



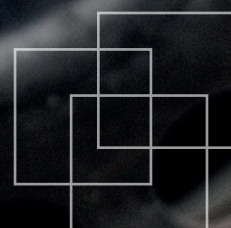
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Assessment of the economic impacts of the 2017 increase in the minimum wage in North Macedonia

Marjan Petreski
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WORKING CONDITIONS
AND EQUALITY



DECENT WORK TECHNICAL SUPPORT TEAM AND COUNTRY OFFICE FOR CENTRAL AND EASTERN EUROPE

Assessment of the economic impacts of the 2017 increase in the minimum wage in North Macedonia

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PREFACE

Wage growth and combatting inequality are one of the main agendas outlined in Sustainable Development Goal (SDG) 8 on “Decent Work and Economic Growth”. Wage inequality can hinder economic growth, reduce well-being and increase poverty. Conversely, proactive wage policies and reform of labour market institutions can play a critical role in building an equitable society and sustainable economy. Increasing the minimum wage is one direct means to reduce inequality and promote social justice.

Until the implementation of wage reforms in 2017 in North Macedonia, a national statutory minimum wage coexisted with a lower minimum wage in the textiles, apparel and leather industries. Under the reforms the government increased the national minimum wage by 19 per cent and applied an equal minimum wage to all sectors. The main objective of the reforms is to increase overall wage levels, challenge wage inequality, and promote economic growth by increasing purchasing power of the workers.

Following an official request of the Government of North Macedonia, the ILO conducted a study on assessing the impacts of minimum wage increase in 2017 with a particular focus on wage growth, wage distribution, and reduction of wage inequality in employment. The study is based on several components: (1) analysis of the available statistical data; (2) desk analysis of legislation and collective bargaining, (3) interviews with the key stakeholders confirming the applications of legislation and collective bargaining as well as data validity and (4) econometric analysis on the effects of the minimum wage. The findings of the study show positive short-run effects of increase in the minimum wage, particularly for low-paid workers and finds favourable effects on wage distribution and inequality.

The draft version of report was discussed at the high-level tripartite roundtable in Skopje in December 2018 and valuable comments and suggestions by tripartite constituents are incorporated to this report.

This report is the first ILO publication which specifically covers minimum wages in North Macedonia. We trust that this report will serve as a useful reference, particularly for the tripartite constituents as a means of facilitating an ongoing national social dialogue on the development of minimum wage policies in North Macedonia.

Budapest, July 2019

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EXECUTIVE SUMMARY

In January 2012 the Government of North Macedonia introduced a nation-wide statutory minimum wage (MW) of 8,050 Macedonian denars (MKD). In a transitory 3-year period, a lower MW level was set for three low-paying economic sectors (textiles, apparel and leather branches). While some changes in the system and increases in the MW were made between 2012 and 2016, in 2017, the newly elected Government pursued a more comprehensive wage reform with a 19 per cent MW increase to 12,000 MKD. This MW was also applied to the three above-listed economic sectors to equalize the MW across the country. The clear and stated policy objective is to increase overall wage levels, especially those of the low-paid workers, and to reduce poverty and inequality. Moreover, the Government announced its plans to raise the MW to 16,000 MKD by 2020.

The objective of this study is to undertake a comprehensive analysis of the effects of the MW increase on wage growth, distribution (and inequality) of wages and employment. Some other potential side effects such as hours of work, informality, etc. are also examined. The findings of the study show positive short-run effects of the MW increase on wage levels and hence on living standards. The study also finds favourable changes in the overall wage distribution and inequality. In particular, the average hourly wage increased by 6.4 per cent between 2017 and 2018, and by a higher rate for the wages below the median, i.e. it benefitted low-wage workers more. This likely contributed to a compression of wages around and slightly higher than the MW, implying “equalization” of wages.

Similarly, the Kaitz ratio (of the MW to the median wage) shows a large increase from 67 per cent in 2017 to 80 per cent in 2018, suggesting a significant improvement of the relative position of MW earners to the median-level earner. Wage distributions also show that there are still some workers earning below the MW, who have not sufficiently benefitted from the application of new MW regulations.

Wage inequality in North Macedonia declined after the 2017 MW increase, mainly due to the changes in the wage distribution of those receiving less than the MW, more prominently observed for men. A comparison with European Union (EU) countries reveals that the wage distribution in North Macedonia is much more compressed (hence implying lower wage inequality) than the EU average. The econometric analysis shows that these changes are been largely a result of the increase in the MW in 2017, potentially coupled with increased compliance, supply side constraints (insufficient supply of workers), and increased effectiveness of labour inspections.

The study did not find a statistically significant negative relationship between employment and the MW increase. There has been a very small decline of women employed in the textile, footwear and leather industries i.e. the three sectors which had a lower MW prior to 2017, by 0.8 percentage points. The frequency of lower-paid workers such as those in elementary occupations¹ also decreased, as did informal workers, suggesting that the increased MW was not a large burden for employers. And the Labour Force Survey data showed a small, but statistically significant downward adjustment in the hours of work.

The econometric analysis examined the causal effects of the MW increase on a multitude of outcomes: the wage level, hours worked, formality of the job and the probability of

1 An elementary occupation is the lowest level of occupation according to isco08.

unemployment. The main finding of the study is that the 2017 increase in the MW exerted a positive and significant impact on wages in North Macedonia. Observed by sex, the general finding is maintained, however, with lower robustness for men. The findings support the hypothesis of a delayed compliance, i.e. those left behind by previous increases in the MWs are more likely to have benefited from the 2017 MW increase. We also found some evidence of equalization. The analysis of the causal effects of the MW increase on hours worked, informality and unemployment robustly finds that in general there were no negative effects of the latest MW increase. However, there is limited evidence that women may have been exposed to some negative adjustment in terms of hours of work.

The documentary analysis and interviews show that collective bargaining in the country is still weak and subordinate to labour legislation. There are certain inconsistencies between the MW legislation and various collective agreements and hence, in the present setting, collective bargaining and minimum wage legislation cannot be seen as complementary policy tools, but rather uncoordinated. In particular, the recent changes in the MW system have not been translated and reflected in collective agreements at any level, and there are discrepancies between the MW legislation and provisions on the lowest wage rates in the collective agreements at all levels (national, branch- and enterprise-level).

From a policy perspective, the study raises several issues for the future decision-making. First, based on the ILO recommendations, as well as an analysis of the economic developments in the country prior to the MW increase, the study suggests a need for greater use of statistical evidence in setting the MW. In essence, wages need to be aligned with productivity so as to ensure stable labour costs, which are important for employment generation and for the international competitiveness of the economy.

Second, the study examined different scenarios regarding the adjustment of the MW and the likelihood that the MW reaches the intended level of 16,000 MKD by 2020. According to the scenario analysis, based on the current MW indexation formula as well on other MW indexation options, it is not likely that the MW will reach that level. It would be prudent for the social partners and government to review the indexation formula, based on the experience of other countries. The MW in North Macedonia is relatively high in relation to the median wage, especially when compared with EU countries. While the economy has adjusted to this level (temporarily supported by government financial support), further arbitrary increases above productivity growth (or GDP growth) may have harmful effects on the employment.

Finally, this study shows only the short-term effects of increasing the MW and hence the results have to be treated with caution. The effects of the MW increase have to be monitored closely so as to catch potential negative effects in the medium to long-term such as the adjustment of work hours, transformation into informal employment (including semi-informal contracts, like 'envelope wage'), and workers losing their jobs.

ABBREVIATIONS

AW	Average Wage
CPI	Consumer Price Index
ESC	Economic and Social Council
EU	European Union
GCA	General Collective Agreement
GDP	Gross Domestic Product
ILO	International Labour Organization
IT	Information Technology
LFS	Labour Force Survey
MKD	Macedonian Denar
MLSP	Ministry of Labour and Social Policy
MW	Minimum Wage
OLS	Ordinary Least Squares
ORM	Organization of Employers of Macedonia
PPP	Purchasing Power Parity
SLI	State Labour Inspectorate
SSM	Association of Trade Unions of Macedonia
SSO	State Statistics Office
ULC	Unit Labour Costs
UN	United Nations
UNDP	United Nations Development Program

INTRODUCTION

In 2011, following a consultative process with the social partners, the Government of North Macedonia introduced a nation-wide statutory minimum wage (MW), effective from 1 January 2012. However, a lower MW remained in place for three low-paying economic sectors, namely: textiles, apparel and leather branches. This lower MW was to remain in place for three years, albeit the period was extended until 2017. While some changes in the system were made between 2012 and 2016, in September 2017 the newly elected Government increased the minimum wage to 12,000 Macedonian Denar (MKD) (a 19 per cent hike). The minimum wage in the three lowest-paid economic sectors was also brought up to this level, i.e. textiles, footwear and leather.

The objective of the present study is to undertake a comprehensive overview of the effects of the MW increase on the distribution of wages and employment. In doing so, the study combines several approaches:

- i) A descriptive analysis of the available statistical data and micro-data from the Labour Force Survey (LFS).
- ii) An analysis of existing legislation and collective bargaining.
- iii) An econometric investigation of the causality of the relationship between the MW increase and the wage and employment and developments.
- iv) Interviews with constituents and key stakeholders so as to complement the quantitative data with qualitative information as a means of providing context and the perceived impacts by those working on the reforms.

The main role of the MW is to ensure decent living standards for workers and their families. It can be a strong redistributive tool, and can be used to prevent working poverty. In addition, the existence of a MW can reduce wage inequality. Evidence around the world shows that a MW can reduce both wage inequality within establishments (by compressing the wages in the lowest paying enterprises) and between firms (through increasing the average wage of the lowest-paying enterprises) (ILO, 2016, p.57-59).

There are a range of different views on the effects of the MW on the labour market, social justice, and the overall economy. On one hand, if properly designed and set at an adequate level, a MW has proved to be an effective policy tool, ensuring a decent living standard for workers and raising the wages of low-paid workers (ILO, 2012, 2016). Moreover, an MW can act as an automatic stabilizer, supporting aggregate demand and is found to be associated with poverty reduction (ILO, 2008). In contrast, UNDP (2006) and Rutkowski (2008) argue that a country facing high unemployment and informal employment, such as North Macedonia, should be cautious in setting up a statutory minimum wage as the increase of labour costs may constrain creation of formal low-paid jobs.

It is an inherent responsibility of government to implement policies which ensure sustainable wage growth, spreading the fruits of economic progress to all, especially to the most vulnerable (ILO, 2016). Such policies need to take into account the long-term trends in the economy,

including GDP growth and productivity, ongoing economic developments, and specific factors which affect wages at national, sector and enterprise levels. However, the statutory MW is not, and cannot be a tool for addressing all social problems, nor can it serve as a substitute to collective bargaining.

The structure of this report is as follows: Part I of this report presents the impact of the introduction of the MWs in North Macedonia based on the institutional analysis. It includes a review of the historical and institutional context of the MW system in North Macedonia, looks at the impact of the 2017 Minimum Wage Law, and the role of collective bargaining in setting wages. A short overview of the literature is presented in Annex 1.

Part II assesses the impact of the MW based on the statistical analysis. In this part, both the employment and wage dynamics are reviewed by using the LFS, and this section further discusses the various factors to be considered in the setting of a MW. The study conducts a comprehensive econometric analysis of the effect of the minimum wage on a set of indicators, which is provided in Annex 2.

1. THE IMPACT OF THE MINIMUM WAGE: THE INSTITUTIONAL ANALYSIS

1.1 Historical background of the minimum wage in North Macedonia

1.1.1. provides an historical and institutional account of the minimum wage fixing since 2012 so as to provide necessary contextual background 1.1.2. is particularly focused on the changes to the MW introduced in 2017, and 1.1.3. assesses the practical implementation of the law in the period following the increase. The last section covers the current practice of collective bargaining on wages in North Macedonia.

Chapter 1 also makes use of primary research. In particular, interviews were held with the representatives of the Ministry of Labour and Social Policy, the State Labour Inspectorate and representatives from the employers' and workers' organizations (namely the Organization of Employers of Macedonia-ORM and the Association of Trade Unions of Macedonia-SSM).

1.1.1. Introduction of the statutory minimum wage

As stipulated in ILO Convention No. 131, the minimum wage was agreed through a process of direct participation of representatives from the employers' and workers' associations. The introduction of a MW has been on the agenda of the Economic and Social Council (ESC)² since 2010 and has often been to the fore in public discourse in North Macedonia. Unsurprisingly, workers and employers held different views on the minimum wage both at national and sector/branch levels. Finally, in January 2012 an agreement was reached among social partners and the Law on the Minimum Wage was published in the Official Gazette No. 11/2012 (of January 2012).

The MW covers both the private and public sector workers, with the exception of self-employed workers. The Law determined that the MW be calculated annually with prior approval of the ESC. It set the level of minimum wage for a full-time employee at 39.6 per cent of the average gross wage in the previous year, amounting 8,050 MKD, and those working less than the full-time are entitled to a proportional minimum wage. This minimum wage floor applies to the basic wage of a worker (with a full-time contract).³ Hence, in practice, a worker's basic wage should not be lower than the MW, without taking into consideration any wage supplements (either for good performance or in other circumstances, such as overtime work, night work, etc.).

2 The ESC is a tripartite body established by the Government of North Macedonia in 1996, with the aim to bring together the representative employers' and workers' organizations to ensure economic and social stability in the country.

3 According to the Labour Law and the General Collective Agreement (and the branch level collective agreements), wages consist of: i) basic wage, ii) performance-related wage, and iii) wage supplements.

The pre-2017 MW system prescribed differentiated rates for the low-paying sectors, leaving time for the employers in these sectors to adjust upwards to the statutory MW. Article 10 of the Law on Minimum Wage provided for a transitory period in sectors where the average gross wage in July 2011 was below 15,600 MKD.

Consequently, in the leather, textile and apparel sectors the MW was steadily adjusted upward over a three-year period, from 78 per cent of the statutory MW in 2012, to 93 per cent in 2014. However, in 2012 the MW in these sectors was still higher than the MW prescribed by branch-level collective agreements for the textile industry (5,500 MKD) and the leather and footwear industry (4,800 MKD). Consequently, the statutory MW superseded the terms of these collective agreements, and the lowest wage level at the specific branches was increased accordingly. A full examination of the link between the MW and collective bargaining is provided in 1.2.

According to the Law on MW, the State Labour Inspectorate (SLI) is responsible for monitoring the implementation of the Law, namely: wage calculations, reporting and payment of wages. The 2012 MW Law also contained a provision making the MW conditional upon the achievement of an “accomplished norm” (or production/performance targets), with no further specification about how this established norm would be determined. The MW itself is defined as the lowest monthly amount that the employer is obliged to pay to a worker for full-time work reaching an accomplished work norm. Once the minimum wage is announced, the branch-level collective agreements are amended, and the lowest wage level at the specific branch is increased accordingly.

Since 2012, there have been changes in the MW almost every year, giving the MW a ‘political’ importance in addition to its ‘economic policy’ importance. So far, there have been six amendments and additions to the Law.⁴ The first of these changes was related to the level of the MW itself, and the subsequent three changes were related to charges (in the form of financial penalties) in case of the violation of laws. The last two, of 2017 and 2018, are in the particular focus of this study (and the penultimate change reformed the system of MW in several important ways).

From 2014 onwards, the MW was no longer calculated as a percentage of the average wage of the previous year,⁵ and the net MW was increased annually until 2016, when it reached 10,080 MKD (or 14,223 MKD in gross terms).⁶ Article 13 of the Law on Minimum Wage outlined the increase in the MW at sectoral level as follows: 7,500 MKD in 2014; 8,050 MKD in 2015; 9,000 MKD in 2016; 9,590 MKD in 2017 and 10,080 MKD in 2018. Hence, following this scheme, the lower MW would have levelled out with the statutory MW by 2018. The indexation formula (entered into force in 2016) was based on the consumer price index.

At the time when the MW was introduced, there was a statutory minimum floor under which employers were obliged to pay social security contributions (set at 50 per cent) of the average gross wage in the economy), increasing the relative labour costs for the low-wage workers. While this statutory minimum floor has been preserved, it actually lost its importance, given that, with the 2017 MW increase, the new MW is set at around or slightly above the statutory minimum floor for social security contributions.

4 As of 06.02.2014 (Official Gazette No. 30/2014), 05.12.2014 (No. 180/2014), 18.05.2015 (No. 81/2015), 31.07.2015 (No. 129/2015), 20.09.2017 (No. 132/2017) and 30.07.2018 (No. 140/2018).

5 Amendments to the Law published in the Official Gazette No. 30/2014.

6 The level of MW for 2014 was set at 8,800 MKD in net terms and 9,590 MKD for 2015.

1.1.2. Reforms to the minimum wage in 2017 and 2018

In September 2017, the MW Law was amended (Official Gazette No. 132/2017) by introducing five important changes.

Firstly, the level of the MW was increased from 10,080 MKD to 12,000 MKD (17,130 MKD in gross terms). This level was set for the period September 2017 to June 2018, with a new MW to be announced in July 2018. In June 2017 the MW was 49.6 per cent of the average net wage, a large increase from the initial ratio at the time of introduction of the MW.⁷ The stated policy objective of these increases in the MW is to raise the minimum wage to 16,000 MKD (net) by 2020. Eurostat data on the MW shows that, prior to the MW increase, it amounted to a monthly salary of EUR 240 in the first half of 2017, though expressed in terms of Purchasing Power Parity (PPP) it was the equivalent of EUR 509.⁸ This is at the higher end when compared to other countries in the Balkan region, and even higher than EU Member State Bulgaria (EUR 486).

The increase of the statutory MW not only affects the basic wage of workers, but also triggers an increase of wage supplements, as these supplements are either related to the average wage of the worker (overtime work, shifts, work during holidays, sick leave payment, etc.) or to the average wage in the economy (overtime work, jubilee awards, etc.). Hence, an increase of the basic wage inevitably increases the labour costs for employers.

Secondly, the lower MW in the textile, apparel and leather industries was increased and integrated into the general MW.

Thirdly, temporary subsidies were made available for a 12-month period. The financial support ranged from 500 MKD up to 2,000 MKD per month. The subsidy level was effective for the first 6 months of the MW increase, September 2017 to February 2018 but for the next 6 months (March 2018 – August 2018) these subsidies were halved. In order to be eligible for the subsidies, the law prescribed the following:

- The employer is not exempt from paying mandatory social security contributions and personal income tax for the employee.
- The company is active and not under bankruptcy procedures or liquidation.
- The employer generated a loss or his/her after-tax profit in 2016 that has not exceed 10 per cent of total expenditures.
- The employer must continue to employ the worker for whom he/she received financial support for one year after the support is terminated, or otherwise pay back the subsidy.

Fourthly, the Law outlined a mathematical formula for indexation of the MW. According to article 3 (Official Gazette, No. 132/2017), the MW for the preceding year shall be adjusted in March of every year with:

- one third of the increase of the average wages paid in North Macedonia.
- one third of the increase of the consumer price index (CPI).
- one third of the increase of the real growth of the Gross Domestic Product in the preceding year.

The MW adjustment is made in March and enters in force for workers for the April wages of each year. However, the Law also states that in 2018, the Government was to announce a new, adjusted MW in June 2018, and this would be effective for the period July 2018-March 2019. In other words, there was a small inconsistency for the first year of the new MW.

⁷ In gross terms, the new MW was 52.3 per cent of the average wage in 2017.

⁸ <https://ec.europa.eu/eurostat/web/labour-market/earnings/main-tables>. These data are published bi-annual basis and there are no updated data on North Macedonia for the period after the MW increase.

Given that the adjustments of the MW are not related to a calendar year, there are some ambiguities related to indexation. In particular, the indexation formula is not sufficiently precise and clear. For example, it does not refer to the exact period for which the average wage growth and CPI growth will be considered. As the MW adjustment is to be done in March, it is not clear whether the formula will use CPI for the previous year, previous six months, first quarter of the year, etc.

Fifthly, although there was a discussion around the possibility of scrapping the reference to the accomplished norm in the amended law, the reference was retained and the amended law stipulates that “The minimum wage is the lowest monthly amount of the basic salary that the employer is required to pay to the wage earner for the work performed full-time and with standard performance”. The idea of the policymakers in attempting to retain the norm was to keep some link between the productivity of worker and her/his wage. However, in April 2018 the Constitutional Court has ruled that the article related to the norm was unconstitutional.

The law further stated that:

- The standard performance is annually determined by the employer, in the month of February, based on the criteria for efficiency of the production process set by the employer in collaboration with the employees, and which have to be equal for every technical and technological unit of the business or organization.
- The standard performance in the preceding paragraph shall be attainable for at least 80 per cent of the employees in every technical and technological unit, separately.
- The employer is obligated, at the end of each month, to provide the employee with a certificate for achievement of the standard performance, along with the pay slip.

In July 2018, new amendments were made to the Law on MW (Official Gazette No. 140/2018), introducing financial supports to employers offering wages above the MW as a means of supporting an increase in wage growth. In addition to the requirements supporting the employers to pay the MW (outlined above), the support is conditional on several criteria, namely: the wage costs must be higher than 50 per cent of the overall costs of the employer; the employer paid to the worker an average wage of under 26,250 MKD for the period October-December, 2017⁹; and the employer is not exempt from paying social security contributions and personal income tax for the employee. The financial support is calculated at 30 per cent of the difference between the current wage of a worker and his/her average wage in the period October-December 2017 up to a maximum of 1,200 MKD per worker.¹⁰

In September 2018, the MW was adjusted by using the new indexation formula (although, initially June 2018 was set as the ‘adjustment date’). The new MW is 17,390 MKD, which in net terms translates to 12,165 MKD. The new gross MW is 49 per cent of the average gross wage of June 2018 (latest available data), whereas the ratio of the net MW to the average wage is 50.3 per cent. So, while the ratio of the minimum gross wage to the average gross wage has decreased, this ratio increased for the net wage (from 49.6 per cent to current 50.3 per cent). As witnessed in the interviews, for trade unions the ratio of the minimum wage to the average wage is very important and they are interested in indexation formula that will keep this ratio stable. The new MW was to be effective until March 2019, when the MW will again be adjusted using the indexation formula.

9 18,000 MKD in net terms. Essentially it covers the wage range of 12,000-18,000 MKD.

10 The limit of 1,200 implies that it covers, for instance, about 23 per cent of gross wage increase from the MW level of 12,000 MKD.

1.1.3. Practical implementation of the new minimum wage

According to the Government predictions, in September, 2017 about 130,000 employees were to be receiving the new MW (around 23 per cent of all wage employees in 2017, by LFS).¹¹ But the actual figure was 88,000. At the time of the introduction of the MW in 2012, the LFS data showed that the MW would be binding on about 33,000 workers, some 9 per cent of formal workers.¹² With the Budget Supplement of September 2017, the government set aside 4.4 million EUR as financial support of the MW increase, while additional 7.5 million EUR projected for the 2018 Budget.

The implementation of the higher MW faced several challenges from the outset. Some employers misunderstood the legislation, and considered that the MW covered total payments to workers rather than the basic wage. For its part, the government was not fully prepared and equipped to monitor compliance, nor for effective disbursement of the financial support to employers to cover the increased payroll. The IT system in the Public Revenue Office (to which employers submit wage calculations prior to paying wages) cannot effectively distinguish between basic and total wages. For example, the system is not designed to include details relating to whether the submitted wage levels incorporate overtime, shift work, etc.

By the end of 2017, only 15 per cent of the projected MW subsidy was used. The government argued that the low numbers of applications for financial support reflected the relatively good financial position of business in the country; as companies could cope easily with the increased labour costs, they were mostly ineligible to apply.¹³

The transmission of MW legislation into the collective agreements also proved problematic. In particular, existing collective agreements were often not re-negotiated or adjusted in light of the new MW, despite the clear stipulation, that collective agreements had to be adjusted within six months of the law coming into force. In cases where they are not, collective agreements not in compliance with the Law become obsolete. We come back to this discussion in Section 1.2.

1.2. Collective bargaining and its role in wage setting

The ILO's labour standards on collective bargaining and minimum wages are presented as complementary policy tools. Collective bargaining can further strengthen the role of a MW in mitigating economic inequality. As ILO (2016) notes, the setting of minimum wage is a balancing act that needs to be backed up by statistical evidence and done in full consultation with the social partners. The purpose of a minimum wage, which sets a floor, should also be distinguished from collective bargaining, which can be used to set wages above an existing floor.¹⁴

Collective bargaining in North Macedonia is governed by the Labour Law, which defines the modalities of entering into bargaining, representativeness, validity of the agreements etc. The process of wage setting through collective bargaining tends to be decentralized, and in practice, is subordinated to the law. Parties are not encouraged to freely negotiate and come to new, authentic solutions (EU/ILO, 2015).

Collective bargaining is generally organized on three levels: national level, branch level (for a specific industry or sector) and enterprise level. Wage setting in both the private and public sector

11 <https://vecer.mk/makedonija/od-idniot-mesec-130000-makedonski-rabotnici-kje-zemaat-minimalna-plata-od-12000-denari>.

12 In this context formal workers mean those with the written contracts, while workers in formal economy implies all workers with and without contract who are working in the legally-established businesses.

13 <https://skopjeinfo.mk/dali-12000-denari-e-minimalnata-plata-vo-makedonija>.

14 https://www.ilo.org/global/topics/wages/minimum-wages/definition/WCMS_439072/lang-en/index.htm.

is governed by a specific collective agreement at national level, namely the General Collective Agreement (GCA). There are two strands to the GCA: one for the private sector, and one for the public sector. However, the main issue in decentralising wage setting to the private sector is the prevalence of small and micro firms, where wages for many workers are unilaterally set by employers. Overall, collective bargaining is somewhat ineffective in North Macedonia. On many occasions, the bargaining has been constrained by the indifference of the other party, but also by the unrealistic demands and lack of trust in the negotiating partner(s) (EU/ILO, 2015).

The GCA for the private sector is negotiated and signed by the Association of Trade Unions of Macedonia (SSM) and the Organization of Employers of Macedonia (ORM). The GCA covers all employees in the country, regardless whether or not they are members of trade unions and was most recently renegotiated and signed in May, 2014. Two changes were agreed (published in Official Gazette No. 119/2015 from July 2015 and in Official Gazette No. 150 from August 2016). However, according to the GCA, the agreement expires after two years if the social partners do not both agree to its prolongation 30 days prior to the expiry date. However, the GCA also prescribes an automatic extension of the agreement in cases where it has not been renegotiated within two-year timeframe.

According to the interviews, collective bargaining was frozen in 2017, after an attempt to re-negotiate the branch-level collective agreements between the SSM and ORM. This, as explained by some interviewees, was caused by employers' demands to roll back on workers' rights already agreed in the GCA. Still, some interviewees reported that new negotiations was expected to commence in September 2018. Despite sporadic efforts by trade unions to re-launch the GCA for the public sector, it has not been re-negotiated since 2008, when it expired. .

Article 8 of the Law on MW (Official Gazette No. 11/12) states that collective agreements have to be adjusted to reflect the legislative changes within six months. If they are not, then articles not in line with the law are no longer in force. Although this article is replicated in the amendments to the MW Law from 2017 (Official Gazette No. 132/2017), as outlined above, there has been no renegotiation of the GCA, nor of the branch-level collective agreements. At present, only the MW Law applies.

According to both the Labour Law and collective agreements, wages in the private sector consist of: i) a basic wage, ii) performance-related wages, and iii) wage supplements. The basic wage depends on the complexity of the job, and the GCA sets out nine levels of complexity graded of 1 to 3 (though the law allows for more grades in the branch-level agreements). The basic wage is then calculated by multiplying the job's complexity coefficient with its pay coefficient. The pay coefficient is set in the branch-level collective agreements, and is renegotiated and revaluated once per year. The GCA calculates the pay coefficient based on the costs of living, economic conditions, wage levels in the economy, productivity, profitability, etc. and it is adjusted annually in line with the Consumer Price Index (CPI). In practice the pay coefficient accounting rate tends to be set at the level of the MW prescribed in the Law. Very few branch-level collective agreements have set a higher rate, and this has not changed since the introduction of the MW.

Article 17 of the GCA stipulates that the basic wage of a worker cannot be lower than the MW, as prescribed in law. Meanwhile, the Labour Law states that a workers' wage for full-time work cannot be lower than the MW (article 107, Official Gazette No. 167/2015). This latter definition is not precise as 'full-time work' could be interpreted as meaning the workers' basic wage plus supplements (for instance extra pay for night shifts or overtime work).

There is no database recording the number and content of the branch-level collective agreements. The agreements have to be registered with the Ministry of Labour and Social Policy (MLSP) and are published in the Official Gazette. According to the interviews, the website of

the SSM, and the EU/ILO (2015) analysis, there are, at the time of writing, 15 branch-level collective agreements - albeit two of are not in force. These collective agreements are very similar in content and cover similar or identical issues. The collective agreements only apply to the signatory parties, i.e. non-unionized employees are not included in the collective bargaining; trade unions solely represent employees in the bargaining. Out of these branch-level collective agreements, seven include provisions on the MW, namely:

- The Collective Agreement for the Textile Industry: In 2009, the pay coefficient was increased to 5,500 MKD, and then to 6,859 MKD in 2013, to comply with the newly introduced MW.
- The Collective Agreement for the Leather and Footwear Industry: in 2010 the pay coefficient was increased to 4,800 MKD (from 4,100 MKD) and in 2013, in accordance with the provisions of the MW Law, to 6,859 MKD.
- The Collective Agreement for the Agriculture and Food Processing Industry: In 2011, the pay coefficient was set at 7,350 MKD for Agriculture workers and at 8,600 MKD for the Food Processing industry.
- The Collective Agreement for the Tobacco Industry: The pay coefficient was set at 10,650 MKD in 2014.
- The Collective Agreement for the Energy Sector: The pay coefficient was set at 14,010 MKD in 2014.
- The Collective Agreement for the Healthcare Sector: The pay coefficient was set at 12,654 MKD in 2014.
- The Collective Agreement for Social Welfare Workers: The pay coefficient was negotiated in 2010 at MKD 10,756, but the resultant agreement stipulated that the basic salary cannot be lower than MKD 12,713.¹⁵

No collective agreements have been renegotiated since 2015, albeit all (as outlined above) have been automatically renewed, as they were not re-negotiated within the two-year timeframe. However, all of the collective agreements state that a new pay coefficient should be negotiated every year, which has not happened in four years. It appears collective agreements have lost their importance in providing protection to workers, in relation to the MW and otherwise, and that it is national law that is now the most significant. This runs contrary to the favour laborem principle, i.e. the agreement at enterprise-level should be prioritised (EU/ILO, 2015). Moreover, collective agreements at enterprise-level are not even registered, nor is the procedure regulated, i.e. it is left entirely at the discretion of the signatory parties to define terms.

Since the pay coefficients have not been changed (either in the GCA or in branch-level collective agreements) it is questionable whether the increased MW has been implemented in practice. The interviews suggest that, in practice, many employers simply increased the wages of workers with net wages below 12,000 MKD to the MW level, and of other workers by lower percentages. Consequently, wage inequality within companies decreased and wage structures became more compressed, though the compression has been higher for lower paid workers. We return to these issues in Part II.

There is no database of trade union members, hence it is difficult to calculate the coverage of collective agreements. According to some estimates, around 120,000 workers are members of trade unions, about one fifth of the total number of wage employees in the country (using LFS data for 2017).

¹⁵ This information has to be treated with some caution as it is produced solely based on Internet search and the website of the SSM. As previously stated, there is no complete database of the collective agreements and all amendments to the agreements provided by the authorities. Data are mainly derived from: <http://www.ssm.org.mk/mk/granski-kolektivni-dogovori>.

In summary, collective bargaining in the country is weak and subordinate to labour legislation. Moreover, there are inconsistencies between the MW legislation and collective agreements. At present, collective bargaining and minimum wage legislation are not complementary policy tools, and still remain uncoordinated and somewhat conflicting. There are several elements of the GCA and branch-level collective agreements that need to be re-considered, such as pay coefficients, and, in general, collective bargaining and tripartite dialogue needs to be enhanced in North Macedonia.

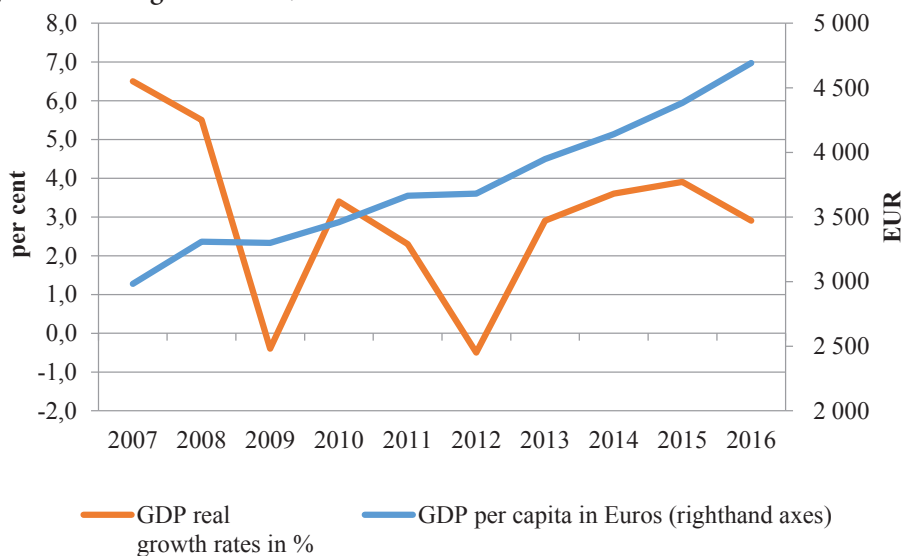
2. THE IMPACT OF THE MINIMUM WAGE: THE STATISTICAL ANALYSIS

2.1. General data

This section presents an analysis of the main economic indicators related to MW policy. These indicators can be viewed at outcome level, i.e. the effect of a change in the MW (such as price levels), and factors such as an increase in productivity can provide arguments for pitching the MW at the appropriate level. However, the aim of this paper is not to explore causality, but rather to discuss potential links and correlations between economic variables and an increase in the MW. ILO (2016) argues that the determination of MW should be based on statistical evidence. In particular, statistical indicators should be used to inform the social partners and government about the range of values for which the benefits of the MW exceed the costs, i.e. and this ought to form a starting point in the negotiations.

As **Figure 1** shows, there has been continuous growth in living standards in North Macedonia, as measured by the GDP per capita. As of 2016, GDP per capita was EUR 4,691, up from about EUR 3,000 a decade previously.¹⁶ Real GDP growth rates peaked in 2007 and 2008 (6.5 per cent and 5.5 per cent, respectively), and by lower rates since, with negative growth rates in 2009 and 2012. 2009 was the year when the government reformed wage policy and 2012 the year when the statutory MW was introduced. In 2017 GDP growth stagnated and this trend continued in first quarter of 2018. However, the second quarter of 2018 showed a real GDP growth of 3.1 per cent. Taking into account these developments, one cannot conclusively draw a link between the MW and growth of the economy or of living standards.

Figure 1 – GDP growth rates, 2007-2016

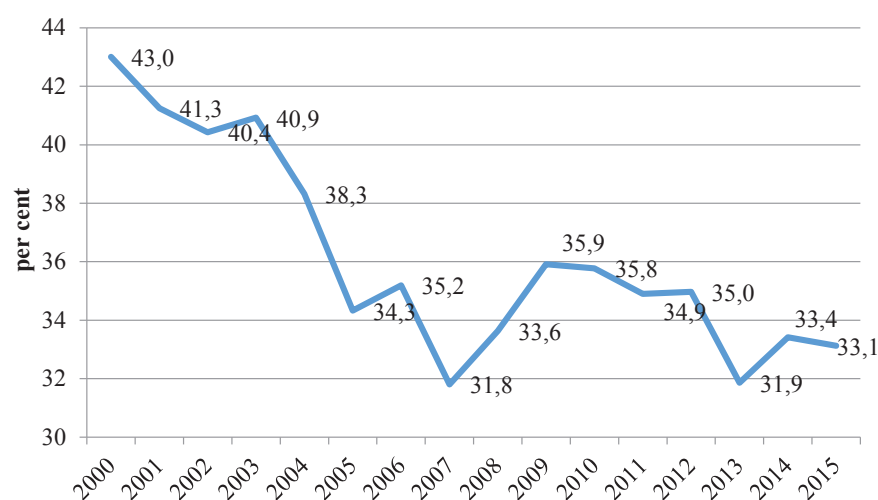


Source: State Statistical Office

¹⁶ Latest available annual GDP data.

The share of labour costs of GDP in North Macedonia has been on a declining trend, from 43 per cent in 2000 to 33 per cent in 2016 (see **Figure 2**). For comparative purposes, the average labour share in the EU-28 countries was 37.3 per cent of GDP in 2017.¹⁷ However, a non-negligible increase can be observed in 2009, potentially related to the wage reforms of that year, which reduced labour taxes, mainly through the reduction of social security contributions. As Mojsoska-Blazevski and Kurtisi (2012) argue, the benefits of the reduced labour taxation were split between workers and employers, and the wage share of GDP continued declining afterwards.

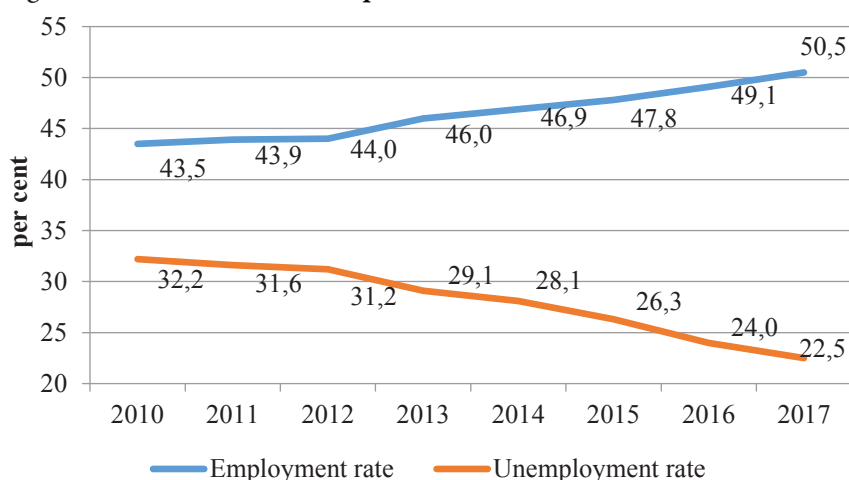
Figure 2 – The share of labour cost of GDP, 2000-2015



Source: State Statistical Office

The main labour market indicators in the country have been showing continuous improvement, though at a moderate rate (**Figure 3**). About half of the working-age population was employed in 2017, and 22.5 per cent of the active population was without a job. Importantly both figures showed a significant improvement since 2010. However, there does not appear to be any relationship between GDP growth rates and employment growth (a correlation coefficient of -0.15 for the period 2001-2017)..

Figure 3 - Labour market developments, 2010-2017



Source: Eurostat database, at: <https://ec.europa.eu/eurostat/data/database>.

¹⁷ [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Income_components_of_GDP_\(per_cent25\)_in_2017_and_1997.png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Income_components_of_GDP_(per_cent25)_in_2017_and_1997.png)

2.2. Survey data

We now turn to quantitative micro-data analysis. We use two cross sections of data from the LFS: the first quarter of 2017 and the first quarter of 2018. In a few designated places, we make use of data from 2011 and 2012 (the period when the MW was first introduced), for comparative purposes. The LFS is a quarterly rotating panel survey. It collects detailed data on the work and unemployment experiences of about 12,000 working-age (15-79) individuals per quarter, and is nationally representative. The two data sets we use (2017 and 2018) cover the period just before and just after the latest amendments to the MW Law in September 2017, when the MW increase became effective. The rotation principle in the LFS methodology is such that households are re-interviewed every second quarter.

We are presently constrained by not having more up-to-date data: the first quarter of 2018 is presently the only period available of the 2018 LFS, while the usage of the fourth quarter of 2017 may not fully capture the effects of latest minimum wage increase, due to lagging compliance effects. Although the data used in the study was specifically from the first quarters of 2017 and of 2018 respectively, for brevity reasons, we refer to this quarterly data simply as data for 2017 and 2018. Quarterly data allows us to capture the effects of the MW increase and to provide a meaningful comparative analysis (quarter-on-quarter), using the sample-weights provided by the State Statistical Office.

It is important to note that the key variable in our analysis is the self-reported wage. In the LFS, this question is set in the following manner: “How much was your last net wage or earning for your main job?”, hence requesting the respondent to specify the exact wage. However, respondents who do not wish to report the exact wage are given the option to provide an interval. The following intervals were available: less than 5,000 MKD; 5,001-8,000 MKD; 8,001-10,000 MKD; 10,001-12,000 MKD; 12,001-16,000 MKD; 16,001-20,000 MKD; 20,001-25,000 MKD; 25,001-30,000 MKD; 30,001-40,000 MKD; over 40,001 MKD.

As evident from the list above, ranges are narrower in the lower part of the wage distribution. For workers who reported wage ranges, we set their wage using the median of the respective range, and believe that this approximation does not generate considerable bias. In September 2017, the minimum wage increased from 10,080 MKD (9,590 MKD for textile, leather and shoes) to 12,000 MKD. Hence, it is likely, though not certain that persons who got an increase would have self-reported as being in the 8,001-10,000 MKD range before the new MW was introduced and 10,001-12,000 MKD range thereafter. This would enable a fairly stable space for investigating the effects of the latest increase in the minimum wage.

Administrative data on wages collected by the SSO, through a survey of companies provides more accurate and reliable information on wages. However, the main drawback is that the data is not accompanied with any personal information on wage recipients such as age, gender, etc., which limits its analytical value. In addition to this, the SSO methodology changed in 2018: instead of collecting the data through an establishment survey, the SSO started using data from the Public Revenue Office (wage data submitted by firms prior to paying personal income tax and social contributions). Hence, we believe that the best option is to use the LFS data.

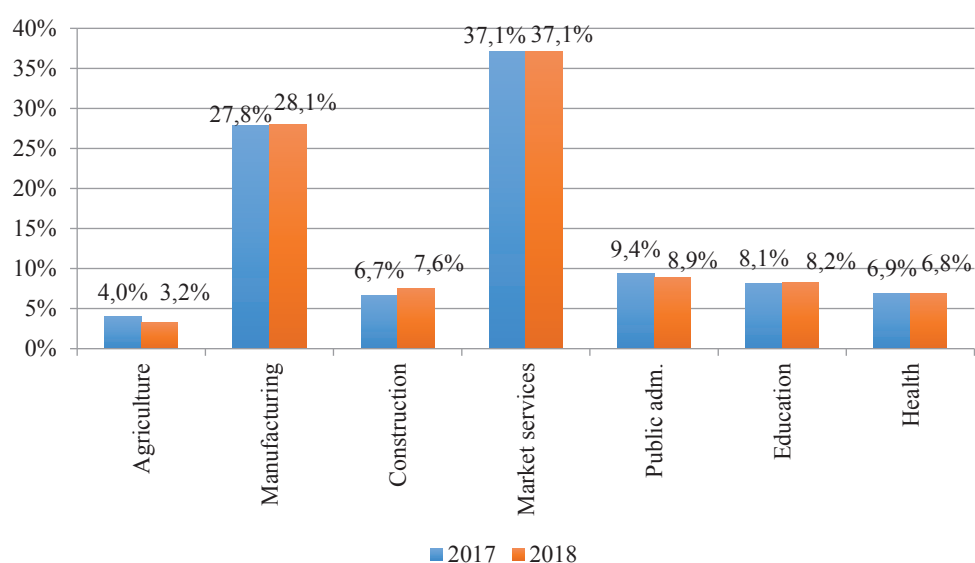
For the analysis, we mainly rely on wage earners, i.e. we do not include unemployed, inactive, self-employed, employers and unpaid family workers. This provides a sample of 8,061 individuals, or if we add unemployed, increases the sample size to 10,606 individuals.

2.3. The employment dynamics

This section presents the employment trends and employment structure, with a focus on gender differences. The analysis compares the period before the MW increase and the period after.

Figure 4 shows that majority of the wage employees (37 per cent) work in market services, a proportion which did not change in two years. A large share of total wage employment is also found in manufacturing (around 28 per cent). Manufacturing is of specific interest in this study given that prior to the 2017 increase in the MW, three economic branches classified under manufacturing (leather, textiles and apparel) were subject to a lower statutory MW, as explained in Section 2. The share of these sectors in total wage employment in both years is 8 per cent.¹⁸

Figure 4 – Structure of employment by sector



Source: Authors' calculations based on LFS microdata.

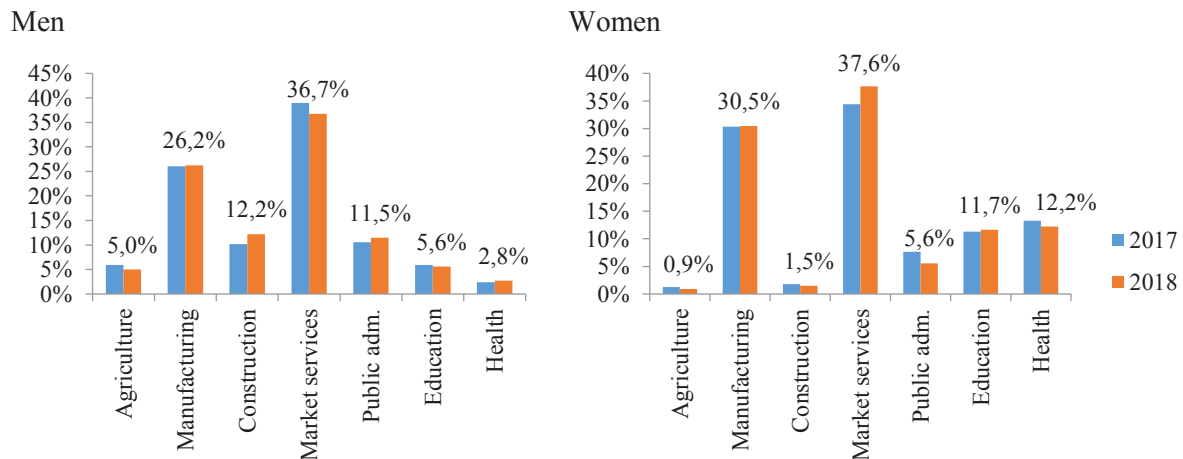
Note: Market services include: trade, transportation, hotels and restaurants, finance, IT, real estate.

The structure of employment is similar for both sexes (**Figure 5**), though with some important differences. In particular, while market services dominate employment for both women and men, a higher share of men work in construction, public administration and agriculture. Women, on the other hand, are more likely to work in health, education and manufacturing.

A large part of female wage employment (15.3 per cent in 2018) is found in the textile and leather industries, i.e. two out of three sectors which had lower MW prior to its equalization in 2017. On the other hand, only 2.6 per cent of male employees worked in these three sectors in 2018. Following the introduction of the new MW in 2017, the proportion of male employment in the textile and leather industry (in total wage employment) increased by 0.3 percentage points, whereas that of women decreased by 0.8 percentage points – statistically insignificant changes.

¹⁸ Administrative data on employment in industry show a trend of declining employment in apparel and leather industry and increasing employment in textiles. However, these trends were present even before the MW increase and cannot be directly related to the change of the MW.

Figure 5 – Structure of employment by sector and gender, 2017 and 2018



Source: Authors' calculations based on LFS.

Note: Market services include: trade, transportation, hotels and restaurants, finance, IT, real estate.

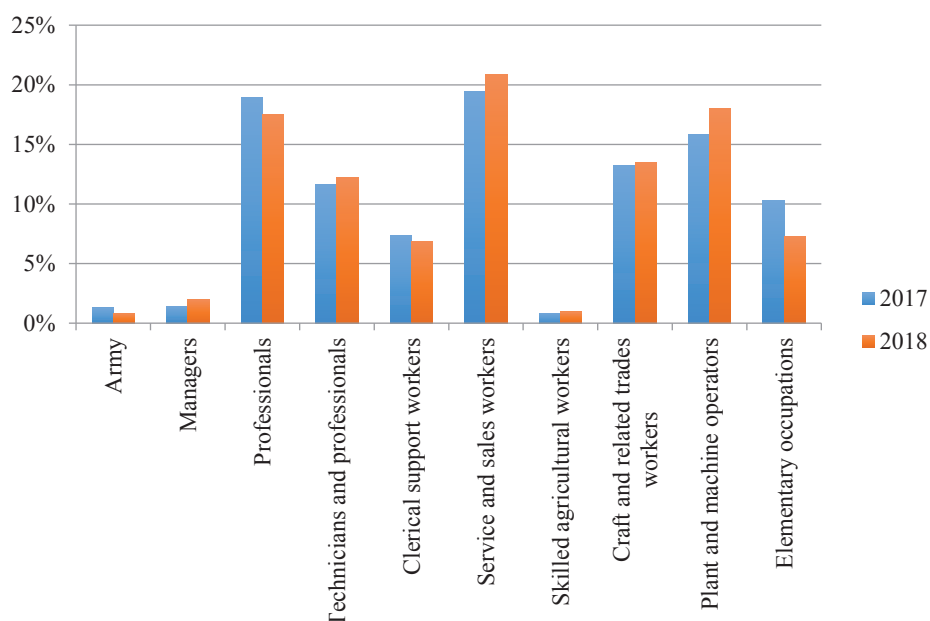
The formality of employees is also in the interest of this study, given the high rates of informality in the country (18 per cent of the overall employment in 2017), but also because of the two potential effects it has on the introduction or increase of the MW. Firstly, if the MW significantly increases labour costs, then one can expect a certain shift from formal to informal employment (to avoid the taxes and contributions). Nataraj et al. (2014) found that while a high MW does not necessarily reduce employment, it may, in developing countries, push some formal workers into informality. Secondly, an increase in the MW, which, by definition, affects only formal workers may also trigger an increase of the wages of informal workers, the so-called lighthouse effect. Some studies find that minimum wage floors are binding for the informal sector (Cunningham, 2007; Dinkelman and Panchhod, 2010). The logic is that as the MW affects the supply of labour, and is perceived as a “fair” wage in the economy, employers need to respect the minimum wage in order to attract quality workers and avoid a large staff turnover.

The LFS data reveals that informality among wage employees decreased from 4.6 per cent in 2017 to 3.2 per cent in 2018, these changes being statistically significant. It ought to be borne in mind that these figures do not include unpaid family workers, so in reality informal employment is higher. Aside from unpaid family work, men are more likely to work informally, though for both sexes we observe a decreasing (statistically significant) informality. The proportion of informal workers (workers without a written contract, irrespective of the formality of the enterprise) among men declined from 6.7 per cent in 2017 to 4.9 per cent in 2018, and for women from 1.7 per cent to 1.1 per cent. The declining informality runs contrary to the initial expectations or may signal that the increased MW was not a large extra burden for employers, and was therefore pitched at a good level. However, the present study does not test the causality of this relationship and many other factors may have contributed to the declining informality among wage employees (for instance, more intensive labour inspections, etc.). We test the existence of the lighthouse effect latter on in this study.

One fifth of wage employment in the country consists of service and sales workers (**Figure 6**). A relatively high share of workers are employed as professionals (with some decline between 2017 and 2018) and as plant and machine operators (18 per cent in 2018). Within occupations, it can be expected that workers in elementary occupations are most likely to be receiving a MW, i.e. that the increased MW is binding for this category of workers. Data indeed shows that the

share of workers employed in elementary occupations declined between 2017 and 2018, from 10.3 per cent to 7.3 per cent, which may suggest some job losses after the increase of the MW, but may also be driven by other factors (for instance, changes in the structure of the economy, etc.).

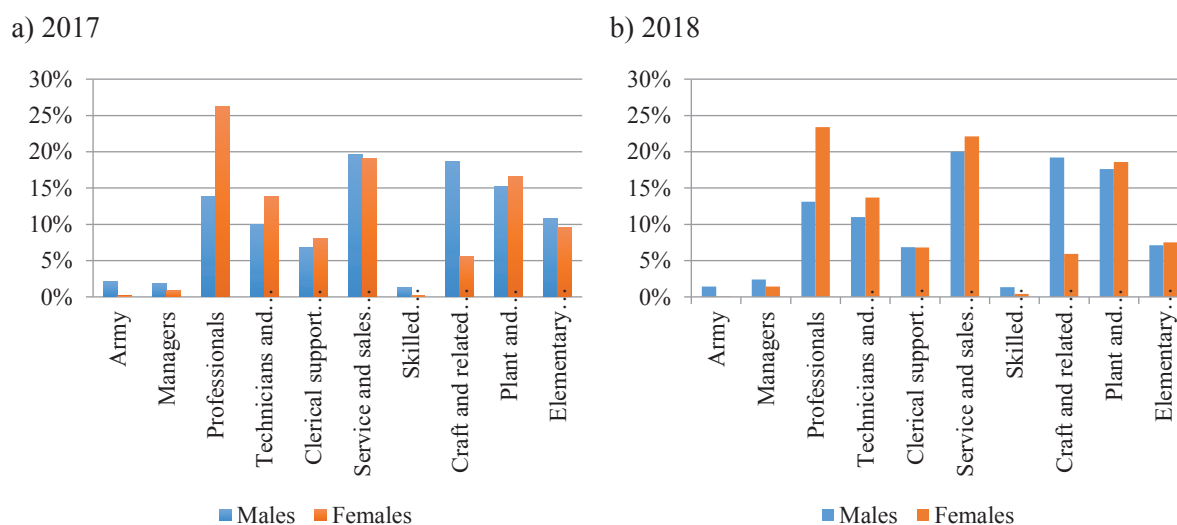
Figure 6 - Structure of employment by occupation



Source: Authors' calculations based on LFS microdata.

The structure of employment by sex shows degrees of occupational segregation between women and men (Figure 7). While women are more likely to be employed as professionals and technicians, a much higher proportion of men work as crafts and related trades' workers. For both sexes, there has been a reduction in the number of workers employed in the elementary occupations between 2016 and 2018, and these declines are statistically significant. This finding is in line with the changing structure of the economy, and the decreased demand for workers with elementary occupations.

Figure 7 – Occupational structure of employment by sex



Source: Authors' calculations based on LFS microdata.

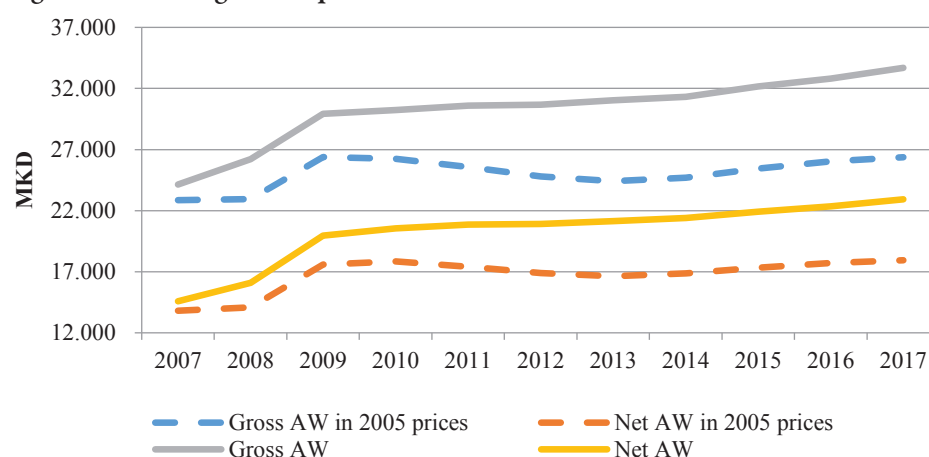
Increased labour costs may lead employers to attempt to mitigate the increased cost of workers by reducing their hours of work. And the LFS data does indeed show that the average weekly hours of waged employees in North Macedonia declined from 41.9 hours to 41.6 hours after the MW was increased in 2017 (the Labour Law sets the common weekly work hours at 40 hours). Although this decline is small, it is statistically significant.¹⁹ Indeed, according to reports in the press at the time, some employers tried to mitigate the increased costs by reducing the reported hours, but not necessarily the actual hours of their employees (when presenting their wage and tax reports of the companies to the Public Revenue Office).²⁰ However, in the interviews, SLI representatives made clear that no major violations of the Law on MW were found during their regular company visits.²¹

2.4. Wage dynamics

2.4.1. General wage trends

Figure 8 depicts the changes of the monthly average wage (AW), in gross and net terms. In nominal terms, both gross and net wage show a near-continuous upward slant. The downward drift in 2009 was almost certainly due to the wage reforms of that year. In essence, wages first declined and then began to rise. By 2017, the gross average wage was 23.6 per cent higher than the 2005-level (in real terms), whereas the respective increase of the average net wage was 42.4 per cent. While data on average wages does give some indication of the purchasing power or living standard of citizens, it does not really tell us much about those at the lower end of the wage scale are doing, i.e. the working poor. The wage distribution, and whether and how it changed after the introduction or MW increase reveals a lot more. We return to these issues below.

Figure 8 – Real wage developments, 2007-2017



Source: Authors' calculations based on data from State Statistical Office.

19 The slight decline has been also accompanied by a reduction of the standard deviation of the variable, from 5.5 to 4.6 hours, suggesting a slight compression of the hours distribution around the new lower mean of 41.6 hours. This is further corroborated with the data showing that the share of minimum wage workers who worked less than the standard 40-hour week also reduced – see section 7. Therefore, any evidence about reducing the contracted hours of work (and not the actual ones) remains only anecdotal.

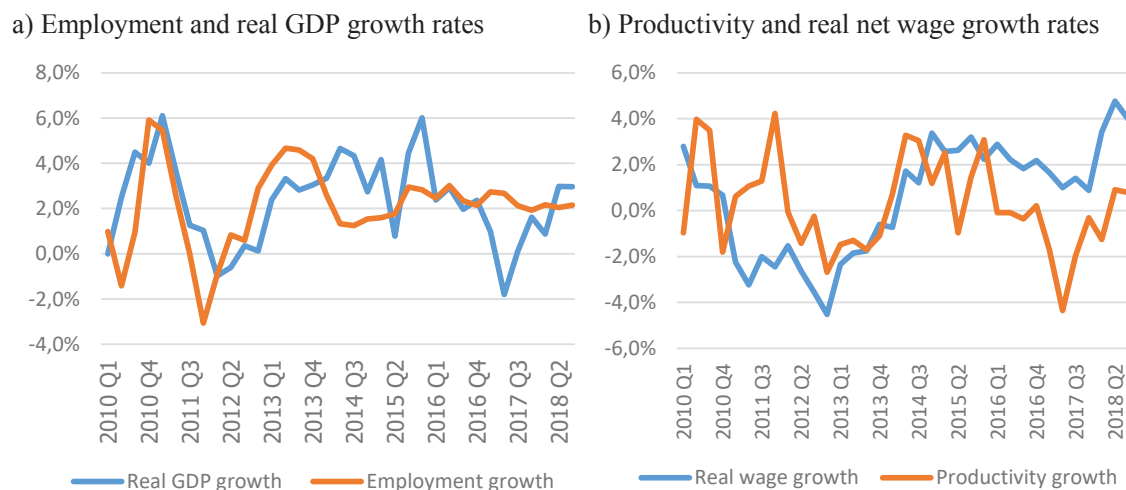
20 Petreski and Kochovska (2018) document some misdemeanor of the employers regarding this issue.

21 Within the regular audits the SLI focuses primarily on the formality of the work contracts and the payment of wages (basic wage and wage supplements). Besides the planned audits, the SLI can also act upon complaints received on their hotline. The SLI representative stated that there have been no complaints by workers on the hotline related to the violation of the MW Law.

Figure 9 attempts to compare GDP and employment growth with productivity and wages.²² The importance of productivity growth in mitigating wage inequality is highlighted in ILO (2016), suggesting that productivity growth can simultaneously support a higher average wage and a reduction in wage inequality. The left-hand panel (panel a) corroborates our discussion above that elasticity of employment to GDP seems small. Changes in GDP (either upward or downward) are not always reflected in employment figures. While in 2012, GDP declined by 0.3 per cent (in real terms), employment increased by 0.9 per cent. In 2013, GDP grew by 2.9 per cent, whereas employment grew by 4.3 per cent. GDP increased negligibly in 2017 (0.2 per cent) due to the political crisis in the country, while employment continued its steady increase (2.4 per cent).

In the right-hand panel (panel b) we observe that labour productivity declined around the recession of 2012 due to declining GDP and increasing employment. Then, again, productivity growth slowed down from 2014, as low GDP growth was still accompanied by slightly higher growth in employment. In 2017, productivity growth was negative (-2.1 per cent) along with a sharp fall in GDP growth. Lastly, wages have been on an upward curve since 2014, in the wake of declining productivity. In 2017, productivity declined by 2.1 per cent, whereas the average real net wages increased by 1.2 per cent. Due to the limited scope of analysis, the study could not identify the impacts of the increase of the MW on productivity.

Figure 9 – Employment, productivity and labour costs, 2010-2018



Source: Authors' calculations based on data from State Statistical Office.

In summary, one cannot draw a clear relationship between the general economic trends and the introduction (or subsequent increases in) of the MW. Indeed, a preliminary overview of the basic indicators above suggests that the decision to increase the MW in September 2017 was mainly a political decision rather than a decision made on sound economic grounds.

²² Labour productivity is defined as the output per worker, i.e. by dividing the GDP with the number of employed persons.

2.4.2. Wage trends and the effectiveness of the minimum wage

Using the LFS data this section presents the wage distributions and trends pre- and post-increase of the MW in 2017, with some analysis also of the years of 2011 and 2012, i.e. just prior to and just after the introduction of the statutory MW in the country for the first time (January 2012). Given that one of the explicit intentions of the MW policy was to reduce wage inequality, the analysis presents the developments in the wage distribution and assesses the rate of compliance. Some important ratios are also examined and presented, in particular as a means of comparison with EU countries.

As seen in **Table 1**, the average net monthly wage in 2017 (based on LFS data) was 17,661 MKD and it increased by 6.3 per cent to 18,783 MKD in 2018. The median monthly wage increased by 20 per cent, indicating clearly that the increase in wages has been more intense in the lower part of the wage distribution (i.e. for the workers earning below the median). These increases in both the mean and the median wage are statistically significant. One note of caution: the data is not calculated pro-rata; and consequently, the rise in the monthly wage could also have resulted from increases in hours worked. For this reason, we focus on the bottom part of the Table, as it is that considers the hourly wages. The average hourly wage increased by 6.4 per cent, from 97.8 MKD to 104.1 MKD between 2017 and 2018. However, there was no change in the median hourly wage, despite the large increase in the monthly median wage. This would suggest that the increase in the monthly median wage was achieved by increased hours of work for those earning below the median wage rather than by a wage increases per se. Indeed, the share of MW workers who worked less than the standard 40-hour week decreased significantly from 26.6 per cent in 2017 to 10.2 per cent in 2018. Thus, while wage increases may be related to the MW increase, other factors may have also affected the average wage in the economy. For instance, according to the interviews, part of the average wage increase may be attributed to the unmet demand for workers (especially in the textile industry).

The gender pay-gap, based on the LFS data, was 3 per cent in 2017, which then increased to 5 per cent in 2018.²³ While this is comparatively low by regional and international standards, in relation to ILO Convention No.100, ratified by North Macedonia in 1991, it is a concern that it has grown by a statistically significant amount in one year. The gender pay-gap is significantly higher in the textile and leather industry, sectors where women are over-represented relative to men. In particular, in 2017 women in the textile and leather industry were receiving 16 per cent lower wages than men. And the gap declined only slightly after the MW increase, to 14.4 per cent. The section 4.3 below provides a more detailed gender pay-gap analysis.

23 The gap is calculated as the difference between men's and women's average wage, as a percentage of men's wage.

Table 1 – Basic wage data and Kaitz ratio

	2017	2018
Monthly net wage		
Mean	17,661	18,783
Median	15,000	18,000
MW	10,080*	12,000
Kaitz index (using mean)	57	64
Kaitz index (using median)	67	67
Kaitz index (using administrative mean wage)	44.0	50.8
Hours worked		
Mean	41.9	41.6
Median	40	40
Hourly net wage		
Mean	97.8	104.1
Median	85.2	85.2
MW	57.3	68.2
Kaitz index (using mean)	59	65
Kaitz index (using median)	67	80

Source: Authors' calculations based on LFS microdata and administrative data for wages.

** We present only the main MW level, though one has to note that in 2017 there were two MW levels, one lower for the low-paid sectors.*

Table 1 presents the Kaitz ratios for a range of scenarios. The Kaitz index is commonly used as a statistical tool to evaluate the level of the MW relative to the national economic and social circumstances. This index is simply a ratio of MW to median wage (and may also include mean wage), but is often used as a proxy indicator for other economic trends. The debate is still open in terms of which Kaitz ratio is most appropriate to amplifying the social and economic benefits of the MW while limiting the possible negative effects on employment or prices (ILO, 2016). In North Macedonia, the Kaitz ratio using the mean hourly wage²⁴ was 59 per cent in 2017 and increased to 65 per cent in 2018, showing unequivocally that the relative position of the MW earners to the average worker improved. This is unsurprising given that the new MW is 19 per cent higher than the previous MW. Moreover, the lower level of MW that applied to a few sectors of the economy, has increased by even more. When the Kaitz ratio is calculated using the administrative data for wages, the ratio is lower, but still shows an increasing trend (from 44 per cent in 2017 to about 51 per cent in 2018).²⁵

When the Kaitz ratio is calculated using the median wage, there is a large increase in the index, from 67 per cent in 2017 to 80 per cent in 2018. This indicates that the relative position of the MW earners to the “median” worker significantly improved. One has to be careful in international comparisons of the Kaitz ratios, as data sources may be different. Some countries may have multiple rates of MW across different sectors or regions, and there may be methodological differences in how it is calculated. Nonetheless, cross-country comparisons can give some indication of the MW is pitched at an optimal level. The Kaitz ratios are the lowest in Estonia and Czech Republic (at 37 and 38 per cent), while they run to over 60 per cent in

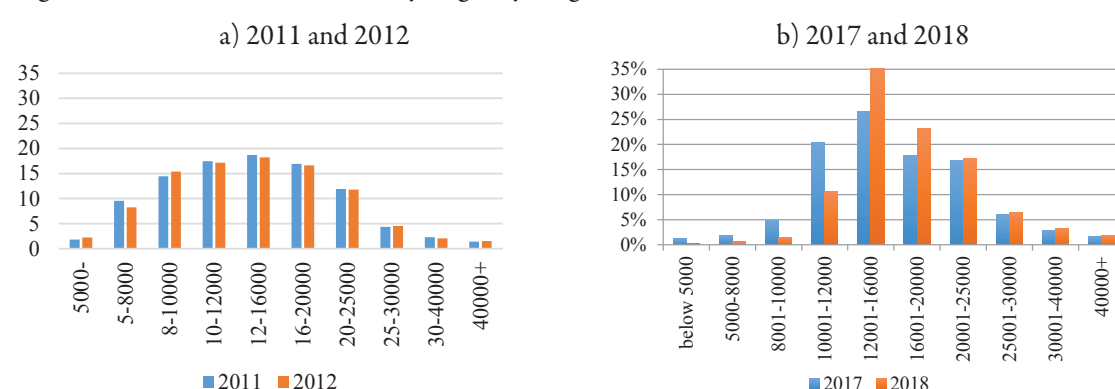
²⁴ Since the monthly wages are not adjusted for a full-time equivalent, we comment only the Kaitz ratio calculated based on the hourly wages.

²⁵ Administrative data on wages published by the State Statistical Office show higher average wage than the LFS data.

Hungary, Portugal and France. Still, the Kaitz ratio in most EU countries is between 45 and 60 per cent, and the weighted average Kaitz ratio for the EU is 50 per cent. Thus, a Kaitz ratio of 65 per cent would suggest that the MW in North Macedonia is set at a relatively high level compared to EU countries.

As found elsewhere (see for instance, Neal and Rosen, 2000), the wage distribution in North Macedonia is skewed to the right (with a long right tail, meaning that top earners have a disproportionally large share in the total wages), and fairly steep descent on the left side (see **Figure 10**). Such wage distributions imply two things: 1) the mean wage exceeds the median wage (Belser and Sobeck, 2012), and ii) a large proportion of workers in the country earn low wages. It is clear that the 2017 increase in the MW initiated larger changes in the wage distribution than the introduction of the MW in 2012. It is also evident that between 2011 and 2018, the share of workers receiving the average wage (and close to the average wage) increased considerably.

Figure 10 – Distribution of monthly wages by range



Source: Authors' calculations based on LFS microdata.

Note: Data are not calculated in full-time equivalent.

Figure 9-b) shows that the increase of the MW most affected wage distribution for workers earning close to the average wage and those with lower wages. In particular, the share of workers receiving wages below the new MW declined substantially, whereas there has also been a large increase in the share of workers earning between 12,000 MKD and 20,000 MKD. However, some small movements have been seen at the higher wage levels. Indeed, some studies (for instance Belser and Sobeck, 2012) show that the introduction of a MW causes some changes in the internal distribution of wages within companies. This can also be expected in North Macedonia, as, at enterprise level, the MW increase was mainly implemented by increasing the wages of low-paid workers disproportionally relative to the wages of the other workers.

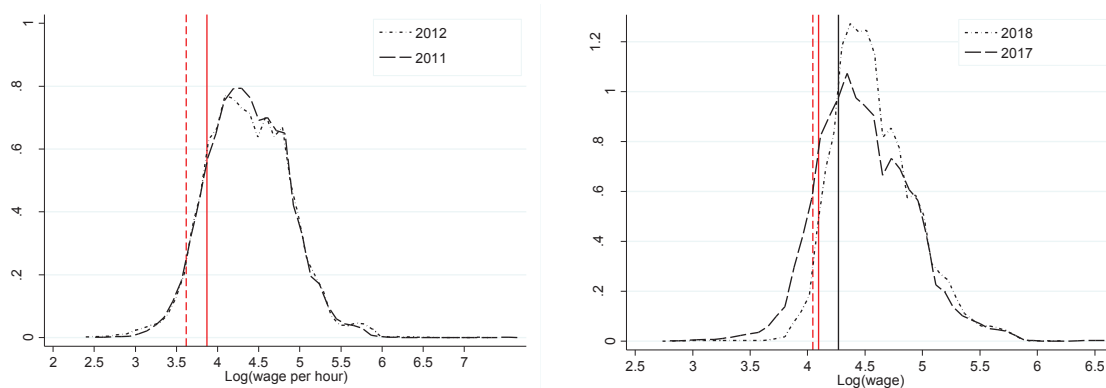
Belser and Sobeck (2012) suggest that a fair minimum wage, defined as one that would ensure appropriate remuneration and protection for workers, while not harming the economy should be set “somewhere on the left-hand side of the peak of the distribution”. When looking at the overall wage distribution in North Macedonia (Figure 9-b), the minimum wage should accordingly be set somewhere between 10,000 and 12,000 MKD.

We further inspect the effect of changes in the MW by estimating the non-parametric Kernel densities of hourly wages and testing for differences between the two time periods using Kolmogorov-Smirnov test of the equality of distributions. To secure initial insights for the Two Sector Model (Welch, 1976) or the “lighthouse effect”²⁶ (Lemos, 2009), Kernel densities for the formal-informal jobs dichotomy are shown for the two periods.

26 The Two Sector Model predicts that introduction of a minimum wage in one sector (e.g. the formal sector) unambiguously worsens the outcomes in other sector (e.g. the informal sector), implying a negative spillover effect. Conversely, the ‘lighthouse effect’ predicts a positive spillover effect; e.g. increasing wages in the formal sector will also drag up wages in the informal sector, to compensate the rising benefits of formalization.

Figure 11 presents the wage distribution at two points in time: when the MW was introduced (January 2012, left graph), and when it was increased, namely September 2017 (right graph). The wage distribution in 2012 is not statistically different to that of 2011 (the Combined Kolmogorov-Smirnov test for the equality of the distributions is provided beneath each graph). However, between 2011 and 2018 two main changes in the distribution are evident: i) the right-hand tail in 2018 is much shorter than in 2011/12 (which should imply reduced wage inequality) and ii) a larger share of workers in 2017/18 were receiving wages close to the average wage.

Figure 11 – Kernel density distribution pre- versus post-increase of the minimum wage



Combined Kolmogorov-Smirnov test [p-value]: 0.179

*red dashed line: MW in leather, footwear and textile branches in 2012; red solid line: national MW line 2012.

Combined Kolmogorov-Smirnov test [p-value]: 0.000

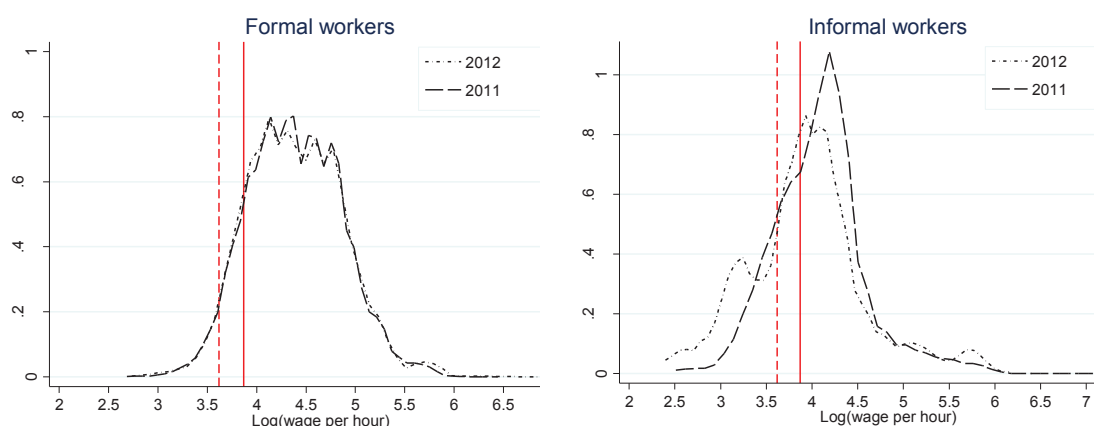
*red dashed line: MW in leather, footwear and textile branches in 2017; red solid line: national MW line 2017; black solid line: national MW line 2018.

Source: Authors' estimates based on LFS microdata.

Notable and statistically significant differences are visible in the wage distribution following the 2017 increase in the MW. The spike in the left part of the distribution has visibly moved rightward which can be directly related to the increase in the MW from 10,080 MKD and 9,590 MKD (for particular sectors, as discussed above) to the new unified level of 12,000 MKD. Secondly, the left part of the 2018 distribution is slightly more vertical (i.e. higher proportion of workers are earning the average wage or an amount close to it), reflecting the unification of the MW across sectors, but also possibly the tendency toward greater compliance. In addition, the bunching of wages at the MW (the highest point of the 2018 distribution) is evident. More workers now are concentrated in and around the MW, suggesting an 'equalization' phenomenon. In particular, the wages of workers earning below the median wage somewhat levelled around the new MW, whereas no significant wage increases occurred at higher wage levels. Finally, Figure 11 also shows that full compliance with the increased MW has not been secured, as there are still workers earning below the hourly MW.

The next figures present the wage distributions by formality. The general trends outlined in **Figure 11** apply to formal workers for the 2012 data set as well (**Figure 12**, left). However, interesting developments occurred in the informal sector (**Figure 12**, right). The wage curve experienced left-ward movement, suggesting that wages in the informal sector, on average, declined after the introduction of the MW in 2012. It is easily visible that after the MW was introduced, informal wages bunched around the level of the MW.

Figure 12 – Kernel density distribution pre- versus post-increase of the minimum wage, by formality, 2011-12



Combined Kolmogorov-Smirnov test [*p-value*]: 0.344

*red dashed line: MW in leather, footwear and textile branches in 2012; red solid line: national MW line 2012.

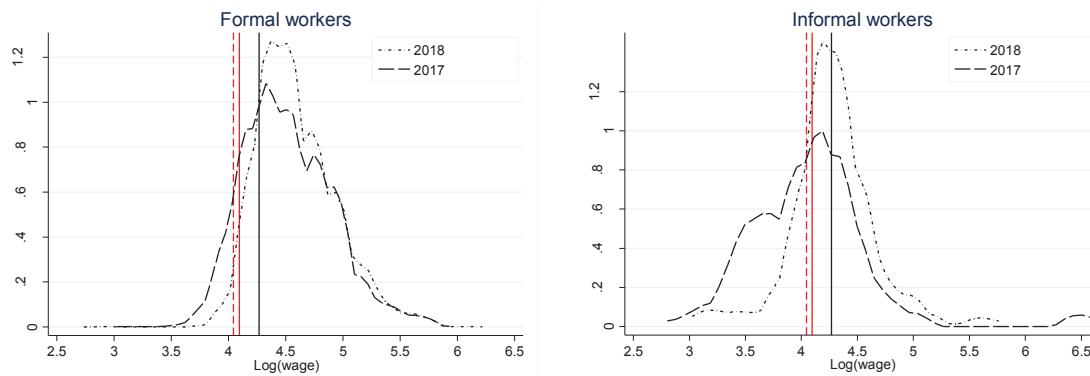
Combined Kolmogorov-Smirnov test [*p-value*]: 0.002

*red dashed line: MW in leather, footwear and textile branches in 2012; red solid line: national MW line 2012.

Source: Authors' estimates based on LFS.

Rightward moves in the wage distributions are observed for both formal and informal workers following the latest increase in the MW (**Figure 13**). The general trends observed in **Figure 11** again apply. Interestingly, the data suggests that the effect of the MW increase on informal workers is substantial (**Figure 13**, right): in particular the distribution, in the left part of the graph, moves further and becomes more vertical after the MW increase. In addition, wage increases for informal workers are evident in the right part of the wage distribution. Both facts may provide preliminary support for the existence of a lighthouse effect in North Macedonia, although this by no means suggests any causality from the MW increase to the formality of the job, especially if other factors (e.g. increased labour inspections) were present over the same period.

Figure 13 – Kernel density distribution pre- versus post-increase of the minimum wage, by formality, 2017-18



Combined Kolmogorov-Smirnov test [p-value]: 0.000

* red dashed line: MW in leather, footwear and textile branches in 2017; red solid line: national MW line 2017; black solid line: national MW line 2018.

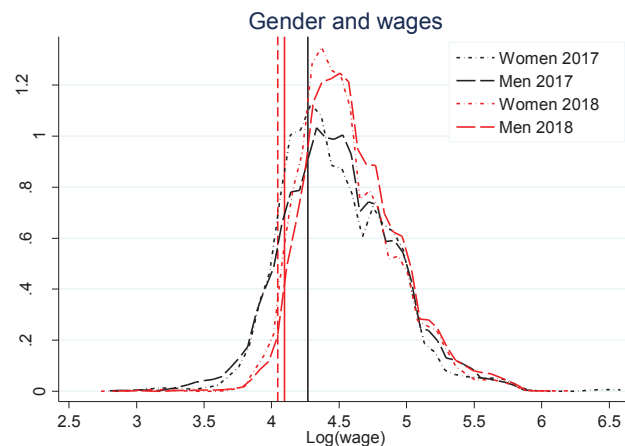
Source: Authors' estimates based on LFS.

Combined Kolmogorov-Smirnov test [p-value]: 0.001

* red dashed line: MW in leather, footwear and textile branches in 2017; red solid line: national MW line 2017; black solid line: national MW line 2018.

Finally, **Figure 14** presents the wage distributions over time, and disaggregated by sex (only the latest increase is examined). The 2018 lines (red) are positioned rightward of the 2017 lines (black), suggesting that the MW might have contributed to higher wages in the left part of the distributions. The spikes are higher for women, suggesting that in both years they were more influenced by the increase in the MW than men.

Figure 14 – Kernel density distribution pre- versus post-increase of the minimum wage, by gender and year



Combined Kolmogorov-Smirnov test 2017 [p-value]: 0.001

Combined Kolmogorov-Smirnov test 2018 [p-value]: 0.001

* red dashed line: MW in leather, footwear and textile branches in 2017; red solid line: national MW line 2017; black solid line: national MW line 2018.

Source: Authors' estimates based on LFS.

2.4.3. Low wage incidence and inequalities

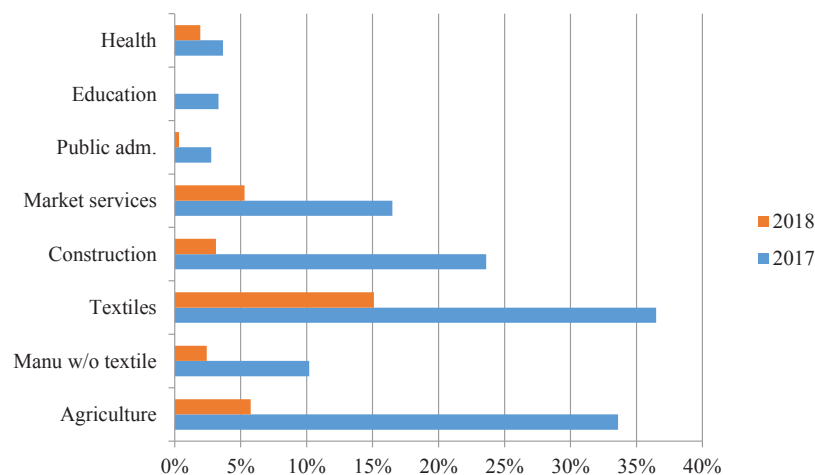
Prior to the MW increase, there were 71,079 employees (14.7 per cent of total wage employees) earning less than 2/3 of the median wage, considered critical workers into the low wage category. As expected, this number significantly declined after the MW increase, falling to 22,908 workers (4.3 per cent of the total wage employees), a dramatic drop by any standards.

The incidence of low wages is much lower in the formal economy, where 4.6 per cent of workers were earning less than 2/3 of the median prior to the MW increase. This declined to 3.2 per cent after the MW increase, a wholly smaller reduction than the overall figure listed above, but statistically significant nonetheless. Mojsoska-Blazevski (2011) finds that, in 2007, 18.5 per cent of the wage employees were earning less than 2/3 of the median, whereas Mojsoska-Blazevski and Kurtisi (2012) find that, after the introduction of the MW in 2012, the share of low-wage earners had declined to 11 per cent. However as explained above, the median hourly wage did not change between 2017 and 2018, suggesting that the new MW sparked a move in wages in the left part of the wage distribution, while the middle (and upper) part remained intact.

In 2017, equal shares of women's and men's employment were falling in the category of low-wages (considering both formal and informal workers). However, after the MW increase, the incidence of low wages for women declined by less and was 5 per cent in 2018, while 3.7 per cent of men earned low wages (the declines being statistically significant for both sexes). This is contrary to expectations, as women are generally overrepresented in sectors with low wages (e.g. the textile and leather industry). When we focus on formal workers only, the data shows that a higher share of men were likely to receive low wages (6.7 per cent relative to 1.7 per cent of women), prior to the MW increase. The low-wage incidence among formal workers declined for both sexes after the increase of the MW, to about 5 per cent for men and 1 per cent for women (the differences being statistically significant).

Figure 15 shows the low-wage incidence by sectors before and after the increase of the MW. Clearly, there is a declining proportion of workers earning low wages in all sectors of the economy and a complete eradication of low-wages in some sectors (mainly education and public administration). However, the data also shows that a relatively large share of workers remaining in the sectors which prior to September 2017 received a lower MW, still earning low wages (15 per cent increase in wages after the introduction of the MW compared to 36.5 per cent prior to it). For comparative purposes, the decline of low wage incidence in agriculture (a sector with high incidence of low-wage prior to the MW increase) has been much more pronounced than in the textile sector.

Figure 15 – Low-wage incidence by sector



Source: Authors' calculations based on LFS microdata.

Finally, we assess the developments in wage inequality after the MW increase through decile ratios. Table 2 presents the shares of median wage to first-decile wage (D5/D1); of ninth-decile to median (D9/D5) and to first-decile wage (D9/D1). The ratios reveal the comparative wage in the observed deciles; e.g. the first number of 3.01 suggests that the average wage for the richest decile was, in 2011, three times higher than the average wage of the poorest decile. Starting from the top of the table and moving down, we observe a decline in the ratios, suggesting a general reduction of wage inequality in North Macedonia since 2011. However, the introduction of the MW in 2012 did not bring any significant improvement in this regard; on the contrary, the differences between the two furthest deciles of the wage distribution (D9/D1) were even amplified. However, the latest MW increase potentially resulted in a more intense wage compression, leading to significant declines in the decile ratios. An exception is, however, the D9/D5 ratio, which insignificantly increased, suggesting that the wage of the richest and of the median worker did not change comparatively, hence any improvements in wage equality have been mainly observed on the left (or lower wage) part of the wage distribution and can be more clearly corroborated with the MW increase. For example, the decline in D5/D1 has been by a sizeable 20 per cent, while D9/D1 saw a more moderate, 7.9 per cent. When disaggregated by sex, we see these declines have been larger for men. Finally, the table suggests that North Macedonia now has a significantly more favourable wage distribution than the EU-28 average. In the left part, wages are similarly distributed as in the EU-28 (the D5/D1 ratio is very similar), while the right part of the wage distribution is significantly more compressed in North Macedonia, especially for men.

Table 2 - Different measures of wage inequality: decile ratios

	D9/D1			D9/D5			D5/D1		
	All	M	F	All	M	F	All	M	F
MK 2011	3.01	2.79	3.37	1.76	1.68	1.74	1.71	1.67	1.94
MK 2012	3.08	2.91	3.50	1.79	1.68	1.76	1.72	1.73	1.99
MK 2017	2.74	2.99	2.58	1.41	1.52	1.50	1.94	1.97	1.72
MK 2018	2.54	2.36	2.56	1.57	1.56	1.60	1.62	1.52	1.60
EU-28 (2014)	3.49	3.67	3.23	2.06	2.12	1.97	1.69	1.72	1.63

Note: Data for North Macedonia for 2011 and 2012 refer to the second quarter of those years, as reported in Mojsoska-Blazevski and Kurtisi (2012). Data for 2017 and 2018 are for first quarters, calculated by the authors. Data for EU-28 are a simple average based on the Structure of Earnings Survey and derived from Eurostat [earn_ses_hourly].

Table 3 presents another measure of wage inequality: the cumulative percentages of the wage distribution. It refers to the share of workers in the distribution of the wage mass; e.g. the first number of 0.2 per cent suggests that the poorest one per cent of wage workers receive only 0.2 per cent in the overall wage mass. Due to the compression generated by the MW increase (as well the potentially intensified inspections), there has been an increase 39.3 per cent in the share of wages received by the bottom 10 per cent. And this increase is even higher (double) for female workers. Part of the increase is undoubtedly down to the increase in the threshold of the decile because of the rising minimum wage, so that a share of workers who previously were earning approximately the MW are now likely to belong to the poorest decile as they did not receive a proportional increase (the 'equalization' phenomenon). Generally, Macedonian wage distribution resembles that of the EU, albeit slightly more favourable and equitable.

Table 3 - Different measures of wage inequality: cumulative wage distribution

		Bottom 1 per cent	Bottom 10 per cent	Bottom 50 per cent	Bottom 75 per cent	Top 25 per cent	Top 10 per cent	Top 1 per cent
2017	All	0.2%	3.3%	27.4%	58.1%	41.9%	21.0%	3.5%
	M	0.3%	3.6%	25.1%	57.3%	42.8%	23.2%	3.2%
	F	0.1%	2.9%	31.0%	59.5%	40.5%	17.7%	3.9%
2018	All	0.2%	4.6%	20.3%	57.9%	42.1%	22.3%	4.3%
	M	0.2%	3.8%	17.1%	56.8%	43.2%	24.3%	5.2%
	F	0.3%	5.9%	25.3%	59.7%	40.3%	19.3%	2.8%
EU-22 (2010)		0.2%	3.6%	29.1%	53.9%	46.1%	25.5%	5.8%

Note: Data for North Macedonia are for first quarters of the two years, calculated by the authors. Data for EU are a simple average of 22 countries based on the Structure of Earnings Survey and derived from ILO (2016).

In assessing the success or otherwise of MW policy, it is important to ascertain the number of the workers for which the MW is binding (disaggregated by sex, formality and sector) and to examine the appropriateness of the MW in light of the needs of the workers and their families. ILO Convention 131 considers that, when setting the MW policy makers should take into account: (a) needs of workers and their families in light of the general level of wages in the country, the cost of living, social security benefits, and living standards relative to other social groups; and (b) economic factors, including the requirements of economic development, levels of productivity, and the desirability of attaining and maintaining high levels of employment. While these criteria are not exhaustive but seek to balance economic and social factors (ILO, 2016). The Preamble of the ILO Constitution calls for “the provision of an adequate living wage”. Later, this idea of an “adequate living wage” was transformed into the concept of a “minimum living wage” as both the 1944 *Declaration of Philadelphia* and the 2008 *ILO Declaration on Social Justice for a Fair Globalization* call for “a minimum living wage to all employed and in need of such protection”.

In analysing the appropriateness of the MW, we set out three different wage ranges: i) workers earning the minimum wage +/- 5 per cent; ii) those earning below the 95 per cent of the MW; and iii) those earning between 105 per cent and 125 per cent. For the period prior to the MW increase, wages in the textile, leather and shoe sectors (for which a lower MW level was prescribed) have been adjusted. As in the previous analysis, for each worker who did not report their wage, the median of the reported wage range was used.

Table 4 provides information on the number and share of MW earners as a percentage of total wage earners, for the period prior to and after MW increase (2017 and 2018, respectively), differentiated by formality and sex. Columns (1) and (2) show us that the share of MW workers more than doubled after the MW increase, from 9.3 per cent to 20 per cent, resulting in a wage equalization. However, workers who, prior to the increase, were already earning 12,000 MKD (the new MW), did not experience a wage increase, or it was sluggish at best. This is in line with the findings from the interviews, which showed that while employers increased wages to the new minimum level, they generally implemented much lower wage increases for remaining workers. The trend is clearly visible in columns (5) and (6), where the number of workers receiving between 105-125 per cent of the MW significantly declines, from 14 per cent of all workers to 3.5 per cent. In essence workers who, prior to the increase, were earning between 105 and 125 per cent of the MW in 2017 transited to receiving wages +/-5 of the new MW in 2018, while their wages didn't move significantly in absolute terms. No significant differences in these patterns can be observed by sex.

Meanwhile the number of workers earning less than 95 per cent of the MW is declining. Yet, the data may be overlooking non-compliance whereby workers earning less than the MW are hidden from view; as well by potential measurement errors.

Table 4 – Share and number of workers earning the minimum wage, by formality and gender

		MW +/- 5 per cent		Below 95 per cent of MW		MW between 105-125 per cent	
		(1)	(2)	(3)	(4)	(5)	(6)
		2017	2018	2017	2018	2017	2018
Entire sample	per cent of wage earners	9.3%	20.1%	5.8%	4.8%	14.0%	3.5%
	Estimated MW workers	44,827	108,364	27,969	25,861	67,876	18,841
Formal	per cent of wage earners	8.9%	19.8%	4.2%	3.9%	14.1%	3.4%
	Estimated MW workers	41,124	103,137	19,413	20,247	65,172	17,889
Men	per cent of wage earners	8.7%	18.1%	6.6%	4.2%	11.4%	3.1%
	Estimated MW workers	24,637	55,422	18,794	12,883	32,139	9,399
Women	per cent of wage earners	10.1%	22.8%	4.6%	5.6%	17.8%	4.1%
	Estimated MW workers	20,190	52,942	9,176	12,979	35,737	9,441

Source: Authors' calculations based on LFS.

Table 5 presents the same information as **Table 4**, but disaggregated by sector. The same patterns observed in **Table 4** are evident in this table, especially in the sectors where the MW is commonly paid to many workers. Most notably, there is a large concentration of wages around the level of the MW in the textiles, leather and shoe industries: before the increase in 2017 one quarter of workers were on the MW, increasing to more than a third after the increase. The trend towards equalization seems most forceful in these sectors; the number of workers receiving 105-125 per cent of the MW accounted for less than half, declining by 240 per cent. This pattern is also observed in other sectors where the MW is commonly paid, i.e. retail, hotels and restaurants, as well as in the other manufacturing industries and construction. The public sector, education and health sectors employ a small number of MW workers and hence the effect of the MW increase is either non-existent or insignificant.

Table 5 – Share of workers earning minimum wage, by sector

	MW +/- 5 per cent		Below 95 per cent of MW		MW between 105-125 per cent	
	2017	2018	2017	2018	2017	2018
Agriculture	16.0%	20.2%	17.6%	5.8%	10.5%	5.8%
Textiles, leather and shoes	26.0%	34.7%	10.5%	16.9%	16.1%	6.8%
Manufacturing - other	7.6%	18.6%	2.9%	2.6%	17.1%	3.8%
Construction	14.3%	23.1%	10.2%	4.9%	10.6%	4.2%
Market services	9.5%	27.7%	7.4%	5.8%	17.1%	4.1%
Public sector	1.3%	1.5%	1.4%	0.3%	4.3%	0.4%
Education	2.2%	4.8%	1.1%	0.5%	10.0%	0.7%
Health	3.8%	1.9%	9.6%	1.2%	5.5%	0.0%

Source: Authors' calculations based on LFS.

To obtain deeper insights into who receives the MW, we ran a Probit regression for all workers earning less than 105 per cent of the MW to ascertain whether personal and labour-market characteristics can be correlated with the probability of receiving the MW, considering the age, gender and education as personal characteristics, and the sector and occupation as labour-market characteristics. The results are presented in Table 6. Younger workers are more likely to earn the MW, reflecting the Backer's theory that the accumulation of human capital over years is reflected in the earnings. Generally speaking, women are more inclined to receive the MW than men (with exception of 2017). Unsurprisingly workers with secondary and tertiary education are less likely than primary-educated individuals to earn the MW. Consistent with Table 5, the private sector, with the exception of education and health, have a higher propensity of paying the MW than the public sector (which is the omitted category). Interestingly, the probability that workers in agriculture, manufacturing, textiles, leather, shoes, construction and market services receive the MW significantly increased after the latest MW increase reflecting the 'equalization' phenomenon. Observed by occupations, all occupations have lower probability of employing MW workers compared to elementary occupations (which is the omitted category).

Table 6 – Profile of minimum wage earners

Dependent variable: The probability of receiving the MW				
		Entire sample	2017	2018
		(1)	(2)	(3)
Personal characteristics	Age	-0.00156***	-0.00105**	-0.00198***
		(0.000)	(0.000)	(0.001)
	Female	0.0502***	0.00966	0.0818***
		(0.011)	(0.012)	(0.016)
	Secondary education	-0.109***	-0.0825***	-0.138***
		(0.014)	(0.016)	(0.022)
	Tertiary education	-0.142***	-0.113***	-0.175***
(0.014)		(0.016)	(0.022)	
Sectors	Agriculture	0.208***	0.112*	0.295***
		(0.060)	(0.063)	(0.097)
	Manufacturing – other	0.151***	0.0236	0.293***
		(0.044)	(0.037)	(0.076)
	Textile, leather, shoes	0.399***	0.249***	0.532***
		(0.060)	(0.075)	(0.079)
	Construction	0.225***	0.0968*	0.339***
		(0.057)	(0.057)	(0.089)
	Market services	0.235***	0.0935**	0.368***
		(0.037)	(0.037)	(0.060)
	Education	0.043	-0.0325	0.154*
		(0.048)	(0.037)	(0.089)
	Health	0.0312	-0.0129	0.0946
		(0.043)	(0.038)	(0.080)
Occupations	Managers	-0.118***	-0.0730***	-0.157***
		(0.014)	(0.017)	(0.021)
	Professionals	-0.170***	-0.122***	-0.209***
		(0.011)	(0.013)	(0.018)
	Technicians and associate professionals	-0.147***	-0.103***	-0.180***
		(0.009)	(0.010)	(0.015)
	Clerical support workers	-0.125***	-0.0894***	-0.154***
		(0.009)	(0.009)	(0.016)
	Services and sales workers	-0.00939	-0.0260*	0.00933
		(0.016)	(0.015)	(0.027)
	Skilled agricultural, forestry and fishery workers	0.0921	0.0388	0.116
		(0.057)	(0.064)	(0.084)
	Craft and related trades workers	-0.0393***	-0.0496***	-0.0245
		(0.015)	(0.013)	(0.027)
Plant and machine operators and assemblers	-0.0605***	-0.0496***	-0.0755***	
	(0.013)	(0.013)	(0.022)	
	Observations	6,391	3,017	3,374

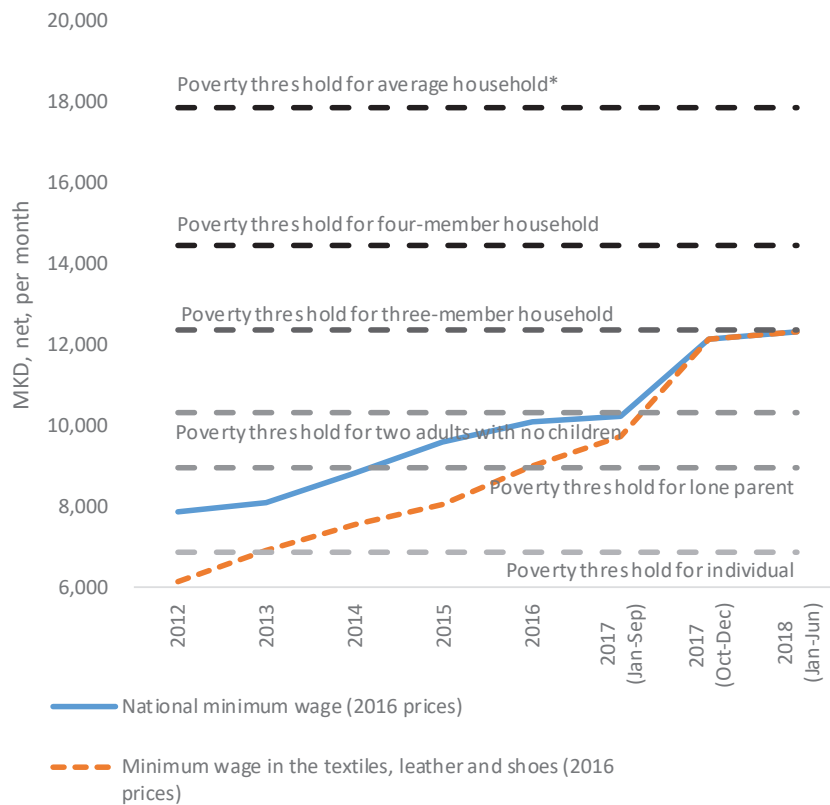
Source: Authors' calculations based on LFS.

*, ** and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses. Standard errors robust to heteroscedasticity.

2.4.4. The minimum wage and the needs of workers and their families

Figure 16 places the minimum wage in the context of the poverty lines for various compositions of households. Note that poverty lines refer to 2016, the latest available data from North Macedonia's Survey on Income and Living Conditions. The figures suggest that the 2017 MW increase strengthened the role of the MW in the fight against poverty. The 2017 increase means a MW worker can now support a three-member household without falling into poverty. Moreover, if the two adult members in a four-member household earn the MW, their total income (24,000 MKD) significantly outpaces the 2018 poverty line of 14,448 MKD. It would appear that the MW is fulfilling one of its policy objectives, namely reducing working poverty..

Figure 16 – Minimum wage and poverty lines



*Source: Authors' estimates based on the minimum wage values of the Law on the Minimum Wage, adjusted for inflation and the value of the annual equivalent disposable income, in MKD, from the State Statistical Office, all adjusted to MKD from 2016. * The average Macedonian household in 2016 is composed of 4.57 persons, of which 3.64 are adults and 0.93 are children.*

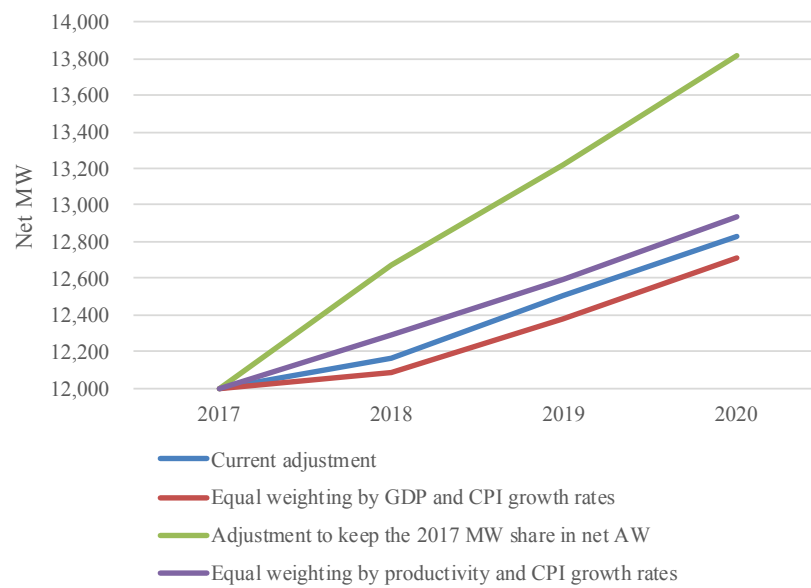
2.5. How to set the minimum wage?

The question of the criteria to be used in setting the MW, in a manner than ensures the government meets its stated policy objectives can be a complex task, often with competing policy priorities pulling calculations in different directions. It can be a tricky balancing act. For one, as outlined above, the MW can be, and is being used to reduce poverty and promote social justice. However, going too high too fast can impede employers' ability to hire and/or ensure their businesses stay profitable. Most economists suggest that the process be kept flexible so that it can adapt to changing economic conditions, rather than having strict, and absolute numerical targets.

For its part, the Macedonian government has committed to raising the MW to 16,000 MKD by 2020. In this regard, the government may consider changing the approach to fixing the MW. The preliminary assessment of the MW level can be done by aligning the MW with the so-called minimum living wage, i.e. a wage that provides workers and their families a decent standard of living. It is highly difficult, complex and even controversial to determine what a "decent standard of living" implies; one approach is to use the national poverty lines, adjusted for the size of the household. However, this approach does not include costs of education, healthcare, etc. The second option is to set the MW as percentage of the average or median wages, a system that was practiced in North Macedonia in the first years the MW was introduced. Such approach allows low-paid workers to get wage rises proportional to the average/median worker. Concerning the periodical indexation of MW, the most commonly used methodologies are based either on the CPI or on economic or productivity growth.

While the CPI indexation preserves the purchasing power of the MW, it does not ensure that MW earners receive their fair share the fruits of economic growth. Some countries have more complex formulas, combining CPI and GDP growth, and incorporating additional rules. For instance, in France, the MW is automatically increased by the CPI of the previous year if the inflation ran higher than 2 per cent. However, the figure will be further adjusted upward if this figure is less than half the increase received by blue-collar workers. In Brazil, the MW is increased by the inflation figure in the previous year added to GDP growth of the previous two years, if the GDP growth was positive (i.e. there is no downward adjustment in case of recession). However, we strongly suggest that the adjustment formula in North Macedonia is kept simple, involving at most two indicators (preferably CPI and GDP growth). During the interviews, representatives of the SSM expressed their preference for an indexation formula based on the average wage growth and the CPI. The formula may be accompanied by some overriding criteria, such as no downward adjustment in case of recession or no upward adjustment in case of increased unemployment, etc. However, it seems that regardless of the indexations used, the 2020 target is unlikely to be attainable without potentially negative economic consequences (**Figure 17**).

Figure 17 – Minimum wage dynamics under different annual adjustment scenarios up to 2020



Source: Authors' calculations, based on current data from SSO and projections for the GDP growth, wages, inflation and employment growth from the Ministry of Finance and/or the National Bank of the Republic of Macedonia.

The increase of the MW in September 2017 has solicited different reactions in North Macedonia. On one hand, it was welcomed as an important measure in improving the living standards of low-paid workers and their families, and was extolled as a tool for reducing wage inequality. There is little doubt that there is a high degree of political commitment to both these objectives, as evidenced by the speed at which the MW has gone up. However, many commentators have argued that raising the MW too quickly may create too large a financial burden for employers, particularly in sectors which previously had a lower minimum wage floor, and could lead to declining employment or rising informality. The policy (and political) debate of that time was dominated by a policy brief (Finance Think, 2016)²⁷, which calculated the optimal MW at 51 per cent of the average wage, based on a cross-country analysis of the relationship between the MW and employment level. The brief suggested that increasing the MW to 13,000 MKD, and not 16,000 MKD, by 2020 is a more realistic option, i.e. it can improve living standards of the poor workers while not resulting in job losses.

²⁷ <http://www.financethink.mk/wp-content/uploads/2017/04/Policy-brief131.pdf>.

CONCLUSIONS: MAIN FINDINGS AND POLICY RECOMMENDATIONS

In 2011, the Government of the North Macedonia after a consultative process with the representative social partners introduced a nation-wide statutory minimum wage (MW), effective from January 2012. While some changes in the system were made between 2012 and 2017, a more important change has been made by the newly elected Government in September 2017: an increase in the MW to 12,000 MKD (by 19 per cent of the previous level), combined with a levelling up of the MW in three economic sectors (leather, textiles and shoes) which previously had a lower MW than the national statutory minimum.

Main findings

1. The study found that, overall the average hourly wage went up by 6.4 per cent between 2017 and 2018. The analysis in this study found positive effects of the MW increase on wages and hence on living standards.
2. This wage increase was not uniform along the wage distribution. Results show a larger increase in lower end of the wage distribution, while the middle and upper part of the wage distribution remained intact. This has resulted in an increased compression of wages up to the median, i.e. an “equalization” of wages around the new MW. Similar findings are found by using the Kaitz ratio (ratio of the MW to the median wage) which increased from 67 per cent in 2017 to 80 per cent in 2018, meaning that the relative position of the MW earners to the median wage earner significantly improved. Considering that the Kaitz ratio in most EU countries is between 45 and 60 per cent, and the weighted average Kaitz ratio for the EU is 50 per cent, the MW in North Macedonia is set at a relatively high level.
3. The detailed analysis of the changes of the wage distribution showed that the wage inequality in North Macedonia declined after the increased MW was applied in 2017. The improvements in wage equality have been mainly derived from the lower (left) part of the wage distribution (an argument we outline above), and are more prominent for men. The econometric analysis proved that these changes in the wage distribution are largely a result of the increasing the MW in 2017, although increased compliance, supply side constraints (unmet demand for workers), increased effectiveness of labour inspections, etc. may also have played a part. Such equalization can however be economically harmful if puts workers with different levels of productivity in the same wage group.
4. It should however be noted that the analysis shows that some workers still earn less than the MW due to non-compliance. While the rightward shift in the wage distribution does show a reduction in the incidence of low wages (2/3 of median wage), a relatively large share of workers in the textiles, leather and shoe industries continued to receive low wages in 2018. However, the percentage of low-wage earners to total workers decreased from 36.5 per cent to 15 per cent due to 2017 MW increase.
5. The reduction in low wages is less pronounced for women. 5 per cent of women workers

were still earning a low wage in 2018 compared with 3.7 per cent of men. This runs somewhat contrary to the expectations, as women are generally overrepresented in sectors with low wages. However, when considering only formal workers, there are fewer women earning a low wage than men. At 3 per cent the overall gender pay gap was, by regional and international standards, relatively low even prior to MW increase. However, after the increase the pay gap went up to 5 per cent mainly because the benefits of the MW were more prominently observed for men. The gender pay-gap is quite high in the textile and leather industries, sectors where women are over-represented relative to men. In 2017, women in the textile and leather industries were earning 16 per cent less than men, and declined only slightly after the MW increase, to 14.4 per cent. The econometric analysis maintains the general finding, however, suggesting some bias in favour of women in terms of the overall wage increase because women are more numerous in low-paid jobs. Moreover, the findings support the hypothesis of delayed compliance; that is, those left behind by previous rounds of MW increase are more likely to have benefited from the current increase.

6. The study did not find any negative relationship between employment rates and the MW increase. There has been a very small decline (0.8 per cent) in employment of women in the textile, footwear and leather industries. Employment in elementary occupations also declined, possibly suggesting some loss of jobs after the increase of the MW. However, this could be driven by other factors such as changes in the structure of the economy or overall levels of economic growth
7. The econometric analysis finds very limited evidence that the increased wage compression may have initiated some transition to informality. In fact, contrary to the initial expectations, informal employment declined after the MW increase, which may signal that the increased MW was not a large burden for employers. Nonetheless, the econometric evidence does show that the MW increase negatively affected wages of informal workers in sectors where there are a large number of workers earning the MW.
8. The LFS data indicates that the average weekly hours of work of wage employees in North Macedonia slightly declined from 41.9 hours to 41.6 hours between 2017 and 2018. Although small, the decline it is statistically significant. However, it is not uniform and the study finds that workers earning below the median wage actually increased the hours they worked.
9. Collective bargaining in the country is still weak and subordinated to labour legislation. There are even inconsistencies between the MW legislation and some collective agreements suggesting that, at the time of writing, collective bargaining and MW legislation cannot be seen as a complementary policy tools, but as uncoordinated and somewhat contradictory. Given that collective agreements were not re-negotiated after the 2017 increase in the MW, a standard universal MW took precedence over sector-specific (and sometimes branch specific) wage systems based on pay coefficients and pay coefficient' accounting rate.

Policy recommendations

From a policy perspective, the study raises several issues or recommendations for the future decision-making.

1. Based on the ILO recommendations (Belser and Sobeck, 2012), as well as the analysis of the economic and productivity developments in the country prior to the increase of

the MW, the study suggests a need for greater use of statistical evidence in setting the MW. The dissonance between productivity growth and the MW increase may have a negative effect on employment generation on medium to long-term. In essence, wage developments have to be aligned with productivity so as to ensure stable labour costs conducive to employment dynamics and the international competitiveness of the economy. Authorities may mitigate, to a certain extent, these divergent developments in wages and productivity by supporting productivity growth, technological improvements and innovations. There are currently some government-led programmes in place in this regard but they need to be strengthened and made more relevant to all businesses, including those operating in the low productivity sectors of the economy.

2. The study examined the different scenarios regarding the adjustment of the MW and the likelihood that the MW reaches the intended level of 16,000 MKD in 2020. Based on the current indexation formula (but also applying some other variations of indexation) it is unlikely that the MW will reach that level as it may cause some damages to business profitability and ultimately employment growth. It is therefore recommended that social partners and the government re-think the indexation formula, based on the experience of other countries. In essence, they have to agree on a yardstick with which to adjust the MW (average wage, CPI, GDP growth, etc.). It is important that whatever indexation is used incorporates the CPI and GDP growth as a means of preserving the living standards of the low-wage earners and ensure that they reap the benefits of economic growth. While the mechanism for fixing the MW may need some adjustment, an overly complex mechanism should be avoided: simpler fixing mechanisms are easier to handle by the government officials, easier to explain to the general public, easier to negotiate among the social partners, and easier to monitor.
3. Compared with the EU, the level of the MW is relatively high in relation to the median wage (considering the Kaitz ratio). While the economy has adjusted to this new MW (with temporary government support), further arbitrary increases above the productivity growth (or GDP growth) may have harmful effects on employment. It should also be noted that the comparison to the EU countries revealed that the wage distribution in North Macedonia is much more compressed (implying lower inequality), and was so even prior to the MW increase. While productivity growth in the traditional sectors of the economy (which are likely to pay low wages) is desired, it may temporarily lead to displacement of workers and create unemployment.
4. The relationship between productivity and wages can be enhanced by introducing a legislative provision to define workers' productivity. While the Constitutional Court ruled out introducing such a provision into law, it is one way to establish a stronger link between the productivity of a worker and her/his wage. It is advisable that social partners discuss this issue and come up with a commonly acceptable solution.
5. Finally, the findings of this study show only the short-term effects of the MW increase and hence ought to be treated with caution. The effects of the MW increase have to be monitored closely to catch potentially negative effects in the medium to long-term such as an adjustment in working hours, transformation into informal employment (including semi-informal contracts, like the 'envelope wage') and the discouragement of employment generation.

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Appendix 1 – Literature review on minimum wage analysis

The economic literature has been assessing the effects of the MW for some time. The debate concerning the impact of an MW on the economy dates back to 1913 and the setting up of the United States Department of Labour. At that period, the debate was to a large extent theoretical. On one hand, the neoclassical school (Clark, Lees Smith and Taussig) claimed that wage is determined by productivity; therefore, any “artificial” increase in wages by the setting of a MW would decrease employment among low-skilled workers, as the employers would not be able to bear the additional financial burden. More progressive economists of that time (Webb, Seager, and Commons) argued that an MW would protect low-skilled workers against exploitation in an environment where the employer has bargaining power over wages. This in turn would have a positive impact on the productivity of workers, thus leading to improvement in their consumption and standard of living (Neumark et al., 2014).

Subsequent debates have been backed up by empirical findings. An early empirical paper by Obenauer and von der Nienburg (1915) found that an MW has positive impact on the overall wages, but has no impact on employment. Later studies were concluded that a MW has a tendency to decrease employment for low-skilled workers. One well-known paper by Brown, Gilroy and Kohen (1982) looked into the existing literature on MW and reached a consensus that an increase in the MW of 10 per cent would decrease employment by one to three percent.

New research on the minimum wage began in 1990; however, consensus was not reached on its on employment (Neumark and Wascher, 1992; Card, 1992 a; Card, 1992 b; Katz and Krueger, 1992). The current wave of research on MW is dominated by the work of Neumark and Wascher (2008), who concluded that “...minimum wage reduces employment opportunities for less-skilled workers, especially those that are most directly affected by the minimum wage” (p. 6). Many subsequent empirical studies have expressed deep concern about the methodological aspects of Neumark and Wascher’s study (for example, Dube et al., 2010; Allegretto et al., 2011), and many economists point to the fact that most of the empirical debate on the effects of MW has been framed the employer’s point of view (neoclassical school).

The key question for progressive economists is the extent to which MW can act as an anti-poverty programme and the MW has become part of the debate on the inequality and the growing divide between rich and poor. Understanding the impact of MW on poverty requires an understanding of its impact on different wage levels (or, statistically, on different points in the wage distribution). For example, when the MW is low relative to the average wage, it has the tendency to raise the wage of workers at the bottom of the wage distribution. However, when the MW is high relative to the average, it will increase the wage of workers in the middle (middle class), but not at the bottom of the wage distribution (the lower class) (Gindling, 2014).

This study is the first comprehensive and rigorous attempt to evaluate the effects of increasing the MW in North Macedonia. There are two earlier detailed studies with similar objectives. The first study of Mojsoska-Blazevski and Kurtisi (2012) examined the initial effects of the introduction of the statutory minimum wage on wages, wage distribution, wage inequality, employment, informality, etc., with a strong gender perspective. The study showed that the MW exerted a benign and limited influence on the economy in the first year of introduction; there were no negative effects on the employment; there was an increase of wages in the lower end of the wage distribution, and that the average wage declined. Wage increases were less pronounced for women workers compared to men, as women were over-represented in the low-wage sectors in which the introduction of the statutory minimum wage was gradual. The wage increase was more pronounced for formal workers, men, older workers, high occupational levels and more educated workers, and there was some spill-over effect of the statutory MW to the informal

sector. The analysis showed that some workers were still earning wages below the MW, though that is only indicative of non-compliance given that the analysis was not done by using full-time equivalent wages, and the introduction of the MW only slightly reduced the incidence of low pay.

Mojsoska-Blazevski and Kurtisi's argued that the MW did not reduce wage inequality (i.e. wage compression). According to the authors, this finding was related to: i) the level at which the minimum wage was set (it was too low to make a difference), ii) the transitory period of the lower statutory wage in some sectors (which slowed wage growth for women workers), iii) the low enforcement capacity and iv) the spill-over effect of the minimum wages, particularly the rate at which income at the top increased. The authors conclude that the transitory period of the introduction of MW (for the low-wage sectors) shifted the benefits primarily to low-paid men workers, while little was achieved for low-paid women workers.

The further study, by Petreski and Kochovska (2018), assesses the effect of the MW on the economy (mainly standard of living), by using the MK-MOD Tax and Benefit Microsimulation Model (see details about the model in Petreski and Mojsoska-Blazevski, 2017), and the study predominantly applies qualitative approach, i.e. interviews and focus groups of employers and workers. The model simulation, under the full-compliance assumption, found positive, though minor effects on the standard of living in North Macedonia: relative poverty decreased by 0.6 percentage points, and income inequality improved by 0.5 percentage points.

Interviews with employers suggested that the MW increase has been a significant burden to the companies where a large share of the labour force works at the MW. Nevertheless, the MW increase was found more or less dramatic depending on a company's technological readiness and degree of specialisation. The more technologically advance the company and the greater the specialisation of its manufacturing process, the larger its capacity to absorb an increase in the MW.

The study suggests that the MW increase did not significantly affect to foreign companies, as these are, generally speaking, more technologically advanced and better integrated in the international supply chains. However, employers agreed that any future MW increase should be cautious and in line with the economy's productivity, to avoid any negative effects on employment. All employers interviewed in the study agreed that the increased MW made workers more content in their jobs, it did not necessarily make them more productive. They emphasized that productivity, workers' work habits and ethics should be major considerations in setting wages.

On the workers' side, the study documents a general level of satisfaction with the MW increase. However, workers reported some manipulations of the system such as workers being asked by their employers to return part of the wage in cash, the manipulation of working hours and other wage-related rights, cancellation of free lunch provisions, etc. Moreover, there were reports of inadequate payment of overtime work, of workers being asked work during weekends and holidays and being denied annual leave, and, in one case, of workers being asked to return their vacation allowance in cash.

Appendix 2 – Econometric model and findings

1. Methodology

Our objective is to reveal causal effects of the in the minimum wage increase on a multitude of outcomes for workers and employers in North Macedonia: the wage levels, hours worked, formality of the job and probability of unemployment. To pursue this objective, it is econometrically tested if outcomes altered in the period after the law changed, compared to the period before, and whether these changes are larger in areas (“cells”) where the minimum wage initially had more “bite”.

The “cell” approach considers the stylized fact that the fraction of workers affected with the change in the MW may differ across subsets of a population. The “cell” approach has previously been used in MW studies by Card (1992), Lemos (2009) and Dinkelman and Ranchhod (2012), who considered different regions of the countries under study (and time) as “cells”, i.e. they considered the geographical variations in the exposure to the increase in the minimum wage. As Card (1992) argues, the effect of the increase in the minimum wage may differ across regions due to the differences in the fraction of workers affected. To take the advantage of a larger number of cells, we extend Card’s approach by defining cells based on four demographic characteristics age (15-29; 30-64), gender, education (primary and less, secondary, tertiary and more) and regions (8 regions). By so doing, we arrived at 96 cells, helping us which should benefit the identification of the true effect of the minimum wage increase. The average number of observations (wage earners) per cell is 84, securing sufficient number of observations per cell.

The “bite” is a variable capturing the effect of the minimum wage increase. We construct three bites for each cell. The first is the fraction affected (Card, 1992; Lemos, 2009), being the share of workers in the period before the MW increase, whose wage is between the pre-change and post-change level:

$$FA_j = \frac{\sum_i^n (MW_{t-1} < w_{ijt-1} < MW_t)}{n_j} \quad (1)$$

Whereby FA_j stands for the fraction of workers in cell c , being affected by the minimum wage increase, defined as the workers whose wage in the cell ranged between the old and new level in the period before the increase (w_{ijt-1}), divided by the total number of workers in the particular cell. MW stands for the minimum wage level in a respective period.

The second is **fraction below** (Ramirez et al. 2017), being the share of workers in the pre-change period with wage below the post-change MW level:

$$FB_j = \frac{\sum_i^n (w_{ijt-1} < MW_t)}{n_j} \quad (2)$$

Whereby, notations are self-explanatory. This bite may be more suitable for cases of imperfect compliance with changes in the minimum wage.

The third is the **wage gap** (Dinkelman and Ranchhod, 2012), being the difference between the logged minimum wage post-change and the logged median wage for the cell pre-change:

$$WG_j = \ln(MW_t) - \ln(\text{median}(wage_{jt-1})) \quad (3)$$

Whereby notations are self-explanatory.

We specify the following difference-in-difference regression model:

$$y_{ijt} = \alpha_0 + \alpha_1 POST_t + \alpha_2 BITE_j + \alpha_3 POST_t * BITE_j + X_{ijt}\gamma + u_{ijt} \quad (4)$$

Whereby: y_{ijt} is the outcome variable for individual i of cell j in period t : lolog hourly wages, weekly hours of work, having a formal job contract, and whether the individual is employed or not, among the set of “cell” similar workers. $POST_t$ is a dummy variable taking a value of 1 for the period after the minimum wage law change, being 0 otherwise. $BITE_j$ is cell-specific (hence the subscript j) and comes in three forms: fraction affected, fraction below and wage gap. X_{ijt} is a set of control variables including age, gender and level of education.

As argued in Ramirez et al. (2017), had a significant general increase in wages been observed over the same period, the effect of the minimum wage increase would be plagued. The general wage increase could be considered a confounder in impact-evaluation literature jargon. This may be a particular problem for North Macedonia: Petreski and Kochovska (2018) find that the pressure that the MW increase implied for higher-than-the-minimum wages was less bearable for employers than the MW increase itself. This happens due to the problem of “equalization”: people who previously received 12,000 MKD (the new MW) pressed for higher wages when those deemed are suddenly earning the same money. **Table 4** and **Table 5** provide some insights that equalization happened to a certain extent, while interviewees’ insights suggest that due to the dormancy of collective agreements, employers did not apply the prescribed coefficients to adjust the other wages in the companies, and these were increased by a proportionally smaller amount. However, despite this, a general increase in wages may reach out, inter alia, when the compression for increasing the wages above the minimum wage was not sustained. Assuming non-problematic compliance, we create a variable per cell of the share of formal workers whose wage is above the minimum wage, denoted $WINC_j$. Hence, our model receives the following form:

$$y_{ijt} = \alpha_0 + \alpha_1 POST_t + \alpha_2 BITE_{jt} + \alpha_3 POST_t * BITE_{jt} + \alpha_4 WINC_j + \alpha_5 POST_t * WINC_j + X_{ijt}\gamma + u_{ijt} \quad (5)$$

Our primary interest is parameter α_3 . It reveals the causal effect of the increase in the minimum wage over the outcome. To investigate whether the effect of the minimum wage increase over the outcomes of interest is gender specific, we divide the sample by sex and re-estimate (5).

We estimate equation (5) with OLS. When the dependent variable is binary, we rely on probit. Due to cell clustering, we use clustered standard errors, which control for the presence of unobserved effect at the cell level in the error term. Angrist (2008) suggests 42, as a rule of thumb, being below our number of cells (96), providing robust standard errors.

2. Results

Before embarking on the key results, we provide a brief overview of some descriptive characteristics of the ‘bites’. **Table 7** presents the median and the outer deciles of the three bites. The median fraction of affected wage earners is 13.9 per cent, and the one below is 22.9 per cent, while the median wage gap is negative, suggesting that, on average, the median within-cell wage in 2017 has been slightly below the new minimum wage. Actually, only a quarter of the cells do show a positive wage gap, reflecting the right skewed nature of the wage distribution in North Macedonia. In the upper decile, 66 per cent and 60 per cent of the cells have a fraction of wage earners affected by the MW increase and earning below the new MW, respectively.

Table 7 – Descriptive statistics of the bites

Percentiles	Fraction affected	Fraction below	Wage gap (log)
p10	0.0%	2.8%	(0.65)
p25	6.4%	7.1%	(0.22)
p50	13.9%	22.9%	(0.13)
p75	20.6%	41.7%	(0.00)
p90	33.3%	60.0%	0.18

Source: Authors; calculations based on LFS.

In **Table 8**, we present the Spearman correlations for the bites and the basic personal characteristics of the wage earners. Age and bites are positively correlated, and albeit this correlation is fairly weak, it does suggest that the bite is bigger for older workers, i.e. that older workers are more affected by the MW increase than younger workers. Similarly, bites are bigger for women workers. Bites negatively correlate with education: the higher the education, the lower the strength of the bite, i.e. a lower share of more educated persons are affected by the MW increase. However, in the case of education, the correlations are fairly strong, suggesting that higher educated people are less impacted by MW policy.

Table 8 – Correlation matrix for the bites

	Fraction affected	Fraction below	Wage gap (log)
Age	0.2233*	0.2712*	0.1753*
Female	0.1707*	0.0527*	0.1790*
Primary ed.	0.5242*	0.6543*	0.7326*
Secondary ed.	0.1568*	0.0685*	0.0194*
Tertiary ed.	-0.6919*	-0.7279*	-0.7537*

Source: Authors; calculations based on LFS. * denotes statistical significance at the 5 per cent level.

Table 9 presents the effect of the MW increase on wages per se. Columns (1) to (6) refer to the entire sample, with and without controls, while the rest of the columns split the sample by sex. The effect of the MW increase on wages is presented with the coefficient in front of Post*Bite, is given in grey for easier navigation. It suggests that the 2017 increase in the MW exerted a positive and significant effect on wages in North Macedonia. The coefficients in columns (1) to (6) are all positive, significant and of similar magnitude, irrespective of which bite definition is used. This is a clear and robust finding of a causal link between rising wages in North Macedonia and the MW increase, confirming the average wage data published by the SSO.

Observed by sex, the general finding is maintained, albeit with lower robustness for men. For them, the positive effect of the MW increase on wages per se is only significant when the wage gap is used as a bite, while is significant over both bites for women. These results suggest that there has been some bias in favour of women in terms of the overall wage increase.

However, the insignificance of the ‘fraction affected’ bite vis-à-vis the significance of the ‘fraction below’ bite may shed additional light on our results, namely a delayed compliance; that is, those left behind by previous rounds of increases in the MW are more likely to see their wages be levelled by the later increase. This may have been supported by stricter enforcement of compliance in 2017 than heretofore.

Toward the bottom of the table, the variable $\text{Post}^* \text{WINC}$ is insignificant. It should be borne in mind that it captures any general wage increases over the observed period, either due to GDP growth, or, more importantly in our case, due to the pressure against ‘equalization’: workers who were receiving 12.000 MKD (the new MW level) before the MW increase will inevitably press for wage increase so as not to be earning the same as whom they see as less productive workers. The insignificance of this coefficient proves that ‘equalization’ worked. This is in line with the findings from the interviews that wage increases were much higher for those on low wages, but is also a result of the dormancy of the collective agreements after the MW increase (i.e. no change in the complexity coefficients and the accounting rate for a unit of coefficient).

The other coefficients are aligned with the predictions of human capital theory: wages rise with age (a proxy for experience) and education. The adjusted gender pay-gap is estimated at 5.2 per cent to 8.5 per cent, suggesting a narrowing down compared to previous estimates (see Petreski and Mojsoska-Blazevski, 2016).

Table 9 – Effects of minimum wage increase on wages

	Entire sample				Entire sample				Men				Women			
	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)				
Post	0.0219 (0.019)	0.0260* (0.014)	0.153*** (0.023)	0.137*** (0.052)	0.0265 (0.101)	0.0854 (0.064)	0.105 (0.079)	0.182 (0.210)	0.132** (0.054)	0.168 (0.122)	-0.16 (0.187)	-0.0219 (0.139)				
Bite	-2.313*** (0.263)	-1.334*** (0.089)	-0.999*** (0.027)	-0.434** (0.171)	-0.803*** (0.117)	-0.627*** (0.109)	-0.212 (0.311)	-0.968*** (0.129)	-0.807*** (0.054)	-0.424** (0.174)	-0.651*** (0.139)	-0.474*** (0.113)				
Post*Bite	0.530*** (0.130)	0.241*** (0.048)	0.299*** (0.090)	0.282** (0.117)	0.243** (0.104)	0.296*** (0.083)	0.382 (0.245)	0.0588 (0.247)	0.216*** (0.075)	0.262 (0.157)	0.385*** (0.128)	0.325*** (0.101)				
Age				0.00126 (0.001)	0.00131* (0.001)	0.00103 (0.001)	0.000401 (0.001)	0.00017 (0.001)	0.000203 (0.001)	0.00361*** (0.001)	0.00374*** (0.001)	0.00311*** (0.001)				
Female				-0.0849*** (0.027)	-0.0584** (0.024)	-0.0521** (0.025)										
Secondary ed.				0.0682 (0.042)	0.0551 (0.034)	0.0618* (0.035)	0.0111 (0.060)	-0.0083 (0.034)	0.00265 (0.042)	0.139** (0.052)	0.146*** (0.049)	0.141*** (0.051)				
Tertiary ed.				0.340*** (0.064)	0.287*** (0.058)	0.194** (0.076)	0.245*** (0.082)	0.164*** (0.058)	0.0151 (0.068)	0.474*** (0.088)	0.468*** (0.079)	0.398*** (0.092)				
WINC				0.591*** (0.127)	0.115 (0.109)	0.242** (0.097)	0.743*** (0.166)	0.142 (0.115)	0.267*** (0.099)	0.464*** (0.130)	-0.0533 (0.207)	0.102 (0.116)				
Post*WINC				-0.116** (0.051)	-0.00164 (0.098)	0.0832 (0.098)	-0.0832 (0.072)	-0.144 (0.202)	0.0088 (0.087)	-0.153 (0.127)	0.174 (0.189)	0.202 (0.186)				
Constant	6.221*** (0.044)	6.249*** (0.034)	5.704*** (0.011)	5.374*** (0.089)	5.892*** (0.095)	5.490*** (0.051)	5.323*** (0.137)	6.025*** (0.116)	5.537*** (0.055)	5.217*** (0.105)	5.734*** (0.177)	5.400*** (0.083)				
Observations	8,061	8,061	8,061	8,061	8,061	8,061	4,999	4,999	4,999	3,062	3,062	3,062				
R-squared	0.197	0.27	0.288	0.288	0.298	0.301	0.254	0.267	0.271	0.369	0.374	0.377				

Source: Authors' calculations based on LFS.

*, **, and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses.

Table 10, **Table 11** and **Table 12** investigate the causal effects of the MW increase on hours worked, informality and unemployment. It is well documented in the literature that if an increase in the MW cannot be sustained by the employers, they may pursue alternative adjustments such as reducing the working hours to maintain pre-change labour costs, forcing employees to transit to informality, or they may simply start firing employees. The results robustly suggest that in general there were no significant negative effects of this nature due to the latest MW increase.

In the case of hours worked (**Table 10**), a negative impact of the MW increase is revealed for women for the 'fraction below' bite. This should not be neglected for two reasons. Firstly, women are more affected by the MW increase, especially in the textile, leather and shoes branches, where the increase has been bigger. Secondly, as a 'fraction below' bite is more suitable in case of staggering compliance effects, it suggests that it is likely that in these industries the effects were mitigated by reducing the working hours of women.

In the case of informality (**Table 11**), we cannot neglect the negative and significant coefficient on Post*Bite when controls are not added. The coefficient suggests that the increase of the MW resulted in lower informality rates. While one possible explanation is stricter enforcement of compliance mechanisms, the vanishing significance when controls are added suggests that other factors are at work. Firstly, these are observable personal factors, which suggest that older and less educated men are generally more prone to informality. Secondly, however, the significance of Post WINC may be an early sign that the increased wage compression may have prompted some workers to transit to informality, being predominantly those whose wage was already at the level of the new MW. The effect is only significant for men.

Table 10 – Effects of minimum wage increase on hours worked

	Entire sample				Entire sample				Men				Women			
	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Post	-0.268 (0.314)	-0.419 (0.327)	-0.621** (0.308)	0.285 (1.348)	0.21 (2.657)	0.334 (1.245)	1.17 (1.839)	-3.109 (3.283)	0.995 (1.543)	1.826 (2.139)	10.66*** (3.086)	1.512 (1.995)				
Bite	11.57*** (2.509)	6.166*** (1.646)	4.422*** (0.875)	5.619 (3.416)	1.258 (4.395)	0.107 (1.886)	1.432 (5.491)	-9.573* (5.072)	-1.19 (3.041)	9.798** (4.628)	13.53*** (3.435)	1.342 (1.992)				
Post*Bite	-1.289 (1.775)	0.038 (1.132)	-0.913 (0.841)	-1.858 (2.392)	-0.639 (2.683)	-1.14 (1.149)	-4.063 (4.220)	3.734 (3.803)	-2.126 (1.836)	-3.766 (3.001)	-8.758*** (2.513)	-1.716 (1.333)				
Age				0.0143 (0.010)	9.94E-03 (0.010)	0.00912 (0.010)	0.0126 (0.011)	0.0109 (0.013)	0.0125 (0.013)	0.0064 (0.014)	0.00213 (0.012)	0.00139 (0.014)				
Female				-0.767** (0.303)	-0.569 (0.351)	-0.458 (0.351)										
Secondary ed.				1.402* (0.751)	1.403* (0.808)	1.376* (0.793)	1.746* (0.969)	1.574 (0.945)	1.680* (0.950)	0.898 (1.060)	0.777 (0.869)	0.959 (1.281)				
Tertiary ed.				0.782 (1.049)	0.39 (1.142)	0.0931 (1.167)	1.204 (1.290)	0.57 (1.294)	0.444 (1.521)	-0.0477 (1.474)	-0.186 (1.202)	-0.759 (1.773)				
WINC				-4.984** (2.394)	-5.215 (4.317)	-5.845* (3.003)	-6.532** (3.064)	-13.53*** (4.447)	-7.241* (3.808)	-0.296 (3.040)	10.44** (4.105)	-2.375 (3.214)				
Post*WINC				-0.579 (1.372)	-0.594 (2.582)	-1.271 (1.829)	-1.695 (1.884)	2.142 (3.205)	-2.745 (2.524)	-1.696 (2.156)	-10.39*** (3.052)	-2.406 (2.610)				
Constant	40.87*** (0.362)	40.86*** (0.371)	43.34*** (0.404)	44.17*** (2.160)	44.99*** (4.564)	45.89*** (2.079)	45.71*** (2.800)	53.79*** (4.687)	46.36*** (2.523)	39.53*** (3.436)	29.08*** (4.424)	43.42*** (2.859)				
Observations	8,061	8,061	8,061	8,061	8,061	8,061	4,999	4,999	4,999	3,062	3,062	3,062				
R-squared	0.028	0.035	0.032	0.053	0.051	0.051	0.039	0.044	0.04	0.058	0.066	0.049				

Source: Authors' calculations based on LFS.

*, ** and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses.

Table 11 – Effects of minimum wage increase on the probability of informality

	Entire sample				Entire sample				Men				Women			
	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below	Wage gap	Fraction affected	Fraction below
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Post	0.0208	0.0402**	-0.0284*	-0.0691*	-0.0475	-0.0722*	-0.0917	-0.0498	-0.126*	-0.0319	-0.0249	0.0092				
	(0.019)	(0.018)	(0.015)	(0.041)	(0.082)	(0.040)	(0.074)	(0.161)	(0.071)	(0.046)	(0.075)	(0.045)				
Bite	0.730***	0.531***	0.433***	0.0556	-0.0261	-0.0411	0.248	-0.063	-0.115	-0.0421	-0.0027	0.0066				
	(0.187)	(0.081)	(0.078)	(0.099)	(0.088)	(0.065)	(0.215)	(0.174)	(0.106)	(0.065)	(0.052)	(0.040)				
Post*Bite	-0.200**	-0.135***	-0.219**	-0.01	-0.0285	0.00353	-0.108	-0.087	0.0126	0.0521	0.0198	-0.0134				
	(0.098)	(0.047)	(0.094)	(0.097)	(0.082)	(0.050)	(0.219)	(0.177)	(0.102)	(0.061)	(0.054)	(0.039)				
Age				0.00131***	0.00126***	0.00126***	0.00207***	0.00185***	0.00190***	5.82E-04	0.0006	0.0006				
				(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
Female				-0.0453***	-0.0390***	-0.0377***										
				(0.012)	(0.011)	(0.012)										
Secondary ed.				-0.0293	-0.0306	-0.0301	-0.0124	-0.0151	-0.0134	-0.0367*	-0.0367*	-0.0364*				
				(0.019)	(0.020)	(0.020)	(0.026)	(0.029)	(0.028)	(0.019)	(0.019)	(0.019)				
Tertiary ed.				-0.0404*	-0.0484**	-0.0547**	-0.0341	-0.0538	-0.0714*	-0.0314*	-0.0292	-0.0298				
				(0.022)	(0.021)	(0.024)	(0.036)	(0.037)	(0.039)	(0.018)	(0.018)	(0.020)				
WINC				-0.373***	-0.401***	-0.410***	-0.559***	-0.641***	-0.676***	-0.158***	-0.146**	-0.135**				
				(0.056)	(0.088)	(0.069)	(0.092)	(0.158)	(0.117)	(0.055)	(0.069)	(0.056)				
Post*WINC				0.103***	0.0842	0.106*	0.173**	0.128	0.200*	0.0234	0.0197	-0.0171				
				(0.039)	(0.076)	(0.059)	(0.068)	(0.152)	(0.116)	(0.042)	(0.070)	(0.063)				
Observations	8,061	8,061	8,061	8,061	8,061	8,061	4,999	4,999	4,999	3,062	3,062	3,062				

Source: Authors' calculations based on LFS.

*, ** and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses.

Table 12 – Effects of minimum wage increase on the probability of unemployment

	Entire sample			Men			Women	
	Fraction affected	Fraction below	Fraction affected	Fraction below	Fraction affected	Fraction below	Fraction affected	Fraction below
	(1)	(2)	(4)	(5)	(7)	(8)	(10)	(11)
Post	-0.0213 (0.018)	-0.0233 (0.016)	0.0349 (0.054)	0.0852 (0.089)	-0.0121 (0.077)	0.16 (0.141)	-0.0579 (0.101)	-0.152 (0.153)
Bite	0.489** (0.149)	0.186** (0.089)	0.133 (0.177)	-0.225 (0.155)	0.425 (0.318)	-0.322 (0.240)	-0.0794 (0.212)	-0.227 (0.209)
Post*Bite	-0.0487 (0.093)	-0.0178 (0.046)	-0.104 (0.102)	-0.104 (0.092)	0.0203 (0.197)	-0.205 (0.167)	-0.0257 (0.141)	0.0681 (0.129)
Age			-0.00856*** (0.001)	-0.00888*** (0.001)	-0.00732*** (0.001)	-0.00824*** (0.001)	-0.0102*** (0.002)	-0.0102*** (0.002)
Female			0.00165 (0.029)	0.0212 (0.027)				
Secondary ed.			-0.128** (0.061)	-0.151** (0.062)	-0.130* (0.077)	-0.165* (0.086)	-0.124 (0.080)	-0.139* (0.081)
Tertiary ed.			-0.158*** (0.061)	-0.208*** (0.057)	-0.157** (0.071)	-0.227*** (0.067)	-0.155* (0.091)	-0.181** (0.088)
WINC			0.0664 (0.134)	-0.0707 (0.166)	0.14 (0.179)	-0.0774 (0.251)	-0.118 (0.210)	-0.262 (0.241)
Post*WINC			-0.06 (0.055)	-0.111 (0.086)	0.000284 (0.076)	-0.163 (0.137)	0.014 (0.103)	0.102 (0.152)
Observations	10,606	10,606	10,606	10,606	6,641	6,641	3,965	3,965

Source: Authors' calculations based on LFS.

* **, and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses.

In conclusion, our findings suggest that the latest increase in the minimum wage, in September 2017, has had a positive and significant effect on wages, and that it has been found slightly stronger for women workers. We do not find any evidence that any of the mechanisms used to help employers adjust to the new minimum wage has worked: it did not exert any influence onto hours worked, informality and the probability of unemployment. However, we did find very limited evidence that some reduction of contracted hours might have occurred for women workers. We also find that ‘equalization’ took place, i.e. workers who had a salary around the new minimum wage have not obtained a wage increase, or, at best, that this has not happened yet.

3. Robustness checks

We conduct four sorts of robustness checks. First, we vary the cell composition. We drop regions and define five age groups, each 10 years wide, starting at 15 and ending at 64, and instead of having three levels of education, we used five. By so doing, we ended up with 50 cells, still being above Angrist’s (2008) rule of thumb of 42. **Table 13** presents the key results. They fully corroborate the findings of **Table 9**, **Table 10**, **Table 11** and **Table 12** for each outcome variable. They suggest that the MW increase resulted in an increase of wages per se, while the potential negative effects are all found to be statistically insignificant.

Table 13 – Effects of minimum wage increase on wages with Heckman correction

	Fraction affected	Fraction below	Wage gap
Wages			
Post	0.122*** (0.042)	-0.0253 (0.102)	0.0864* (0.044)
Bite	-0.585*** (0.182)	-0.775*** (0.211)	-0.301*** (0.111)
Post*Bite	0.295*** (0.100)	0.281** (0.111)	0.255*** (0.061)
Hours worked			
Post	0.0241 (1.100)	0.456 (2.369)	0.589 (0.886)
Bite	-1.247 (2.213)	0.755 (2.829)	1.876 (1.500)
Post*Bite	-1.622 (2.293)	-1.138 (2.500)	-1.991 (1.236)
Informality			
Post	-0.0967*** (0.034)	-0.155 (0.130)	-0.0961*** (0.032)
Bite	0.0554 (0.103)	-0.0359 (0.136)	-0.129* (0.073)
Post*Bite	0.147 (0.107)	0.114 (0.133)	0.104* (0.060)
Unemployment			
Post	0.0742 (0.049)	0.0523 (0.121)	
Bite	0.298 (0.203)	0.256 (0.179)	
Post*Bite	-0.119 (0.118)	-0.0227 (0.130)	

Source: Authors' calculations based on LFS.

*, ** and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses. Controls are accordingly used, but not presented due to space.

Secondly, we introduce cell-specific dummy variables in X_{ijt} in equation (5). We do this to dispose of the cell-specific unobserved factors to be potentially correlated with the outcomes (e.g. that highly educated young men in the Skopje region have consistently high wages, and higher employment chances). **Table 14** presents the results. All previous findings are confirmed, as estimated coefficients replicate their sign, magnitude and significance.

Table 14 – Effects of minimum wage increase with cell dummies added

	Fraction affected	Fraction below	Wage gap
Wages			
Post	0.158***	0.0625	0.150***
	(0.052)	(0.107)	(0.048)
Post*Bite	0.269**	0.216*	0.178***
	(0.117)	(0.111)	(0.045)
Hours worked			
Post	0.0483	0.218	0.0727
	(1.228)	(2.351)	(1.068)
Post*Bite	-1.563	-0.813	-0.992
	(2.392)	(2.466)	(1.016)
Informality			
Post	-0.046	-0.0432	-0.0544**
	(0.029)	(0.058)	(0.025)
Post*Bite	-0.0206	-0.0108	0.00547
	(0.082)	(0.062)	(0.043)
Unemployment			
Post	0.0652	0.112	
	(0.058)	(0.107)	
Post*Bite	-0.137	-0.114	
	(0.127)	(0.116)	

Source: Authors' calculations based on LFS.

*, ** and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses. Dummies and controls are accordingly used, but not presented due to space. The coefficient of the bites is wiped out by the dummies, since both are cell-invariant.

Thirdly, we estimated the wage, hours and informality equations through the Heckman (1976, 1979) two-step method, to account for potential selectivity bias. Marriage is used as exclusion restriction. The sample also expands to take into consideration unemployed and inactive individuals.

Table 15 presents the results. The Post*Bite coefficient retains its significance and magnitude in the case of wages, hence corroborating the main results. The potential of negative selection (negative though insignificant ρ) does not affect the key findings about the effect of the MW increase on wages. Similarly, the inexistence of the potentially negative effect of increasing the MW on hours worked and informality status is again established.

Table 15 – Effects of minimum wage increase on wages with Heckman correction

	Fraction affected		Fraction below		Wage gap	
	Outcome equation	Selection equation	Outcome equation	Selection equation	Outcome equation	Selection equation
Wages						
	(1)	(2)	(3)	(4)	(5)	(6)
Post	0.140***	-0.0503	0.0297	-0.000451	0.0867	-0.0225
	(0.052)	(0.104)	(0.101)	(0.121)	(0.064)	(0.069)
Bite	-0.423**	-0.654	-0.807***	0.365	-0.625***	-0.654
	(0.176)	(0.483)	(0.116)	(0.368)	(0.109)	(0.483)
Post*Bite	0.280**	0.0823	0.242**	-0.0332	0.296***	0.0823
	(0.117)	(0.212)	(0.104)	(0.123)	(0.082)	(0.212)
Hours worked						
Post	0.416	-0.0513	0.381	-0.00198	0.464	-0.0223
	(1.317)	(0.104)	(2.633)	(0.122)	(1.229)	(0.069)
Bite	6.298*	-0.658	1.087	0.364	0.299	-0.658
	(3.300)	(0.483)	(4.218)	(0.368)	(1.832)	(0.483)
Post*Bite	-1.964	0.0862	-0.725	-0.031	-1.222	0.0862
	(2.340)	(0.212)	(2.656)	(0.124)	(1.135)	(0.212)
Informality						
Post	-0.502*	-0.0497	-0.355	-0.00064	-0.526**	-0.0225
	(0.275)	(0.104)	(0.579)	(0.121)	(0.268)	(0.069)
Bite	0.327	-0.653	-0.177	0.365	-0.324	-0.653
	(0.733)	(0.482)	(0.629)	(0.367)	(0.471)	(0.482)
Post*Bite	-0.078	0.0816	-0.204	-0.0326	0.0386	0.0816
	(0.705)	(0.212)	(0.605)	(0.124)	(0.359)	(0.212)
Observations	27,133	27,133	27,133	27,133	27,133	27,133

Source: Authors' calculations based on LFS.

*, ** and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses. Controls are accordingly used, but not presented due to space. Marital status is used as exclusion restriction, but not shown due to space. The coefficient has been positive and significant in all specification, suggesting that married individuals have higher probability of being employed.

The final robustness check is to add an additional explanatory factor in (5). We use the opportunity to test if the Two Sector Model or the lighthouse effect is present i.e. whether increasing the statutory minimum wage affected the wages in the informal sector. To equation (5), we add an indicator on informality, as well a cross product of Post*Informality. The coefficient in front of the latter will reveal a potential two-sector or lighthouse effect. **Table 16** presents the results; the table is organized in two panels: the upper panel presents the results for the entire sample disaggregated by sex; and the lower panel presents the results for the three sectors with the largest incidence of the MW: textiles, leather and apparel, construction and market services (see **Table 5**).

Two important patterns are observed in **Table 16**. Firstly, the Post*Bite coefficient – revealing the causal effect of the MW increase on wages – is corroborated in most of the cases. The

magnitudes and significances are similar to our earlier findings (see **Table 9**), hence serving a robustness check.

Secondly, the negative coefficient in front of Informal suggests that workers without written contract (informal workers) earn, on average, 37-38 per cent less than workers with formal contract, articulating a formal-informal dichotomy on the Macedonian labour market. However, the coefficient on Post*Informal captures the extent to which the existing wage differences between the two sectors was increased or reduced after the MW increase. As the coefficient is insignificant, we conclude the formal-informal wage differential has been maintained, i.e. the statutory increase in the MW dragged up informal wages by the same proportion as in the formal sector. This is an indication of the potential existence of the lighthouse effect.

The textile, leather and apparel industries are exceptions. At 22 per cent, the formal-informal wage difference before the MW increase was lower in these industries, which one would expect, given the prevalence of the minimum wage there. This gap increased after the MW increase to 32-36 per cent, suggesting a negative spill-over effect, corroborating the predictions of the two sector model. The finding suggests that while informality was likely not affected by the MW increase in terms of its incidence (recall **Table 11**), it likely negatively affected the wages of informal workers in the sector where the incidence of the MW is the highest.

Table 16 – Two-Sector or Lighthouse effect

	All			Men			Women		
Post	0.0597 (0.052)	-0.0625 (0.105)	0.000928 (0.069)	0.00648 (0.073)	0.102 (0.204)	0.0245 (0.062)	0.142 (0.128)	-0.189 (0.155)	-0.0233 (0.151)
Bite	-0.507*** (0.174)	-0.884*** (0.124)	-0.683*** (0.109)	-0.23 (0.325)	-1.030*** (0.177)	-0.881*** (0.067)	-0.470*** (0.160)	-0.673*** (0.110)	-0.484*** (0.107)
Post*Bite	0.328*** (0.105)	0.273*** (0.101)	0.325*** (0.084)	0.446* (0.239)	0.0639 (0.233)	0.262*** (0.075)	0.300** (0.144)	0.407*** (0.101)	0.324*** (0.097)
Informal	-0.372*** (0.038)	-0.378*** (0.040)	-0.384*** (0.039)	-0.374*** (0.036)	-0.376*** (0.040)	-0.386*** (0.039)	-0.385*** (0.129)	-0.385*** (0.125)	-0.387*** (0.127)
Post*Informal	0.0191 (0.041)	0.0202 (0.040)	0.0305 (0.041)	0.0294 (0.041)	0.0254 (0.040)	0.0382 (0.040)	-0.0136 (0.126)	-0.0117 (0.123)	-0.00909 (0.126)
Sectors									
	Textiles, leather, apparel			Construction			Market services		
Post	0.171 (0.165)	0.0506 (0.258)	0.19 (0.162)	0.553*** (0.181)	0.354 (0.355)	0.158 (0.158)	0.219*** (0.080)	0.0889 (0.108)	0.155** (0.059)
Bite	-0.410** (0.189)	-0.310** (0.150)	-0.340* (0.185)	0.407 (0.634)	0.0662 (0.273)	-0.407 (0.278)	-0.313 (0.192)	-0.168 (0.185)	-0.443** (0.175)
Post*Bite	0.279 (0.238)	0.196 (0.191)	0.133 (0.187)	-0.889 (0.638)	-0.0812 (0.405)	0.351** (0.154)	0.153 (0.142)	0.219* (0.120)	0.223*** (0.055)
Informal	-0.195*** (0.060)	-0.218*** (0.052)	-0.220*** (0.051)	-0.103 (0.087)	-0.102 (0.088)	-0.121 (0.091)	-0.163** (0.066)	-0.163** (0.064)	-0.180*** (0.061)
Post*Informal	-0.132* (0.067)	-0.125* (0.064)	-0.137** (0.061)	-0.0522 (0.088)	-0.0522 (0.094)	-0.0361 (0.092)	-0.0262 (0.081)	-0.0228 (0.080)	-0.00952 (0.077)
Source: Authors' calculations based on LFS.									
* **, and *** denote statistical significance at the 10, 5 and 1 per cent level, respectively. Standard errors provided in parentheses. Controls are accordingly used, but not presented due to space.									



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