Minimum wage rates in 207 countries, 2014-2023

WageIndicator Foundation

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WageIndicator started in 2000 to contribute to a more transparent labour market by publishing easily accessible information online. It collects, compares and shares labour market information through online and face-to-face surveys and desk research. It publishes the collected information on national websites in almost 200 countries, thereby serving as an online library for cost of living and wage information, labour law, and career advice, both for workers/employees and employers. The WageIndicator websites and related communication activities reach out to millions of people each month.

By 2024 WageIndicator has its HQ in Amsterdam (HQ) and regional hubs in Bratislava, Buenos Aires, Cairo, Cape Town, Jakarta, Islamabad, Maputo, Pune, Sarajevo and Venice. The foundation has a core team of 75 people and some 300 associates - specialists in wages, labour law, industrial relations, data science, data collection, statistics - from all over the world. On a yearly basis, WageIndicator Foundation offers around 150 internships to students from different universities. FLAME University in Pune, India, plays a key role in the intern program.

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Bibliographical information

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Abstract

Minimum wages are often associated with one rate per country with yearly updates, but only a minority of countries applies this model. Our study concludes that two not-mutually exclusive models for minimum wage setting are dominant, namely ensuring minimum wages for the entire labour force in 147 countries and mimicking collective bargaining in 76 countries. To achieve this outcome we used a database with fine-grained minimum wage information for 207 countries for each month between 2014-2023. The database contains information for more than 22,000 minimum wages, of which two-thirds from India with its mimicking model. Minimum wage levels are extremely low in Africa. In four out of five African countries hourly wages are less than 2 PPP adjusted US Dollar (USD), compared to less than one out of ten in the Americas and Europe. In nine years, on average countries updated their minimum wages 3.8 times, thus every 2.4 years. 39 countries did not update at all. High-income countries update more regularly. Expressed in USD in the period 2015-2022 in just nine countries the minimum wages increased faster than inflation while in 137 countries with data available the minimum wages lagged behind inflation, particularly in Africa and low-income countries.

1. Introduction

In recent years statutory minimum wages are ranking high on the policy agendas of many governments and international organisations. In 2015, the United Nations formulated Sustainable Development Goal 8 (SDG-8) about “decent work and economic growth”, to be reached by 2030. Although not explicitly mentioned in SDG-8, decent minimum wages can be considered pivotal here, assuming that their provision could fuel economic and social development around the world. In 2019 the International Labour Organisation (ILO) Centenary Declaration called for “an adequate minimum wage, statutory or negotiated” (ILO 2019). In October 2022, the European Council issued a Directive on adequate minimum wages in the EU aiming “to help to achieve decent working and living conditions for employees in Europe (European Commission 2022).

In light of the recent advocacy for decent minimum wages, knowledge that spans the world on minimum wage levels and on whether these levels are keeping up with inflation is lagging behind. This is in particular the case for low- and middle-income (LMI) countries. This paper explores in-depth the varieties cross-country and over time in minimum wage rates, using a fine-grained database with over 22,000 rates in 207 countries for each month from January 2014 till December 2023. Based on the minimum wage descriptions in this database, our study first reconstructs five key types questioning: do countries aim for minimum wage setting in their entire labour force, for reducing poverty, for ensuring productivity, for keeping up with the Consumer Price Index (CPI) differences in their country, or do they mimic collective bargaining? Second, we question: do these types affect countries’ updating policies and related nominal minimum wage increases, and the extent to which minimum wages keep up with inflation?

The roadmap of this contribution is as follows. Section 2 contains a literature review regarding the history of minimum wages and the academic literature related to the minimum wage fixing machineries as well as the levels of coverage and of compliance with minimum wage legislation. Section 3 provides details of the WageIndicator Minimum Wage Database (MWDB), a unique dataset used here. Section 4 presents the descriptive and explanatory findings related to the five types. Section 5 details the analytical results regarding levels and trends. Section 6 concludes, reflects, and presents recommendations.

2. Literature review

How minimum wages became common

The first statutory minimum wages date back to the 19th century. In 1894 New Zealand was the first country to implement a minimum wage, followed by the Australian state of Victoria in 1896, and the United Kingdom in 1909. Early forms of minimum wages targeted their protection at homeworkers or women, like those discussed in the United States in the 1900s and 1910s. In 1938 the US Congress adopted the Fair Labor Standards Act, which instituted a federal minimum wage that was validated by the US Supreme Court in 1941 (ILO 2016, 7). After the second World War, newly independent countries also adopted statutory minimum wages. India was the first, with the Minimum Wages Act 1948 enacted soon after the country gained independence. Though extremely complex from an administration perspective, this Act still can be considered a landmark (Varkkey 2015, 120). In 1961 the Pakistan Minimum Wages Ordinance regulated the minimum rates of wages "for all classes of workers employed in certain industrial undertakings" (Ali et al. 2015, 110). In Francophone Africa, countries adopted the French model of a general minimum wage (SMIG) with a lower rate for agriculture (SMAG), while Anglophone African countries followed the tradition of creating sectoral wage boards. Since the early 1990s many more developing and emerging economies established minimum wages, like China in 1994 and South Africa, after the end of apartheid, in 1997 (ILO 2016, 7-8).

The ILO, founded in 1919 under the League of Nations and from 1945 a specialised United Nations agency, is coordinating and advising countries on their minimum wage setting. A form of international wage coordination started in 1928, when the General Conference of the ILO adopted the Minimum Wage-fixing Machinery Convention (Convention No. 26). According to this Convention, each ratifying member undertakes or creates a "machinery whereby minimum rates of wages can be fixed for workers employed in certain of the trades or parts of trades (and in particular in home-working trades) in which no arrangements exist for the effective regulation of wages by collective agreement or otherwise and wages are exceptionally low"; agriculture was excluded. Two subsequent ILO Minimum Wage Conventions, No.'s 99 and 131, have enlarged the scope of minimum wages beyond the categories of workers explicitly mentioned in No. 26, though Convention No. 99 as of 1951 was limited to workers employed in agricultural undertakings and related occupations. In 1970 Convention No. 131, the Minimum Wage Fixing Convention, regulated minimum wages in greater detail. It covers "all groups of wage earners whose terms of employment are such that coverage would be appropriate." Other than the older Conventions, No. 131 explicitly requires the ratifying countries to regularly adjust the minimum wage rate and to establish objective criteria for such adjustments, stipulating "When determining the level of minimum wages, this shall include as far as possible and appropriate in relation to national practice and conditions, the needs of workers and their families, taking into account the general level of wages in the country, the cost of living, social security benefits, and the relative living standards of other social groups, as well as economic factors". Clearly, the post-war ILO Conventions stimulated governments to initiate (mechanisms for fixing) minimum wages although from an administrative viewpoint Convention No. 26 has remained the main impetus.

The minimum wage setting machinery worldwide

As shown in cross-country studies (Rani et al. 2013; Van Klaveren et al. 2015; Bhorat et al. 2017), the minimum wage fixing machinery varies largely across countries. Three databases provide relevant information on the institutional context of this machinery. The *OECD/AIAS ICTWSS database* provides data on industrial relations allowing to capture the institutional

variety in wage-setting processes, based on country-level surveys or interviews with key persons (Visser 2021; Besamusca et al. 2021; https://www.oecd.org/employment/ictwss-database.htm). Its 2023 version covers 56 countries; for 37 of them it captures data between 1960 and 2020, with shorter time series for the remaining countries. *ILO's NORMLEX ratification database* provides an overview which of the 196 ILO member states have signed the Conventions, and if so, on which date (website ILO NORMLEX Ratification by Convention). It shows that by Januari 5, 2024, Convention No. 26 had been ratified by 104 countries and Conventions No.'s 99 and 131 by 52 respectively 53 countries. The third source are the *WageIndicator Minimum Wages Regulations webpages*, for 91 countries providing detailed information about the current national Minimum Wage Legislation (https://wageindicator.org/labour-laws/labour-law-around-the-world/minimum-wages-regulations). Though the numbers of ratifying countries may suggest otherwise, these three sources clarify that the majority of countries have a country-level minimum wage-fixing machinery in place albeit with a wide variety. These machineries regulate minimum wage setting either at national or at sub-national level, as part of the country's labour legislation or separately. Main dimensions address the extent to which the labour force is covered and whether minimum wages vary across occupations, industries, geographical areas or other dimensions (ILO 2014, 49-68).

ILO's Global Wage Report 2020-21 states that the primary objective of a minimum wage is "to protect workers against unduly low pay", adding that "(….) many countries have recognized the additional potential of a minimum wage to promote equality by increasing workers' remuneration and improving the living conditions of those at the lower end of the wage distribution" (ILO 2020, 56). The report identifies three sets of conditions under which minimum wages can best reduce inequality and contribute to social justice: (a) broad legal coverage and compliance with minimum wage legislation; (b) an adequate minimum wage level, and (c) beneficiaries who are at the lower end of the wage and income distributions (ILO 2020, 59, 89). As we will discuss, bodies of knowledge have become available taking into account these three conditions.

Coverage and compliance

How well-developed minimum wage fixing machineries may be, the positive effects of minimum wages will remain disappointing if, first, legal coverage is limited and regulations do not cover majorities of the labour force and, second, if compliance with existing regulations is limited and the enforcement capacity of governments remains weak. The ILO Global Wage Report 2020-21 stated that in 2020 266 million wage earners around the world earned less than existing hourly minimum wages, either because they were not legally covered or because of non-compliance. It noted that the groups most frequently excluded from legal coverage were agricultural workers and domestic workers and that, as of 2020, an estimated 18 per cent of countries with minimum wages excluded either one of these occupational groups or both (ILO 2020, 17).

(Non-)compliance is the next issue at stake. One of the most significant indicators of non-compliance is a high incidence of informality: "In countries with high levels of informality, if minimum wages are to be effective, they need to be accompanied by measures to encourage formalization" (ILO 2020, 17). The basis of this citation can be found in ILO's Transition from the Informal to the Formal Economy Recommendation, 2015 (No. 204), stating that countries should progressively extend minimum wage protections to workers in the informal economy through formalization. As other measures needed the Global Wage Report mentions targeted labour inspections, awareness-raising campaigns, and in particular efforts to raise productivity (ILO 2020, 96-97). ILO's definition of informal employment refers to working arrangements that are de facto or de jure not subject to national labour legislation, income taxation or entitlement to social protection or certain other employment benefits. It separates three groups of workers: (i) employees considered informally employed (if their

employer does not contribute to social security on their behalf); (ii) employers and own-account workers if they run an economic unit in the informal sector, and (iii) contributing family workers, informally employed by definition. Worldwide, the ILO estimated for 2019 informal employment at 58.2 per cent of total employment: 46.0 per cent in the informal sector; 7.6 per cent in the formal sector, and 4.6 per cent in households (ILO 2023, 17). A caveat worth mentioning is that these figures are mainly based on national labour force surveys with often large margins of error (Tijdens et al. 2015, 870). Also, it has to be noted that besides agricultural and domestic workers the informal sector includes a variety of other occupational groups such as retail and wholesale trade, hospitality and transport (Van Klaveren and Tijdens 2012, 77-100).

Thus far, only a few studies have dared to calculate the gaps in minimum wage compliance in multiple countries while taking into account the complexity of minimum wage setting. An ILO team did so for 11 developing and emerging countries in Africa, Asia and Latin Ameri-ca. They found that in 2009, taking the full complexity of minimum wages into account, the rate of compliance with minimum wage regulations ranged from 95 per cent in Vietnam to only 49 per cent in Indonesia. Their estimates of the 'depth' of violations showed that by then in most of these countries underpaid workers received on average about 30 to 40 per cent less than the applicable minimum wage. A low level of minimum wages –estimated by the Kaitz index: the ratio of minimum to median wages-- tended to be associated with a relative-ly high degree of compliance (Rani et al. 2013, 391-393). Bhorat et al. (2017) traced compliance levels among covered workers in seven SSA (Sub-Saharan Africa) countries using labour force and household survey data. On average, in the SSA countries non-compliance was slightly higher than in the 11 countries researched by the ILO team but, in contrast, non-compliance was less 'deep' here. Interestingly, in the SSA group high levels of non-compliance were noticed in the countries with relatively complex minimum wage schedules.

Adequate minimum wage levels

ILO's Global Wage Report 2020-21 also addresses what can be regarded an adequate minimum wage level: the second main factor determining the impact of a minimum wage on inequality. The report indicates the existence of a balance act here: "If set too low, minimum wages will have little effect in protecting workers and their families against unduly low pay or poverty. If set too high, compliance will be poor and/or there will be adverse employment effects. Setting an adequate minimum wage level between these two extremes is not an easy task, and has to take into account the social and economic context of the country, as well as the number of rates that are in place" (ILO 2020, 98). Consequently, the Report continues, Convention No. 131 calls for a balanced and evidence-based approach to setting minimum wage levels which considers, on the one hand, the needs of workers and their families and, on the other, economic factors.

The fact that Convention No. 131 stipulates to take into consideration "the general level of wages in the country, the cost of living (….)", implies that countries are under the obligation to update minimum wages regularly and if needed frequently as to keep up with inflation ie. with the applicable CPI. In the European Union, around half of the countries with minimum wages have to take inflation into account when setting rates (Eurofound 2022). The unprecedented inflation in 2022, occurring almost on a global scale, as well as inflation in specific countries and specific time frames, raises the question to what extent countries are keeping their minimum wages up with the CPI, not only when stated in the minimum wage legislation, but also in real terms.

Distributional and employment effects

Since the 1960s a stream of empirical research has in particular been addressing the distributional and employment effects of minimum wages. This stream is now well established; several reports and journal articles have reviewed the findings in this field, in particular those in a number of low- and middle-income (LMI) countries (Belman and Wolfson 2014; Grimshaw et al. 2014; Neumark and Wascher 2007; Neumark et al. 2014; Betcherman 2015; Bhorat et al. 2017; ILO 2020; Varkkey et al. 2021).

The debate on *distribution effects* concentrates on the issue whether minimum wage legislation contributes to reduce inequality, in other words pay equity, and reduce poverty levels. The picture out of our review literature arising from 35 LMI country-level studies, covering 14 countries and the period between 2001 and 2018, is that introducing or raising minimum wages either redistributed income slightly in favour of the poor in both the formal and the informal sectors, or that the evidence in this regard was inconclusive. For the three countries extensively researched, Brazil, Indonesia and South Africa, there is proof that the compliance rate in the informal sector has played a substantial role. Relatively high minimum wages could repeatedly be attributed to underdeveloped or government-constrained collective bargaining, as was the case for Indonesia (Tjandra and Van Klaveren 2015; Van Klaveren 2021).

Concerning the *employment effects* of introducing or raising minimum wages a small majority of the LMI country-level studies included in the review literature listed above, in this regard covering 16 countries and once more the period between 2001 and 2018, concluded to – mostly small-- negative effects on the employment opportunities of young, unskilled and women in notably the informal sectors of most countries. A minority of these studies concluded to positive effects, albeit statistically insignificant or overall small (Betcherman 2015: 138-9).

Research objectives detailed

This body of knowledge points to a white spot, namely a global analysis of country's typology of their minimum wage fixing machinery. Our study aims to understand these types, focussing on in- or excluded labour market groups as well as on the related wage levels and their trends, controlled for purchasing power parity. We pursue two research objectives:

1 which types follow countries according to their minimum wage descriptions and levels: ensuring minimum wages for the entire labour force; reducing poverty; ensuring productivity; keeping up with the applicable consumer price index, and/or mimicking collective bargaining?;
2 do these types contribute to explain the variation in minimum wage levels and trends across countries, and do these trends keep up with inflation during 2014 – 2023?

3. Methods and data

Minimum Wage Databases

For an exploration of the research objectives, four databases with Minimum Wage rates and time series are available. First, the *ILO Wages and Working Time Statistics* (website ILOSTAT) provide time series of the statutory gross monthly minimum wages for 164 countries, with one rate per country per year over 1980-2023, though not all years for all countries. For countries with multiple rates the minimum wages are averaged. Second, the *OECD.Stat database* includes time series over 2001-2022 of the annual minimum wages for 30 (of 38) OECD member states and six non-member countries, also providing one rate per country per year (website OECD.Stat database). Third, the *WSI-Mindestlohndatenbank International* contains yearly time series over 2000-2023 of the hourly and monthly minimum wages in PPP-adjusted Euro, for 22 EU member states, eight European countries outside the EU and eight countries in continents other than Europe, providing one rate per country per year (Luebker and Schulten 2022; website WSI). This database calculates a weighted average for countries with multiple rates or multiple updates during the year. Fourth, the *WageIndicator Minimum Wage Database (MWDB*) contains monthly rates in Local Currency Units (LCU) from 2014 on, registering all minimum wage rates valid in 207 countries, of which all 193 United Nations members plus an additional 14 countries or dependent territories, namely, Aruba, Bermuda, British Virgin Islands, Bonaire/St Eustatius/Saba, Cayman Islands, Cook Islands, Hong Kong, Kosovo, Macao, New Caledonia, Palestine, Puerto Rico, Réunion, and Taiwan. (For readability reasons we will use 'countries' here for both countries and territories). For each month MWDB includes more than 22,000 rates valid in that month. This fine-grained database is better suited for understanding the types of minimum wage setting within and across countries and over time than the one-rate-per-country-per-year approach of the other three databases. This paper therefore uses MWDB while selecting the monthly rates between January 2014 and December 2023. For the codebook, see Tijdens, Amanquarnor, Ahmad (2024).

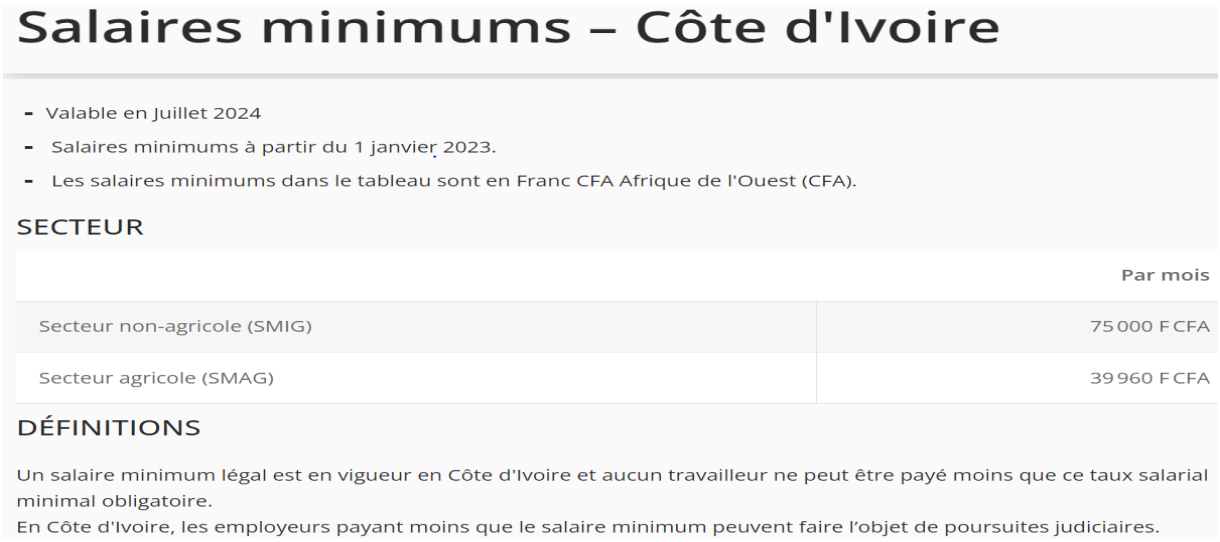
MWDB is maintained by the WageIndicator Foundation, a Netherlands-based NGO running frequently visited websites with job-related content in the national language(s) in 207 countries. In 2001 the Foundation launched a website in the Netherlands, called www.loonwijzer.nl , and from 2004 on websites for other countries followed. All websites provide easily accessible and findable information related to the national labour laws; minimum wages; living wages; collective labour agreements; salaries by occupation; wages of celebrities, and alike. Already early on, the coordinating Dutch team became aware that the minimum wage webpages were quite frequently visited. The Foundation also deploys research and consciousness-raising projects related to these websites and its data collections. In 2023 WageIndicator got worldwide 39 million unique web and social media visitors. WageIndicator's helpdesk continues to receive many messages from visitors, like when they notice gaps or errors in the content of webpages.

India stands out as a special case, with thousands of minimum wage rates, defined per state and within states per sector, job title, skill level or other characteristics. Each state publishes minimum wages in official *Notifications*. These proved difficult to find online, were frequently updated and sometimes published in the local language only. When in 2005 WageIndicator launched a website in India, www.paycheck.in, the Indian WageIndicator team got questions from web visitors asking about the applicable minimum wage. The team initiated collecting these Notifications by contacting each state's Labor Ministry (Varkkey and Mehta 2015), publishing them online. By 2015 Paycheck had become the leading website in India in this regard. WageIndicator teams from other countries reported similar experiences and took similar action. South Africa also has complex minimum wages, and from 2010 onwards www.mywage.co.za in South Africa posted minimum wage rates. Similarly, the minimum

wage pages of www.gajimu.com made the Indonesian website popular. The difficulties in tracing minimum wage information may often flow from the background that Labour Ministries and Wage Boards are designed for decision-making while their dissemination capacities are typically not that well developed.

In the 2000s and 2010s WageIndicator published minimum wages on its national web pages by entering the rates directly into the websites' Content Management System. The desire to manage the data increased with an increasing number of participating countries, the need to harmonize the web pages and to keep track of updates. A spreadsheet was designed in which all rates of all countries were included in one tab while software was applied to feed these rates directly into the national minimum wage webpages. In January 2019 the spreadsheet and the database software became operational. If minimum wages were uprated, the outdated amount was replaced with the new one. To keep track of the rates over time a monthly data dump was stored in MWDB. To populate MWDB for the period 2014 to 2018, information was collected from the archived WageIndicator websites and, if missing, from online sources. For six countries the time series could not be completed over 2014-18 while for another nine countries that was the case for 2014-15.

Up till now almost 2,400 webpages in the national languages for the national websites (see: Figure 1) and another 2,400 duplicate webpages in English could be generated directly from the database, see www.wageindicator.org/salary/minimum-wage. The WageIndicator team at the Centre for Labour Research in Pakistan is tracking minimum wage updates by checking relevant websites of the Ministries of Labour and Wage Boards worldwide, and is receiving their notifications as well as alerts from team members and web visitors.



Salaires minimums – Côte d'Ivoire

- Valable en Juillet 2024
- Salaires minimums à partir du 1 janvier 2023.
- Les salaires minimums dans le tableau sont en Franc CFA Afrique de l'Ouest (CFA).

SECTEUR

	Par mois
Secteur non-agricole (SMIG)	75 000 F CFA
Secteur agricole (SMAG)	39 960 F CFA

DÉFINITIONS

Un salaire minimum légal est en vigueur en Côte d'Ivoire et aucun travailleur ne peut être payé moins que ce taux salarial minimal obligatoire.
En Côte d'Ivoire, les employeurs payant moins que le salaire minimum peuvent faire l'objet de poursuites judiciaires.

Figure 1 Screenshot of https://votresalaire.org/cotedivoire/salaire/salaire-minimum, accessed 10 July 2024

Defining Minimum Wages

MWDB targets Statutory Minimum Wage (SMW) rates specified by the issuing authorities, be it the national government or any institution entitled to issue such rates, like Ministries of Labour, Wage Boards, regional authorities, or municipalities. MWDB does not include wages agreed in Collective Labour Agreements because minimum wages in MWDB must have the force of law. The ILO (2020, 61) argues that countries with wage floors that apply only to the civil service/public sector are not counted as having a minimum wage, because these wages are regulated by pay scales and set through administrative law or legal arrangements. In MWDB two countries -- Bahrain and Republic of Congo (Brazzaville)-- have minimum wages

that apply only to the public sector. According to our assessment, these minimum wages have the force of law.

Each record in MWDB has a unique ID and has a description exactly copied from the *Notifications* provided by the issuing authority. Descriptions can be texts such as *National Minimum Wage*, but may equally refer to industries, job titles, or geographical areas. They may range from very detailed to very broad, in India for example from *Foundries with or without attached machine shops* to *Any manufacturing*. Descriptions may refer to a geographical entity, e.g. to the cities *Guolon, Haixi, Yushu* in the province of *Qinghai* in China, following the introduction of minimum wages in many Chinese cities (Hu 2015). Descriptions can refer to job titles, such as *Plumber in sanitary facilities in the Free Trade Zone of the Northern Border* in Mexico. Descriptions targeting youth, trainees or apprentices, tipped workers, handicapped workers or workers not covered by the Fair Labor Standards Act in the USA are classified as sub-minimum rates. Descriptions relating the wage to the volume of the work to be performed are classified as piece rates. By December 2023 MWDB contained information for 207 countries and 22,274 rates (records). With 14,724 rates India counted for almost two-thirds of all rates, followed by Ecuador with 2,178 rates and Pakistan with 1,257 rates.

Countries with none, one or multiple rates

Eighteen of 207 countries in MWDB have no statutory minimum wage: Bermuda, Brunei, Denmark, Finland, Iceland, Italy, La Réunion, Liechtenstein, Nauru, North Korea, Norway, Singapore, Somalia, South Sudan, Sweden, Tonga, Tuvalu, and Zimbabwe. Some of these countries are or recently were located in war zones and may therefore lack a minimum wage. Others remained without war for decades, such as the five Scandinavian countries just mentioned where a high level of union density has been decisive in abstaining from a statutory minimum wage (Eldring and Alsos 2015). Since 2014 only one country introduced a national minimum wage, namely Germany in January 2015.

In MWDB 93 countries have specified a single minimum wage rate, 62 between two and 10 rates, 22 between 11 and 100 rates, nine between 100 and 1,000 rates, and three countries have more than 1,000 rates. Figure 2 shows a breakdown by continent and countries' income class.

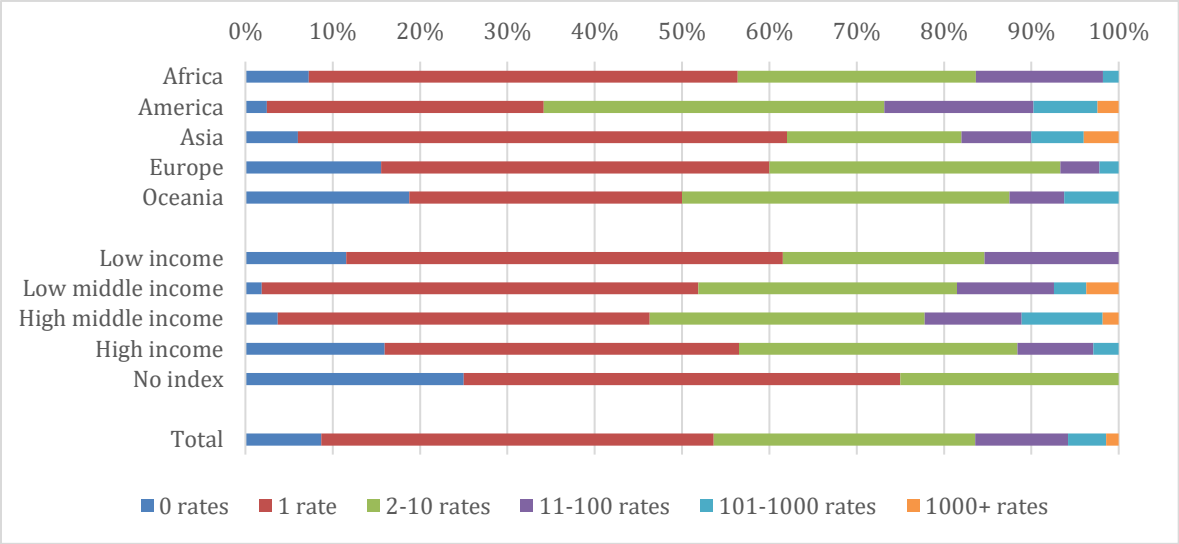


Figure 2 Stacked bar graph of countries by number of Minimum Wage rates in 2023, by continent and 2023 income class

Source: *Country aggregates of the WageIndicator Minimum Wage Database December 2023,*
Africa N=55, Americas N=41, Asia N=50, Europe N=45, Oceania N=16, Total N=207
Low income N=26, Lower middle-income N=54, Upper middle-income N=54, High-income N=69, No index N=4, Total N=198

Between 2014 and 2023, 30 countries increased the number of minimum wage rates because their wage-issuing institutions agreed on adding new rates. For example, in the USA a growing number of cities and counties decided to lift the minimum wage rate above the federal rate. MWDB shows that in Pakistan for the higher-skilled job titles a tighter division of labour took place and hence for these job titles an increasing number of minimum wages could be observed, whereas that was not the case for the lower-skilled job titles. Since 2014 many more new rates entered MWDB while only a few disappeared.

Hourly and monthly minimum wages

MWDB registers the pay period of each minimum wage rate. These range from hours to years. In the USA all minimum rates are defined per hour, whereas in Russia all rates are defined per month. China specifies monthly rates for full-time workers and hourly rates for part-time workers (Hu 2015). In total 129 countries define each rate for just one pay period; for 87 countries this regards a monthly rate, while 31 countries specify an hourly rate, nine a daily rate and two a weekly rate. The 60 countries specifying multiple pay periods can be broken down in two groups. The largest group specifies few periods for each rate, mostly an hourly and a monthly rate. Another group specifies different pay periods for different rates. In India, for example, the rates of low-skilled workers are typically defined per day and those of high-skilled managers per month. Four countries specify in total 1,503 minimum wage rates for piece rate workers, namely Ecuador, India, Sri Lanka, and St Vincent and the Grenadines.

Countries with monthly rates typically apply standard days per month, thus the rates are equal whether a month has 28, 29, 30 or 31 days. Serbia is an exception here by specifying the rates depending on the number of working hours in the month at stake -- resulting in a higher monthly minimum wage in January compared to February. Four countries specify different rates for different lengths of the working week. Cuba specifies rates for weeks of 40 and 44 hours, Aruba for weeks of 40, 42, 44 and 45 hours, Tunisia for weeks of 40 and 48 hours, and Israel for 5 and 6 days per week. Two countries, the Netherlands and Malaysia,

specify similar monthly rates for different lengths of the working week. (Per January 2024 the Netherlands abandoned this rule).

Through using a table with standard weekly working hours per country for all years from 2014 on, the rates are converted to monthly and hourly rates. If a weekly or yearly pay period is specified, a monthly rate is achieved by multiplying these rates with 4.333 weeks per month respectively dividing by 12 months per year. For rates specified per hour, monthly rates are calculated by multiplying the rate with the country's standard weekly working hours times 4.333. For rates specified per day, monthly rates are calculated by dividing the rate by the standard working hours per day and multiplying these with the country's standard working hours per week times 4.333. If the wage issuer has specified multiple pay periods, monthly rates are prioritized, followed by hourly rates, and otherwise weekly and daily rates are used to compute monthly rates. MWDB does not calculate monthly rates for piece rate workers, neither does it account for 13th or 14th months or travel allowances nor does it correct for meals, accommodation or other non-monetary allowances.

The phrase 'standard working hours per week' refers to the weekly working hours as defined by the minimum wage issuer, though some countries - like the USA-- specify an hourly rate and leave the length of the working week to the employer. In just 50 countries the hours per week are specified in the Minimum Wage Notifications. Unfortunately, worldwide data is lacking regarding standard weekly working hours. In its Data catalogue ILO provides information about mean weekly hours actually worked. The World Bank presents information about the number of hours in the standard workday as well as on the maximum number of working days per week (see www.worldbank.org/en/research/employing-workers/data/working-hours), but neither ILO nor World Bank provide data about the standard weekly working hours. To fill this gap, WageIndicator has developed a table with standard working hours per week for the 207 countries between 2014 and 2023, based on a rigid comparison of a range of sources, including employment contracts and Collective Labour Agreements (Tijdens 2023). This table was used to calculate the monthly and hourly rates in MWDB.

Personal income taxation affects take-home wages. Gross wages can significantly deviate from net wages. The vast majority of countries in MWDB solely set a net wage and only 30 countries set a gross minimum wage, while Turkey and North Macedonia set both gross and net rates. The countries with gross minimum wages are either OECD or EU member countries, as well as the British Virgin Islands and Cayman Islands. Due to the complexities of national tax regulations, MWDB is not able to convert gross into net minimum wages.

PPP-adjusted minimum wages and other time series

All rates in MWDB are expressed in Local Currency Units (LCU). For the few countries with changes in their currency, rates have been converted to the most recent currency. For cross-country comparisons the monthly rates have been converted into the standardized International Dollar (Int$), using the World Bank's Purchasing Power Parities (PPP) indexes for private consumption (last update date 28-3-2024, when PPP factors for 2023 were not yet available).

Four external time series have been used. First, the Human Development Index maintained by the United Nations (https://hdr.undp.org/data-center/human-development-index?). Second, inflation rates for average consumer prices maintained by the IMF (https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD, accessed March 5, 2024). Third, employment figures of the working-age population by sex in most recent year till 2022, maintained by ILOSTAT (https://ilostat.ilo.org/topics/population-and-labour-force/). Fourth, data about the share of the labour force covered by Collective Labour Agreements maintained by ILOSTAT for 99 countries (https://ilostat.ilo.org/topics/collective-bargaining).

4. Minimum Wage setting types

Our first research objective addresses countries' types to implement one or more minimum wages. Do countries aim to protect the poorest categories of workers according to ILO Convention No. 26? Do they broaden the scope of the minimum wage to cover all those in wage employment? Do they aim to protect certain industries or small businesses assuming these are unable to pay minimum wages or keep up with competing countries? How do countries cope with different levels of cost-of-living across regions, if relevant? And in which countries does minimum wage setting mimic wage setting in collective bargaining? To answer these questions, the descriptions of the 22,274 rates in MWDB have been classified manually according to 11 categories that could be distinguished (Table 1). These descriptions have been clustered into five types, namely: (a) ensuring minimum wage for the entire labour force; (b) reducing poverty; (c) ensuring productivity; (d) regional cost-of-living adjustments, and (e) mimicking collective bargaining. Note that the five clusters are not mutually exclusive: countries can for example have a national minimum wage, thus ensuring full coverage, while additionally specifying some or all minimum wages by industry, thus mimicking collective bargaining. The latter is the case for 36 of the 189 countries with a SMW. In total 110 countries apply one type, and the remaining 79 apply two to five types.

Five types	Eleven categories plus their coverage
a) Decent wage for entire labour force	National/federal minimum wage (full coverage)
b) Reducing poverty among low-paid workers	MW rates for domestic workers MW rates for unskilled workers MW rates for agricultural workers MW rates for piece rate workers
c) Ensuring productivity	MW rates for small firm size groups MW rates for Export Processing Zones (EPZ) MW rates for young age groups
d) Regional cost-of-living adjustments	MW rates for geographical areas
e) Mimicking collective bargaining	MW rates for occupations MW rates for industries

Table 1 Five types for minimum wage setting, divided into eleven coverage groups

Minimum wage for the entire labour force: full coverage

Countries with a *National minimum wage* or a *Federal minimum wage* are classified as having full coverage, for example USA, Australia, Russia, or Argentina. Countries without a *National minimum wage*, but with minimum wages rates for all provinces, such as Canada, China, Japan, Philippines, and Bosnia and Herzegovina, are classified to have full coverage too. Chad ensures full coverage with two minimum wage rates, *Agricultural sector and similar* and *Non-agricultural sector*; so does Malawi with *Urban* and *Rural*. In 2023 in MWDB full coverage applied to 147 countries (77.7% of the 189 countries with SMW).

81 of these 147 countries have one single minimum wage, while the remaining countries have additional higher or lower rates for specific categories. Both Russia and the USA have one Federal Minimum Wage, but some of their states/regions or cities apply higher rates. Other countries apply additionally lower rates, like several western European countries and Australia with lower rates for youth categories. Figure 3 reveals that full coverage ranges from 68 per cent of the countries with SMW in Africa to 94 per cent in Europe and from 56

per cent in low-income countries to 86 per cent in high income countries. The countries with full coverage make up 10.5 per cent of all rates in MWDB.

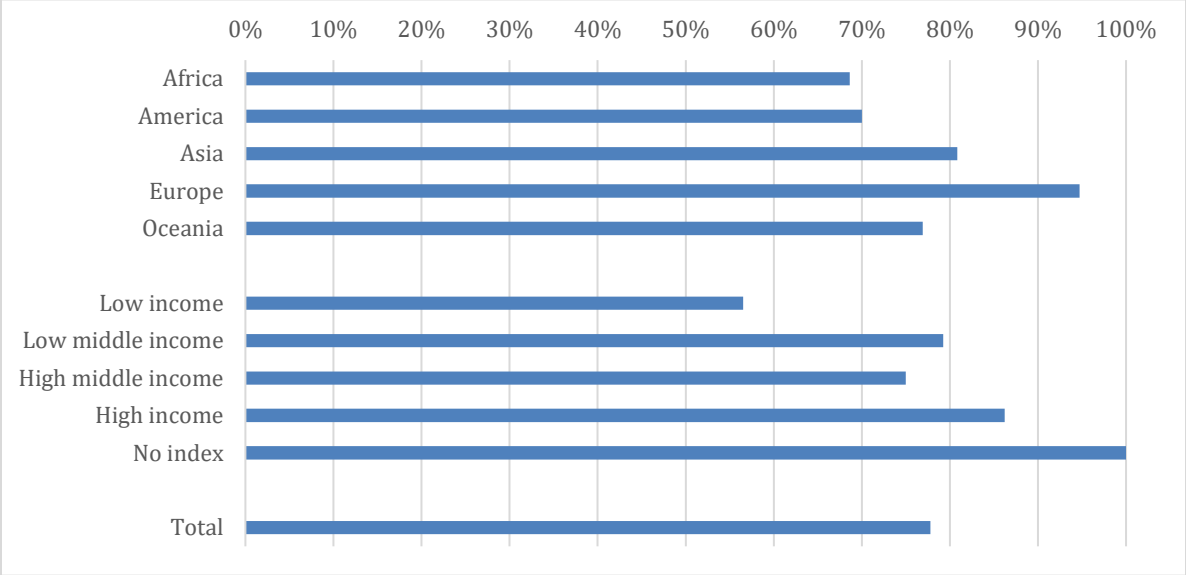


Figure 3 Bar graph of percentage of countries in MWDB with full coverage, by continent and income class

Source: *WageIndicator Minimum Wage Database MWDB, December 2023, country aggregated data, countries without SMW excluded,*
Africa N=51, Americas N=40, Asia N=47, Europe N=38, Oceania N=13, Total N=189
Low income N=23, Lower middle-income N=53, Upper middle-income N=52, High-income N=58, No index N=3, Total N=189

Reducing poverty for low-paid workers

ILO Convention No. 26 stipulates that countries should implement minimum wages for low-paid workers unprotected by collective bargaining. In the MWDB minimum wage descriptions four groups could be identified as specifically targeting low-paid workers, namely agricultural, domestic, unskilled, and piece rate workers.

For agricultural work a wide range of descriptions is used, ranging from *Harvesting, Weeding, Grass cutting* in Andhra Pradesh, India, to *Agriculture, Livestock and Forestry* in Mozambique, *Harvesting of Coffee* in El Salvador, or *Farm worker* in South Africa. In Malawi five of the six rates apply to agricultural workers, in the Philippines 33 out of 53 rates, and in Madagascar 20 out of 40 rates. Burundi, Chad, Senegal, and New Caledonia have two minimum wage rates, of which one each applies to agricultural workers. In total, MWDB has 1,594 agricultural rates in 30 countries (15.8% of countries and 7.1% of rates).

Descriptions of domestic workers address *Domestic work*, *Home assistant*, *Domestic Helper*, *Live-in domestic worker*, or just *Household work*. South Africa specifies rates for domestic workers working more or less than 27 hours per week. Tanzania specifies rates for domestic workers employed by diplomats, businessmen, and others. Argentina stands out with five different rates for domestic workers, notably for *Supervisor, Housemaid, Support and caretaker, Staff for general tasks,* and *Staff for specific tasks*. In MWDB, 24 countries have in total 112 rates for domestic workers (12.6% of countries and 0.5% of rates).

Minimum wage rates have been classified into skill levels when explicitly using the wording *Unskilled*, *Semi-skilled*, *Skilled*, or *Highly skilled*. A few countries use phrases that most likely indicate skill level differences, such as *Grades* or *Ranks*, but MWDB is unable to fit such phrases into the appropriate skill levels. India explicitly addresses the unskilled and semi-

skilled in almost 30 per cent of its more than 13,000 minimum wage rates, while Bangladesh, Pakistan and Sri Lanka do so in a quarter of their rates. In MWDB, 14 countries have in total 4,547 rates referring to unskilled and semi-skilled workers (7.4% of countries and 20.4% of rates). Though fewer rates refer to skilled and highly-skilled workers, skill level is one of the most applied divisions across the MWDB rates.

Piece work has been defined for rates in which the wage was related to the volume of the job to be performed. The descriptions vary largely. In Ecuador, piece rates are for example specified for *Crew member of fishing vessel crew per ton tuna fish*. In the Indian state of Andhra Pradesh piece rates are specified in *Cashew processing establishments for roastering 80 kilograms of cashew nuts*. Descriptions that explicitly address a job to be performed for a limited number of hours per day have also been classified as piece rates, for example *Domestic Workers - Washing clothes/washing utensils - One hour per day* in Bihar, India. MWDB observes 1,053 piece rates in four countries (2.1% of countries and 6.7% of rates).

The reducing poverty type is applied in 48 countries and in 4,969 rates (25.4% of countries with SMW and 22.3% of rates, Figure 4), most frequently in the Americas and in low-middle income (LMI) countries. Within this type, rates for agricultural workers show up most frequently and piece rates least so.

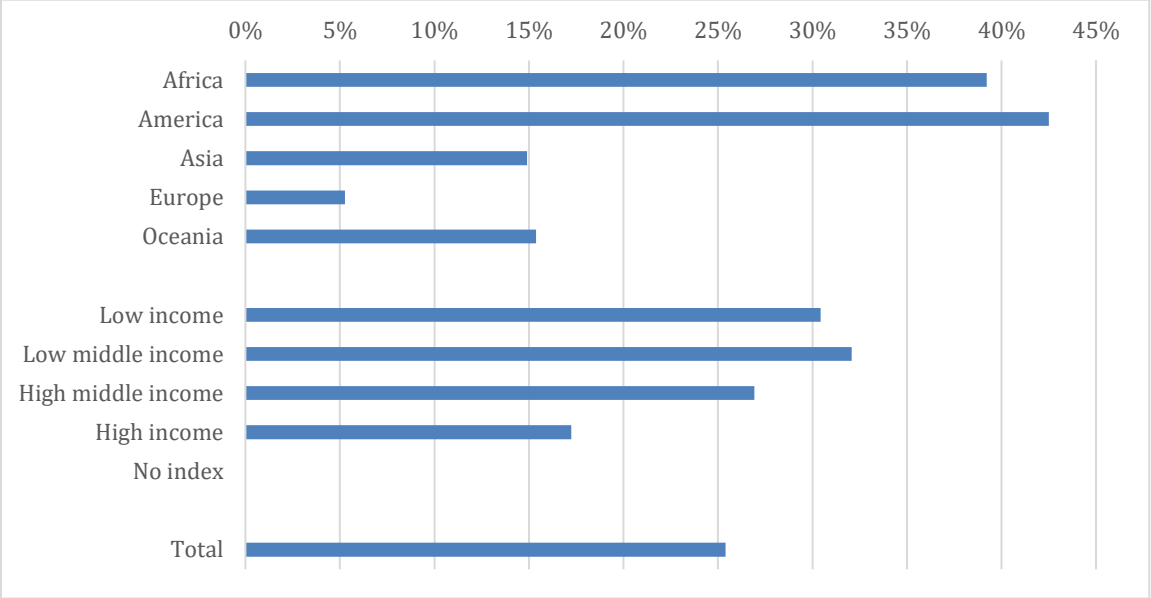


Figure 4 Bar graph for percentage of countries with reducing poverty type, by continent and income class

Source: *WageIndicator Minimum Wage Database MWDB, December 2023, country aggregated data, countries without SMW excluded,*
Africa N=51, Americas N=40, Asia N=47, Europe N=38, Oceania N=13, Total N=189
Low income N=23, Lower middle-income N=53, Upper middle-income N=52, High-income N=58, No index N=3, Total N=189

Ensuring productivity

Companies and authorities alike may fear that minimum wages will harm the competitiveness of companies. In the descriptions of the minimum wages, three groups have been identified as efforts to avoid this fear, namely rates for young workers, for EPZ areas and for small firms.

Descriptions of minimum wages have been defined as age-based when they refer to the age of a worker. Most common are breaks under and over 17 or 18 years of age. Kosovo, however, specifies a break for employees under the age of 35. The Netherlands stands out because that country's minimum wage setting distinguishes minimum wages for workers aged respectively 15, 16, 17, 18, 19, 20 years of age, and an adult rate for workers aged 21 years and older. No other country has youth rates laid down in such detail. In 15 countries MWDB holds in total 104 records with age-related rates (7.9% of countries and 0.3% of rates).

Minimum wage descriptions may refer to Export Processing Zones (EPZs) or similar facilities in terms such as *EPZ*, *Free Trade Zone (FTZ)*, *Special Economic Zone (SEZ)*, *Maquiladoras*, *Toll Tax Barriers* or *Freight transport in free zones*. MWDB has 77 rates for EPZ-type facilities in six countries (3.1% of countries and 0.4% of rates). Four countries in the Americas have one or more EPZ rates, namely Guatemala, Haiti, Mexico, and Panama. Outside the Americas, India and Mauritius both have few EPZ rates.

Minimum wage descriptions refer to firm size if they indicate numbers of employees, e.g. *Oil Mills (for less than 10 employees),* a size category, e.g. *Small companies*, or a company's turnover, e.g. *Employers with annual gross volume of sales of USD 500,000 or more*. In India the *Mini-Cement Plant Establishment industry* is classified under small firm size and in Panama a *Hotel with more than 200 rooms* under a large company. In the USA firms can have different rates depending on either the number of employees or their gross annual sales. The most common distinctions in the USA are those between firms with less than 10 employees, 11-50 employees, and over 50 employees. MWDB includes 273 firm size-based minimum wage rates from 14 countries (7.4% of countries and 1.2% of rates).

Countries are classified as applying the ensuring productivity type if they score on any of the three groups mentioned above. This is the case in 30 countries with in total 454 rates (15.8% of countries (Figure 5) and 2.0% of rates). The Americas and Africa stand out for differentiating minimum wage rates according to firm sizes, the Americas for having EPZ rates as well, and Europe for having youth rates.

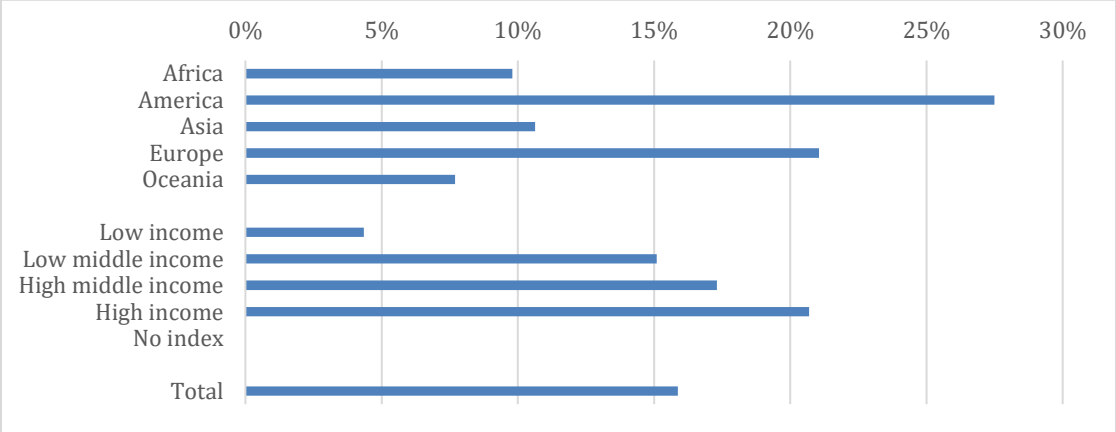


Figure 5 Bar graph for percentage of countries with ensuring productivity type, by continent and income class

Source: *WageIndicator Minimum Wage Database MWDB, December 2023, country aggregated data, countries without SMW excluded,*
Africa N=51, Americas N=40, Asia N=47, Europe N=38, Oceania N=13, Total N=189
Low income N=23, Lower middle-income N=53, Upper middle-income N=52, High-income N=58, No index N=3, Total N=189

Regional cost-of-living adjustments

ILO Convention No. 131 demands that countries adjust their minimum wages in line with the cost of living. This section analyses regional cost-of-living adjustments, while section 5 analyses a country's updating frequencies as to explore whether the MW rates keep up with national CPI increases.

Minimum wages in MWDB are classified as region-based when their descriptions refer to a geographical area. MWDB contains 15,549 region-based minimum wage rates in 24 countries (12.6% of countries with SMW (Figure 6) and 69.8% of rates). Eleven of the 15 most populous countries worldwide specify their minimum wage rates in greater detail for states or provinces: Bangladesh, Brazil, China, India, Indonesia, Japan, Pakistan, Philippines, Russia, Vietnam, and USA. Four of these countries - China, Indonesia, Russia and USA - have additional city- or region-based rates, while India breaks down some rates into zones within states. Even when countries have regional minimum wage rates, they still can have one country-wide *Federal Minimum Wage*, like USA and Russia do. If countries apply a regional breakdown, its application is almost universal.

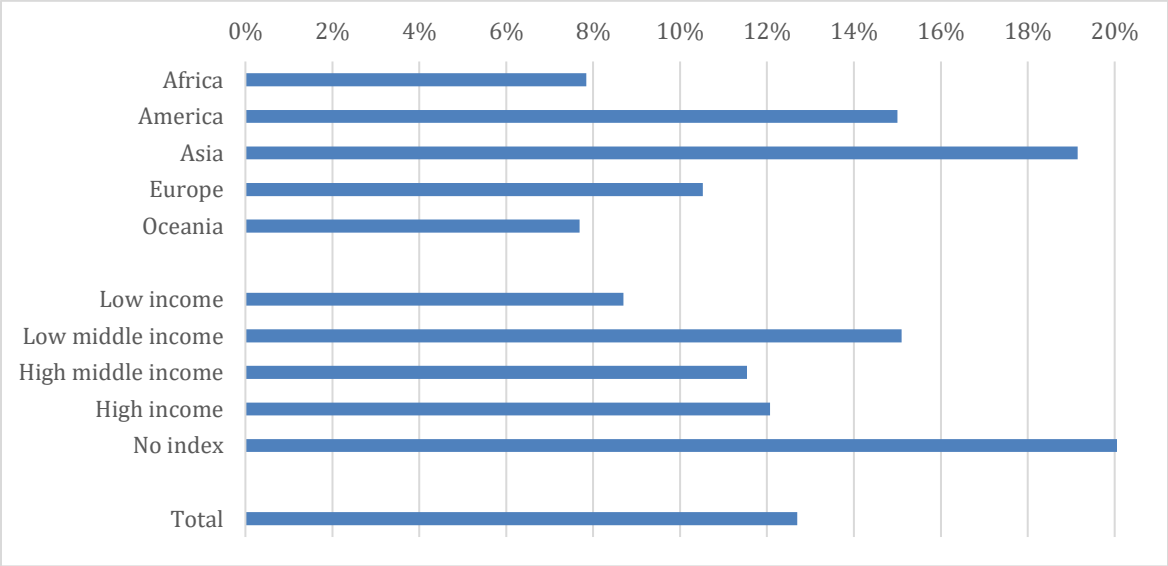


Figure 6 Bar graph for percentages of countries with regional cost-of-living adjustments, by continent and income class

Source: *WageIndicator Minimum Wage Database MWDB, December 2023, country aggregated data, countries without SMW excluded,*
Africa N=51, Americas N=40, Asia N=47, Europe N=38, Oceania N=13, Total N=189
Low income N=23, Lower middle-income N=53, Upper middle-income N=52, High-income N=58, No index N=3, Total N=189

Mimicking collective bargaining

Collective bargaining on wages and working conditions is typically concluded by employers or their organisations and labour unions representing workers in the occupations or industries to be covered by Collective Labour Agreements. The descriptions of the minimum wages in MWDB reveal that in quite some countries minimum wage setting is referring to occupations or industries, hence mimicking the collective bargaining type, though under existing legal rule.

Minimum wages specified by occupation or a job title are rather common, namely by 14,091 rates in 53 countries. These countries vary largely regarding the share of occupations in all

rates. The Philippines and the USA specify only a few rates according to occupation, whereas 13 countries, among which Ecuador and Zambia, specify job titles in all rates.

Minimum wages specified by industry are even more common. MWDB contains 18,981 industry-based minimum wage rates in 59 countries. The phrasing ranges from very broad activities, such as *Agriculture, fishery, food manufacturing* or *Service sector* to very narrow definitions such as *Banana plantations and other tropical fruit crops* or *Cinema (Distribution Side)*. In 39 of 59 countries the share of industry-based rates is 80 per cent or more, pointing to the importance of the industry divide in minimum-wage setting machineries. Half of all industry-based minimum wage rates belong to the group Manufacturing, followed by Agriculture, forestry and fishing; Wholesale and retail trade, and Transportation and storage.

The mimicking collective bargaining type is applied in 76 countries with in total 20,767 rates (40.2% of countries with SMW (Figure 7) and 93,2% of rates). The Americas stand out for differentiating minimum wage rates according to the mimicking collective bargaining type, whereas Europe does least so. Low-income countries most frequently mimic their minimum wage setting while the high-income countries do least so.

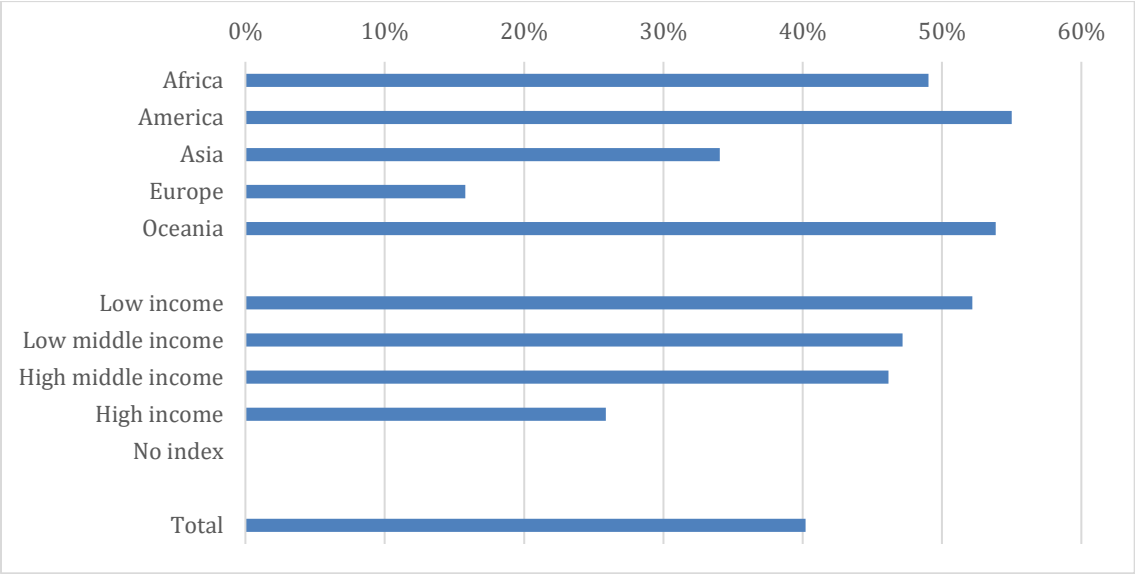


Figure 7 Bar graph for percentages of countries with mimicking bargaining type, by continent and income class

Source: *WageIndicator Minimum Wage Database MWDB, December 2023, country aggregated data, countries without SMW excluded,*
Africa N=51, Americas N=40, Asia N=47, Europe N=38, Oceania N=13, Total N=189
Low income N=23, Lower middle-income N=53, Upper middle-income N=52, High-income N=58, No index N=3, Total N=189

The five types

Worldwide the policy of a minimum wage with full coverage for the entire labour force in wage employment is by far the most common type, present in 147 countries, followed by the mimicking collective bargaining type in 76 countries with an overlap in 36 countries. The reducing poverty type is observed in 48 countries, the ensuring productivity type in 30 countries, and the regional differentiation in 24 countries. The five types overlap considerably. When exploring their bi-variate relationships, three patterns emerge. First, countries' full coverage types are negatively associated with the reducing poverty and mimicking bargaining types (r=-.33 respectively r=-.59). Second, the reducing poverty types are strongly positively associated with the mimicking bargaining types (r=.66). Third, regional

differentiation is not related to the full coverage type and hardly to the mimicking bargaining types (r=.06 respectively r=.14).

These bi-variate findings are confirmed in a multi-variate analysis of the types in relation to the other types, controlled for continent and country's income class (see Annex). Again, these findings show that the full coverage and the mimicking types are opposed minimum wage models while the poverty type is associated with the mimicking type:

- when countries apply a full coverage type, the odds ratio for applying the mimicking type decreases with a factor four;
- when countries apply an ensuring productivity type, the odds ratio for applying the poverty type increases 1.3 times;
- when countries apply a poverty type, the odds ratios for applying the full coverage type increase slightly, for applying a regional cost-of-living type increase with a factor three and for applying the mimicking type with a factor five;
- when countries apply the regional cost-of-living type, the odds ratio for applying the poverty type increases with a factor two;
- when countries apply the mimicking type, the odds ratio for applying full coverage decreases with a factor five, whereas the odds ratio for applying the poverty type increases with a factor five.

Additionally, we explored the relationship between the types and the ratification of ILO Conventions No.'s 26, 99, and 131 about Minimum Wages:

- ratification of Convention No. 26 increases the odds ratio 1.6 times for applying the poverty type, decreases the odds ratio .8 times for applying the mimicking type, and does not affect the incidence of the other three types;
- ratification of Convention No. 99 increases the odds ratio 1.2 times for applying the poverty type, but does not affect the incidence of the other three types;
- ratification of Convention No. 131 increases the odds ratio 1.05 times for applying the poverty type, but does not affect the incidence of the other types.

Finally, we explored whether the mimicking type relates to the share of the labour force covered by Collective Labour Agreements, as provided by ILOSTAT for 99 countries (for the most recent data available: minimal 1% in Ethiopia, maximal 98% in Austria and France):

- bargaining coverage appears to be negatively related to the mimicking bargaining type (r=-0.18).

In conclusion, it is likely that low coverage by collective agreements is compensated by a mimicking bargaining model.

5. Minimum wage levels, updates and trends

Our second research objective is to explore the minimum wage levels and their updates, and to analyse whether these updates reflect inflationary trends and whether the types contribute to the understanding of the levels over time. In this section we depart from one rate per country. This rate is considered the reference rate for the 114 countries with a Federal/National Minimum wage. We calculated for the 18 countries with a minimum wage per region, the median of these regional minimum wages. For the remaining 57 countries the median of their rates was calculated, thereby excluding the sub-minimum rates. For the reference rates we calculated the number of updates from 2015 to 2023. We did not include the year 2014 due to missing values. We calculated the PPP adjusted rates for 2015 and 2022, resulting in data for 171 countries with valid rates available in both years. Here 2023 could not be included as the PPP data was not yet available.

Minimum wage levels

Minimum wage levels vary largely across countries. In 2022 the lowest minimum reference wage is not even 0.02 USD per hour in Burundi, whereas the highest rate is more than 19 USD in Switzerland (Mean=4.29, SD=4.07). Figure 8 shows that in 2022 the level is between 0-2 USD in four out of five African countries, compared to less than one out of ten in the Americas and Europe. In all 18 low-income countries the minimum rate is between 0-2 USD, whereas this is only the case for two of the 51 high-income countries.

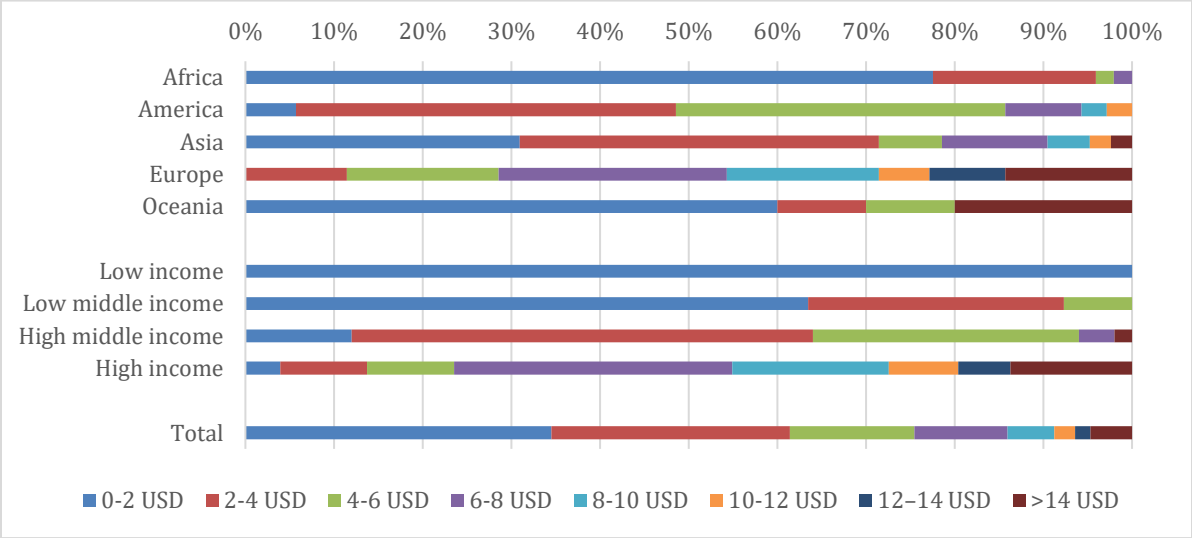


Figure 8 Stacked bar graph of PPP adjusted USD hourly reference minimum rates in 2022, by continent and income class

Source: *Country aggregated data of the WageIndicator Minimum Wage Database MWDB, December 2022, by PPP adjusted hourly federal/national minimum rates, median rates of regional defined rates and median rates for countries without such rates in 2022*
Africa N=49, Americas N=35, Asia N=42, Europe N=35, Oceania N=10, Total N=171
Low income N=18, Lower middle-income N=52, Upper middle-income N=50, High-income N=51, Total N=171

In countries that apply the ensuring productivity type the 2022 PPP adjusted reference minimum wage levels are 1.4 USD higher rates compared to countries that do not apply this type. The other types do not significantly affect minimum wage levels. The rates in Europe are 3.1 USD and in Oceania 2.1 USD higher than in other continents, and they are 1.9 USD higher in high-mid income countries and even 5.9 USD in high-income countries. We used

an OLS model to regress the country-level reference rates, with valid data for 171 countries (see Annex).

ILOSTAT employment figures allow calculating the worldwide average minimum wage rate. Data about the working-age population by sex is available for 156 countries for 2022, and if missing for 2021 or 2020. Using the PPP adjusted reference minimum wages for 2022, we calculated a worldwide average minimum wage of 3.74 USD. Strikingly, even for minimum wages a gender pay gap exists. For women the worldwide average is 3.43 USD and for men 3.90 USD, resulting in a gender minimum wage pay gap of 12 per cent. In conclusion, in countries with relatively low minimum wages the female labour force is relatively larger than in countries with higher minimum wages.

Minimum wage updating policies 2015-2023

For the nine-year period from January 2015 to December 2023 we know the updating frequency for 168 countries with valid rates in the entire period. On average these countries updated their minimum wages 3.8 times, thus every 2.4 years. This reveals a higher updating frequency than the 3.1 years average concluded by ILO based on an analysis of 85 countries during the period 2010-2019 (ILO 2020, 113). This difference might be due to country selection, to different periods covered, or to the fact that ILO registers only one rate per year whereas MWDB does so per month, thus capturing multiple updates within a year. According to MWDB, countries with multiple rates update their rates mostly at the same point in time, e.g. Indonesia on every 1st of January. For the 37 countries with multiple rates and different updating dates across rates we used the mean updating frequency.

Argentina ranks highest with 19 updates between 2015 and 2023, thus approximately each half year, while at the other extreme 39 countries did not update at all. Figure 9 shows that 59 countries updated between one and four times and 58 updated between five and eight times in this nine-year period. Only 12 countries updated on average at least every year.

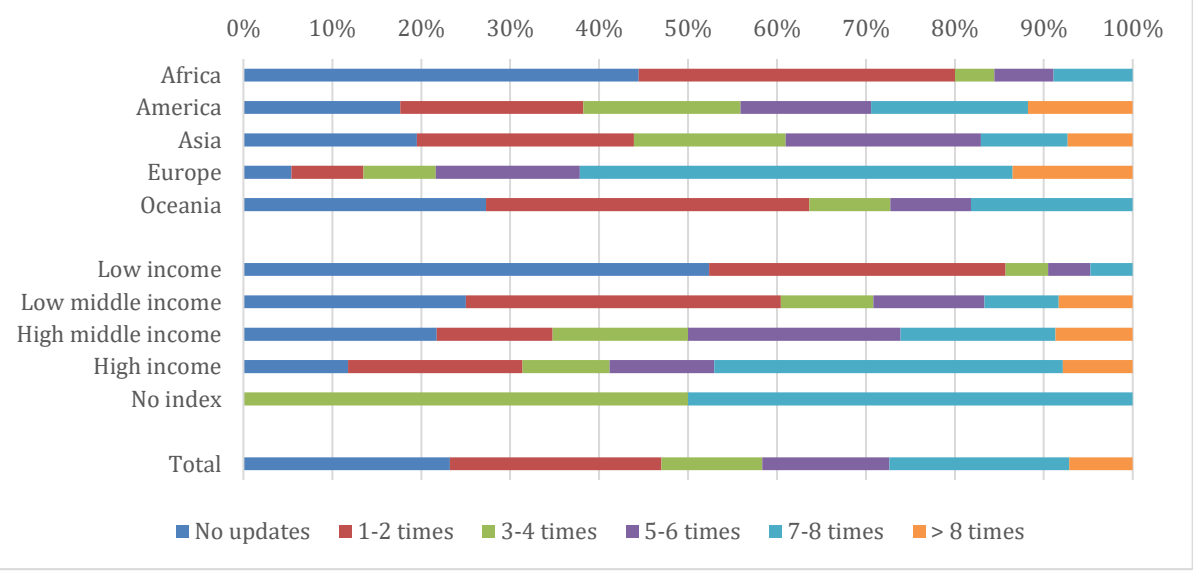


Figure 9 Stacked bar graph of updating frequencies between Jan-2015 and Dec-2023, by continent and income class

Source: *Country aggregated data of the WageIndicator Minimum Wage Database MWDB, December 2023, mean updating frequencies in case of countries with multiple minimum wages with different updating dates for countries with valid rates on January 2014*
Africa N=45, Americas N=34, Asia N=41, Europe N=37, Oceania N=11, Total N=168
Low income N=21, Lower middle- by continent and income class income N=48, Upper middle-income N=46, High-income N=51, No Index N=2, Total N=168

We created a discrete variable for countries updating at least six times between 2015-2023 and those updating less frequently, and then performed a logistic regression for the 166 countries with valid data over the entire period (excluding the two countries with no index). Three types significantly relate to countries' updating frequencies. The odds ratios for updating frequently increase 1.3 times for countries applying full coverage, 1.5 times for countries applying the productivity type, 1.03 times for countries applying the regional cost-of-living type, and 2.4 for high-income countries. This supports ILO's conclusion that "high-income countries adjust their minimum wages more frequently than countries in lower income groups" (ILO 2020, 113). However, when controlled for continent, a country's income level is no longer significant, as the odds ratios significantly increase 1.4 times for American and 3.1 for European countries. Ratification of ILO Convention No. 131 on the need for updating does not affect the model significantly (see Annex).

Minimum wage increases 2015-2022

Does updating result in increases in PPP adjusted minimum wages? Therefore, we compared the PPP reference rates expressed of January 2015 with those of December 2022: unavoidable as last year as 2022 was the latest year with PPP indexes available. Figure 10 shows that for 15 per cent of the countries no increase was observed during the eight years at stake. In this period of time, in 75 per cent of countries the minimum wages increased between zero to one time and 10 per cent saw a doubling or more of the minimum wages. Whereas all countries in the Americas, Europe and Oceania noticed an increase in minimum wages, only six in ten African countries did so. Most striking finding is that half of low-income and a quarter of low-middle income countries did not have any increase in minimum wages.

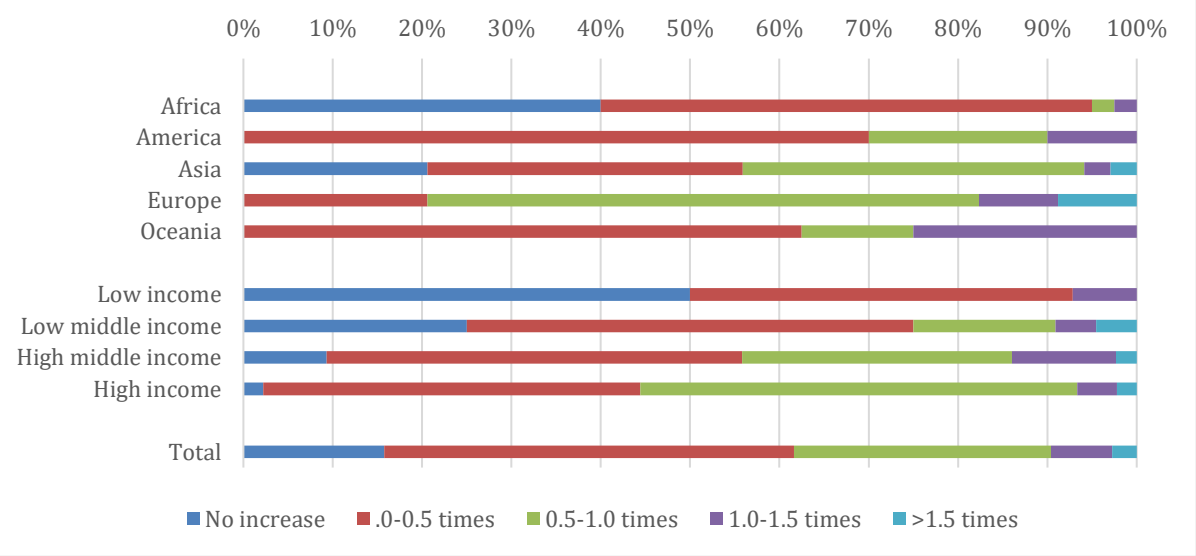


Figure 10 Stacked bar graph of increases of the reference minimum wages in PPP adjusted USD between 2015 and 2022, by continent and income class

Source: *Country aggregated data of the WageIndicator Minimum Wage Database MWDB, December 2023, mean updating frequencies in case of countries with multiple minimum wages with different updating dates for countries with valid rates on January 2014*
Africa N=40, Americas N=30, Asia N=34, Europe N=34, Oceania N=8, Total N=146
Low income N=14, Lower middle-income N=44, Upper middle-income N=43, High-income N=45, Total N=146

We created a discrete variable for countries with no increase or a minor increase up to 0.5 versus and those with a positive increase higher than 0.5 and then perform logistic regressions (see Annex). In countries that apply a productivity type, the odds ratio for an increase in PPP adjusted minimum wage decreases with 1.2 times. Neither the other types,

nor the ratification of ILO Convention No. 131 are significantly related to the increases we found. The odds ratios increase in all continents except Africa. Not surprisingly, minimum wage increases show up as strongly related to updating frequencies. For each update (of the maximal 19 updates) the odds ratio increases with 0.12 USD.

Keeping up with inflation 2015-2022

Wage adjustments in nominal terms do not imply wage increases in real terms when the increases have not kept up with inflation. In this section we explore to what extent minimum wages are lagging behind inflation by calculating what the reference minimum wage in LCU in December 2022 should have been if the January 2015 LCU rate would have been updated with annual inflation in the country at stake, using data of the inflation rate for average consumer prices. We removed four countries with data outliers for inflation, namely Afghanistan, Lebanon, Sudan, and Uganda, leaving 146 countries for the analysis. Figure 11 reveals a worrying picture. In just nine countries the minimum wages increased faster than inflation in this eight-year period, namely in Azerbaijan, Bangladesh, Dem. Rep. of Congo, Lithuania, Mexico, Montenegro, Romania, Ukraine, and Uzbekistan. In 15 countries minimum wage increases did not keep up with inflation, albeit with less than 0.5 percentage points difference. In 61 countries the negative gap between inflation and minimum wage increase was between 0.5 and one percentage point, and in 46 countries the gap was between one and 1.5 percentage points. Finally, in 15 countries (10%) the gap was larger than 1.5 percentage points. For example, in Surinam in these eight years the minimum wage measured in LCU increased with 3.66 per cent while inflation rose with 7.40 per cent, resulting in a minimum wage versus inflation difference of -3.74. Figure 11 reveals that between 2015 and 2022 particularly in Africa and in low-income countries minimum wages lagged behind inflation.

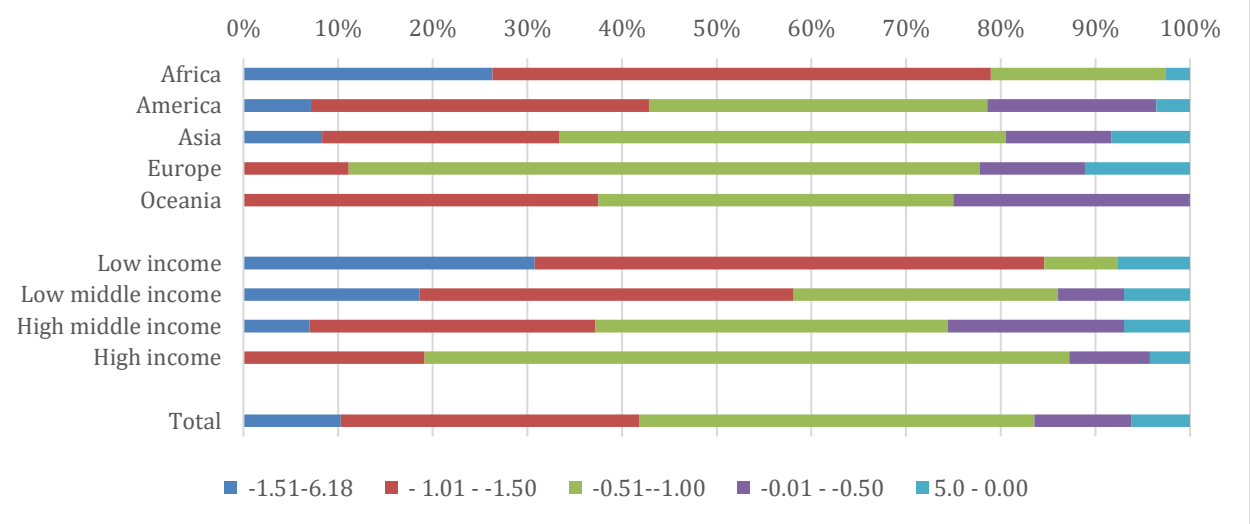


Figure 11 Stacked bar graph of the gap between the increase of the reference minimum wage in LCU and the inflation 2015-2022, by continent and income class

Source: *Country aggregated data of the WageIndicator Minimum Wage Database MWDB, December 2023, countries with missing or unreliable inflation data were excluded, namely Afghanistan, Lebanon, Sudan, Uganda*
Africa N=38, Americas N=28, Asia N=36, Europe N=36, Oceania N=8, Total N=146
Low income N=13, Lower middle-income N=43, Upper middle-income N=43, High-income N=47, Total N=146

We created a discrete variable for countries indicating that their minimum wages kept up with inflation, defined as wages lagging at most one percentage point behind inflation, versus countries where minimum wages lagged behind more than one percentage point. We performed a logistic regression for the 146 countries with valid data. The odds ratio of

keeping up with inflation increases by 2.2 times for countries with full coverage, whereas the other types do not contribute significantly. In all continents except Africa, the odds ratio for keeping up with inflation increases for the Americas with 4.3, for Asia with 3.7, for Europe with 4.4 and for Oceania also with 4.4 times. For high-income countries the odds ratio decreases with 3.8 times. Some countries follow a strategy of regularly updating the minimum wage rates in line with inflation, but overall the updating frequency does not have a sufficient impact to keep minimum wages up with inflation.

6. Conclusions

Minimum wages are typically associated with a single National Minimum Wage covering the entire dependent labour force, but our study shows that this is the case in only 81 of the 189 countries with Statutory Minimum Wage (SMW). Another 66 countries have full coverage with multiple rates, either by specifying minimum wage rates for states or provinces covering the entire country or by extending the national rate for specific groups, such as youth. Another 40 countries do not have full coverage and specify minimum wage rates for industries or job titles, and three countries specify rates for low-paid workers, while 18 countries have no Statutory Minimum Wage. Almost 100 countries specify one rate, 84 countries specify between two and 100 different rates, while 12 countries specify more than 100 different categories of workers, of which India stands out with more than 14,000 rates.

These findings are derived from the Minimum Wage Database (MWDB), maintained by WageIndicator Foundation and covering 207 countries with more than 22,000 rates for each month from 2014 onwards. This fine-grained database provides greater insight into the minimum wage fixing machinery than the mostly used one-rate-per-country-per-year databases or the databases based on inventories of countries' regulations.

The descriptions for each minimum wage rate allowed to classify countries' types in five: notably countries aiming to set a minimum wage for the entire labour force (full coverage); to reduce poverty for the poorest paid workers; to ensure productivity by avoiding to harm competitiveness of companies; to allow regional cost-of-living adjustments, and to mimic collective bargaining. The full coverage type is most frequently observed, followed by the mimicking collective bargaining type, while the other three types are observed in a smaller number of countries. The five types overlap to some extent, showing that the reducing poverty type is positively related to the mimicking bargaining type, while the full coverage type does not go along with the reducing poverty and mimicking bargaining types. Low coverage of collective agreements in a country is compensated by a mimicking bargaining type. Ratification of the three ILO Conventions about minimum wages relates positively to the reducing poverty type, whereas the ratification of Convention No. 26 relates negatively to the mimicking collective bargaining.

Minimum wage levels reveal huge inequalities across countries, from 0.02 USD per hour in Burundi to 19 USD in Switzerland in 2022, applying PPP adjusted wages. In four out of five African countries the wages are between 0-2 USD compared to less than one out of ten countries in the Americas and Europe. ILOSTAT employment figures allow to calculate the worldwide average minimum wage rate of 3.74 USD (157 countries with valid data) in 2022. The average for the worldwide female labour force is 3.43 USD and for the male labour force 3.90 USD, resulting in a gender minimum wage pay gap of 12 per cent. Thus, in countries with relatively low minimum wages the female labour force is relatively larger than in countries with higher minimum wages. In nine years' time (2015-2023) countries updated their minimum wages on average 3.8 times with 39 countries not updating at all while only 12 countries updated on average at least every year. Countries applying the full coverage, productivity and the regional cost-of-living adjustments types update more frequently, and so do high-income countries. By comparing the PPP adjusted minimum wages between 2015 and 2022, 75 per cent of the countries the applicable minimum wages increased between 0 to 1 times while 10 per cent saw a doubling or more of the minimum wages. Whereas all countries in America, Europe and Oceania noticed an increase in minimum wages, only six in ten African countries did so. Most striking finding is that half of low-income and a quarter of low-mid income countries did not show any increase in minimum wages.

Of course, wage adjustments in nominal terms do not imply wage increases in real terms if increases have not kept up with inflation. Only in nine countries the minimum wages increased faster than inflation in this eight-year period, namely Azerbaijan, Bangladesh, Dem. Rep. of Congo, Lithuania, Mexico, Montenegro, Romania, Ukraine, and Uzbekistan. In

15 countries minimum wage increases did not keep up with inflation, but with less than 0.5 percentage points difference. In 61 countries the negative gap between inflation and minimum wage increases was between 0.5 and 1 percentage points, and in 46 countries the negative gap was between 1 and 1.5 percentage points. Finally, in 15 countries (10%) that gap was larger than 1.5 percentage points. Thus, from a global perspective the vast majority of workers paid on (or close to) minimum wages have lost purchasing power in the last eight years. Particularly in Africa and in the low-income countries minimum wages lagged behind inflation. Countries applying the full coverage type are least lagging behind.

Limitations of the study

The cross-country comparison of minimum wage rates is hampered by the fact that for 30 countries MWDB only contains gross rates that cannot be converted into net minimum wages, whereas the remaining countries all have net wages. Particularly for 2014, MWDB has missing data for 25 countries, thus restricting the analysis of trends over 2014-2022. Due to the lack of PPP indexes for 2023, the calculations on keeping up with inflation had to be limited to 2014-2022.

Further research

MWDB is updated monthly and scheduled to be continued for the years to come. It allows for research by using solely MWDB data like in this article or by combining MWDB data with either country-level data or micro-data.

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Data availability

The data underlying this article will be shared on reasonable request to WageIndicator.org.

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