economic environment.

The findings in this study have several important implications for businesses and policymakers in Ukraine. The money used on employee education can boost starting salaries, and produce a rising wage trend. Good vocational training can help workers with lower levels of education improve wages and productivity, something businesses need to encourage if they are to boost the potential of their workforce. From a policy perspective, lifelong learning programs are important in helping workers adjust to labor market changes and earn higher long run wage growth.

While this study provided valuable insights into the Ukrainian labor market, it also highlighted areas for future exploration:

1. Longitudinal Analysis: a more complex picture can be obtained if one analyzes how the dynamics of wage growth change over time, but this, of course, is only possible

with panel data. By doing so we can understand the long run effect of education and experience.

2. Post-2022 Data: the study was conducted on the basis of the pre 2022 data and further research can look into how the current war in Ukraine affects the Ukrainian labor market, in particular, the wage disparities, educational accessibility, occupational changes. The war has much potential to change wage structures regionally and sectorally because of the displacement and forced relocations in large numbers.

3. Sectoral and Regional Disparities: sectoral and regional differences in wage determination are also left for future studies. The results of the current study suggest, although hint, that there may be differences, but a more complex analysis can look at how wage returns are influenced by local labour market conditions, regional economic development and sector specific factors.

4. Non-Categorical Variables: exploring the use of more specific, non-categorical variables (like precise years of experience instead of ranges) could provide more precise outcomes.

This thesis finally provides strong evidence that in Ukraine the education really affects returns to work experience and that occupational group also affects wage growth. Improving access to education and providing targeted training opportunities should be a priority for Ukraine, helping to unlock the full wage potential of its workforce and strengthen the nation's economy.

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APPENDIX

Appendix A. Regional Distribution of Respondents

Oblast	N	%
Vinnytsia	4698	2,83
Volyn	4116	2,48
Dnipropetrovsk	12886	7,77
Donetsk	6539	3,94
Zhytomyr	4740	2,86
Zakarpattia	3695	2,23
Zaporizhzhia	6936	4,18
Ivano-Frankivsk	3868	2,33
Kyiv (oblast)	7104	4,29
Kirovohrad	3842	2,32
Luhansk	2892	1,74
Lviv	9583	5,78
Mykolaiv	4221	2,55
Odesa	7329	4,42
Poltava	6540	3,95
Rivne	3923	2,37
Sumy	4229	2,55
Ternopil	3343	2,02
Kharkiv	11044	6,66
Kherson	3476	2,1
Khmelnytskyi	4448	2,68
Cherkasy	4569	2,76
Chernivtsi	2485	1,5
Chernihiv	4118	2,48
Kyiv (city)	35148	21,2

Source: author's calculations based on data from SSSU